



# CERTIFICATE OF ACCREDITATION

**The ANSI National Accreditation Board**

Hereby attests that

**Cal-Tek Company, Inc.**  
**20 Republic Road**  
**N. Billerica, MA 01862**

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](http://www.anab.org).

A handwritten signature in black ink, appearing to read 'R. Douglas Leonard Jr.', is positioned above a horizontal line.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 22 May 2024  
Certificate Number: AC-1328



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)

### Cal-Tek Company, Inc.

20 Republic Road  
N. Billerica, MA 01862  
Tim Cooke 800-447-4020  
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### CALIBRATION

Valid to: **May 22, 2024**

Certificate Number: **AC-1328**

#### Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
DC Voltage – Source <sup>1</sup>	Up to 220 mV 220 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V 220 V to 1.1 kV	8.6 $\mu$ V/V + 0.4 $\mu$ V 3.9 $\mu$ V/V + 0.7 $\mu$ V 2.7 $\mu$ V/V + 2.5 $\mu$ V 2.9 $\mu$ V/V + 4 $\mu$ V 3.8 $\mu$ V/V + 40 $\mu$ V 4.8 $\mu$ V/V + 0.4 mV	Fluke 5730A Multiproduct Calibrator
DC Voltage – Measure <sup>1</sup>	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V 100 V to 1 kV	15 $\mu$ V/V + 0.3 $\mu$ V 8.4 $\mu$ V/V + 0.3 $\mu$ V 4.2 $\mu$ V/V + 0.5 $\mu$ V 6.4 $\mu$ V/V + 30 $\mu$ V 20 $\mu$ V/V + 0.1 mV	HP 3458A 8.5 Digit Multimeter
DC Voltage – Measure <sup>1</sup>	(1.02 to 120) kV	1.1 mV/V	Ross VD120-6.2Y-A Voltage Divider, HP 34401A 6.5 Digit Multimeter
DC Current – Source <sup>1</sup>	Up to 220 $\mu$ A 220 $\mu$ A to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A	38 $\mu$ A/A + 6 nA 35 $\mu$ A/A + 7 nA 32 $\mu$ A/A + 40 nA 41 $\mu$ A/A + 0.7 $\mu$ A 66 $\mu$ A/A + 12 $\mu$ A	Fluke 5730A Multiproduct Calibrator
DC Current – Source <sup>1</sup>	(2.2 to 3) A (3 to 11) A (11 to 20.5) A	0.8 mA/A + 40 $\mu$ A 0.8 mA/A + 0.5 mA 1.8 mA/A + 0.75 mA	Fluke 5520A Multiproduct Calibrator

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
DC Current Clamps – Source <sup>1</sup>	(20 to 150) A (150 to 1 000) A	6.3 mA/A + 160 mA 5.3 mA/A + 540 mA	Fluke 5520A Multiproduct Calibrator, Fluke 5500A/COIL
DC Current – Measure <sup>1</sup>	Up to 100 nA 100 nA to 1 $\mu$ A (1 to 10) $\mu$ A (10 to 100) $\mu$ A 100 $\mu$ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	0.11 mA/A + 40 pA 64 $\mu$ A/A + 40 pA 26 $\mu$ A/A + 0.1 nA 25 $\mu$ A/A + 0.8 nA 27 $\mu$ A/A + 5 nA 23 $\mu$ A/A + 50 nA 40 $\mu$ A/A + 0.5 $\mu$ A 0.13 mA/A + 10 $\mu$ A	HP 3458A 8.5 Digit Multimeter
Resistance – Source <sup>1</sup>	1 $\Omega$ 1.9 $\Omega$ 10 $\Omega$ 19 $\Omega$ 100 $\Omega$ 190 $\Omega$ 1 k $\Omega$ 1.9 k $\Omega$ 10 k $\Omega$ 19 k $\Omega$ 100 k $\Omega$ 190 k $\Omega$ 1 M $\Omega$ 1.9 M $\Omega$ 10 M $\Omega$ 19 M $\Omega$ 100 M $\Omega$	88 $\mu\Omega$ 0.16 m $\Omega$ 0.22 m $\Omega$ 0.41 m $\Omega$ 0.92 m $\Omega$ 1.9 m $\Omega$ 6 m $\Omega$ 12 m $\Omega$ 60 m $\Omega$ 0.11 $\Omega$ 0.79 $\Omega$ 1.6 $\Omega$ 13 $\Omega$ 29 $\Omega$ 0.32 k $\Omega$ 0.85 k $\Omega$ 11 k $\Omega$	Fluke 5730A Multiproduct Calibrator
Resistance – Measure <sup>1</sup>	Up to 10 $\Omega$ (10 to 100) $\Omega$ 100 $\Omega$ to 1 k $\Omega$ (1 to 10) k $\Omega$ (10 to 100) k $\Omega$ 100 k $\Omega$ to 1 M $\Omega$ (1 to 10) M $\Omega$ (10 to 100) M $\Omega$ 100 M $\Omega$ to 1 G $\Omega$	20 $\mu\Omega/\Omega$ + 50 $\mu\Omega$ 19 $\mu\Omega/\Omega$ + 0.5 m $\Omega$ 11 $\mu\Omega/\Omega$ + 0.5 m $\Omega$ 12 $\mu\Omega/\Omega$ + 5 m $\Omega$ 11 $\mu\Omega/\Omega$ + 50 m $\Omega$ 16 $\mu\Omega/\Omega$ + 2 $\Omega$ 96 $\mu\Omega/\Omega$ + 0.1 k $\Omega$ 0.5 m $\Omega/\Omega$ + 1 k $\Omega$ 7 m $\Omega/\Omega$ + 10 k $\Omega$	HP 3458A 8.5 Digit Multimeter

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Voltage – Source <sup>1</sup>	Up to 2.2 mV		Fluke 5730A Multiproduct Calibrator
	(10 to 20) Hz	0.42 mV/V + 4 μV	
	(20 to 40) Hz	0.34 mV/V + 4 μV	
	40 Hz to 20 kHz	0.35 mV/V + 4 μV	
	(20 to 50) kHz	0.47 mV/V + 4 μV	
	(50 to 100) kHz	0.76 mV/V + 5 μV	
	(100 to 300) kHz	1.5 mV/V + 10 μV	
	(300 to 500) kHz	1.9 mV/V + 20 μV	
	500 kHz to 1MHz	4.5 mV/V + 20 μV	
	(2.2 to 22) mV		
	(10 to 20) Hz	0.25 mV/V + 4 μV	
	(20 to 40) Hz	0.15 mV/V + 4 μV	
	40 Hz to 20 kHz	0.13 mV/V + 4 μV	
	(20 to 50) kHz	0.24 mV/V + 4 μV	
	(50 to 100) kHz	0.58 mV/V + 5 μV	
	(100 to 300) kHz	0.95 mV/V + 10 μV	
	(300 to 500) kHz	1.3 mV/V + 20 μV	
	500 kHz to 1MHz	2.6 mV/V + 20 μV	
	(22 to 220) mV		
	(10 to 20) Hz	0.23 mV/V + 12 μV	
	(20 to 40) Hz	92 μV/V + 7 μV	
	40 Hz to 20 kHz	61 μV/V + 7 μV	
	(20 to 50) kHz	0.12 mV/V + 7 μV	
	(50 to 100) kHz	0.31 mV/V + 17 μV	
	(100 to 300) kHz	0.6 mV/V + 20 μV	
	(300 to 500) kHz	1.3 mV/V + 25 μV	
	500 kHz to 1MHz	2.6 mV/V + 45 μV	
	220 mV to 2.2 V		
(10 to 20) Hz	0.23 mV/V + 40 μV		
(20 to 40) Hz	84 μV/V + 15 μV		
40 Hz to 20 kHz	43 μV/V + 8 μV		
(20 to 50) kHz	66 μV/V + 10 μV		
(50 to 100) kHz	89 μV/V + 30 μV		
(100 to 300) kHz	0.31 mV/V + 80 μV		
(300 to 500) kHz	0.92 mV/V + 0.2 mV		
500 kHz to 1MHz	1.6 mV/V + 0.3 mV		

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Voltage – Source <sup>1</sup>	(2.2 to 22) V (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1MHz (22 to 220) V (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1MHz 220 V to 1 kV (15 to 50) Hz 50 Hz to 1 kHz	0.23 mV/V + 0.4 mV 86 μV/V + 0.15 mV 49 μV/V + 50 μV 87 μV/V + 0.1 mV 95 μV/V + 0.2 mV 0.27 mV/V + 0.6 mV 0.92 mV/V + 2 mV 1.5 mV/V + 3.2 mV 0.23 mV/V + 4 mV 88 μV/V + 1.5 mV 51 μV/V + 0.6 mV 78 μV/V + 1 mV 0.14 mV/V + 2.5 mV 0.82 mV/V + 16 mV 4.3 mV/V + 40 mV 9.3 mV/V + 80 mV 0.27 mV/V + 16 mV 66 μV/V + 3.5 mV	Fluke 5730A Multiproduct Calibrator
AC Voltage – Measure <sup>1</sup>	Up to 10 mV (1 to 40) Hz 40 Hz to 1kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz 100 kHz to 1 MHz (1 to 4) MHz (4 to 8) MHz	1.7 mV/V + 3 μV 1.4 mV/V + 1.1 μV 2.1 mV/V + 1.1 μV 2.8 mV/V + 1.1 μV 13 mV/V + 1.1 μV 15 mV/V + 5 μV 70 mV/V + 7 μV 0.2 V/V + 8 μV	HP 3458A 8.5 Digit Multimeter

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Voltage – Measure <sup>1</sup>	(10 to 100) mV		HP 3458A 8.5 Digit Multimeter
	(1 to 40) Hz	0.32 mV/V + 4 $\mu$ V	
	40 Hz to 1 kHz	0.26 mV/V + 2 $\mu$ V	
	(1 to 20) kHz	0.29 mV/V + 2 $\mu$ V	
	(20 to 50) kHz	0.65 mV/V + 2 $\mu$ V	
	(50 to 100) kHz	1.1 mV/V + 2 $\mu$ V	
	(100 to 300) kHz	3.3 mV/V + 10 $\mu$ V	
	300 kHz to 1 MHz	11 mV/V + 10 $\mu$ V	
	(1 to 2) MHz	16 mV/V + 10 $\mu$ V	
	(2 to 4) MHz	40 mV/V + 70 $\mu$ V	
	(4 to 8) MHz	40 mV/V + 80 $\mu$ V	
	(8 to 10) MHz	0.15 V/V + 0.1 mV	
	100 mV to 1 V		
	(1 to 40) Hz	0.16 mV/V + 40 $\mu$ V	
	40 Hz to 1kHz	0.13 mV/V + 20 $\mu$ V	
	(1 to 20) kHz	0.19 mV/V + 20 $\mu$ V	
	(20 to 50) kHz	0.37 mV/V + 20 $\mu$ V	
	(50 to 100) kHz	0.85 mV/V + 20 $\mu$ V	
	(100 to 300) kHz	3.1 mV/V + 0.1 mV	
	300 kHz to 1 MHz	10 mV/V + 0.1 mV	
	(1 to 2) MHz	17 mV/V + 0.1 mV	
	(2 to 4) MHz	40 mV/V + 0.7 mV	
	(4 to 8) MHz	41 mV/V + 0.8 mV	
	(8 to 10) MHz	0.15 V/V + 1 mV	
	(1 to 10) V		
	(1 to 40) Hz	91 $\mu$ V/V + 0.4 mV	
	40 Hz to 1 kHz	0.14 mV/V + 0.2 mV	
	(1 to 20) kHz	0.28 mV/V + 0.2 mV	
	(20 to 50) kHz	0.35 mV/V + 0.2 mV	
	(50 to 100) kHz	1 mV/V + 0.2 mV	
(100 to 300) kHz	3.1 mV/V + 1 mV		
300 kHz to 1 MHz	10 mV/V + 1 mV		
(1 to 2) MHz	15 mV/V + 1 mV		
(2 to 4) MHz	40 mV/V + 7 mV		
(4 to 8) MHz	41 mV/V + 8 mV		
(8 to 10) MHz	0.15 V/V + 10 mV		

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Voltage – Measure <sup>1</sup>	(10 to 100) V (1 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz 100 V to 1 kV (1 to 10) Hz (10 to 40) Hz 40 Hz to 10 kHz (10 to 30) kHz 30 to 100) kHz	0.29 mV/V + 4 mV 0.23 mV/V + 2 mV 0.39 mV/V + 2 mV 1.2 mV/V + 2 mV 4.1 mV/V + 10 mV 15 mV/V + 10 mV 0.4 mV/V + 40 mV 0.5 mV/V + 20 mV 1 mV/V + 20 mV 1.5 mV/V + 20 mV 3 mV/V + 20 mV	HP 3458A 8.5 Digit Multimeter
AC High Voltage – Measure <sup>1</sup>	(1 to 84.84) kV 60 Hz	11 mV/V	Ross VD120-6.2Y-A Voltage Divider, HP 34401A 6.5 Digit Multimeter
AC Current – Source <sup>1</sup>	Up to 220 μA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz 220 μA to 2.2 mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (2.2 to 22) mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (22 to 220) mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.26 mA/A + 16 nA 0.18 mA/A + 10 nA 0.12 mA/A + 8 nA 0.3 mA/A + 12 nA 1.1 mA/A + 65 nA 0.27 mA/A + 40 nA 0.17 mA/A + 35 nA 0.13 mA/A + 35 nA 0.2 mA/A + 0.11 μA 0.96 mA/A + 0.65 μA 0.26 mA/A + 0.4 μA 0.18 mA/A + 0.35 μA 0.11 mA/A + 0.35 μA 0.21 mA/A + 0.55 μA 1.1 mA/A + 5 μA 0.27 mA/A + 4 μA 0.17 mA/A + 3.5 μA 0.12 mA/A + 2.5 μA 0.21 mA/A + 3.5 μA 0.95 mA/A + 10 μA	Fluke 5730A Multiproduct Calibrator

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Current – Source <sup>1</sup>	220 mA to 2.2 A 20 Hz to 1 kHz (1 to 5) kHz (5 to 10) Hz	0.26 mA/A + 35 µA 0.42 mA/A + 80 µA 6.1 mA/A + 0.16 mA	Fluke 5730A Multiproduct Calibrator
AC Current – Source <sup>1</sup>	(2.2 to 3) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (3 to 11) A (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz (11 to 20.5) A (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	2.8 mA/A + 0.1 mA 1.6 mA/A + 0.1 mA 12 mA/A + 1 mA 36 mA/A + 5 mA 4 mA/A + 2 mA 1.6 mA/A + 2 mA 60 mA/A + 2 mA 2.7 mA/A + 5 mA 2.7 mA/A + 5 mA 45 mA/A + 5 mA	Fluke 5520A Multiproduct Calibrator
AC Current Clamps – Source <sup>1</sup>	(20 to 150) A (45 to 65) Hz (65 to 440) Hz (150 to 1 000) A (45 to 65) Hz (65 to 440) Hz	5.8 mA/A + 260 mA 11 mA/A + 300 mA 5.9 mA/A + 1 A 14 mA/A + 1.3 A	Fluke 5520A Multiproduct Calibrator, Fluke 5500A/COIL
AC Current – Measure <sup>1</sup>	Up to 100 µA (10 to 20) (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz 100 µA to 1 mA (10 to 20) (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	4 mA/A + 30 nA 1.6 mA/A + 30 nA 0.66 mA/A + 30 nA 0.7 mA/A + 30 nA 4.1 mA/A + 0.2 µA 1.5 mA/A + 0.2 µA 0.61 mA/A + 0.2 µA 0.32 mA/A + 0.2 µA 0.65 mA/A + 0.2 µA 4 mA/A + 0.4 µA 5.5 mA/A + 1.5 µA	HP 3458A 8.5 Digit Multimeter



**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Current – Measure <sup>1</sup>	(1 to 10) mA		HP 3458A 8.5 Digit Multimeter
	(10 to 20)	4 mA/A + 2 μA	
	(20 to 45) Hz	1.5 mA/A + 2 μA	
	(45 to 100) Hz	0.61 mA/A + 2 μA	
	100 Hz to 5 kHz	0.31 mA/A + 2 μA	
	(5 to 20) kHz	0.63 mA/A + 2 μA	
	(20 to 50) kHz	4 mA/A + 4 μA	
	(50 to 100) kHz	5.5 mA/A + 15 μA	
	(10 to 100) mA		
	(10 to 20)	4 mA/A + 20 μA	
	(20 to 45) Hz	1.6 mA/A + 20 μA	
	(45 to 100) Hz	0.61 mA/A + 20 μA	
	100 Hz to 5 kHz	0.31 mA/A + 20 μA	
	(5 to 20) kHz	0.63 mA/A + 20 μA	
	(20 to 50) kHz	4 mA/A + 40 μA	
	(50 to 100) kHz	5.5 mA/A + 0.15 mA	
	100 mA to 1 A		
(10 to 20)	4 mA/A + 0.2 mA		
(20 to 45) Hz	1.7 mA/A + 0.2 mA		
(45 to 100) Hz	0.81 mA/A + 0.2 mA		
100 Hz to 5 kHz	1.1 mA/A + 0.2 mA		
(5 to 20) kHz	3.2 mA/A + 0.2 mA		
(20 to 50) kHz	12 mA/A + 0.4 mA		
Electrical Simulation of Thermocouple Indicating Devices – Source/Measure <sup>1</sup>	Type B		Fluke 5520A Multiproduct Calibrator
	(600 to 800) °C	0.48 °C	
	(800 to 1 000) °C	0.39 °C	
	(1 000 to 1 550) °C	0.35 °C	
	(1 550 to 1 820) °C	0.38 °C	
	Type C		
	(0 to 150) °C	0.31 °C	
	(150 to 650) °C	0.27 °C	
	(650 to 1 000) °C	0.32 °C	
	(1 000 to 1 800) °C	0.51 °C	
	(1 800 to 2 316) °C	0.85 °C	
	Type E		
	(-250 to -100) °C	0.55 °C	
(-100 to -25) °C	0.37 °C		
(-25 to 350) °C	0.25 °C		
(350 to 650) °C	0.26 °C		
(650 to 1 000) °C	0.28 °C		

**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 <sup>1</sup>	Type J		Fluke 5520A Multiproduct Calibrator
	(-210 to -100) °C	0.33 °C	
	(-100 to -30) °C	0.25 °C	
	(-30 to 150) °C	0.25 °C	
	(150 to 760) °C	0.27 °C	
	(760 to 1 200) °C	0.3 °C	
	Type K		
	(-200 to -100) °C	0.44 °C	
	(-100 to -25) °C	0.26 °C	
	(-25 to 120) °C	0.25 °C	
	(120 to 1 000) °C	0.32 °C	
	(1 000 to 1 372) °C	0.44 °C	
	Type L		
	(-200 to -100) °C	0.37 °C	
	(-100 to 800) °C	0.26 °C	
	(800 to 900) °C	0.18 °C	
	Type N		
	(-200 to -100) °C	0.53 °C	
	(-100 to -25) °C	0.29 °C	
	(-25 to 120) °C	0.27 °C	
	(120 to 410) °C	0.31 °C	
	(410 to 1 300) °C	0.35 °C	
	Type R		
	(0 to 250) °C	0.62 °C	
(250 to 400) °C	0.43 °C		
(400 to 1 000) °C	0.43 °C		
(1 000 to 1 767) °C	0.52 °C		
Type S			
(0 to 250) °C	0.51 °C		
(250 to 1 000) °C	0.41 °C		
(1 000 to 1 400) °C	0.42 °C		
(1 400 to 1 767) °C	0.5 °C		
Type T			
(-250 to -150) °C	0.71 °C		
(-150 to 0) °C	0.31 °C		
(0 to 120) °C	0.25 °C		
(120 to 400) °C	0.28 °C		
Type U			
(-200 to 0) °C	0.56 °C		
(0 to 600) °C	0.27 °C		

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Electrical Simulation of RTD Indicating Devices <sup>1</sup>	Pt 385, 100 Ω		Fluke 5520A Multiproduct Calibrator
	(-200 to 0) °C	0.051 °C	
	(0 to 100) °C	0.071 °C	
	(100 to 300) °C	0.091 °C	
	(300 to 400) °C	0.1 °C	
	(400 to 630) °C	0.13 °C	
	(630 to 800) °C	0.23 °C	
	Pt 3926, 100 Ω		
	(-200 to 0) °C	0.051 °C	
	(0 to 100) °C	0.071 °C	
	(100 to 300) °C	0.091 °C	
	(300 to 400) °C	0.1 °C	
	(400 to 630) °C	0.12 °C	
	Pt 3916, 100 Ω		
	(-200 to -190) °C	0.25 °C	
	(-190 to -80) °C	0.04 °C	
	(-80 to 0) °C	0.05 °C	
	(0 to 100) °C	0.06 °C	
	(100 to 260) °C	0.07 °C	
	(260 to 300) °C	0.08 °C	
	(300 to 400) °C	0.09 °C	
	(400 to 600) °C	0.11 °C	
	(600 to 630) °C	0.23 °C	
	Pt 385, 200 Ω		
	(-200 to 100) °C	0.04 °C	
	(100 to 260) °C	0.05 °C	
	(260 to 300) °C	0.13 °C	
	(300 to 400) °C	0.14 °C	
	(400 to 600) °C	0.14 °C	
	(600 to 630) °C	0.16 °C	
Pt 385, 500 Ω			
(-200 to -80) °C	0.04 °C		
(-80 to 100) °C	0.05 °C		
(100 to 260) °C	0.06 °C		
(260 to 400) °C	0.08 °C		
(400 to 600) °C	0.09 °C		
(600 to 630) °C	0.12 °C		

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Electrical Simulation of RTD Indicating Devices <sup>1</sup>	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 PtNi 385, 120 Ω (Ni 120) (-80 to 100) °C (100 to 260) °C Cu 427, 10 Ω (-100 to 260) °C	0.04 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.02 °C 0.08 °C 0.14 °C 0.31 °C	Fluke 5520A Multiproduct Calibrator
Oscilloscopes <sup>1</sup> AC Voltage Square wave, 50 Ω Fast Edge, 1 MΩ  Leveled Sine Wave (relative to 50 kHz) < 310 ps rise time, 50 Ω  Time Markers Sinewave  Sine/Square-wave  Spike/Square-wave  Spike Square or 20% Pulse  Spike, Square-wave	1 mV pp to 6.6 V pp 1 mV pp to 130 V pp  5 mV pp to 2.5 V pp 50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz 600 MHz to 1.1 GHz  2 ns 5 ns  10 ns  20 ns 50 ns  100 ns to 20 ms  50 ms to 5 s	2.6 mV/V + 40 μV 1 mV/V + 40 μV  23 mV/V + 0.1 mV 30 mV/V + 0.1 mV 50 mV/V + 0.1 mV 57 mV/V + 0.1 mV  2.5 μs/s 2.5 μs/s  2.5 μs/s  2.5 μs/s  2.5 μs/s  1 ms/s +25 μs	Fluke 5520A/SC 1100 Multiproduct Calibrator

**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Capacitance – Source <sup>1</sup>			
10 Hz to 10 kHz	190 pF to 1.1 nF	6 mF/F + 10 pF	Fluke 5520A Multiproduct Calibrator
10 Hz to 3 kHz	(1.1 to 3.3) nF	6.6 mF/F + 10 pF	
10 Hz to 1 kHz	(3.3 to 11) nF	4 mF/F + 10 pF	
10 Hz to 1 kHz	(11 to 110) nF	3 mF/F + 0.1 nF	
10 Hz to 1 kHz	(110 to 330) nF	3 mF/F + 0.3 nF	
(10 to 600) Hz	330 nF to 1.1 μF	4 mF/F + 1 nF	
(10 to 300) Hz	(1.1 to 3.3) μF	3 mF/F + 3 nF	
(10 to 150) Hz	(3.3 to 11) μF	3 mF/F + 10 nF	
(10 to 120) Hz	(11 to 33) μF	6.6 mF/F + 30 nF	
(10 to 80) Hz	(33 to 110) μF	5 mF/F + 0.1 μF	
(0 to 50) Hz	(110 to 330) μF	6.6 mF/F + 0.3 μF	
(0 to 20) Hz	330 μF to 1.1 mF	5 mF/F + 1 μF	
(0 to 6) Hz	(1.1 to 3.3) mF	6.6 mF/F + 3 μF	
(0 to 2) Hz	(3.3 to 11) mF	5 mF/F + 10 μF	
(0 to 0.6) Hz	(11 to 33) mF	10 mF/F + 30 μF	
(0 to 0.2) Hz	(33 to 110) mF	20 mF/F + 0.1 mF	

**Length – Dimensional Metrology**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Micrometers <sup>1</sup>	Up to 1 in (1 to 6) in (6 to 12) in	52 μin 89 μin 160 μin	Starrett - Weber B89 Grade 0 Gage Blocks, Long Block Set
Depth Micrometers <sup>1</sup>	Up to 12 in	160 μin	
Calipers <sup>1</sup>	Up to 6 in (6 to 12) in (12 to 24) in	70 μin 710 μin 750 μin	Starrett - Weber B89 Grade 0 Gage Blocks, Long Block Set
Test Indicators <sup>1</sup>	Up to 0.1 in	120 μin	
Dial Indicators <sup>1</sup>	Up to 2 in	80 μin	
Height Gages <sup>1</sup>	Up to 24 in	720 μin	Starrett Weber B89 Grade 0 Gage Blocks, Surface Plate
Ring Gages <sup>2,3</sup>	(0.25 to 1) in (1 to 12) in	(5L + 13) μin	Labmaster, Master Rings

### Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Torque <sup>1</sup>	(10 to 40) lbf·in (40 to 480) lbf·in (40 to 200) lbf·ft	0.023 lbf·in/lbf·in 0.016 lbf·in/lbf·in 0.013 lbf·ft/lbf·ft	AKO TSD 6000 Torque Calibrator
Pressure – Source <sup>1</sup>	(0 to 30) psig (30 to 100) psig (100 to 300) psig (300 to 1 000) psig	0.003 6 psi 0.018 % of reading 0.057 psi 0.018 % of reading	Fluke PPC4 Pressure Calibrator

### Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature – Measure <sup>1</sup>	(-20 to 140) °C	0.081 °C	Burns 18332 PRT, Agilent 3458A 8.5 Digit Multimeter


### Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Source <sup>1</sup>	10 mHz to 1.1 GHz	2.5 μHz/Hz + 5 μHz	Fluke 5520A Multiproduct Calibrator

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 all parameters except as noted, 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. The use of (L) signifies Length in inches.
3. This measurement capability is available in the laboratory only.
4. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1328.



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