



# CERTIFICATE OF ACCREDITATION

## ANSI-ASQ National Accreditation Board

500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

**Continental Testing**  
**104 South Main Street**  
**Union, OH 45322-3358**

has been assessed by ANAB  
and meets the requirements of international standard

**ISO/IEC 17025:2005**

and national standard

**ANSI/NCSL Z540-1-1994 (R2002)**

while demonstrating technical competence in the field of

**CALIBRATION**

Refer to the accompanying Scope of Accreditation for information regarding the types of calibrations to which this accreditation applies.

AC-1647

Certificate Number

  
ANAB Approval

Certificate Valid: 03/18/2018-03/29/2020  
Version No. 004 Issued: 03/18/2018



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. 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 17025:2005  
AND ANSI/NCSL Z540-1-1994 (R2002)**

**Continental Testing**

104 South Main Street

Union, OH 45322-3358

DuWain Ake

800-648-5091

Email: dake@continentaltesting.com

Website: www.continentaltesting.com

**CALIBRATION**

Valid to: **March 29, 2020**

Certificate Number: **AC-1647**

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current – Source	Up to 320 $\mu$ A 320 $\mu$ A to 3.2 mA (3.2 to 32) mA (32 to 320) mA 320 mA to 3.2 A (3.2 to 10.5) A (10.5 A to 20) A	140 $\mu$ A/A + 19 nA 140 $\mu$ A/A + 180 nA 140 $\mu$ A/A + 1.8 $\mu$ A 160 $\mu$ A/A + 18 $\mu$ A 600 $\mu$ A/A + 200 $\mu$ A 550 $\mu$ A/A + 1.8 mA 550 $\mu$ A/A + 4.8 mA	Fluke / Wavetek 9100 (w/ Option -200) Universal Calibration System
DC Voltage - Source	Up to 320 mV 320 mV to 3.2 V (3.2 to 30) V (32 to 320) V (320 to 1.05) kV	60 $\mu$ V/V + 16 $\mu$ V 60 $\mu$ V/V + 160 $\mu$ V 65 $\mu$ V/V + 1.6 mV 65 $\mu$ V/V + 16 mV 60 $\mu$ V/V + 160 mV	Fluke / Wavetek 9100 Universal Calibration System
DC Resistance - Source	Up to 40 $\Omega$ (40 to 400) $\Omega$ 400 $\Omega$ to 4 k $\Omega$ (4 to 40) k $\Omega$ (40 to 400) k $\Omega$ 400 k $\Omega$ to 4 M $\Omega$ (4 to 40) M $\Omega$ (40 to 400) M $\Omega$ 400 M $\Omega$ to 2 G $\Omega$	250 $\mu\Omega/\Omega$ + 11 m $\Omega$ 150 $\mu\Omega/\Omega$ + 26 m $\Omega$ 150 $\mu\Omega/\Omega$ + 180 m $\Omega$ 150 $\mu\Omega/\Omega$ + 1.8 $\Omega$ 180 $\mu\Omega/\Omega$ + 18 $\Omega$ 200 $\mu\Omega/\Omega$ + 190 $\Omega$ 500 $\mu\Omega/\Omega$ + 2.6 k $\Omega$ 600 $\mu\Omega/\Omega$ + 43 k $\Omega$ 1 m $\Omega/\Omega$ + 160 k $\Omega$	Fluke / Wavetek 9100 (w/ Option -135) Universal Calibration System



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Conductance - Source	(2.5 to 25) ns (25 to 250) ns 250 ns to 2.5 μs (2.5 to 25) μs (25 to 250) μs 250 ns to 2.5 ms	4 ms/s + 1.6 ps 2 ms/s + 16 ps 1.2 ms/s + 160 ps 500 μs/s + 1.6 ns 500 μs/s + 16 ns 400 μs/s + 160 ns	Fluke / Wavetek 9100 Universal Calibration System
AC Current – Source	Up to 32 μA 10 Hz to 3 kHz (3 to 10) kHz (10 to 20) kHz (20 to 30) kHz (32 to 320) μA 10 Hz to 3 kHz (3 to 10) kHz (10 to 20) kHz (20 to 30) kHz 320 μA to 3.2 mA 10 Hz to 3 kHz (3 to 10) kHz (10 to 20) kHz (20 to 30) kHz (3.2 to 32) mA 10 Hz to 3 kHz (3 to 10) kHz (10 to 20) kHz (20 to 30) kHz (32 to 320) mA 10 Hz to 3 kHz (3 to 10) kHz (10 to 20) kHz (20 to 30) kHz 320 mA to 3.2 A 10 Hz to 3 kHz (3 to 10) kHz (3.2 to 10.5) A 10 Hz to 3 kHz (3 to 10) kHz	700 μA/A + 900 nA 1 mA/A + 1.8 μA 2.0 mA/A + 6 μA 2.5 mA/A + 9 μA 700 μA/A + 300 nA 1 mA/A + 600 nA 2 mA/A + 2 μA 2.5 mA/A + 3 μA 700 μA/A + 340 nA 1.0 mA/A + 620 nA 2 mA/A + 2 μA 2.5 mA/A + 3 μA 700 μA/A + 3.6 μA 1.0 mA/A + 6.6 μA 2.0 mA/A + 13 μA 2.5 mA/A + 23 μA 800 μA/A + 36 μA 1 mA/A + 51 μA 2 mA/A + 66 μA 2.5 mA/A + 98 μA 1 mA/A + 510 μA 2.5 mA/A + 2.6 mA 2 mA/A + 3.4 mA 5 mA/A + 11 mA	Fluke / Wavetek 9100 (w/ Option -200) Universal Calibration System with Current Coil



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source	(10.5 to 20) A		Fluke / Wavetek 9100 (w/ Option -200) Universal Calibration System with Current Coil
	10 Hz to 3 kHz	2 mA/A + 7.1 mA	
	(3 to 10) kHz	5 mA/A + 23 mA	
	(20 to 32) A		
	(10 to 100) Hz	2 mA/A + 5.8 mA	
	(100 to 440) Hz	7.8 mA/A + 27 mA	
	(32 to 200) A		
AC Voltage - Source	(10 to 100) Hz	2.1 mA/A + 92 mA	Fluke / Wavetek 9100 Universal Calibration System
	(100 to 440) kHz	6.7 mA/A + 250 mA	
	(200 to 1 000) A		
	(10 to 100) Hz	2.1 mA/A + 480 mA	
	Up to 10 mV		
	10 Hz to 3 kHz	400 $\mu$ V/V + 390 $\mu$ V	
	(3 to 10) kHz	400 $\mu$ V/V + 520 $\mu$ V	
	(10 to 30) kHz	600 $\mu$ V/V + 960 $\mu$ V	
	(30 to 50) kHz	0.9 mV/V + 2 mV	
	(50 to 100) kHz	2.0 mV/V + 5.2 m	
	(10 to 32) mV		
	10 Hz to 3 kHz	400 $\mu$ V/V + 98 $\mu$ V	
	(3 to 10) kHz	400 $\mu$ V/V + 130 $\mu$ V	
	(10 to 30) kHz	600 $\mu$ V/V + 240 $\mu$ V	
	(30 to 50) kHz	900 $\mu$ V/V + 480 $\mu$ V	
	(50 to 100) kHz	2 mV/V + 1.3 mV	
	(32 to 320) mV		
	10 Hz to 3 kHz	400 $\mu$ V/V + 25 $\mu$ V	
	(3 to 10) kHz	400 $\mu$ V/V + 30 $\mu$ V	
	(10 to 30) kHz	600 $\mu$ V/V + 51 $\mu$ V	
	(30 to 50) kHz	900 $\mu$ V/V + 100 $\mu$ V	
(50 to 100) kHz	2 mV/V + 260 mV		
320 mV to 3.2 V			
10 Hz to 3 kHz	400 $\mu$ V/V + 250 $\mu$ V		
(3 to 10) kHz	400 $\mu$ V/V + 300 $\mu$ V		
(10 to 30) kHz	600 $\mu$ V/V + 510 $\mu$ V		
(30 to 50) kHz	900 $\mu$ V/V + 1 mV		
(50 to 100) kHz	2.0 mV/V + 2.6 mV V		



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Source	(3.2 to 32) V		Fluke / Wavetek 9100 Universal Calibration System
	10 Hz to 3 kHz	400 $\mu$ V/V + 2.5 mV	
	(3 to 10) kHz	600 $\mu$ V/V + 3.0 mV	
	(10 to 30) kHz	800 $\mu$ V/V + 5.1 mV	
	(30 to 50) kHz	1.5 mV/V + 9.8 mV	
	(50 to 100) kHz	3.5 mV/V + 32 mV	
	(32 to 105) V		
	10 Hz to 3 kHz	400 $\mu$ V/V + 17 mV	
	(3 to 10) kHz	600 $\mu$ V/V + 18 mV	
	(10 to 30) kHz	800 $\mu$ V/V + 22 mV	
	(30 to 50) kHz	1.5 mV/V + 35 mV	
	(50 to 100) kHz	3.5 mV/V + 110 mV	
	(105 to 320) V		
	(40 to 100) Hz	500 $\mu$ V/V + 25 mV	
	100 Hz to 1 kHz	500 $\mu$ V/V + 25 mV	
	(1 to 3) kHz	800 $\mu$ V/V + 25 mV	
	(3 to 10) kHz	800 $\mu$ V/V + 36 mV	
	(10 to 20) kHz	1.2 mV/V + 51 mV	
	(20 to 30) kHz	1.5 mV/V + 66 mV	
	(320 to 800) V		
(40 to 100) Hz	500 $\mu$ V/V + 170 mV		
100 Hz to 1 kHz	500 $\mu$ V/V + 170 mV		
(1 to 3) kHz	800 $\mu$ V/V + 170 mV		
(3 to 10) kHz	800 $\mu$ V/V + 190 mV		
(10 to 20) kHz	1.2 mV/V + 220 mV		
(20 to 30) kHz	1.5 mV/V + 260 mV		
(800 to 1 050) V			
(40 to 100) Hz	500 $\mu$ V/V + 200 mV		
(100 to 1) kHz	500 $\mu$ V/V + 200 mV		
(1 to 3) kHz	800 $\mu$ V/V + 200 mV		
(3 to 10) kHz	800 $\mu$ V/V + 260 mV		
(10 to 20) kHz	1.2 mV/V + 350 mV		
Capacitance - Simulation	(0.5 to 4.0) nF	3 mF/F + 15 pF	Fluke / Wavetek 9100 Universal Calibration System
	4.0 to 40) nF	3 mF/F + 34 pF	
	(40 to 400) nF	3 mF/F + 230 pF	
	400 nF to 4 $\mu$ F	4 mF/F + 2.3 nF	
	(4 to 40) $\mu$ F	5 mF/F + 23 nF	
	(40 to 400) $\mu$ F	5 mF/F + 230 nF	
	(400 to 4 000) $\mu$ F	5 mF/F + 2.3 $\mu$ F	
	(4 000 to 40 000) $\mu$ F	10 mF/F + 62 $\mu$ F	



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Oscilloscopes AC Voltage (50 Ω, 1kHz) (1 MΩ, 1kHz)  DC Voltage (50 Ω) DC Voltage (1 MΩ)  Leveled Sine Wave (50 Ω) 10 Hz to 50 kHz 50 kHz to 100 MHz 100 MHz to 250 MHz 250 MHz to 600 MHz  (1 MΩ) 10 Hz to 50 kHz  Frequency Accuracy	4.44 mV to 3.336 V 4.44 mV to 133.4 V  4.44 mV to 2.78 V 4.44 mV to 133 V  4.44 mV to 5.56 V 4.44 mV to 5.56 V 4.44 mV to 5.56 V 10.66 mV to 3.34 V  4.44 mV to 133 V  10 Hz to 600 MHz	4.4 mV/V 4.4 mV/V  4.1 mV/V + 40 μV 4.1 mV/V + 40 μV  4.4 mV/V 15.6 mV/V 30 mV/V 50 mV/V  4.4 mV/V  250 nHz/Hz	Fluke / Wavetek 9100 (w/ Options -100 & -600) Universal Calibration System
DC Current - Measure	Up to 100 nA 100 nA to 1 μA (1 to 10) μA (10 to 100) μA 100 μA to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	30 μA/A + 41 pA 20 μA/A + 54 pA 20 μA/A + 240 pA 20 μA/A + 2.0 nA 20 μA/A + 17 nA 20 μA/A + 170 nA 35 μA/A + 2.4 μA 110 μA/A + 50 μA	Agilent / HP 3458A Multimeter
AC Current - Measure	Up to 100 μA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz 100 μA to 1 mA (10 to 20) Hz (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 + 44 nA 1.5 mA/A + 240 nA 600 μA/A + 40 nA 600 μA/A + 40 nA  4 mA/A + 240 nA 1.5 mA/A + 240 nA 600 μA/A + 240 nA 300 μA/A + 240 nA 400 μA/A + 240 nA 2.7 mA/A + 420 nA 3.7 mA/A + 1.5 μA	Agilent / HP 3458A Multimeter



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measure	(1 to 10) mA		Agilent / HP 3458A Multimeter
	(10 to 20) Hz	4 mA/A + 2.7 $\mu$ A	
	(20 to 45) Hz	1.5 mA/A + 2.7 $\mu$ A	
	(45 to 100) Hz	600 $\mu$ A/A + 2.7 $\mu$ A	
	100 Hz to 5 kHz	300 $\mu$ A/A + 2.7 $\mu$ A	
	(5 to 20) kHz	600 $\mu$ A/A + 2.7 $\mu$ A	
	(20 to 50) kHz	4 mA/A + 4.5 $\mu$ A	
	(50 to 100) kHz	5.5 mA/A + 16 $\mu$ A	
	(10 to 100) mA		
	(10 to 20) Hz	4 mA/A + 28 $\mu$ A	
	(20 to 45) Hz	1.5 mA/A + 28 $\mu$ A	
	(45 to 100) Hz	600 $\mu$ A/A + 28 $\mu$ A	
	100 Hz to 5 kHz	300 $\mu$ A/A + 28 $\mu$ A	
	(5 to 20) kHz	600 $\mu$ A/A + 28 $\mu$ A	
	(20 to 50) kHz	4 mA/A + 45 $\mu$ A	
(50 to 100) kHz	5.5 mA/A + 160 $\mu$ A		
DC Voltage - Measure	100 mA to 1 A		Agilent / HP 3458A Multimeter
	(10 to 20) Hz	4 mA/A + 290 $\mu$ A	
	(20 to 45) Hz	1.6 mA/A + 290 $\mu$ A	
	(45 to 100) Hz	800 $\mu$ A/A + 290 $\mu$ A	
	100 Hz to 5 kHz	1 mA/A + 290 $\mu$ A	
	(5 to 20) kHz	3 mA/A + 290 $\mu$ A	
(20 to 50) kHz	10 mA/A + 460 $\mu$ A		
AC Voltage - Measure	Up to 100 mV	9 $\mu$ V/V + 510 nV	Agilent / HP 3458A Multimeter
	100 mV to 1 V	8 $\mu$ V/V + 3 $\mu$ V	
	(1 to 10) V	8 $\mu$ V/V + 28 $\mu$ V	
	(10 to 100) V	10 $\mu$ V/V + 510 $\mu$ V	
	(100 to 1 000) V	10 $\mu$ V/V + 7.3 mV	
AC Voltage - Measure	Up to 10 mV		Agilent / HP 3458A Multimeter
	(1 to 40) Hz	300 $\mu$ V/V + 4.1 $\mu$ V	
	40 Hz to 1 kHz	200 $\mu$ V/V + 3 $\mu$ V	
	(1 to 20) kHz	300 $\mu$ V/V + 3.1 $\mu$ V	
	(20 to 50) kHz	1 mV/V + 9.1 $\mu$ V	
	(50 to 100) kHz	5 mV/V + 66 $\mu$ V	
(100 to 300) kHz	40 mV/V + 66 $\mu$ V		



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Measure	(10 to 100) mV		Agilent / HP 3458A Multimeter
	(1 to 40) Hz	70 $\mu$ V/V + 7 $\mu$ V	
	40 Hz to 1 kHz	70 $\mu$ V/V + 6.1 $\mu$ V	
	(1 to 20) kHz	140 $\mu$ V/V + 8.1 $\mu$ V	
	(20 to 50) kHz	300 $\mu$ V/V + 38 $\mu$ V	
	(50 to 100) kHz	800 $\mu$ V/V + 38 $\mu$ V	
	(100 to 300) kHz	300 $\mu$ V/V + 70 $\mu$ V	
	300 kHz to 1 MHz	10 mV/V + 70 $\mu$ V	
	(1 to 2) MHz	15 mV/V + 70 $\mu$ V	
	100 mV to 1 V		
	(1 to 40) Hz	70 $\mu$ V/V + 64 $\mu$ V	
	40 Hz to 1 kHz	70 $\mu$ V/V + 54 $\mu$ V	
	(1 to 20) kHz	140 $\mu$ V/V + 72 $\mu$ V	
	(20 to 50) kHz	300 $\mu$ V/V + 0.14 mV	
	(50 to 100) kHz	800 $\mu$ V/V + 0.22 mV	
	(100 to 300) kHz	300 $\mu$ V/V + 0.61 mV	
	300 kHz to 1 MHz	10 mV/V + 1.7 mV	
	(1 to 2) MHz	15 mV/V + 1.7 mV	
	(1 to 10) V		
	(1 to 40) Hz	70 $\mu$ V/V + 700 $\mu$ V	
	40 Hz to 1 kHz	70 $\mu$ V/V + 530 $\mu$ V	
	(1 to 20) kHz	140 $\mu$ V/V + 710 $\mu$ V	
	(20 to 50) kHz	300 $\mu$ V/V + 1.4 mV	
	(50 to 100) kHz	800 $\mu$ V/V + 1.7 mV	
	(100 to 300) kHz	300 $\mu$ V/V + 5.2 mV	
	300 kHz to 1 MHz	10 mV/V + 19 mV	
	(1 to 2) MHz	15 mV/V + 19 mV	
	(10 to 100) V		
	(1 to 40) Hz	200 $\mu$ V/V + 9.3 mV	
	40 Hz to 1 kHz	200 $\mu$ V/V + 8.7 mV	
(1 to 20) kHz	200 $\mu$ V/V + 13 mV		
(20 to 50) kHz	350 $\mu$ V/V + 15 mV		
(50 to 100) kHz	1.2 mV/V + 35 mV		
(100 to 300) kHz	4.0 mV/V + 36 mV		
300 kHz to 1 MHz	15 mV/V + 36 mV		
750 V			
(1 to 40) Hz	400 $\mu$ V/V + 83 mV		
40 Hz to 1 kHz	400 $\mu$ V/V + 79 mV		
(1 to 20) kHz	600 $\mu$ V/V + 79 mV		
(20 to 50) kHz	1.2 mV/V + 79 mV		
(50 to 100) kHz	3.0 mV/V + 79 mV		





Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance Measure	Up to 100 Ω (10 to 100) Ω 100 Ω to 1 kΩ (1 to 10) kΩ (10 to 100) kΩ 100 kΩ to 1 MΩ (1 to 10) MΩ (10 to 100) MΩ 100 MΩ to 1 GΩ	15 μΩ/Ω + 0.11 mΩ 12 μΩ/Ω + 1 mΩ 10 μΩ/Ω + 7.6 mΩ 10 μΩ/Ω + 76 mΩ 10 μΩ/Ω + 760 mΩ 15 μΩ/Ω + 8.2 Ω 50 μΩ/Ω + 180 Ω 500 μΩ/Ω + 2 kΩ 5 mΩ/Ω + 25 kΩ	Agilent / HP 3458A Multimeter
Electrical Simulation of RTD Indicating Devices	R0 = (10 to 60) Ω (-200 to -100) °C (-100 to 100) °C (100 to 630) °C (630 to 850) °C R0 = 60 Ω to 1 kΩ (-200 to -100) °C (-100 to 100) °C (100 to 630) °C (630 to 850) °C R0 = (1 to 2) kΩ (-200 to -100) °C (100 to 100) °C (100 to 630) °C (630 to 850) °C	0.23 °C 0.15 °C 0.3 °C 0.45 °C 0.15 °C 0.1 °C 0.2 °C 0.3 °C 0.12 °C 0.082 °C 0.16 °C 0.24 °C	Fluke / Wavetek 9100 Universal Calibration System
Electrical Simulation of Thermocouple Indicating Devices	Type B (500 to 800) °C (800 to 1 000) °C (1 000 to 1 400) °C (1 400 to 1 820) °C Type C (0 to 600) °C (600 to 1 000) °C (1 000 to 1 800) °C (1 800 to 2 320) °C Type E (-250 to -200) °C (-200 to -100) °C (-100 to 100) °C (100 to 1 000) °C	0.57 °C 0.44 °C 0.38 °C 0.4 °C 0.33 °C 0.31 °C 0.43 °C 0.44 °C 0.48 °C 0.27 °C 0.23 °C 0.26 °C	Fluke / Wavetek 9100 Universal Calibration System



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices	Type J		Fluke / Wavetek 9100 Universal Calibration System
	(-210 to -100) °C	0.3 °C	
	(-100 to 800) °C	0.25 °C	
	(800 to 1000) °C	0.26 °C	
	(1 000 to 1 200) °C	0.28 °C	
	Type K		
	(-250 to -200) °C	0.59 °C	
	(-200 to -100) °C	0.31 °C	
	(-100 to 100) °C	0.25 °C	
	(100 to 600) °C	0.28 °C	
	(600 to 1 372) °C	0.31 °C	
	Type L		
	(-200 to -50) °C	0.31 °C	
	(-50 to 200) °C	0.24 °C	
	(200 to 700) °C	0.26 °C	
	(700 to 900) °C	0.28 °C	
	Type N		
	(-200 to -100) °C	0.37 °C	
	(-100 to 900) °C	0.28 °C	
	(900 to 1 100) °C	0.27 °C	
	(1 100 to 1 300) °C	0.29 °C	
	Type R		
	(0 to 100) °C	0.55 °C	
	(100 to 200) °C	0.43 °C	
(200 to 1 600) °C	0.39 °C		
(1 600 to 1 767) °C	0.32 °C		
Type S			
(0 to 200) °C	0.52 °C		
(200 to 1 000) °C	0.4 °C		
(1 000 to 1 400) °C	0.39 °C		
(1 400 to 1 767) °C	0.4 °C		
Type T			
(-250 to -200) °C	0.61 °C		
(-200 to -100) °C	0.31 °C		
(-100 to 0) °C	0.27 °C		
(0 to 400) °C	0.23 °C		

**Length – Dimensional metrology**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Length Standards <sup>2,3</sup>	(1 to 10) in	(14 + 6.4L) μin	Gauge Blocks, Supermicrometer,
Calipers <sup>3</sup>	Up to 24 in	(590 + 6.9L) μin	Gauge Blocks
Micrometers <sup>3</sup>	Up to 24 in	(49 + 5.3L) μin	
Dial Indicators	Up to 0.025 in (0.025 to 1) in (1 to 4) in	85 μin 91 μin 140 μin	Gauge Blocks, Micrometer Head
Test Indicators	Up to 0.008 in (0.008 to 0.06) in	85 μin 45 μin	Gauge Blocks
Micrometer Heads	Up to 1 in	59 μin	Gauge Blocks, Electronic Indicator
Height Gages Digital or Dial	Up to 6 in (6 to 12) in	72 μin 98 μin	Gauge Blocks, Surface Plate
Pin Gauges <sup>2</sup>	Up to 1 in	20 μin	Supermicrometer

**Mass and Mass Related**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Torque Wrenches	Up to 10 lbf·in (10 to 100) lbf·in (100 to 200) lbf·in Up to 100 lbf·ft (100 to 2 000) lbf·ft (2 000 to 2 500) lbf·ft	0.06 lbf·in 0.26 lbf·in 0.32 lbf·in 0.15 lbf·ft 2.8 lbf·ft 3.3 lbf·ft	Torque Sensor
Tensiometers	Up to 200 lbf (200 to 2 000) lbf	0.74 lbf 2.8 lbf	Dead weights Torque Sensor
Force Gages and Load Cells Tension	Up to 200 lbf (200 to 1 200) lbf	0.035 lbf 0.18 lbf	Dead Weights
	(200 to 1 000) lbf (1 000 to 10 000) lbf (10 000 to 30 000) lbf	0.42 lbf 5.5 lbf 15 lbf	Load Cell
Force Gages and Load Cells Compression	Up to 200 lbf (200 to 1 200) lbf	0.038 lbf 0.2 lbf	Dead Weights



Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Force Gages and Load Cells Compression	(200 to 1 000) lbf	0.43 lbf	Load Cell
	(1 000 to 10 000) lbf	5.3 lbf	
(10 000 to 30 000) lbf	15 lbf		
Force Gages and Load Cells Compression <sup>2</sup>	(30 000 to 100 000) lbf	40 lbf	
Scales	Up to 50 lbf	0.01 lbf	Class S-1 weights Class F weights Class F weights
	(50 to 200) lbf	0.04 lbf	
	(200 to 1 200) lbf	0.18 lbf	
	(200 to 1 000) lbf	0.42 lbf	Load Cell
	(1 000 to 10 000) lbf	5.7 lbf	
	(10 000 to 30 000) lbf	16 lbf	
Scales <sup>2</sup>	(30 000 to 100 000) lbf	40 lbf	
Pressure Gauges	Up to 100 psi	0.08 psi	Setra 370 Pressure Indicators
	(35 to 500) psi	0.75 psi	
	(500 to 5 000) psi	11 psi	
	(5 000 to 10 000) psi	7 psi	
	(10 000 to 15 000) psi	9.1 psi	
Vacuum Gauges	Up to 19 psia	0.004 7 psi	Druck DPI 145 Pressure Tester
	(19 to 50) psia	0.032 psi	Setra 370 Pressure Indicator

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Logic Pulses - Source  Pulse Width	(0.3 to 999.9) μs	250 ns/s + 1.6 μs	Fluke / Wavetek 9100 (w/ Option -100) Universal Calibration System
	0.3 μs to 99.999 ms	250 ns/s + 1.6 μs	
	1 μs to 999.99 ms	250 ns/s + 16 μs	
	10 μs to 1999.9 ms	250 ns/s + 160 μs	
Logic Pulses - Source  Period	(0.6 to 999.9) μs	250 ns/s + 1.6 μs	Fluke / Wavetek 9100 (w/ Option -100) Universal Calibration System
	6 μs to 99.999 ms	250 ns/s + 1.6 μs	
	1 μs to 999.99 ms	250 ns/s + 16 μs	
	10 μs to 2 s	250 ns/s + 160 μs	
Frequency Accuracy - Source	10 Hz to 600 MHz	250 nHz/Hz	



**Time and Frequency**

<b>Parameter/Equipment</b>	<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>	<b>Reference Standard, Method, and/or Equipment</b>
Tachometers	200 000 rpm	0.01 % of reading	Frequency Counter, Signal Generator

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 most parameters, 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. This parameter is only available at the laboratory facility.
3.  $L$  = length in inches.
4. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1647.



Vice President