



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

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CALIBRATION

Valid To: September 30, 2024

Certificate Number: 1145.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1,7}:

I. Dimensional

Parameter / Equipment	Range	CMC ^{2,4} (±)	Comments
Extensometer Calibrator	(0.0015 to 2) in	(5 + 2L) μin	Laser interferometer, ISO 9513 Annex B
Extensometer – Displacement	(0.0015 to 2) in	0.2 % + 13 μin	MTS extensometer calibration system
Gage Length	(6 to 25) mm (>25 to 50) mm (0.2 to 1) in (>1 to 2) in	7 μm 9 μm 250 μin 350 μin	Keyence vision system
Laser Extensometer	Up to 5 in Up to 15 in	(400 + 2L) μin (1300 + 2L) μin	Laser interferometer, ASTM E83



Parameter / Equipment	Range	CMC ^{2, 4, 5} (±)	Comments
Extensometer ³ –			ASTM E83, E399, ISO 9513
Displacement	(0.0015 to 2) in	0.1 % + 10 μin	Extensometer calibrator
	(0.0015 to 36) in	0.13 % + 35 μin	Laser interferometer
Gage Length	(0.2 to 2) in	(65 + 200L) μin	Optical and extensometer calibrator
	(2 to 4) in	(100 + 200L) μin	Caliper
MTS Length Standard –			
Vee Groove	(0.1, 0.5, 1, and 2) in	180 μin	Keyence vision system
	(6, 12, and 15) mm	3 μm	
	(25, and 50) mm	4 μm	
Linear Displacement –			
Linear Encoder	Up to 2.4 in Up to 4 in Up to 18 in	12 μin 150 μin 200 μin or 0.003 %	Gage blocks Whichever is greater
Magnetostrictive Sensor (Temposonics)	Up to 48 in	400 μin	Laser interferometer and linear stage
Interferometer/Doppler Laser Systems	Up to 60 in	25 μin	Laser interferometer and linear stage
Linear Displacement ³ – Measure			ASTM E2309
	(0.0015 to 2) in	(50 + 100L) μin	Extensometer calibrator
	(0.0015 to 48) in	(100 + 200L) μin	Laser interferometer
Angular Displacement –			
Generate	(1 to 10)° (11 to 30)° (31 to 3600)°	0.0005° 0.001° 0.002°	Indexing rotary table

Parameter / Equipment	Range	CMC ^{2,4,5} (±)	Comments
Angular Displacement ³ – Measure	(1 to 3600) °	0.25 % + 0.005°	Rotary encoder
Protractor	(0 to 360) °	0.03°	Gage blocks, sine bar
Caliper	Up to 6 in (> 6 to 24) in	350 μin 500 μin	Gage blocks, ring gages, length standards

II. Electrical – DC / Low Frequency

Parameter / Equipment	Range	CMC ^{2,4,6} (±)	Comments
DC Voltage – Generate	(10 to 220) mV 220 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V (220 to 1100) V	6 μV/V + 0.4 μV 3.5 μV/V + 0.8 μV 2.5 μV/V + 3 μV 2.5 μV/V + 4 μV 3.5 μV/V + 41 μV 4.6 μV/V + 400 μV	Fluke 5720A
Fixed Point	10 V	5 μV	Fluke 732B
DC Voltage ³ – Generate	(0.004 to 20) V	0.025 %	Yokogawa GS200
DC Voltage – Measure	(1 to 200) mV (0.2 to 2) V (2 to 20) V (20 to 200) V (200 to 1000) V	4.6 μV/V + 0.1 μV 3.1 μV/V + 0.4 μV 3 μV/V + 4 μV 4.5 μV/V + 40 μV 4.9 μV/V + 450 μV	Fluke 8508A
Fixed Point	10 V	5 μV	Fluke 8508A, 732B (ratiometric)
DC Voltage ³ – Measure	(4 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1000) V	38 μV/V + 0.9 μV 25 μV/V + 2 μV 24 μV/V + 40 μV 35 μV/V + 0.5 mV 41 μV/V + 6 mV	Keithley 2010

Parameter / Equipment	Range	CMC ^{2, 6} (±)	Comments
DC Current – Generate	(10 to 220) µA 220 µA to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A	35 µA/A + 6 nA 31 µA/A + 8 nA 31 µA/A + 41 nA 40 µA/A + 0.8 µA 61 µA/A + 12 µA	Fluke 5720A
	(3 to < 11) A (11 to 20) A	0.04 % + 600 µA 0.08 % + 1 mA	Fluke 5522A
DC Current – Measure	120 nA to 1.2 µA (1.2 to 12) µA (12 to 120) µA 120 µA to 1.2 mA (1.2 to 12) mA (12 to 120) mA 120 mA to 1.0 A	20 µA/A + 0.05 nA 21 µA/A + 0.1 nA 20 µA/A + 0.8 nA 20 µA/A + 5 nA 20 µA/A + 51 nA 35 µA/A + 510 nA 0.011 % + 10 µA	HP 3458A
Resistance – Generate Fixed Points	1 Ω 10 kΩ	6 µΩ 0.03 Ω	Fluke 742A
	1 Ω 1.9 Ω 10 Ω 19 Ω 100 Ω 190 Ω 1 kΩ 1.9 kΩ 10 kΩ 19 kΩ 100 kΩ 190 kΩ 1 MΩ 1.9 MΩ 10 MΩ 19 MΩ 100 MΩ	84 µΩ 0.16 mΩ 0.21 mΩ 0.42 mΩ 1.0 mΩ 1.7 mΩ 8.0 mΩ 15 mΩ 80 mΩ 0.15 Ω 0.9 Ω 1.7 Ω 16 Ω 32 Ω 320 Ω 780 Ω 9.8 kΩ	Fluke 5720A



Parameter / Equipment	Range	CMC ^{2, 6} (±)	Comments
Resistance – Measure	(1 to 12) Ω (12 to 120) Ω 120 Ω to 1.2 kΩ (1.2 to 12) kΩ (12 to 120) kΩ 120 kΩ to 1.2 MΩ (1.2 to 12) MΩ (12 to 120) MΩ 120 MΩ to 1 GΩ	15 μΩ/Ω + 0.06 mΩ 12 μΩ/Ω + 0.6 mΩ 10 μΩ/Ω + 0.6 mΩ 10 μΩ/Ω + 6.5 mΩ 10 μΩ/Ω + 63 mΩ 15 μΩ/Ω + 2 Ω 51 μΩ/Ω + 110 Ω 0.050 % + 1 kΩ 0.50 % + 12 kΩ	HP 3458A

Parameter / Range	Frequency	CMC ^{2, 6} (±)	Comments
AC Voltage – Generate			
(1 to 2.2) mV	(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 1 MHz	0.022 % + 4 μV 88 μV/V + 4 μV 79 μV/V + 4 μV 0.018 % + 4 μV 0.048 % + 5 μV 0.092 % + 10 μV 0.12 % + 20 μV 0.25 % + 20 μV	Fluke 5720A
(2.2 to 22) mV	(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 1 MHz	0.022 % + 4 μV 88 μV/V + 4 μV 79 μV/V + 4 μV 0.018 % + 4 μV 0.048 % + 5 μV 0.092 % + 10 μV 0.12 % + 20 μV 0.25 % + 20 μV	
(22 to 220) mV	(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 1 MHz	0.022 % + 12 μV 88 μV/V + 7 μV 79 μV/V + 7 μV 0.018 % + 7 μV 0.044 % + 17 μV 0.076 % + 20 μV 0.12 % + 25 μV 0.25 % + 45 μV	



Parameter / Range	Frequency	CMC ^{2, 6} (±)	Comments
AC Voltage – Generate (continued)			
220 mV to 2.2 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 1 MHz	0.022 % + 44 μV 83 μV/V + 16 μV 43 μV/V + 9 μV 72 μV/V + 12 μV 0.011 % + 31 μV 0.034 % + 81 μV 0.090 % + 210 μV 0.15 % + 310 μV	Fluke 5720A
(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 1 MHz	0.022 % + 0.44 mV 83 μV/V + 0.16 mV 43 μV/V + 0.06 mV 72 μV/V + 0.12 mV 96 μV/V + 0.20 mV 0.026 % + 0.61 mV 0.090 % + 2.0 mV 0.13 % + 3.3 mV	
(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 1 MHz	0.022 % + 4.0 mV 86 μV/V + 1.5 mV 49 μV/V + 0.60 mV 76 μV/V + 1.0 mV 0.013 % + 3.0 mV 0.080 % + 17 mV 0.42 % + 40 mV 0.70 % + 80 mV	
(220 to 1100) V	50 Hz to 1 kHz	60 μV/V + 4 mV	
AC Voltage – Measure			
(1 to 10) mV	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.03 % + 3.2 μV 0.02 % + 1.1 μV 0.03 % + 1.1 μV 0.10 % + 1.1 μV 0.5 % + 1.1 μV 4 % + 2.1 μV	HP 3458A



Parameter / Range	Frequency	CMC ^{2, 6} (\pm)	Comments
AC Voltage – Measure (cont)			
(10 to 100) mV	(1 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	75 μ V/V + 4.3 μ V 71 μ V/V + 2.2 μ V 0.014 % + 2.2 μ V 0.03 % + 2.1 μ V 0.08 % + 2.1 μ V 0.3 % + 11 μ V 1 % + 11 μ V 1.5 % + 10 μ V	HP 3458A
100 mV to 1 V	(1 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	75 μ V/V + 43 μ V 71 μ V/V + 22 μ V 0.014 % + 22 μ V 0.03 % + 21 μ V 0.08 % + 21 μ V 0.3 % + 110 μ V 1 % + 110 μ V 1.5 % + 100 μ V	
(1 to 10) V	(1 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	75 μ V/V + 0.43 mV 71 μ V/V + 0.22 mV 0.014 % + 0.22 mV 0.03 % + 0.21 mV 0.08 % + 0.21 mV 0.3 % + 1 mV 1 % + 1 mV 1.5 % + 1 mV	
(10 to 100) V	(1 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 % + 4 mV 0.02 % + 22 mV 0.02 % + 22 mV 0.035 % + 21 mV 0.12 % + 21 mV 0.4 % + 110 mV 1.5 % + 110 mV	
(100 to 1000) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.04 % + 43 mV 0.04 % + 21 mV 0.06 % + 22 mV 0.12 % + 21 mV 0.3 % + 21 mV	



Parameter / Range	Frequency	CMC ^{2, 4, 6} (±)	Comments
AC Voltage ³ – Measure (0.5 to 10) V	(1 to 10) kHz	0.05 %	Keithley 2010
AC Current – Generate (22 to 220) µA	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.024 % + 17 nA 0.015 % + 10 nA 0.011 % + 9 nA 0.026 % + 12 nA 0.091 % + 65 nA	Fluke 5720A
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	0.024 % + 41 nA 0.015 % + 36 nA 0.011 % + 38 nA 0.019 % + 120 nA 0.091 % + 650 nA	
(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	0.024 % + 0.42 µA 0.014 % + 0.36 µA 0.011 % + 0.36 µA 0.019 % + 0.55 µA 0.094 % + 5 µA	
(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	0.024 % + 4.2 µA 0.014 % + 3.6 µA 0.011 % + 2.5 µA 0.019 % + 3.5 µA 0.094 % + 10 µA	
250 mA to 2.2 A	20 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.025 % + 36 µA 0.040 % + 82 µA 0.60 % + 170 µA	
(3 to < 11) A	(45 to 100) Hz 100 Hz to 1 kHz	0.05 % + 2 mA 0.08 % + 2 mA	
(11 to 20) A	(45 to 100) Hz 100 Hz to 1 kHz	0.09 % + 5 mA 0.12 % + 5 mA	
AC Current – Measure (12 to 120) µA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz	0.41 % + 21 nA 0.16 % + 21 nA 0.06 % + 21 nA 0.06 % + 21 nA	HP 3458A



Parameter / Range	Frequency	CMC ^{2,6} (±)	Comments
AC Current – Measure (continued)			
120 µA to 1.2 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 % + 0.21 µA 0.16 % + 0.21 µA 0.06 % + 0.21 µA 0.03 % + 0.21 µA 0.06 % + 0.21 µA 0.41 % + 0.41 µA 0.57 % + 1.6 µA	HP 3458A
(1.2 to 12) 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 % + 2.1 µA 0.16 % + 2.1 µA 0.06 % + 2.1 µA 0.03 % + 2.1 µA 0.06 % + 2.1 µA 0.41 % + 4.1 µA 0.57 % + 16 µA	
(12 to 120) 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 % + 21 µA 0.16 % + 21 µA 0.06 % + 21 µA 0.03 % + 21 µA 0.06 % + 21 µA 0.41 % + 41 µA 0.57 % + 160 µA	
120 mA to 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	0.41 % + 0.21 mA 0.16 % + 0.21 mA 0.08 % + 0.21 mA 0.10 % + 0.21 mA 0.31 % + 0.21 mA 1 % + 0.41 mA	

Parameter / Equipment	Range	CMC ² (±)	Comments
Calibration of Thermocouple Devices by Electrical Simulation –			
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.38 °C 0.12 °C 0.11 °C 0.12 °C 0.16 °C	Fluke 5522A

Parameter / Equipment	Range	CMC ² (±)	Comments
Calibration of Thermocouple Devices by Electrical Simulation – (cont)			
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 0.12 °C 0.11 °C 0.13 °C 0.18 °C	Fluke 5522A
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.25 °C 0.14 °C 0.12 °C 0.20 °C 0.31 °C	
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.44 °C 0.27 °C 0.25 °C 0.31 °C	
Type S	(0 to 250) °C (250 to 1400) °C (1400 to 1760) °C	0.36 °C 0.28 °C 0.35 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.48 °C 0.19 °C 0.12 °C 0.11 °C	



Parameter / Equipment	Range	CMC ² (±)	Comments
Calibration of Thermocouple Devices by Electrical Simulation ³ –			
Type E	(-250 to -100.0) °C (-100.0 to 1000) °C	1.1 °C 0.51 °C	Fluke 714
Type J	(-210 to -0.0) °C (0.0 to 800) °C (800 to 1200) °C	0.72 °C 0.50 °C 0.62 °C	
Type K	(-200 to 0.0) °C (0.0 to 1000) °C (1000 to 1372) °C	0.97 °C 0.62 °C 0.88 °C	
Type R and S	(-20 to 0.0) °C (0.0 to 1767) °C	2.4 °C 1.7 °C	
Type T	(-250 to 0.0) °C (0.0 to 400) °C	1.1 °C 0.49 °C	
Calibration of RTD Devices by Electrical Simulation –			
Pt 385, 100 Ω	(-200 to 0) °C (0 to 100) °C (100 to 400) °C (400 to 630) °C (630 to 800) °C	0.04 °C 0.06 °C 0.08 °C 0.09 °C 0.18 °C	Fluke 5522A
Pt 3916, 100 Ω	(-200 to -190) °C (-190 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 600) °C (600 to 630) °C	0.19 °C 0.04 °C 0.05 °C 0.06 °C 0.08 °C 0.18 °C	
Pt 3926, 100 Ω	(-200 to 0) °C (0 to 100) °C (100 to 400) °C (400 to 630) °C	0.04 °C 0.06 °C 0.08 °C 0.09 °C	



Parameter / Equipment	Range	CMC ² (±)	Comments
Calibration of RTD Devices by Electrical Simulation ³ –			
Pt 385, 100 Ω	(-200 to 100) °C (100 to 300) °C (300 to 600) °C (600 to 800) °C	0.27 °C 0.38 °C 0.49 °C 0.62 °C	Fluke 712
Pt 3916 and 3926, 100 Ω	(-200 to 100) °C (100 to 300) °C (300 to 630) °C	0.27 °C 0.38 °C 0.49 °C	

III. Mechanical

Parameter / Equipment	Range	CMC ^{2, 4, 5} (±)	Comments
Force – Generate	(1 to 25 000) lbf (1000 to 240 000) lbf	0.01 % 0.05 %	Deadweight systems, transducer systems, ASTM E74, ISO 376, and EN10002-3
Force ³ – Measure	(0.002 to 100) lbf (2 to 25 000) lbf (>25 000 to 1 000 000) lbf	0.05 % 0.13 % 0.25 %	Deadweights, transducer systems, ASTM E4 and ISO 7500-1
Torque – Measuring Equipment	(5 to 2000) lbf·in (200 to 12 000) lbf·in (400 to 100 000) lbf·in	0.06 % 0.06 % 0.05 %	Deadweight systems, ASTM E2428 Transducer systems, ASTM E2428
Torque ³ – Measure and Measuring Equipment	(0.15 to 200) lbf·in (4 to 750 000) lbf·in	0.1 % 0.25 %	Deadweight systems, ASTM E2624 Transducer systems, ASTM E2624

Parameter / Equipment	Range	CMC ^{2, 4, 5, 6} (±)	Comments
Testing Machines ³ – Measure			
Static Alignment	Up to 50% bending	0.5 % + 2 micro-strain	Alignment transducer per ASTM E1012, NASM 1312
Dynamic Force	100 lbf to 500 000 lbf (0.1 Hz to 1 kHz)	0.5 % of maximum IV	Force transducer, ASTM E647, NASM 1312B
Linear Speed (Crosshead)	(0.002 to 500) in/min	0.1 % or 0.0002 in/min	Whichever is greater, linear encoder, ASTM E2658
Rotational Speed (RPM)	(5 to 10 000) RPM	0.033 %	Optical tachometer
Pressure – Measuring Equipment			
Pneumatic	(4 to 500) psi	0.015 %	Deadweight system
Hydraulic	(10 to 10 000) psi	0.02 %	Deadweight system
Pressure ³ – Measure and Measuring Equipment			
Pneumatic	Up to 100 psi	0.02 psi	Additel 681 gage
	Up to 300 psi	0.06 psi	Fluke 2700 gage
	Up to 5 psi	0.1 % + 0.0001 psi	Additel 681 gage and pump kits
	Up to 50 psi	0.1 % + 0.001 psi	
	Up to 500 psi	0.1 % + 0.01 psi	
Hydraulic	Up to 500 psi	0.1 % + 0.01 psi	Additel 681 gage and pump kits
	Up to 5000 psi	0.1 % + 0.1 psi	
	Up to 20 000 psi	0.12 % + 1 psi	Additel 681 20k gage
	Up to 30 000 psi	0.15 % + 1 psi	Additel 681 30k gage
	Up to 50 000 psi	0.15 % + 1 psi	Additel 681 50k gage
	(4 to 50 000) psi	0.25 %	mV/V transducers

Parameter / Equipment	Range	CMC ^{2, 4, 5, 6} (\pm)	Comments
Vacuum – Measuring Equipment Pneumatic	(3 to 29) inHg	0.02 %	Deadweight system
Vacuum ³ – Measure and Measuring Equipment Pneumatic	Up to 28 inHg	0.1 % + 0.001 inHg	Additel 681 gage and pump
Mass – Measure Fixed Points	(1, 2, 5, 10, 20) g (50, 100) g (200, 500, 1000) g (2, 5) kg (10, 20) kg 50 kg (0.1, 0.2) lb (0.25, 0.5, 1, 2) lb (5, 10) lb (20, 50) lb	0.3 mg 0.3 mg 3 mg 0.02 g 0.2 g 0.3 g 0.000 000 6 lb 0.000 01 lb 0.0001 lb 0.001 lb	Reference weights and comparator balances

IV. Thermodynamics

Parameter / Equipment	Range	CMC ^{2, 5} (\pm)	Comments
Temperature – Measure	(-100 to 400) °C	0.04 °C	PRT and meter
Generate	0 °C (-5 to 200) °C (50 to 400) °C	0.01 °C 0.1 °C 0.25 °C	Ice bath PRT and fluid bath PRT and dry-well

Parameter / Equipment	Range	CMC ^{2, 5} (±)	Comments
Temperature ³ –			
Measure	(-200 to 660) °C	0.05 °C	PRT and Fluke 1524 meter
Generate	(-5 to 660) °C	0.085 °C	PRT and Fluke 1524 meter with fluid bath or dry-well
Relative Humidity –			
Generate	(10 to 90) % RH 11 % RH 33 % RH 75 % RH	0.6 % RH 1.4 % RH 1.3 % RH 1.6 % RH	Thunder Scientific 1200 Vaisala HMK 15
Measure	(10 to 75) % RH	2 % RH	Vaisala HMP75

V. Time & Frequency

Parameter / Equipment	Range	CMC ^{2, 5} (±)	Comments
Frequency –			
Generate	(5, 10) MHz 1 Hz to 20 MHz	1 x 10 ⁻¹¹ Hz 1 x 10 ⁻⁸ Hz	Fluke 910 GPS Agilent 33220A
Measure	1 Hz to 225 MHz	1 x 10 ⁻¹⁰ Hz	Agilent 53131A

VI. Vibration

Parameter / Equipment	Range	CMC ^{2, 4, 5} (±)	Comments
Vibration – Measure and Measuring Equipment	(3 to < 100) Hz	1.5 %	LF accelerometer calibration system
	≥ 100 Hz to 1 kHz	1.1 %	
	(5 to < 100) Hz	1.3 %	HF accelerometer calibration system
	≥ 100 Hz to 1 kHz	1.2 %	
(> 1 to 5) kHz	1.4 %		
(> 5 to 10) kHz	1.9 %		
Vibration ³ – Measure and Measuring Equipment	(3 to < 100) Hz	1.6 %	LF accelerometer calibration system BK 3629
	(100 to 500) Hz	1.3 %	
	3 Hz to 2 kHz	2.0 %	LF accelerometer calibration system TMS 9210D
	10 Hz to 5 kHz	2.0 %	HF accelerometer calibration system TMS 9110D
(>5 to 10) kHz	3.0 %		

¹ This laboratory offers limited commercial calibration service 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 services are 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 In the statement of CMC, the percent is defined as the percentage of reading unless otherwise noted, *L* represents the Length in inches; “IV” represents Indicated Value.

⁵ 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.

⁶ The measurands stated are generated using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure the measurand in the ranges indicated. CMCs are expressed as either a specific value that covers the full range or as a fraction of the reading plus a fixed floor specification.

⁷ This scope meets A2LA’s *P112 Flexible Scope Policy*.



Accredited Laboratory

A2LA has accredited

MTS SYSTEMS CORPORATION MTS CALIBRATION ORGANIZATION

Eden Prairie, MN

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 19th day of October 2022.

A blue ink signature of a person, likely the Vice President of Accreditation Services, written over a horizontal line.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1145.01
Valid to September 30, 2024

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