



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

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CALIBRATION

Valid To: November 30, 2026

Certificate Number: 1995.01

In recognition of the successful completion of the A2LA evaluation process (including an assessment of the organization's compliance with A2LA's Calibration Program Requirements), accreditation is granted to this laboratory to perform the following calibrations^{1,11}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2,7} (±)	Comments
Gage Blocks	Up to 1 in (1 to 4) in (4 to 20) in	(2.4 + 0.79L) μin (2.1 + 1.1L) μin (1.0 + 1.3L) μin	By mechanical comparison with reference gage blocks
Length Standards ^{3,9}	Up to 80 in	(4.5 + 1.3L) μin	P&W Lab Master UMM, reference gage blocks
Bore Gages ^{3,9}	Up to 5 in	0.000 40 in	Master ring gages
Micrometers ^{3,9}	Up to 4 in (4 to 24) in (24 to 80) in	(4.5 + 11L) μin (39 + 4.3L) μin (3.1 + 5.7L) μin	Gage blocks
Calipers ^{3,9}	Up to 80 in	(98 + 2L) μin	Gage blocks
Indicators - Dial & Test Indicators ^{3,9}	Up to 8 in	(18 + 4.6L) μin	Gage blocks & gage stand

Parameter/Equipment	Range	CMC ^{2,7} (\pm)	Comments
Ruled Standards ^{3,9} – Steel Rules Steel Tape	Up to 60 in Up to 100 ft	(400 + 200L) μ in 0.016 in	Precision rule & microscope Precision rule, microscope, standard tape
Plain Ring Gages ⁹	(0.05 to 14) in	(10 + 1.8D) μ in	ULM & Master rings
Plain Plug & Pin Gages ^{3,9}	Up to 12 in	(76 + 3L) μ in	ULM & gage blocks
Thread Measuring Wires	(1 to 120) TPI	5 μ in	P&W Lab Master UMM
Thread Plug Gages – Major Diameter ⁹ Pitch Diameter ⁹	Up to 5 in Up to 5 in (4 to 80) TPI	68 μ in 63 μ in	ULM & gage blocks Thread wires
Coating Thickness Gages ^{3,9}	Up to 60 mils	(0.071 + 0.0061L) mils	Coating thickness standards
Ultrasonic Thickness Gages ^{3,9}	Up to 1 in	0.000 59 in	Step block standards
Height Gages ³	Up to 24 in	(50 + 8L) μ in	Gage blocks & surface plate
Surface Roughness Testers ^{3,9}	Ra (14 to 16) μ in Ra (114 to 120) μ in	2.4 μ in 2.4 μ in	Surface roughness specimens

II. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 4, 6, 10} (±)	Comments
DC Voltage –Generate ^{3, 9} Fixed points	Up 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	14 μV/V + 0.4 μV 6.6 μV/V + 0.7 μV 4.4 μV/V + 2.5 μV 4.4 μV/V + 4 μV 6.4 μV/V + 40 μV 9.3 μV/V + 400 μV	Fluke 5720A calibrator
	0.1 V 1 V	2.2 μV/V 1.7 μV/V	Datron 4910 w/ divider
	10 V	0.50 μV/V	Datron 4910
	100 V 1000 V	1.8 μV/V 2.2 μV/V	Datron 4910 w/ divider
DC Voltage –Measure ^{3, 9}	(0 to 200) mV 200 mV to 2 V (2 to 20) V (20 to 200) V (200 to 1050) V	1.0 μV/V + 0.41 μV 0.71 μV/V + 0.40 μV 0.71 μV/V + 4.0 μV 1.1 μV/V + 40 μV 1.5 μV/V + 0.50 mV	Fluke 8508A Opt. 01 DMM characterized with 10V ref.
DC High Voltage – Generate & Measure ^{3, 9}	(1 to 120) kV	0.12 %	Ross VD120 HV divider w/ Agilent 34401A meter & high voltage DC source
DC Current – Generate ^{3, 9}	Up to 220 μA 220 μA to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A	53 μA/A + 6 nA 47 μA/A + 7 nA 47 μA/A + 40 nA 57 μA/A + 0.7 μA 0.010 % + 1.2 μA	Fluke 5720A calibrator
	(2 to 20) A (20 to 120) A	0.016 % + 0.8 mA 0.014 % + 4.8 mA	Fluke 52120A amplifier
Current Clamps ^{3, 9}	(10 to 16.5) A (16.5 to 150) A (150 to 1025) A	0.25 % + 0.002 A 0.26 % + 0.015 A 0.28 % + 0.05 A	Fluke 5522A & 50 turn coil
	(100 to 5000) A	0.81 %	Fluke 52120A & 25/50 turn coil

Parameter/Equipment	Range	CMC ^{2, 4, 5, 6, 10} (\pm)	Comments
DC Current – Measure ^{3, 9}	Up to 200 μ A 200 μ A to 2 mA (2 to 20) mA (20 to 200) mA	5.2 μ A/A + 0.1 nA 5.3 μ A/A + 1 nA 5.3 μ A/A + 0.01 μ A 5.1 μ A/A + 0.1 μ A	Fluke 8508A Opt. 01 DMM, standard resistors
	200 mA to 1 A (1 A to 10 A) (10 to 20) A (20 to 50) A (50 to 100) A	14 μ A/A + 1 μ A 14 μ A/A + 2 μ A 0.013 % + 0.01 mA 0.013 % + 0.02 mA 0.013 % + 0.1 mA	Fluke 8508A Opt. 01 DMM, standard shunts
DC Current – Generate & Measure ³	(100 to 1000) A	0.25 %	Empro shunts, Agilent 3458A & current source
DC Power – Generate ^{3, 9}	Up to 109 μ W (0.109 to 1.09) mW (1.09 to 10.9) mW (10.9 to 109) mW (0.109 to 1.09) W (1.09 to 10.9) W (10.9 to 109) W (109 to 337) W (337 to 990) W (0.99 to 3.06) kW (3.06 to 11.2) kW (11.2 to 20.9) kW	0.023 % 0.014 % 0.013 % 0.013 % 0.013 % 0.013 % 0.013 % 0.013 % 0.013 % 0.027 % 0.045 % 0.064 % 0.12 %	Fluke 5522A calibrator

Parameter/Equipment	Range	CMC ^{2, 4, 5, 6, 10} (\pm)	Comments	
Resistance – Generate	Fixed Points	0.0001 Ω	0.25 %	Empro 2672 shunt
		0.001 Ω	0.013 %	Ohm-Labs CS-100 shunt
0.01 Ω		0.013 %	Ohm-Labs CS-50 shunt	
0.1 Ω		13 $\mu\Omega/\Omega$	Ohm-Labs CS-10 shunt	
1 Ω		1.2 $\mu\Omega/\Omega$	Fluke 742A-1	
10 Ω		1.8 $\mu\Omega/\Omega$	Fluke 742A-10	
25 Ω		2.6 $\mu\Omega/\Omega$	Fluke 742A-25	
100 Ω		1.9 $\mu\Omega/\Omega$	Fluke 742A-100	
1 k Ω		1.6 $\mu\Omega/\Omega$	Fluke 742A-1K	
10 k Ω		0.74 $\mu\Omega/\Omega$	ESI SR-104 standard resistor	
100 k Ω		2.5 $\mu\Omega/\Omega$	Fluke 742A-100K	
1 M Ω		8.2 $\mu\Omega/\Omega$	Fluke 742A-1M	
10 M Ω		5.2 $\mu\Omega/\Omega$	Fluke 742A-10M	
100 M Ω		15 $\mu\Omega/\Omega$	Ohm Labs 108	
1 G Ω		31 $\mu\Omega/\Omega$	Fluke 8508A-7000K	
10 G Ω		2.4 %	Fixed resistor	
100 G Ω		5.8 %	Fixed resistor	
Variable Range ^{3, 9}		0 Ω	41 $\mu\Omega$	Fluke 5720A calibrator
		1.9 Ω	120 $\mu\Omega/\Omega$	
	19 Ω	28 $\mu\Omega/\Omega$		
	190 Ω	14 $\mu\Omega/\Omega$		
	1.9 k Ω	12 $\mu\Omega/\Omega$		
	19 k Ω	12 $\mu\Omega/\Omega$		
	190 k Ω	16 $\mu\Omega/\Omega$		
	1.9 M Ω	28 $\mu\Omega/\Omega$		
	19 M Ω	73 $\mu\Omega/\Omega$		
	(0 to 11) Ω	51 $\mu\Omega/\Omega$ + 0.001 Ω	Fluke 5522A calibrator	
	(11 to 33) Ω	35 $\mu\Omega/\Omega$ + 0.0015 Ω		
	(33 to 110) Ω	33 $\mu\Omega/\Omega$ + 0.0014 Ω		
	(110 to 330) Ω	33 $\mu\Omega/\Omega$ + 0.002 Ω		
	330 Ω to 1.1 k Ω	33 $\mu\Omega/\Omega$ + 0.002 Ω		
	(1.1 to 3.3) k Ω	33 $\mu\Omega/\Omega$ + 0.02 Ω		
	(3.3 to 11) k Ω	33 $\mu\Omega/\Omega$ + 0.02 Ω		
	(11 to 33) k Ω	33 $\mu\Omega/\Omega$ + 0.2 Ω		
	(33 to 110) k Ω	33 $\mu\Omega/\Omega$ + 0.2 Ω		
	(110 to 330) k Ω	37 $\mu\Omega/\Omega$ + 2 Ω		
	330 Ω to 1.1 M Ω	38 $\mu\Omega/\Omega$ + 2 Ω		
	(1.1 to 3.3) M Ω	70 $\mu\Omega/\Omega$ + 30 Ω		
	(3.3 to 11) M Ω	0.015 % + 50 Ω		
	(11 to 33) M Ω	0.029 % + 2.5 k Ω		
	(33 to 110) M Ω	0.06 % + 3 k Ω		
	(110 to 330) M Ω	0.35 % + 0.1 M Ω		
	(330 to 1100) M Ω	1.7 % + 0.5 M Ω		

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Electrical Calibration of Thermocouple Indicators ^{3,9} – Generate & Measure			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.34 °C 0.26 °C 0.23 °C 0.26 °C	Fluke 5522A calibrator
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 0.12 °C 0.13 °C 0.17 °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 0.12 °C 0.14 °C 0.19 °C	
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 0.20 °C 0.31 °C	
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 0.18 °C 0.16 °C 0.15 °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 0.27 °C 0.26 °C 0.31 °C	
Type S	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.36 °C 0.28 °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 0.20 °C 0.13 °C 0.12 °C	

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Electrical Calibration of RTD Indicator ^{3,9} – Generate Only			
Pt385, 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	0.04 °C 0.04 °C 0.04 °C 0.07 °C 0.08 °C 0.09 °C 0.19 °C	Fluke 5522A calibrator

Parameter/Range	Frequency	CMC ^{2,4,10} (±)	Comments
AC Voltage – Generate ^{3,9}			
Up 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	0.23 % + 4 μV 0.16 % + 4 μV 0.13 % + 4 μV 0.18 % + 4 μV 0.23 % + 5 μV 0.37 % + 10 μV 0.46 % + 20 μV 0.62 % + 20 μV	Fluke 5720A calibrator
(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	0.040 % + 4 μV 0.019 % + 4 μV 0.017 % + 4 μV 0.031 % + 4 μV 0.069 % + 5 μV 0.14 % + 10 μV 0.18 % + 20 μV 0.34 % + 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	0.033 % + 12 μV 0.013 % + 7 μV 0.010 % + 7 μV 0.025 % + 7 μV 0.056 % + 17 μV 0.11 % + 20 μV 0.17 % + 25 μV 0.36 % + 45 μV	

Parameter/Range	Frequency	CMC ^{2, 4, 10} (±)	Comments
AC Voltage – Generate ³ (cont)			
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	0.035 % + 40 μV 0.013 % + 15 μV 55 μV/V + 8 μV 100 μV/V + 10 μV 0.015 % + 30 μV 0.059 % + 80 μV 0.13 % + 200 μV 0.27 % + 300 μV	Fluke 5720A calibrator
(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	0.035 % + 400 μV 0.013 % + 150 μV 59 μV/V + 50 μV 100 μV/V + 100 μV 0.014 % + 200 μV 0.046 % + 0.6 mV 0.13 % + 2 mV 0.26 % + 3.2 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	0.035 % + 4 mV 0.013 % + 1.5 mV 68 μV/V + 0.6 mV 0.011 % + 1 mV 0.019 % + 2.5 mV 0.092 % + 16 mV 0.45 % + 40 mV 0.82 % + 80 mV	Note: Voltage output above 100 kHz exhibits a linear drop off of -2.2 mV per Hz above 100 kHz.
(220 to 1100) V	(10 to 50) Hz 50 Hz to 1 kHz (1 to 20) kHz (20 to 30) kHz	0.038 % + 16 mV 87 μV/V + 3.5 mV 0.020 % + 6 mV 0.070 % + 11 mV	Fluke 5720A calibrator Fluke 5725A amplifier
(220 to 750) V	(30 to 50) kHz (50 to 100) kHz	0.070 % + 11 mV 0.27 % + 45 mV	Fluke 5725A amplifier
AC Current – Generate ^{3, 9}			
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)	0.042 % + 16 nA 0.024 % + 10 nA 0.014 % + 8 nA 0.034 % + 12 nA 0.20 % + 65 nA	Fluke 5720A calibrator

Parameter/Range	Frequency	CMC ^{2, 6, 10} (\pm)	Comments
AC Current – Generate (cont)			
(0.22 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	0.039 % + 40 nA 0.024 % + 35 nA 0.020 % + 35 nA 0.032 % + 0.11 μ A 0.15 % + 0.65 μ A	Fluke 52120A amplifier
(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	0.048 % + 0.4 μ A 0.028 % + 0.35 μ A 0.022 % + 0.35 μ A 0.037 % + 0.55 μ A 0.20 % + 5 μ A	
(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	0.047 % + 4 μ A 0.028 % + 3.5 μ A 0.022 % + 2.5 μ A 0.034 % + 3.5 μ A 0.17 % + 10 μ A	
(0.22 to 2.2) A	40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.044 % + 35 μ A 0.071 % + 80 μ A 1.0 % + 0.16 mA	
(2 to 20) A	(10 to 65) Hz (65 to 300) Hz 300 Hz to 1 kHz (1 to 3) kHz (3 to 6) kHz (6 to 10) kHz	0.022 % + 9.4 mA 0.032 % + 9.4 mA 0.090 % + 9.4 mA 0.27 % + 31 mA 0.90 % + 62 mA 2.7 % + 94 mA	
(20 to 120) A	(10 to 65) Hz (65 to 300) Hz 300 Hz to 1 kHz (1 to 3) kHz (3 to 6) kHz	0.031 % + 19 mA 0.038 % + 28 mA 0.092 % + 94 mA 0.27 % + 0.23 A 0.92 % + 0.42 A	

Parameter/Range	Frequency	CMC ^{2, 4, 10} (\pm)	Comments
Current Clamps ³ –			
(10 to 16.5) A	(45 to 65) Hz (65 to 440) Hz	0.29 % + 0.003 A 0.83 % + 0.003 A	Fluke 5522A + 50 turn coil
(16.5 to 150) A	(45 to 65) Hz (65 to 440) Hz	0.32 % + 0.025 A 0.87 % + 0.027 A	
(150 to 1025) A	(45 to 65) Hz (65 to 440) Hz	0.32 % + 0.09 A 1.5 % + 0.1 A	
(0 to 6000) A	(10 to 65) Hz (65 to 300) Hz	0.82 % + 0.47 A 0.82 % + 0.84 A	Fluke 52120A + 25/50 turn coil
AC Voltage – Measure ^{3, 9}			
Up 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	0.20 % + 1.3 μ V 0.088 % + 1.3 μ V 0.053 % + 1.3 μ V 0.096 % + 2 μ V 0.14 % + 2.5 μ V 0.27 % + 4 μ V 0.28 % + 8 μ V 0.42 % + 8 μ V	Fluke 5790A
(2.2 to 7) 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	0.099 % + 1.3 μ V 0.044 % + 1.3 μ V 0.026 % + 1.3 μ V 0.047 % + 2 μ V 0.070 % + 2.5 μ V 0.14 % + 4 μ V 0.15 % + 8 μ V 0.27 % + 8 μ V	
(7 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	0.035 % + 1.3 μ V 0.023 % + 1.3 μ V 0.014 % + 1.3 μ V 0.025 % + 2 μ V 0.036 % + 2.5 μ V 0.094 % + 4 μ V 0.10 % + 8 μ V 0.20 % + 8 μ V	

Parameter/Range	Frequency	CMC ^{2, 4, 5, 6, 10} (\pm)	Comments
AC Voltage – Measure ^{3, 9} (cont)			
(22 to 70) mV	(9.5 to 10) Hz (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	0.12 % + 1.5 μ V 0.030 % + 1.5 μ V 0.016 % + 1.5 μ V 0.0086 % + 1.5 μ V 0.016 % + 2 μ V 0.031 % + 2.5 μ V 0.061 % + 4 μ V 0.082 % + 8 μ V 0.14 % + 8 μ V	Fluke 5790A
(70 to 220) mV	(9.5 to 10) Hz (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	0.12 % + 1.5 μ V 0.025 % + 1.5 μ V 0.010 % + 1.5 μ V 0.0052 % + 1.5 μ V 0.0082 % + 2 μ V 0.019 % + 2.5 μ V 0.030 % + 4 μ V 0.046 % + 8 μ V 0.12 % + 8 μ V	
(220 to 700) mV	(9.5 to 10) Hz (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	0.12 % + 1.5 μ V 0.025 % + 1.5 μ V 0.0095 % + 1.5 μ V 0.0041 % + 1.5 μ V 0.0060 % + 2 μ V 0.0094 % + 2.5 μ V 0.021 % + 4 μ V 0.036 % + 8 μ V 0.11 % + 8 μ V	
(0.7 to 2.2) V	(9.5 to 10) Hz (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	0.12 % 0.023 % 0.0080 % 0.0028 % 0.0054 % 0.0083 % 0.019 % 0.031 % 0.11 %	

Parameter/Equipment	Range	CMC ^{2, 4, 5, 6, 10} (±)	Comments
AC Voltage – Measure ^{3, 9} (cont)			
(2.2 to 7) V	(9.5 to 10) Hz (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	0.12 % 0.023 % 0.0081 % 0.0029 % 0.0056 % 0.0096 % 0.022 % 0.047 % 0.14 %	Fluke 5790A
(7 to 22) V	(9.5 to 10) Hz (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	0.12 % 0.023 % 0.0081 % 0.0033 % 0.0057 % 0.0094 % 0.022 % 0.047 % 0.14 %	
(22 to 70) V	(9.5 to 10) Hz (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	0.12 % 0.023 % 0.0082 % 0.0039 % 0.0067 % 0.011 % 0.023 % 0.048 % 0.14 %	
(70 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	0.023 % 0.0082 % 0.0038 % 0.0081 % 0.011 % 0.024 % 0.058 %	
(220 to 700) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz	0.023 % 0.012 % 0.0050 % 0.015 % 0.058 %	

Parameter/Range	Frequency	CMC ^{2, 4, 5, 6, 10} (±)	Comments
AC Voltage – Measure ^{3, 9} (cont) (700 to 1000) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz	0.023 % 0.012 % 0.0049 % 0.015 % 0.058 %	Fluke 5790A
AC High Voltage – Generate & Measure ³ (1 to 84) kV	60 Hz	0.68 %	Ross VD120 HV divider w/ Agilent 34401A meter & high voltage AC source
AC Current – Measure ^{3, 9} 10 µA to 20 A (20 to 50) A (50 to 100) A	10 Hz to 10 kHz 10 Hz to 6 kHz 10 Hz to 6 kHz	0.015 % 0.028 % 0.028 %	Fluke 5790A w/ Holt HCS-1 Ohm-Labs CS-50 shunt Ohm-Labs CS-100 shunt
AC Current – Generate & Measure ³ (100 to 1000) A (1000 to 5000) A (5000 to 6000) A	60 Hz 60 Hz 60 Hz	0.05 % 0.10 % 1.0 %	Amplifier aided current transformer, Agilent 3458A, Current Source PEM LFR 30/300, Agilent 3458A, & current source

III. Mechanical

Parameter/Equipment	Range	CMC ^{2,6,10} (±)	Comments
Torque Wrenches ^{3,9}	5 lbf-in to 2500 lbf-ft	0.27 %	AKO torque system
Torque Multipliers ^{3,9}	Up to 5000 lbf-ft	1.6 %	AWS torque multiplier system
Hydraulic, Pneumatic & Electric Torque Tools ^{3,9}	Up to 20 000 lbf-ft	0.5 %	AKO torque system
Pressure ^{3,9} (Pneumatic) –			
Calibration of High Accuracy Transfer Standards	(0.005 to 1) Torr	0.49 %	MKS capacitance manometer
	(0.2 to 100) psia	0.0013 %	Ruska 2465
	(100 to 1000) psia	0.0028 %	
Effective Area Determination of Piston-Cylinder Unit (PCU) or Ball Nozzle Unit (BNU)	(100 to 2500) psi	0.0031 %	Ruska 2470
	(6 to 12 000) psi	0.0037 %	oil to gas (2400/2413)
	(0.14 to 30) psi	0.0082 %	Deadweight tester
	(10 to 300) psi	0.0063 %	effective area by cross
	(100 to 2500) psi	0.0059 %	float method
Pressure ^{3,9} (Hydraulic) –			
Effective Area Determination of Piston-Cylinder Unit (PCU)	(100 to 1500) psi	0.0066 %	Deadweight tester
	(1000 to 15 000) psi	0.0071 %	effective area by cross
			float method.
Calibration of High Accuracy Transfer Standards	(6 to 2400) psi	0.0025 %	Ruska 2400HL
	(30 to 12 000) psi	0.0035 %	
	Up to 50 000 psi	0.010 %	Budenberg 5306
	(50 to 60 000) psi	0.12 %	Additel reference gauge

Parameter/Equipment	Range	CMC ² (±)	Comments
Conventional Mass	1 mg to 10 g (10 to 50) g (50 to 100) g (100 to 200) g (200 to 350) g (350 to 500) g (500 to 1000) g (1000 to 2000) g (2000 to 5000) g (5000 to 30 000) g	0.000 022 g 0.000 034 g 0.000 080 g 0.000 15 g 0.000 60 g 0.000 67 g 0.000 78 g 0.0062 g 0.0082 g 0.059 g	Single substitution method
Balances & Scales ^{3,9}	1 mg to 50 g (50 to 100) g (100 to 150) g (150 to 350) g (350 to 500) g (500 to 1100) g (1100 to 3000) g (3000 to 6000) g (6000 to 12 000) g (12 000 to 30 000) g (50 to 100) lb (100 to 200) lb (200 to 500) lb	0.000 034 g 0.000 056 g 0.000 063 g 0.000 16 g 0.000 35 g 0.000 53 g 0.0025 g 0.0058 g 0.0065 g 0.013 g 0.0089 lb 0.012 lb 0.019 lb	Class 1 weights Class F weights
Indirect Hardness Verification ^{3,9} – Rockwell HRA Scale HRBW Scale HRC Scale	 (> 20 to ≤ 92) HRA (> 30 to ≤ 90) HRBW (> 20 to ≤ 70) HRC	 0.34 HRA 0.43 HRB 0.41 HRC	 Indirect verification per ASTM E18

IV. Thermodynamics

Parameter/Equipment	Range	CMC ^{2,10} (±)	Comments
Temperature – Measure ^{3,9}	(-197 to -38.8) °C (-38.8 to 0.01) °C 0.01 °C (0.01 to 29.7) °C (29.7 to 156.5) °C (156.5 to 231.9) °C (231.9 to 419.5) °C (491.5 to 660) °C (660 to 900) °C (900 to 1100) °C (1100 to 1450) °C	0.012 °C 0.0024 °C 0.0016 °C 0.0028 °C 0.0040 °C 0.0054 °C 0.0070 °C 0.0095 °C 0.97 °C 1.4 °C 3.5 °C	Hart 5699 SPRT, 1595A Super-Thermometer Hart Scientific 5650 with type S thermocouple & Hart Scientific 1529A
Temperature – Generate ^{3,9}	(-40 to 0.01) °C 0.01 °C (0.01 to 30) °C (30 to 60) °C (40 to 160) °C (160 to 232) °C (232 to 420) °C (420 to 660) °C (660 to 900) °C (900 to 1200) °C	0.0098 °C 0.0017 °C 0.0099 °C 0.014 °C 0.011 °C 0.027 °C 0.039 °C 0.075 °C 1.4 °C 2.0 °C	Hart Scientific 5699 SPRT, 1595A Super-Thermometer with the following source: Fluke 7341 bath Fluke 5901B-G Mini TPW cell Fluke 7341 bath Fluke 6331 bath Fluke 9173 metrology well Hart Scientific 5650 with type S thermocouple, Hart Scientific 1529, & Fluke 9150 furnace
Relative Humidity – Measure & Measuring Devices ^{3,9}	11 % RH 33 % RH 56 % RH 75 % RH 85 % RH	0.66 % RH 0.77 % RH 0.73 % RH 0.96 % RH 1.2 % RH	Vaisala MI70/HMP75 & salt baths

V. Time & Frequency

Parameter/Equipment	Range	CMC ^{2,10} (\pm)	Comments
Frequency – Measure ^{3,9}	0.1 Hz to 2.7 GHz	1.8 parts in 10 ⁸	Fluke PM6681
Frequency – Measuring Equipment ³	0.1 Hz to 20 MHz	1.8 parts in 10 ⁸	Agilent 33250A ref. to Fluke PM6681
	0.01 Hz to 2 MHz	29 μ Hz/Hz	Fluke 5522A
Time Interval – Timers & Stop Watches ^{3,9}			NIST SP 960-12
Time Base ⁸	(0 to 24) hours	0.06 s/day	Helmut Klein 4500 Timometer
Totalize Method	(0 to 24) hours	0.12 s	Fluke PM6681, function generator

¹ This laboratory offers commercial calibration service and field calibration services.

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 Generate. 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.

³ This laboratory performs field calibration activities for these parameters. 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. Field environmental conditions are limited to 15 °C to 30 °C and < 80% relative humidity to 30 °C.

⁴ Fluke 5700A and 5500A CMCs are based upon the temperature the standard was calibrated ($t_{cal} \pm 5$ °C) and assuming the instrument is zeroed at least every seven days or when the ambient temperature changes more than 5 °C. For Resistance, a zero calibration is performed at least every 12 hours within ± 1 °C of use. For AC Current, best uncertainties are determined with the LCOMP off. CMCs are also based upon 1-year floor specifications. 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 Agilent 3458A CMCs are based upon the temperature the standard was calibrated ($t_{cal} \pm 5 \text{ }^\circ\text{C}$) and an auto calibration (ACAL) was performed within the previous 24 hours ($\pm 1 \text{ }^\circ\text{C}$ of ambient temperature.) CMCs are also based upon 1-year floor specifications. CMCs are expressed as either a specific value that covers the full range or as a combination of the fraction/percentage of the reading/output plus a range specification.
- ⁶ In the statement of CMC, percentages are percentages of reading, unless otherwise indicated.
- ⁷ In the statement of CMC, L is the numerical value of the nominal length in inches; D is the diameter of the device in inches.
- ⁸ Applicable when the internal time base (oscillator) of the device under test is/can be measured directly by the frequency counter.
- ⁹ This laboratory may perform field calibration activities for these parameters with their Mobile Laboratory.
- ¹⁰ 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.
- ¹¹ This scope meets A2LA's *P112 Flexible Scope Policy*.



Accredited Laboratory

A2LA has accredited

JM TEST SYSTEMS, LLC.

Baton Rouge, LA

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/NCCL 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 20th day of November 2024.

A blue ink signature of Mr. Trace McInturff, written in a cursive style.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1995.01
Valid to November 30, 2026

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