



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

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CALIBRATION

Valid To: August 31, 2025

Certificate Number: 2092.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1, 8}:

I. Acoustical

Parameter/Range	Frequency	CMC ² (±)	Comments
Sound Level Meters ³			
(125, 250, 500, 1000, 2000, 4000) Hz	(74, 84, 94, 104) dB	0.76 dB	IET 1986 Omnidirectional sound level calibrator
(125, 250, 500, 1000, 2000) Hz	114 dB	0.43 dB	
4000 Hz	114 dB	0.66 dB	

II. Chemical

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
Conductivity ³	~ 9.62 µS/cm ~ 100 µS/cm ~ 1400 µS/cm ~ 10 000 µS/cm ~ 99 900 µS/cm	0.56 µS/cm 2.1 µS/cm 5.4 µS/cm 40 µS/cm 0.37 mS/cm	Conductivity standards

III. Dimensional

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
Calipers ³ –			
Digital	Up to 4 in (>4 to 12) in (>12 to 36) in	0.000 30 in (280 + 4.5L) μin (230 + 8.9L) μin	Gage blocks
Vernier	Up to 4 in (>4 to 12) in (>12 to 36) in	0.0012 in (1100 + 6.1L) μin (1100 + 7.0L) μin	
Micrometers ³ –			
Digital	Up to 1 in (>1 to 4) in (>4 to 12) in (>12 to 36) in	80 μin 99 μin (70 + 9.0L) μin (110 + 9.0L) μin	Gage blocks
Vernier	Up to 1 in (>1 to 4) in (>4 to 12) in (>12 to 36) in	0.000 13 in 0.000 14 in (60 + 12L) μin (70 + 12L) μin	
Height Gages	Up to 36 in	0.0014 in	Gage blocks, surface plate
Depth Gages	Up to 4 in (>4 to 12) in (>12 to 36) in	0.000 21 in 0.000 26 in 0.000 51 in	Gage blocks, surface plate
Dial Indicators	Up to 4 in (4 to 6) in	64 μin 0.00010 in	Gage blocks, surface plate, height gage
Thickness Gages ³	Up to 1 in	50 μin	Gage blocks

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
Pin Gauges	(0.011 to 1) in	38 μin	Supermicrometer™, gage blocks
Plain Plugs	Up to 1 in (>1 to 6) in (>6 to 14) in	38 μin (26 + 10D) μin (22 + 12D) μin	Supermicrometer™, gage blocks
Protractors	(0 to 90)°	0.059°	Angle blocks, surface plate
Optical Comparators ³ – Linearity (X & Y axes)	(0.05 to 12) in	(120 + 7.1L) μin	Gage blocks
Steel Rules ³	Up to 12 in (>12 to 36) in (>36 to 80) in	0.012 in 0.041 in 0.090 in	Gage blocks
Precision Balls	(0.04 to 1) in	26 μin	Supermicrometer™, gage blocks
Feeler/Thickness Gage	Up to 0.2 in	28 μin	Supermicrometer™, gage blocks
Length Standards	Up to 1 in (>1 to 4) in (>4 to 12) in (>12 to 20) in	28 μin (31 + 6.8L) μin (35 + 11L) μin (27 + 12L) μin	Supermicrometer™, gage blocks
Adjustable Thread Ring Gages	Up to 4 in	0.000 16 in	Set to thread set plug
Thread Ring Gages	(0.12 to 7) in	(47 + 3.7D) μin	Labmaster Universal™, gage blocks, master plain rings

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
Tapered Thread Ring Gages – Standoff	Up to 2 in	0.000 35 in	Test indicator, thread set plug, gage blocks
Inner Diameter Measuring Gages	(0.12 to 4) in	0.000 14 in	Ring gage set
Ring Gages	(0.04 to 14) in	(15 + 3.5D) μin	Labmaster™, gage blocks
Radius Gages	Up to 4 in	0.000 47 in	Optical comparator
Thread Plug Gages – Pitch Diameter Up to 20 in Major Diameter Up to 20 in	(4 to 80) TPI Up to 20 in Up to 20 in	(87 + 4.0D) μin (37 + 12D) μin	Supermicrometer™, gage blocks, thread measuring wires Supermicrometer™, gage blocks
Tapered Thread Plug Gages – Pitch Diameter Up to 20 in Major Diameter Up to 20 in Notch Height Up to 2 in	(4 to 80) TPI Up to 20 in Up to 20 in Up to 2 in	(180 + 4.5D) μin (150 + 7.5D) μin 0.000 48 in	Supermicrometer™, gage blocks, thread measuring wires, sine block Supermicrometer™, gage blocks, sine block Gage blocks, test indicator
Ultrasonic Thickness Gages ³	Up to 4 in	0.000 58 in	Gage blocks
Coating Thickness Gages ³	Up to 60.25 mils	0.55 % + 0.021 mils	Standard shims

Parameter/Equipment	Range	CMC ^{2,6} (±)	Comments
Gage Blocks	Up to 4 in (4 to 13) in	(4.8 + 0.88L) μin (10 + 1.3L) μin	Master gage blocks with Labmaster™
Surface Roughness Meter Profilometer ³	~ 16 μin Ra ~ 120 μin Ra	3.7 μin 3.5 μin	Precision roughness specimen
Surface Roughness Specimens ³	~ 16 μin Ra ~ 120 μin Ra	3.7 μin 3.5 μin	Surface roughness tester, precision roughness specimen

IV. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,4,7} (±)	Comments
DC Voltage – Generate ³	(0 to 330) mV (0 to 3.3) V (0 to 33) V (30 to 330) V (100 to 1020) V	13 μV/V + 2.2 μV 7.6 μV/V + 7.2 μV 10 μV/V + 17 μV 12 μV/V + 0.94 mV 13 μV/V + 3.3 mV	Fluke 5522A-PQ/6
DC Current – Generate ³	(0 to 3.3) mA (0 to 33) mA (0 to 330) mA (0 to 1.1) A (0 to 3.0) A (0 to 11) A (0 to 20) A (20 to 50) A	77 μA/A + 0.052 μA 63 μA/A + 0.94 μA 65 μA/A + 9.0 μA 0.015 % + 51 μA 0.024 % + 0.2 mA 0.032 % + 1.4 mA 0.052 % + 7.0 mA 0.022 % + 3.6 mA	Fluke 5522A-PQ/6 Power supply, Fluke 8508A, Ohm Labs CS300 shunt
Clamp-On Only	(20 to 1000) A	0.54 % + 1.1 A	Fluke 5522A-PQ/6, 50 turn coil

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Resistance – Generate ³	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (33 to 330) Ω (0.33 to 1.1) kΩ 1.1 Ω to 3.3 kΩ (3.3 to 11) kΩ (11 to 33) kΩ (33 to 110) kΩ (110 to 330) kΩ (0.33 to 1.1) MΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ (0.33 to 1.1) GΩ	31 μΩ/Ω + 0.80 mΩ 23 μΩ/Ω + 1.2 mΩ 23 μΩ/Ω + 1.1 mΩ 20 μΩ/Ω + 2.4 mΩ 18 μΩ/Ω + 8.0 mΩ 20 μΩ/Ω + 25 mΩ 20 μΩ/Ω + 57 mΩ 20 μΩ/Ω + 0.25 Ω 20 μΩ/Ω + 0.54 Ω 25 μΩ/Ω + 2.2 Ω 24 μΩ/Ω + 6.0 Ω 44 μΩ/Ω + 46 Ω 0.01 % + 100 Ω 0.017 % + 3.4 kΩ 0.033 % + 12 kΩ 0.24 % + 78 kΩ 1.1 % + 1.4 MΩ	Fluke 5522A-PQ/6

Parameter/Equipment	Frequency	CMC ^{2,4} (±)	Comments
AC Voltage – Generate ³			
(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	0.059 % + 6.5 μV 0.010 % + 6.1 μV 0.015 % + 6.0 μV 0.071 % + 7.7 μV 0.26 % + 15 μV 0.60 % + 50 μV	Fluke 5522A-PQ/6
(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	0.021 % + 16 μV 0.010 % + 16 μV 0.011 % + 13 μV 0.024 % + 20 μV 0.060 % + 35 μV 0.13 % + 0.17 mV	
330 mV 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	0.023 % + 74 μV 0.011 % + 97 μV 0.015 % + 77 μV 0.021 % + 0.15 mV 0.051 % + 0.24 mV 0.17 % + 1.1 mV	

Parameter/Equipment	Frequency	CMC ^{2,4} (±)	Comments
AC Voltage – Generate ³ (cont)			
(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	0.023 % + 0.92 mV 0.011 % + 0.90 mV 0.018 % + 0.89 mV 0.025 % + 1.5 mV 0.066 % + 2.7 mV	Fluke 5522A-PQ/6
(33 to 330) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz	0.013 % + 9.8 mV 0.014 % + 13 mV 0.019 % + 11 mV	
(330 to 1020) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.021 % + 33 mV 0.018 % + 33 mV 0.021 % + 33 mV	
AC Current – Generate ³			
(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	0.15 % + 0.11 µA 0.11 % + 0.11 µA 0.097 % + 0.10 µA 0.22 % + 0.17 µA 0.62 % + 0.18 µA	Fluke 5522A-PQ/6
330 µA 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	0.15 % + 0.56 µA 0.09 % + 0.40 µA 0.071 % + 0.43 µA 0.14 % + 0.76 µA 0.34 % + 2.4 µA	
(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	0.14 % + 4.8 µA 0.065 % + 3.8 µA 0.024 % + 5.6 µA 0.054 % + 5.1 µA 0.15 % + 7.7 µA	
(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	0.14 % + 43 µA 0.065 % + 38 µA 0.025 % + 47 µA 0.061 % + 0.12 mA 0.11 % + 0.35 mA	
(0.33 to 1.1) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz	0.14 % + 0.25 mA 0.040 % + 0.12 mA 0.47 % + 0.89 mA	

Parameter/Range	Frequency	CMC ^{2, 4} (±)	Comments
AC Current – Generate ³ cont.			
(1.1 to 3) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz	0.14 % + 0.25 mA 0.038 % + 0.61 mA 0.47 % + 0.89 mA	Fluke 5522A-PQ/6
(3 to 11) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.040 % + 2.8 mA 0.072 % + 2.6 mA 2.4 % + 1.9 mA	
(11 to 20.5) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.092 % + 4.8 mA 0.12 % + 4.2 mA 2.4 % + 4.1 mA	
Clamp-On Only			
(20 to 1000) A	(45 to 65) Hz	0.69 % + 1.1 A	Fluke 5522A-PQ/6, 50 turn coil
(20 to 150) A	(65 to 440) Hz	1.3 % + 0.30 A	

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Capacitance – Generate ³	(0.33 to 0.3999) nF (0.4 to 1.0999) nF (1.1 to 3.2999) nF (3.3 to 10.999) nF (11 to 32.999) nF (33 to 109.99) nF (110 to 329.99) nF (0.33 to 1.0999) μF (1.1 to 3.2999) μF (3.3 to 10.999) μF (11 to 32.999) μF (33 to 109.99) μF (110 to 329.99) μF (330 to 1.1) mF	0.4 % + 0.0090 nF 0.35 % + 0.010 nF 0.36 % + 0.010 nF 0.19 % + 0.010 nF 0.18 % + 0.10 nF 0.19 % + 0.10 nF 0.19 % + 0.30 nF 0.19 % + 1.1 nF 0.19 % + 3.0 nF 0.19 % + 12 nF 0.28 % + 56 nF 0.3 % + 0.16 μF 0.31 % + 0.58 μF 0.33 % + 1.2 μF	Fluke 5522A-PQ/6

Parameter/Equipment	Range	CMC ^{2, 4, 5} (±)	Comments
DC Voltage – Measure ³	Up to 200 mV 200 mV to 2 V (2 to 20) V (20 to 200) V (200 to 1000) V (1 to 30) kV	6.0 μV/V + 0.6 μV 3.8 μV/V + 0.25 μV 3.8 μV/V + 0.25 μV 6.0 μV/V + 0.25 μV 6.1 μV/V + 0.60 μV 0.21 % + 7.3 V	Fluke 8508A Fluke 287, Ross engineering VMP30E
Electrical Simulation of Thermocouples – Generate ³ and Measure ³			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.35 °C 0.27 °C 0.24 °C 0.27 °C	Fluke 5522A-PQ/6
Type C	(0 to 150) °C (150 to 650) °C (650 to 1000) °C (1000 to 1800) °C (1800 to 2316) °C	0.24 °C 0.21 °C 0.24 °C 0.39 °C 0.66 °C	
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.39 °C 0.13 °C 0.11 °C 0.13 °C 0.16 °C	
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.21 °C 0.13 °C 0.11 °C 0.14 °C 0.18 °C	

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Electrical Simulation of Thermocouples – Generate ³ & Measure ³ (cont)			
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.26 °C 0.15 °C 0.13 °C 0.21 °C 0.31 °C	Fluke 5522A-PQ/6
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.31 °C 0.17 °C 0.15 °C 0.14 °C 0.21 °C	
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.44 °C 0.28 °C 0.27 °C 0.32 °C	
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.37 °C 0.29 °C 0.29 °C 0.36 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.49 °C 0.19 °C 0.13 °C 0.11 °C	

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Electrical Calibration of RTD Indicating Systems – Generate ³			
Pt 385, 100 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C	0.040 °C 0.040 °C 0.055 °C 0.071 °C 0.080 °C 0.094 °C 0.18 °C	Fluke 5522A-PQ/6
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	0.032 °C 0.040 °C 0.094 °C 0.11 °C 0.12 °C 0.13 °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	0.035 °C 0.042 °C 0.049 °C 0.064 °C 0.072 °C 0.087 °C	
Pt 385, 1000 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	0.028 °C 0.035 °C 0.042 °C 0.054 °C 0.067 °C 0.18 °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	0.20 °C 0.032 °C 0.040 °C 0.048 °C 0.055 °C 0.063 °C 0.07 °C 0.079 °C 0.18 °C	
Pt 3926, 100 Ω	(-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.040 °C 0.055 °C 0.071 °C 0.079 °C 0.095 °C	

Parameter/Equipment	Range	CMC ^{2, 4, 7} (\pm)	Comments
Electrical Calibration of RTD Indicating Systems – Generate ³ (cont)			
PtNi 385, 120 Ω (Ni 120)	(-80 to 100) °C (100 to 260) °C	0.063 °C 0.11 °C	Fluke 5522A-PQ/6
Cu 427, 10 Ω	(-100 to 260) °C	0.24 °C	
Oscilloscope Calibration – Generate ³			
Amplitude DC Signal 50 Ω Load 1 M Ω Load	(-6.6 to 6.6) V (-130 to 130) V	0.20 % + 0.32 μ V 0.039 % + 67 μ V	Fluke 5522A-PQ/6
Amplitude Square Wave Signal 50 Ω Load 1 M Ω Load	\pm 1 mV to \pm 6.6 V _{p-p} \pm 1 mV to \pm 130 V _{p-p}	0.20 % + 66 μ V _{p-p} 0.085 % + 0.20 mV _{p-p}	
Leveled Sine Wave Flatness Into 50 Ω , Relative to 50 kHz 5 mV _{p-p} to 5.5 V _{p-p}	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	0.50 mV _{p-p} 0.61 mV _{p-p} 1.1 mV _{p-p}	
11.2 mV _{p-p} to 0.5 V _{p-p}	1 kHz to 26.5 GHz	2.0 % + 0.47 mV	Fluke 96270 Reference Source
Time Marker into 50 Ω	5 s to 50 ms 20 ms to 2 ns	0.40 % 2.0 μ s/s + 6.0 ps	
Rise Time into 50 Ω Load	\leq 300 ps	78 ps	Fluke 5522A-PQ/6

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
DC Current – Measure ³	Up 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	14 µA /A + 0.31 nA 14 µA/A + 3.1 nA 15 µA/A + 31 nA 48 µA/A + 0.62 µA 0.018 % + 13 µA 0.042 % + 20 µA	Fluke 8508A
	(20 to 50) A (50 to 100) A (100 to 300) A	0.020 % + 10 mA 0.023 % + 12 mA 0.044 % + 11 mA	Fluke 8508A, Ohm Labs CS-300
Resistance – Measure ³	Up to 2 Ω (2 to 20) Ω (20 to 200) Ω 200 Ω to 2 kΩ (2 to 20) kΩ (20 to 200) kΩ 200 kΩ to 2 MΩ (2 to 20) MΩ (20 to 200) MΩ 200 MΩ to 2 GΩ	20 µΩ/Ω + 4.0 µΩ 11 µΩ/Ω + 62 µΩ 10 µΩ/Ω + 10 µΩ 8.7 µΩ/Ω + 0.50 mΩ 8.4 µΩ/Ω + 5.0 mΩ 8.0 µΩ/Ω + 0.15 Ω 8.0 µΩ/Ω + 12 Ω 22 µΩ/Ω + 0.12 kΩ 0.013 % + 11 kΩ 0.14 % + 1.0 MΩ	Fluke 8508A

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage – Measure ³	Up 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	0.014 % + 3.9 µV 0.011 % + 3.9 µV 0.011 % + 3.1 µV 0.014 % + 3.9 µV 0.032 % + 7.8 µV 0.068 % + 19 µV
	200 mV 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 to 1000) kHz	0.012 % + 19 µV 96 µV/V + 20 µV 73 µV/V + 19 µV 0.011 % + 19 µV 0.021 % + 39 µV 0.052 % + 0.19 mV 0.24 % + 1.9 mV 0.78 % + 19 mV

Parameter/Range	Frequency	CMC ^{2, 5} (±)	Comments
AC Voltage – Measure ³ (cont)			
(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	0.011 % + 0.19 mV 89 μV/V + 0.19 mV 74 μV/V + 0.19 mV 0.011 % + 0.19 mV 0.021 % + 0.39 mV 0.051 % + 1.9 mV	Fluke 8508A
(20 to 200) V	(40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	92 μV/V + 2.3 mV 77 μV/V + 2.0 mV 0.011 % + 1.9 mV 0.021 % + 3.9 mV 0.051 % + 19 mV	
(200 to 1000) V	40 Hz to 10 kHz	0.012 % + 20 mV	
Up to 1 kV (1 to 21) kV	60 Hz 60 Hz	0.011 kV 1.2 % + 0.017 kV	Fluke 287 plus Ross Engineering VMP30E Probe
AC Current – Measure ³			
(0 to 200) μA	10 Hz to 10 kHz (10 to 30) kHz	0.052 % + 0.018 μA 0.065 % + 0.019 μA	Fluke 8508A
200 μA to 2 mA	10 Hz to 10 kHz (10 to 30) kHz	0.030 % + 0.19 μA 0.063 % + 0.19 μA	
(2 to 20) mA	10 Hz to 10 kHz (10 to 30) kHz	0.031 % + 1.9 μA 0.063 % + 1.9 μA	
(20 to 200) mA	10 Hz to 10 kHz (10 to 30) kHz	0.030 % + 19 μA 0.058 % + 19 μA	
200 mA to 2 A	10 Hz to 2 kHz (2 to 10) kHz	0.074 % + 0.19 mA 0.083 % + 0.19 mA	
(2 to 20) A	10 Hz to 2 kHz	0.072 % + 1.9 mA	

V. Electrical – RF/Microwave

Parameter/Equipment	Range/Frequency	CMC ^{2, 7, 10} (±)	Comments
RF Power – Generate ³ (-35 to +12) dBm (-100 to -35) dBm	1 kHz to 26.5 GHz 200 Hz to 4 GHz (4 to 26.5) GHz	0.13 dBm 0.51 dBm 1.0 dBm	Fluke 96270A, Rohde & Schwarz NRP40T Fluke 96270A
RF Power – Measure ³ (-35 to +20) dBm (-130 to +20) dBm (-110 to +20) dBm	DC to 100 MHz 100 MHz to 2.4 GHz (2.4 to 12.4) GHz (12.4 to 26.5) GHz (26.5 to 40) GHz 100 kHz to 26.5 GHz 26.5 GHz to 50 GHz	0.055 dBm 0.070 dBm 0.093 dBm 0.12 dBm 0.15 dBm 0.39 dBm 0.43 dBm	Fluke 96270A, Rohde & Schwarz NRP40T Keysight N5531X Keysight N5531X
Amplitude Modulation – Measure ³ Depth Rate: 10 Hz to 10 kHz Depth: (5 to 99)% Rate: 10 Hz to 5 kHz Depth: (5 to 99)% Distortion Rate: (1 to 10) kHz Depth: (5 to 90)% Residual AM- 50 Hz to 3 kHz BW	100 kHz to 3.6 GHz (3.6 to 50) GHz 100 kHz to 50 GHz 100 kHz to 3.6 GHz (3.6 to 50) GHz	0.12 % IV + 0.003 % 0.29 % IV + 0.004 % 1.2 % IV + 0.26 % 0.0062 % 0.059 %	Keysight N5531X IV = Indicated Value Keysight N5531X IV = Indicated Value Keysight N5531X IV = Indicated Value Keysight N5531X

Parameter/Range	Frequency	CMC ^{2,7,10} (\pm)	Comments
Frequency Modulation – Measure ³ Deviation Rate: 10 Hz to 10 kHz Deviation: 10 Hz to 400 kHz Distortion Rate: (1 to 10) kHz Residual FM 50 Hz to 3 kHz BW	 100 kHz to 3.6 GHz (3.6 to 50) GHz 100 kHz to 50 GHz 100 kHz to 3.6 GHz (3.6 to 50) GHz	 0.42 % + 27 Hz 3.2 % 2.4 % IV + 0.34 % 0.47 Hz 3.8 Hz	 Keysight N5531X Keysight N5531X IV = Indicated Value Keysight N5531X
Phase Modulation – Measure ³ Deviation Rate: 50 Hz to 10 kHz Deviation: (0.05 to 400) rad Distortion Rate: (1 to 10) kHz	 100 kHz to 3.6 GHz (3.6 to 50) GHz 100 kHz to 50 GHz	 0.0064 rad 0.032 rad 2.4 % IV + 0.057 %	 Keysight N5531X Keysight N5531X IV = Indicated Value

VI. Mechanical

Parameter/Equipment	Range	CMC ^{2,6,7} (\pm)	Comments
Pressure Gages ³	(0 to 1) in H ₂ O (0 to 5) psi (5 to 30) psi (0 to 100) psi (5 to 500) psi (500 to 2000) psi (1500 to 10 000) psi (10 000 to 40 000) psi Up to 100 psia	0.0037 in H ₂ O 0.0027 psi 0.0031 psi 0.036 psi 0.16 psi 0.60 psi 3.3 psi 25 psi 0.051 psia	Fluke pressure module Additel pressure modules Fluke pressure module

Parameter/Equipment	Range	CMC ^{2, 6, 7} (±)	Comments
Vacuum ³	Up to -29 in Hg	0.027 in Hg	Additel ADT681-CP30
Torque ³ – Wrenches and Screwdrivers Analyzers	(5 to 50) ozf·in (15 to 200) ozf·in (4 to 50) lbf·in (50 to 400) lbf·in (400 to 1000) lbf·in (1000 to 3000) lbf·in Up to 50 lbf·in (50 to 3000) lbf·in	1.1 % ozf·in 1.1 % ozf·in 0.80 % lbf·in 0.95 % lbf·in 0.71 % lbf·in 0.69 % lbf·in 0.060 % + 0.0010 lbf·in 0.060 %	Torque transducers Torque wheels and arms, class F weights
Weights ³	(0.001 to 2) g (2 to 20) g (20 to 210) g (210 to 500) g (500 to 3000) g (3000 to 7000) g	0.38 mg 0.43 mg 0.57 mg 1.9 mg 24 mg 0.65 g	Sartorius MSE524S w/ class 1 weights A&D FXI-3000 balance & class 4 weights Ohaus NOH110 balance & class 4 weights
Scales ³ – Resolution 0.01 mg 0.1 mg 1 mg 0.01 g 0.002 lbs 0.01 lbs 0.1 lbs 1 lbs	(1 to 500) mg (>0.5 to 5) g (>5 to 100) g (>100 to 520) g (>520 to 1000) g (>1000 to 3200) g (>3200 to 8100) g (>15 to 60) lbs (>60 to 200) lbs (>200 to 500) lbs (>500 to 1150) lbs	0.015 mg 0.044 mg 0.43 mg 0.0022 g 0.0038 g 0.054 g 0.097 g 0.0063 lbs 0.013 lbs 0.12 lbs 1.7 lbs	Class 1 weights Class 4 weights Class F weights Class F weights, bulk substitution weights

Parameter/Equipment	Range	CMC ^{2, 6, 7} (±)	Comments
Force – Measure ³			
Tension Only	(0 to 50 lbf) (50 to 150) lbf	0.0083 lbf 0.059 lbf	Class F weights
Tension and Compression ³	(0 to 500) lbf (0 to 5000) lbf	0.0080 % + 0.22 lbf 0.025 % + 2.1 lbf	Interface load cells
Indirect Verification of Rockwell Hardness Testers ³	HRA: Low Middle High HRBw: Low Middle High HRC: Low Middle High HREw: Low Middle High HR15N: Low Middle High HR15Tw: Low Middle High	1.1 HRA 0.70 HRA 0.63 HRA 1.4 HRBw 1.2 HRBw 0.83 HRBw 1.2 HRC 1.2 HRC 1.2 HRC 1.2 HREw 1.1 HREw 0.83 HREw 0.81 HR15N 0.84 HR15N 0.71 HR15N 0.92 HR15Tw 0.86 HR15Tw 0.75 HR15Tw	ASTM E18

Parameter/Equipment	Range	CMC ^{2, 6, 7} (±)	Comments
Durometers –			
Indenter Extension Length	0.098 in	0.00059 in	Surface Gage & Gage Blocks
Scale Accuracy			
Type A	(0 to 100) duro points	0.63 duro points	Durometer Calibrator
Type D	(0 to 100) duro points	0.58 duro points	

VII. Thermodynamic

Parameter/Equipment	Range	CMC ^{2, 7, 9} (±)	Comments
Temperature – Measure ³	(-200 to 0) °C (0 to 200) °C (200 to 420) °C (32 to 1000) °F (1000 to 1900) °F (1900 to 2150) °F	0.065 °C 0.088 °C 0.081 °C 2.3 °F 3.4 °F 5.8 °F	Hart Scientific 1523, 5627A PRT Fluke 5520A w/ K type thermocouple
Temperature – Measuring Equipment ³	(-25 to 0) °C (0 to 150) °C (150 to 420) °C (420 to 660) °C	0.083 °C 0.086 °C 0.40 °C 0.86 °C	Fluke 1523 Readout + 5627 PRT + 9142 Bath Fluke 1523 Readout + 5627 PRT, Additel ADT875 Dry Well Additel ADT875 Dry Well
Infrared Thermometers ³	(32 to 216) °C	0.25 % + 0.92 °C	Omega BB702
Relative Humidity – Measure ³	(10 to 95) % RH	1.8 % RH	Kaymont M2000SPA-X

VIII. Time & Frequency

Parameter/Equipment	Range	CMC ^{2, 4, 9} (±)	Comments
Timers & Stop Watches ³	(0.1 to 10 000) s	1 μs/s + 0.014 s	Fluke 5522A, HP 53131A
Tachometers – Non-Contact ³	(30 to 100 000) RPM	0.000 20 % + 0.040 RPM	Fluke 5522A-PQ/6
Tachometers – Contact ³	(10 to 199.99) RPM (200 to 50 000) RPM	0.10 % + 0.18 RPM 0.044 % + 0.52 RPM	Ideal Aerosmith 1921
Frequency – Measuring Equipment ³			
AC Voltage	(0.01 to 119.99) Hz (120.0 to 1199.9) Hz (1.200 to 9.999) kHz (10.000 to 11.999) kHz (12.00 to 119.99) kHz (120.0 to 1199.9) kHz (1.200 to 2.000) MHz	20 μHz/Hz + 1.0 mHz 20 μHz/Hz + 1.0 mHz 20 μHz/Hz + 1.5 mHz 22 μHz/Hz + 15 mHz 20 μHz/Hz + 15 mHz 20 μHz/Hz + 15 mHz 20 μHz/Hz + 15 mHz	Fluke 5522A-PQ/6
Leveled Sine Wave	50 kHz to 600 MHz (10 kHz Resolution)	2.0 μHz/Hz + 30 Hz	Fluke 5522A -PQ/6
	10 Hz to 26.5 GHz	56 nHz/Hz + 0.25 mHz	Fluke 96270A
Frequency – Measure ³	2 Hz to 100 MHz 100 MHz to 50 GHz	52 nHz/Hz + 2.4 mHz 77 nHz/Hz + 1.6 Hz	Keysight N5531X

¹ This laboratory offers commercial and field 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 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.
- ⁴ The measurands stated are generated with the Fluke 5520A-PQ6. This capability is suitable for the calibration of the devices intended to measure the stated measurand in the ranges indicated. CMCs are expressed as either a specific value that covers the full range or as a fraction/percentage of the reading plus a fixed floor specification.
- ⁵ The measurands stated are measured with the Fluke 8508A. This capability is suitable for the calibration of the devices intended to generate the stated measurand in the ranges indicated. CMCs are expressed as either a specific value that covers the full range or as a fraction/percentage of the reading plus a fixed floor specification.
- ⁶ R is the resolution of the unit under test, L is the numerical value of the nominal length measured in inches, and D is the numerical value of the nominal length of the diameter measured in inches.
- ⁷ In the statement of CMC, percentages are percentages of reading, unless otherwise indicated.
- ⁸ This scope meets A2LA's *P112 Flexible Scope Policy*.
- ⁹ 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.
- ¹⁰ 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. CMCs are expressed as either a specific value that covers the full range or as a fraction/percentage of the reading plus a fixed floor specification.



Accredited Laboratory

A2LA has accredited

USCALIBRATION INC.

Irvine, CA

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 15th day of August 2023.

A blue ink signature of Mr. Trace McInturff.

Mr. Trace McInturff Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2092.01
Valid to August 31, 2025

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