



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

8400 Wolf Lake Dr. Suite 106  
Bartlett, TN 38133  
Eric Mansfield Phone: 678 797 3423  
Jeff Cook Phone: 770 423 1400

CALIBRATION

Valid To: March 31, 2026

Certificate Number: 1888.05

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations and dimensional inspections<sup>1,7</sup>:

I. Chemical

Parameter/Equipment	Range	CMC <sup>2,6</sup> (±)	Comments
pH Measuring Equipment <sup>3</sup>	(4.01, 7.0, 10.0) pH units	0.034 pH units	pH buffer solutions
Conductivity <sup>3</sup> – Liquid	10 µS (>10 to 100) µS (>100 to 1413) µS (>1413 to 10 000) µS	0.68 µS 0.57 µS 6.0 µS 54 µS	Conductivity solutions

II. Dimensional

Parameter/Equipment	Range	CMC <sup>2,4</sup> (±)	Comments
Calipers <sup>3</sup>	Up to 80 in	(170 + 12L) μin	Gage blocks
Micrometers <sup>3</sup>	Up to 6 in (6 to 80) in	(20 + 10L) μin (55 + 13L) μin	Gage blocks
Height Gages <sup>3</sup>	Up to 80 in	(120 + 8L) μin	Gage blocks
Bore Micrometers <sup>3</sup>	Up to 4 in	(70 + 20L) μin	Ring gages
Ring Gages, Cylindrical	Up to 12 in	(12 + 1.2L) μin	Universal length machine (ULM)
Length Indicators <sup>3</sup> (Dial, Digital, Test, Bore & Co-Axial)	Up to 4 in	(25 + 6L) μin	Gage blocks
Rigid Rulers <sup>3</sup>	Up to 80 in	0.010 in	Gage blocks
Tape Measures <sup>3</sup>	Up to 100 ft	0.014 in per 6 foot	Master rule
Cylindricals – OD Pins, Plugs, Master Disc  Outside Diameter <sup>3</sup>	Up to 10 in	30 μin	P&W Supermicrometer™
Thread Plug Gages <sup>3</sup> –  Pitch Diameter  Major Diameter	(4 to 80) TPI  Up to 10 in	100 μin  30 μin	P&W Supermicrometer™ with thread wires  P&W Supermicrometer™

Parameter/Equipment	Range	CMC <sup>2, 4</sup> ( $\pm$ )	Comments
Micrometer Standards <sup>3</sup>	Up to 10 in	$(33 + 8L) \mu\text{in}$	P&W Supermicrometer <sup>TM</sup>
Feeler Gages <sup>3</sup>	Up to 1 in	$70 \mu\text{in}$	P&W Supermicrometer <sup>TM</sup>
Surface Plate <sup>3</sup> – Flatness	12 in $\times$ 12 in to 12 ft $\times$ 12 ft	$(20 + 2 DL) \mu\text{in}$	Electronic level system <i>DL</i> =diagonal distance
Repeat Reading	12 in $\times$ 12 in to 12 ft $\times$ 12 ft	$34 \mu\text{in}$	Repeat-o-meter
Optical Comparator & Vision Machines <sup>3</sup> – X-Y Linearity	Up to 6 in	$250 \mu\text{in} + 0.60R$	Glass master
Crimp Tools <sup>3</sup>	Go/No Go Crimp Height	$600 \mu\text{in}$ $0.001 \text{ in}$	Pin gages Crimp micrometer
Protractors <sup>3</sup>	$0^\circ, 30^\circ, 45^\circ, 60^\circ,$ $90^\circ$	$0.033^\circ + 0.6R$	Angle blocks

### III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC <sup>2, 5, 6</sup> ( $\pm$ )	Comments
DC Voltage – Generate <sup>3</sup>	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (330 to 1000) V	$21 \mu\text{V/V} + 1.0 \mu\text{V}$ $12 \mu\text{V/V} + 2.0 \mu\text{V}$ $13 \mu\text{V/V} + 20 \mu\text{V}$ $19 \mu\text{V/V} + 150 \mu\text{V}$ $19 \mu\text{V/V} + 1.5 \text{ mV}$	Fluke 5522A

Parameter/Equipment	Range	CMC <sup>2, 5, 6</sup> ( $\pm$ )	Comments
DC Voltage – Measure <sup>3</sup>	(0 to 100) mV	10 $\mu$ V/V + 3.0 $\mu$ V	Agilent 3458A
	100 mV to 1 V	9 $\mu$ V/V + 3.0 $\mu$ V	
	(1 to 10) V	9 $\mu$ V/V + 5.0 $\mu$ V	
	(10 to 100) V	11 $\mu$ V/V + 30 $\mu$ V	
	(100 to 1000) V	11 $\mu$ V/V + 100 $\mu$ V	
	(1 to 9) kV	0.036 %	Vitretek 4700
	(9 to 90) kV	0.67 %	Vitretek 4700 with HVL-4700
	(90 to 175) kV	1.1 %	KVM 200 divider
DC Current – Generate <sup>3</sup>	Up to 330 $\mu$ A	0.016 % + 0.020 $\mu$ A	Fluke 5522A
	(330 $\mu$ A to 3.3 mA)	0.011 % + 0.030 $\mu$ A	
	(3.3 to 33) mA	0.011 % + 0.20 $\mu$ A	
	(33 to 330) mA	0.011 % + 2.5 $\mu$ A	
	330 mA to 1.1 A	0.021 % + 40 $\mu$ A	
	(1.1 to 3.0) A	0.039 % + 40 $\mu$ A	
	(3.0 to 11) A	0.051 % + 500 $\mu$ A	
	(11 to 20.5) A	0.10 % + 750 $\mu$ A	
Clamp-on only	(20.5 to 1025) A	0.50 % + 0.50 A	Fluke 5520A/coil
DC Current – Measure <sup>3</sup>	(10 to 100) $\mu$ A	22 $\mu$ A/A + 1.0 nA	Agilent 3458A
	100 $\mu$ A to 1 mA	22 $\mu$ A/A + 5.0 nA	
	(1 to 10) mA	22 $\mu$ A/A + 50 nA	
	(10 to 100) mA	37 $\mu$ A/A + 0.50 nA	
	100 mA to 1 A	0.012 % + 10 $\mu$ A	
	(1 to 3) A	0.13 % + 0.60 mA	
	3 A to 2 kA	0.25 %	Agilent 34401A
	(2 to 10) kA	1.0 %	Current shunts

Parameter/Equipment	Range	CMC <sup>2, 5, 6</sup> ( $\pm$ )	Comments
Resistance – Generate <sup>3</sup>	(0 to 11) $\Omega$ (11 to 33) $\Omega$ (33 to 110) $\Omega$ 110 $\Omega$ to 1.1 k $\Omega$ (1.1 to 11) k $\Omega$ (11 to 110) k $\Omega$ 110 k to 1.1 M $\Omega$ (1.1 to 3.3) M $\Omega$ (3.3 to 11) M $\Omega$ (11 to 33) M $\Omega$ (33 to 110) M $\Omega$ (110 to 330) M $\Omega$ (330 to 1100) M $\Omega$ (1 to 10) G $\Omega$ (10 to 100) G $\Omega$	40 $\mu\Omega/\Omega$ + 1.0 m $\Omega$ 30 $\mu\Omega/\Omega$ + 1.5 m $\Omega$ 28 $\mu\Omega/\Omega$ + 1.4 m $\Omega$ 28 $\mu\Omega/\Omega$ + 2.0 m $\Omega$ 28 $\mu\Omega/\Omega$ + 20 m $\Omega$ 28 $\mu\Omega/\Omega$ + 0.20 $\Omega$ 32 $\mu\Omega/\Omega$ + 2.0 $\Omega$ 60 $\mu\Omega/\Omega$ + 30 m $\Omega$ 0.013 % + 50 $\Omega$ 0.025 % + 2.5 k $\Omega$ 0.05 % + 3.0 k $\Omega$ 0.30 % + 100 k $\Omega$ 1.5 % + 500 k $\Omega$ 0.51 % 1.1 %	Fluke 5522A              Decade box Decade box
Fixed Points <sup>3</sup>	1.0 m $\Omega$ 10.0 m $\Omega$ 100.0 m $\Omega$ 1 $\Omega$	50 $\mu\Omega/\Omega$ 50 $\mu\Omega/\Omega$ 50 $\mu\Omega/\Omega$ 50 $\mu\Omega/\Omega$	L&N resistor L&N resistor L&N resistor L&N resistor
Resistance – Measure <sup>3</sup>	(0 to 10) $\Omega$ (10 to 100) $\Omega$ (100 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 $\mu\Omega$ 15 $\mu\Omega/\Omega$ + 0.50 m $\Omega$ 13 $\mu\Omega/\Omega$ + 1.1 m $\Omega$ 18 $\mu\Omega/\Omega$ + 2.0 $\Omega$ 50 $\mu\Omega/\Omega$ + 100 $\Omega$ 0.060 % + 1.0 k $\Omega$ 0.50 % + 10 k $\Omega$	Agilent 3458A
Capacitance – Generate <sup>3</sup>	(0.19 to 3.3) nF (3.3 to 330) nF 330 nF to 3.3 $\mu$ F (3.3 to 33) $\mu$ F (33 to 330) $\mu$ F 330 $\mu$ F to 3.3 mF (3.3 to 33) mF (33 to 110) mF	0.50 % + 0.01 nF 0.25 % + 0.30 nF 0.20 % + 3.0 nF 0.40 % + 30 nF 0.45 % + 300 nF 0.45 % + 3.0 $\mu$ F 0.75 % + 30 $\mu$ F 0.66 % + 100 $\mu$ F	Fluke 5522A



Parameter/Equipment	Range	CMC <sup>2, 5, 6</sup> (±)	Comments	
Capacitance – Generate Fixed Points <sup>3</sup>	(0.001, 0.01, 0.1) μF	0.16 %	GR 1409 series	
	1 μF Up to 1.1 μF	0.070 %	GR 1413	
Capacitance – Measure <sup>3</sup> at 1 kHz	Up to 1120 μF	0.27 %	GR 1689	
Inductance – Generate <sup>3</sup> at 1 kHz	1 mH	0.42 %	GR 1482-E	
	10.0 mH	0.12 %	GR1482-H	
	100 mH	0.12 %	GR1482-L	
Inductance – Measure <sup>3</sup>	1 μH to 100 H	0.27 %	GR 1689	
Electrical Calibration of Thermocouple Indicators <sup>3</sup> –	Type B	600 °C to 800 °C	0.49 °C	Fluke 5522A
		800 °C to 1000 °C	0.40 °C	
		1000 °C to 1550 °C	0.36 °C	
		1550 °C to 1800 °C	0.31 °C	
	Type C	0 °C to 150 °C	0.28 °C	
		150 °C to 650 °C	0.23 °C	
		650 °C to 1000 °C	0.28 °C	
		1000 °C to 1800 °C	0.45 °C	
		1800 °C to 2316 °C	0.73 °C	
	Type E	-250 °C to -100 °C	0.05 °C	
		-100 °C to -25 °C	0.15 °C	
		-25 °C to 350 °C	0.13 °C	
		350 °C to 650 °C	0.16 °C	
		650 °C to 1000 °C	0.20 °C	

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Electrical Calibration of Thermocouple Indicators <sup>3</sup> – (cont)			
Type J	-210 °C to -100 °C -100 °C to -30 °C -30 °C to 150 °C 150 °C to 760 °C 760 °C to 1200 °C	0.32 °C 0.15 °C 0.13 °C 0.17 °C 0.22 °C	Fluke 5522A
Type K	-200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 1000 °C 1000 °C to 1372 °C	0.30 °C 0.17 °C 0.15 °C 0.23 °C 0.35 °C	
Type N	-200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 410 °C 410 °C to 1300 °C	0.36 °C 0.20 °C 0.18 °C 0.17 °C 0.25 °C	
Type R	0 °C to 250 °C 250 °C to 400 °C 400 °C to 1000 °C 1000 °C to 1767 °C	0.56 °C 0.33 °C 0.31 °C 0.36 °C	
Type S	0 °C to 250 °C 250 °C to 1000 °C 1000 °C to 1400 °C 1400 °C to 1767 °C	0.55 °C 0.35 °C 0.33 °C 0.40 °C	
Type T	-250 °C to -150 °C -150 °C to 0 °C 0 °C to 120 °C 120 °C to 400 °C	0.56 °C 0.22 °C 0.15 °C 0.13 °C	

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Electrical Calibration of RTD Indicators <sup>3</sup> –			
Pt 385, 100 Ω	-200 °C to 0 °C 0 °C to 100 °C 100 °C to 300 °C 300 °C to 630 °C 630 °C to 800 °C	0.063 °C 0.083 °C 0.10 °C 0.12 °C 0.25 °C	Fluke 5522A
Pt 3926, 100 Ω	-200 °C to 0 °C 0 °C to 300 °C 300 °C to 630 °C	0.06 °C 0.10 °C 0.12 °C	
Pt 3916, 100 Ω	-200 °C to -190 °C -190 °C to 0 °C 0 °C to 260 °C 260 °C to 600 °C 600 °C to 630 °C	0.29 °C 0.07 °C 0.08 °C 0.10 °C 0.27 °C	
Pt 385, 200 Ω	-200 °C to 260 °C 260 °C to 630 °C	0.060 °C 0.17 °C	
Pt 385, 500 Ω	-200 °C to 260 °C 260 °C to 400 °C 400 °C to 630 °C	0.060 °C 0.090 °C 0.11 °C	
Pt 385, 1000 Ω	-200 °C to 260 °C 260 °C to 600 °C 600 °C to 630 °C	0.050 °C 0.080 °C 0.26 °C	
Ni 120, 120 Ω	-80 °C to 100 °C 100 °C to 260 °C	0.090 °C 0.16 °C	
Cu 427, 10 Ω	-100 °C to 260 °C	0.35 °C	



Parameter/Range	Frequency	CMC <sup>2, 5, 6</sup> ( $\pm$ )	Comments
AC Voltage – Generate <sup>3</sup>			
(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	0.080 % + 6.0 $\mu$ V 0.015 % + 6.0 $\mu$ V 0.02 % + 6.0 $\mu$ V 0.10 % + 6.0 $\mu$ V 0.36 % + 12 $\mu$ V 0.80 % + 50 $\mu$ V	Fluke 5522A
(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	0.030 % + 8.0 $\mu$ V 0.015 % + 8.0 $\mu$ V 0.016 % + 8.0 $\mu$ V 0.035 % + 8.0 $\mu$ V 0.080 % + 32 $\mu$ V 0.20 % + 70 $\mu$ V	
(0.33 to 3.3) 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	0.030 % + 50 $\mu$ V 0.015 % + 60 $\mu$ V 0.019 % + 60 $\mu$ V 0.030 % + 50 $\mu$ V 0.070 % + 130 $\mu$ V 0.24 % + 600 $\mu$ V	
(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	0.030 % + 650 $\mu$ V 0.015 % + 600 $\mu$ V 0.024 % + 600 $\mu$ V 0.035 % + 600 $\mu$ V 0.090 % + 1.6 mV	
(33 to 330) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.019 % + 2.0 mV 0.020 % + 6.0 mV 0.025 % + 6.0 mV 0.030 % + 6.0 mV 0.20 % + 6.0 mV	
(330 to 1020) V	45 Hz to 10 kHz	0.030 % + 10 mV	

Parameter/Range	Frequency	CMC <sup>2, 5, 6</sup> (±)	Comments
AC Voltage – Measure <sup>3</sup>			
(1 to 10) mV	(10 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.031 % rdg + 0.030 % rng 0.021 % rdg + 0.010 % rng 0.031 % rdg + 0.010 % rng 0.011 % rdg + 0.010 % rng 0.51 % rdg + 0.010 % rng 4.1 % rdg + 0.020 % rng	Agilent 3458A
(10 to 100) mV, 100 mV to 1 V, (1 to 10) V	(10 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz	0.0080 % rdg + 0.0050 % rng 0.0080 % rdg + 0.0020 % rng 0.015 % rdg + 0.0020 % rng 0.031 % rdg + 0.0020 % rng 0.081 % rdg + 0.0020 % rng 0.031 % rdg + 0.010 % rng 2.0 % rdg + 0.010 % rng 2.0 % rdg + 0.010 % rng	
(10 to 100) V	(10 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz	0.021 % rdg + 0.0040 % rng 0.021 % rdg + 0.0020 % rng 0.021 % rdg + 0.0020 % rng 0.036 % rdg + 0.0020 % rng 0.13 % rdg + 0.0020 % rng 0.41 % rdg + 0.013 % rng 1.8 % rdg + 0.010 % rng	
(100 to 750) V	(10 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.041 % rdg + 0.0040 % rng 0.041 % rdg + 0.0020 % rng 0.061 % rdg + 0.0020 % rng 0.13 % rdg + 0.0020 % rng 0.31 % rdg + 0.0020 % rng	
750 V to 9 kV	(50 to 60) Hz	0.45 %	Vitrek 4700
(9 to 70) kV	(50 to 60) Hz	1.5 %	Vitrek 4700 with HVL-4700
(70 to 100) kV	60 Hz	1.5 %	KVM 200 divider

Parameter/Range	Frequency	CMC <sup>2, 5, 6</sup> ( $\pm$ )	Comments
AC Current – Generate <sup>3</sup>			
(29 to 330) $\mu$ A	(10 to 20) Hz (20 to 45) Hz (0.45 to 1) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.03 % rdg + 6.0 $\mu$ A 0.15 % rdg + 1.0 $\mu$ A 0.13 % rdg + 0.1 $\mu$ A 0.3 % rdg + 0.20 $\mu$ A 0.8 % rdg + 0.10 $\mu$ A 1.6 % rdg + 0.50 $\mu$ A	Fluke 5522A
330 $\mu$ A to 3.3 mA	(10 to 20) Hz (20 to 45) Hz (0.45 to 1) kHz (1 to 5) kHz (5 to 30) kHz	0.20 % rdg + 17 $\mu$ A 0.14 % rdg + 16 $\mu$ A 0.11 % rdg + 15 $\mu$ A 0.20 % rdg + 0.30 $\mu$ A 0.90 % rdg + 0.60 $\mu$ A	
(3.3 to 33) mA	(10 to 20) Hz (20 to 45) Hz (0.45 to 1) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.20 % rdg + 5.0 $\mu$ A 0.20 % rdg + 15 $\mu$ A 0.12 % rdg + 15 $\mu$ A 0.08 % rdg + 2.0 $\mu$ A 0.19 % rdg + 3.0 $\mu$ A 1.0 % rdg + 6.0 $\mu$ A	
(33 to 330) mA	(10 to 20) Hz (20 to 45) Hz (0.45 to 1) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.18 % rdg + 20 $\mu$ A 0.50 % rdg + 50 $\mu$ A 0.050 % rdg + 5.0 $\mu$ A 0.10 % rdg + 50 $\mu$ A 0.15 % rdg + 75 $\mu$ A 0.40 % rdg + 500 $\mu$ A	
330 mA to 1.1 A	(10 to 45) Hz (0.45 to 1) kHz (1 to 5) kHz (5 to 10) kHz	0.19 % rdg + 300 $\mu$ A 0.050 % rdg + 200 $\mu$ A 0.10 % rdg + 500 $\mu$ A 3.0 % rdg + 2.0 mA	
(1.1 to 3) A	(10 to 45) Hz (0.45 to 1) kHz (1 to 10) kHz	0.18 % rdg + 100 $\mu$ A 0.80 % rdg + 600 $\mu$ A 0.80 % rdg + 1.0 mA	
(3 to 11) A	(45 to 100) Hz (0.1 to 1) kHz (1 to 5) kHz	1.8 % rdg + 5.0 mA 2.5 % rdg + 5.0 mA 3.0 % rdg + 5.0 mA	
(11 to 20.5) A	(45 to 100) Hz (0.1 to 5) kHz	1.0 % rdg + 500 mA 2.5 % rdg + 500 mA	

Parameter/Range	Frequency	CMC <sup>2, 5, 6</sup> (±)	Comments
AC Current – Generate <sup>3</sup> (cont)  Clamp-on Only (20.5 to 1025) A	(45 to 65) Hz (65 to 440) Hz	0.80 % 0.99 %	Fluke 5522A with Fluke 50- turn coil
AC Current – Measure <sup>3</sup>  (5 to 100) µA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 5 kHz	0.45 % rdg + 0.030 % rng 0.18 % rdg + 0.030 % rng 0.80 % rdg + 0.030 % rng	Agilent 3458A
(1, 10, 100) 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	0.41 % rdg + 0.020 % rng 0.16 % rdg + 0.020 % rng 0.07 % rdg + 0.020 % rng 0.04 % rdg + 0.020 % rng 0.40 % rdg + 0.040 % rng 0.42 % rdg + 0.040 % rng 0.56 % rdg + 0.16 % rng	
1 A	(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	0.42 % rdg + 0.020 % rng 0.16 % rdg + 0.020 % rng 0.10 % rdg + 0.020 % rng 0.12 % rdg + 0.020 % rng 0.35 % rdg + 0.020 % rng 0.35 % rdg + 0.020 % rng	
3 A	(3 to 5) Hz (5 to 10) Hz 10 Hz to 5 kHz	1.2 % rdg + 0.060 % rng 0.37 % rdg + 0.060 % rng 0.17 % rdg + 0.060 % rng	HP 34401A
3 A to 1 kA	45 Hz to 5 kHz	0.80 %	Clamp-on meter

Parameter/Range	Frequency	CMC <sup>2,5</sup> (±)	Comments
Oscilloscopes <sup>3</sup> –			
DC			
50 Ω	(0 to +/- 6.6) V	0.26 % + 40 μV	Fluke 5522A/SC1100
1 MΩ	(0 to +/- 130) V	0.06 % + 40 μV	
Square Wave			
50 Ω	(0 to +/- 6.6) V	0.26 % + 40 μV	
1 MΩ	10 Hz to 10 kHz (0 to +/- 130) V 10 Hz to 10 kHz	0.2 % + 40 μV	
Level Sine Wave			
Amplitude (50 kHz Reference)	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz (600 to 1100) MHz	2.0 % + 300 μV 2.5 % + 300 μV 5.0 % + 300 μV 6.0 % + 300 μV	
Flatness (50 kHz Reference)	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz (600 to 1100) MHz	2.0 % + 100 μV 3.0 % + 100 μV 5.0 % + 100 μV 6.0 % + 100 μV	
Time Marker	1 ns to 20 ms 50 ms to 5 s	3 μs/s (30 + 1000 <i>t</i> ) μs/s	<i>t</i> = time in seconds

#### IV. Mechanical

Parameter/Equipment	Range	CMC <sup>2,4,5</sup> (±)	Comments
Universal Testing Machines, Compression Testing Machines & Tension Testing Machines <sup>3</sup>	(0.2 to 600) lbf	0.04 % + 0.6 <i>R</i>	Deadweights, ASTM E4
	Up to 600 000 lbf	0.4 % + 0.6 <i>R</i>	Load cells; the range for testing machines in tension is only to 60 000 lbf.ASTM E4

Parameter/Equipment	Range	CMC <sup>2, 4, 5</sup> (±)	Comments
Indirect Verification of Rockwell Hardness & Rockwell Superficial Hardness Tester <sup>3</sup>	HRA:		Indirect verification per ASTM E18
	Low	0.22 HRA	
	Medium	0.30 HRA	
	High	0.19 HRA	
	HRBW:		
	Low	0.47 HRBW	
	Medium	0.46 HRBW	
	High	0.34 HRBW	
	HRC:		
	Low	0.33 HRC	
	Medium	0.37 HRC	
	High	0.25 HRC	
	HRE:		
	Low	0.17 HRE	
	Medium	0.13 HRE	
	High	0.14 HRE	
	HR15N:		
	Low	0.32 HR15N	
	Medium	0.12 HR15N	
	High	0.17 HR15N	
	HR15TW:		
	Low	0.49 HR15TW	
	Medium	0.25 HR15TW	
	High	0.43 HR15TW	
HR15YW:			
Low	0.75 HR15YW		
High	0.70 HR15YW		
HR30N:			
Low	0.26 HR30N		
Medium	0.27 HR30N		
High	0.17 HR30N		
HR30TW:			
Low	0.49 HR30TW		
Medium	0.46 HR30TW		
High	0.46 HR30TW		
HR30YW:			
Low	0.94 HR30YW		
High	0.78 HR30YW		

Parameter/Equipment	Range	CMC <sup>2, 4, 5</sup> ( $\pm$ )	Comments
Calibration of Force Gages, Load Cells, Dynamometers & Cable Tensiometers <sup>3</sup>	Up to 200 lbf  (0 to 500) lbf (0 to 1000) lbf (0 to 10 000) lbf	0.02 % + 0.6R  0.32 lbf + 0.6R 0.94 lbf + 0.6R 4.0 lbf + 0.6R	Comparison to Class F weights, compression & tension  Master load cells – tension & compression
Pressure Gages & Transducers –			
Hydraulic <sup>3</sup>	(10 to 15 000) psig	0.12 % + 0.58R	Ametek T150 deadweight tester
Pneumatic <sup>3</sup>	Up to 2000 psig	0.25 % + 0.58R	6270A with modules
Pneumatic <sup>3</sup>	Up to 100 psia	0.01 % + 0.58R	6270A with modules
Vacuum	Up to 28 in·Hg	0.01 % + 0.58R	6270A with modules
Torque <sup>3</sup> –			
Wrenches	20 in·oz to 600 ft·lbf	1.0 %	Master dead weight standards, master length standard, CDI Datatest 950-DT
Analyzers	(10 to 24 000) in·lbf	0.1 %	Class F weights & various torque wheels & arms
Guns, Drivers, Screwdrivers	(0.2 to 250) Nm	0.40 %	Crane torque transducers

Parameter/Equipment	Range	CMC <sup>2, 4, 5</sup> ( $\pm$ )	Comments
RPM <sup>3</sup> – Measure	(6 to 8300) RPM (8300 to 24 999) RPM	0.02 % + 0.1 RPM 0.02 % + 1.0 RPM	Laser tachometer
Calibration of Scales & Balances <sup>3</sup>	(1 to 20) mg (20 to 500) mg 500 mg to 5 g (5 to 20) g 20g to 20 kg	30 $\mu$ g + 0.6R 30 $\mu$ g + 0.6R 50 $\mu$ g + 0.6R 0.001 % + 0.6R 0.0005 % + 0.6R	Comparison to Class 1 weights
	0.25 oz to 1 lb (1 to 10) lb (10 to 1200) lb	0.05 % + 0.6R 0.002 % + 0.6R 0.012 % + 0.6R	Comparison to Class F weights

#### V. Thermodynamics

Parameter/Equipment	Range	CMC <sup>2, 4, 6</sup> ( $\pm$ )	Comments
Temperature Measuring Equipment <sup>3</sup> –  Liquid in Glass Thermometers, Dial, RTDs, & Thermocouples	-30 °C to 200 °C	0.056 °C + 0.6R	Master PRT display with probe, temperature bath
	200 °C to 660 °C	0.14 °C + 0.6R	Block calibrations with Master PRT display with probe
Temperature – Measure <sup>3</sup>	-80 °C to 420 °C	0.056 °C	Master PRT display with probe
Relative Humidity – Measure <sup>3</sup>	(10 to 90) % RH (90 to 95) % RH	1.2 % RH 2.3 % RH	Vaisala HMP series



Parameter/Equipment	Range	CMC <sup>2,4,6</sup> (±)	Comments
Relative Humidity – Measuring Equipment	(10 to 95) % RH	1.3 % RH	Fluke 5128A
Ovens, Chambers, Freezers, Furnaces <sup>3,9</sup>	(-196 to 400) °C (>400 to 550) °C (550 to 800) °C (800 to 1000) °C (1000 to 1200) °C	0.14 °C 1.6 °C 3.8 °C 4.7 °C 5.6 °C	Fluke 1502 with PRT Fluke 753 with TC
IR Thermometry – Measuring Equipment <sup>3</sup>  $\varepsilon \cong 0.90$ to 1.00 $\lambda \cong (8$ to 14) $\mu\text{m}$	(-15 to 35) °C (35 to 100) °C (100 to 200) °C (200 to 300) °C (300 to 400) °C (400 to 500) °C	0.6 °C 0.6 °C 0.73 °C 0.97 °C 1.6 °C 2.1 °C	IR black body calibrators

## VI. Time & Frequency

Parameter/Equipment	Range	CMC <sup>2,6</sup> (±)	Comments
Frequency – Measure <sup>3</sup>	10 Hz to 500 MHz 500 MHz to 1.3 GHz	0.011 $\mu\text{Hz}/\text{Hz}$ 0.002 $\mu\text{Hz}/\text{Hz}$	HP 5334B
Frequency – Measuring Equipment <sup>3</sup>	(10 to 500) MHz  100 kHz to 1.3 GHz  10 MHz	20 $\mu\text{Hz}/\text{Hz}$  9.6 $\mu\text{Hz}/\text{Hz}$  $2.5 \times 10^{-11} \text{ Hz}/\text{Hz}$	HP 3325B Fluke 5522A  HP 8657B  Fluke 910R
Tachometer – Optical <sup>3</sup>	(0 to 60 000) RPM	0.001 RPM	Agilent 33220A
Stopwatches & Timers <sup>3</sup>	(0.1 to 86 400) s	0.03 s/day	Helmut timometer

- <sup>1</sup> This laboratory offers commercial calibration service, field calibration service.
- <sup>2</sup> Calibration and Measurement Capability (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. Calibration and Measurement Capabilities 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.
- <sup>3</sup> 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.
- <sup>4</sup> In the statement of CMC,  $L$  is the length of the unit under test in inches;  $D$  is the diagonal of the unit under test in inches; and  $R$  is the resolution of the device under test.
- <sup>5</sup> In the statement of CMC, the first percentage given is the percentage of the reading, unless otherwise noted.
- <sup>6</sup> 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. CMC's are expressed as either a specific value that covers the full range or as a percent or fraction of the reading plus a fixed floor specification.
- <sup>7</sup> This scope meets A2LA's *P112 Flexible Scope Policy*.



# Accredited Laboratory

A2LA has accredited

## APPLIED TECHNICAL SERVICES, LLC.

*Bartlett, TN*

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/NCSL 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 6<sup>th</sup> day of March 2024.

A blue ink signature of Mr. Trace McInturff, written over a horizontal line.

Mr. Trace McInturff, Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 1888.05  
Valid to March 31, 2026

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