



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

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CALIBRATION

Valid To: September 30, 2025

Certificate Number: 1078.02

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. Chemical

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
pH – Measuring Equipment	4 pH, 7 pH 10 pH	0.011 pH 0.02 pH	Buffer solutions
Electrolytic Conductivity – Measuring Equipment	≈ 10 μS/cm ≈ 100 μS/cm ≈ 1000 μS/cm ≈ 10 mS/cm	0.62 μS/cm 2.1 μS/cm 4.6 μS/cm 40 μS/cm	Conductivity solutions

II. Dimensional

Parameter/Equipment	Range	CMC ² (±)	Comments
Bore Gages	(0.28 to 5.25) in	27 μin + 16 μin/in	Ring gages
Calipers ³			
Outside, Step, Depth	Up to 80 in	16 μin + 4.8 μin/in	Gage blocks
Inside	Up to 1 in	25 μin	Master ring gage

Parameter/Equipment	Range	CMC ² (±)	Comments
Cylindrical Rings	Up to 8 in	58 μin + 1.2 μin/in	UMM & gage blocks
Cylindrical Plugs / Pins	Up to 8 in	19 μin + 2.6 μin/in	UMM & gage blocks
Gage Amp w/ Probe ³	Up to 0.025 in	12 μin	Gage blocks
Gage Blocks	0.05 in (0.05 to 0.4) in (0.4 to 1) in (1 to 2) in (2 to 3) in (3 to 4) in (4 to 20) in	6.2 μin 5.4 μin 5.5 μin 5.7 μin + 4.7 μin/in 7.5 μin + 4.3 μin/in 9.3 μin + 3.1 μin/in 11 μin + 3.1 μin/in	Gage blocks & comparator
Height Gages ³	Up to 48 in	27 μin + 5 μin/in	Standard reference bars
Indicators ³	Up to 4 in	6.5 μin + 3.2 μin/in	Gage blocks
Length Standards	Up to 8 in (8 to 18) in	13 μin + 2.4 μin/in 47 μin + 3.4 μin/in	UMM & gage blocks
Micrometers – Depth, Inside, Outside	Up to 80 in	8.3 μin + 4.8 μin/in	Gage blocks
Groove	Up to 4 in	8.3 μin + 4.9 μin/in	
Flatness	Up to 1 in diameter	5.5 μin	Optical flat

Parameter/Equipment	Range	CMC ² (±)	Comments
Optical Comparators ³ – Squareness Linear Magnification	(0 to 360)° Up to 12 in 10x, 20x, 50x, 62.5x, 100x	16 " 53 μin + 20 μin/in 230 μin + 39 μin/in	Calibration sphere Glass scale Calibration sphere w/ overlay
Protractors ³ Digital & Bevel	(0 to 90)°	0.085°	Sine bar, gage blocks, cylindrical square, surface plate
Rules/Linear Scales ³	Up to 24 in	0.0029 in	Digiscope master rule
Surface Plate ³ – Flatness Repeatability	Up to 100 in diagonal Up to 0.001 in	$\sqrt{DL} \times 12 \mu\text{in}$ 31 μin	Level meters (<i>DL</i> is the diagonal in inches) Repeat-O-Meter
Tape Measures ³	Up to 55 ft	0.0013 in + 6.4 μin/in	Master rule
Threaded Plug Gages – Simple Pitch Diameter Major Diameter	Up to 8 in (5 to 80) TPI Up to 8 in	83 μin + 7.4 μin/in 23 μin + 4.2 μin/in	UMM, master thread wires UMM
Adjustable Thread Rings	Up to 14 in	Class X (Set Plug Tolerance)	Set using master plug gages

III. Electrical – DC/Low Frequency

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Current – Generate ³			
(29 to 329.99) µA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.13 µA + 1.6 nA/µA 0.12 µA + 1.2 nA/µA 0.11 µA + 1 nA/µA 0.19 µA + 2.4 nA/µA 0.35 µA + 6.4 nA/µA 0.70 µA + 13 nA/µA	Fluke 5520A
330 µA to 3.2999 mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.65 µA + 1.6 µA/mA 0.45 µA + 1 µA/mA 0.39 µA + 0.8 µA/mA 0.69 µA + 1.6 µA/mA 2.9 µA + 1.6 µA/mA 3.4 µA + 8 µA/mA	
(3.3 to 32.999) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	6.4 µA + 1.4 µA/mA 4 µA + 0.72 µA/mA 2.7 µA + 0.32 µA/mA 3.7 µA + 0.64 µA/mA 7.7 + 1.6 µA/mA 14 µA + 3.2 µA/mA	
(33 to 329.99) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	65 µA + 1.4 µA/mA 42 µA + 0.72 µA/mA 29 µA + 0.31 µA/mA 68 µA + 0.8 µA/mA 0.13 mA + 1.6 µA/mA 0.27 mA + 3.2 µA/mA	
330 mA to 1.099 99 A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.56 mA + 1.4 mA/A 0.22 mA + 0.4 mA/A 2.4 mA + 4.8 mA/A 11 mA + 20 mA/A	
(1.1 to 2.999 99) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	1.7 mA + 1.4 mA/A 0.61 mA + 0.48 mA/A 6.1 mA + 4.8 mA/A 26 mA + 20 mA/A	
(3 to 10.9999) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	3.1 mA + 0.48 mA/A 4 mA + 0.8 mA/A 74 mA + 24 mA/A	
(11 to 20.5) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	15 mA + 0.96 mA/A 17 mA + 1.2 mA/A 0.27 A + 24 mA/A	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Current – Generate³			
Toroidal (10 to 16.5) A (16.5 to 150) A (150 to 1025) A	(45 to 65) Hz	26 mA + 2.1 mA/A 50 mA + 1.9 mA/A 0.34 A + 1.9 mA/A	Fluke 5520A w/ 5500A coil
	(10 to 16.5) A (16.5 to 150) A (150 to 1025) A	(65 to 440) Hz 60 mA + 6 mA/A 0.11 A + 5.3 mA/A 0.86 A + 5.3 mA/A	
Nontoroidal (10 to 16.5) A (16.5 to 150) A (150 to 1025) A	(45 to 65) Hz	60 mA + 3.8 mA/A 0.23 A + 3.7 mA/A 1.2 A + 3.7 mA/A	5520A, 3458A, amplifier & shunt
	(10 to 16.5) A (16.5 to 150) A (150 to 1025) A	(65 to 440) Hz 90 mA + 7.2 mA/A 0.28 A + 6.7 mA/A 1.6 A + 6.7 mA/A	
(20 to 120) A	(45 to 65) Hz	0.16 %	5520A, amplifier, Shunt, 3458A w/3KA coil
(120 to 3000) A	(45 to 65) Hz	0.13 %	
AC Current – Measure³			
(5 to 100) µA	(10 to 20) Hz	58 nA + 4 mA/A	HP 3458A
	(20 to 45) Hz 45 Hz to 5 kHz	45 nA + 1.5 mA/A 41 nA + 0.64 mA/A	
(0.1 to 1) mA	(10 to 20) Hz	0.43 µA + 0.0041 mA/mA	
	(20 to 45) Hz (45 to 100) Hz (0.1 to 5) kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.31 µA + 0.0016 mA/mA 0.26 µA + 0.000 67 mA/mA 0.25 µA + 0.000 37 mA/mA 0.26 µA + 0.000 67 mA/mA 0.63 µA + 0.0042 mA/mA 1.8 µA + 0.0056 mA/mA	
(1 to 10) mA	(10 to 20) Hz	2.4 µA + 0.0041 mA/mA	
	(20 to 45) Hz (45 to 100) Hz (0.1 to 5) kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	2.3 µA + 0.0016 mA/mA 2.3 µA + 0.000 67 mA/mA 2.3 µA + 0.000 37 mA/mA 2.3 µA + 0.000 67 mA/mA 4.5 µA + 0.0041 mA/mA 16 µA + 0.0056 mA/mA	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Current – Measure ³ (cont)			
(10 to 100) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz (0.1 to 5) kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	42 µA + 0.004 mA/mA 30 µA + 0.0015 mA/mA 25 µA + 0.0006 mA/mA 24 µA + 0.0003 mA/mA 25 µA + 0.0006 mA/mA 62 µA + 0.004 mA/mA 0.18 mA + 0.0055 mA/mA	HP 3458A
(0.1 to 1) A	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz (0.1 to 5) kHz (5 to 20) kHz (20 to 50) kHz	0.42 mA + 0.0041 A/A 0.3 mA + 0.0017 A/A 0.26 mA + 0.0009 A/A 0.27 mA + 0.0011 A/A 0.37 mA + 0.0031 A/A 0.92 mA + 0.01 A/A	
(1 to 3) A	10 Hz to 5 kHz (5 to 10) kHz	2.9 mA + 1.1 mA/A 20 mA + 2.7 mA/A	Fluke 8845A
(3 to 10) A	10 Hz to 5 kHz (5 to 10) kHz	12 mA + 0.9 mA/A 63 mA + 2.7 mA/A	
AC High Voltage – Measure ³			
(1 to 2) kV	(50 to 100) Hz (100 to 400) Hz	3.1 V + 0.81 mV/V 9/3 V + 4.6 mV/V	Vitretek 4620B
(2 to 20) kV	(50 to 100) Hz	28 V + 2.3 mV/V	

Parameter/Frequency	Range	CMC ^{2,4,5} (±)	Comments
AC Power ³ – Generate			
(45 to 65) Hz, PF = 1 Up to 32.999 mA (33 to 329.999) mA (0.33 to 1.099 99) A (1.1 to 2.9999) A (3 to 10.999 99) A (11 to 20.5) A	Up to 1020 V Up to 33 W (33 to 330) W 330 W to 1.1 kW (1.1 to 3) kW (3 to 11) kW (11 to 20.9) kW	0.1 % 0.062 % 0.072 % 0.075 % 0.087 % 0.14 %	Fluke 5520A

Parameter/Range	Frequency	CMC ^{2, 4, 5} (±)	Comments
AC Flatness ³ - Measure	10 Hz to 1 MHz (1 to 20) MHz (20 to 30) MHz (30 to 50) MHz (50 to 70) MHz (70 to 80) MHz (80 to 100) MHz	0.039 % 0.074 % 0.1 % 0.25 % 0.5 % 0.63 % 0.93 %	EL1100 TVC
AC Voltage – Generate ³			Fluke 5520A
(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 200) kHz (200 to 500) kHz	5.5 μV + 0.64 μV/mV 5 μV + 0.12 μV/mV 5 μV + 0.16 μV/mV 5.6 μV + 0.8 μV/mV 12 μV + 2.8 μV/mV 47 μV + 6.4 μV/mV 47 μV + 6.4 μV/mV	
(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 200) kHz (200 to 500) kHz	14 μV + 0.24 μV/mV 24 μV + 87 nV/mV 11 μV + 0.13 μV/mV 35 μV + 0.28 μV/mV 47 μV + 0.64 μV/mV 0.11 mV + 1.6 μV/mV 0.11 mV + 1.6 μV/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 200) kHz (200 to 500) kHz	0.12 mV + 0.24 mV/V 88 μV + 0.12 mV/V 99 μV + 0.15 mV/V 0.12 mV + 0.24 mV/V 0.29 mV + 0.56 mV/V 1.1 mV + 1.9 mV/V 1.1 mV + 1.9 mV/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	1.3 mV + 0.24 mV/V 0.94 mV + 0.12 mV/V 1.6 mV + 0.18 mV/V 1.4 mV + 0.28 mV/V 3.7 mV + 0.72 mV/V	
(33 to 330) V	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	6.8 mV + 0.15 mV/V 10 mV + 0.16 mV/V 12 mV + 0.2 mV/V 13 mV + 0.24 mV/V 93 mV + 1.6 mV/V	
(330 to 1020) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	87 mV + 0.24 mV/V 74 mV + 0.2 mV/V 88 mV + 0.24 mV/V	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage ³ – Measure			
Up 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	6.1 μV + 0.0003 mV/mV 4.1 μV + 0.0002 mV/mV 4.2 μV + 0.0003 mV/mV 4.9 μV + 0.001 mV/mV 9 μV + 0.005 mV/mV 45 μV + 0.04 mV/mV	Agilent 3458A
(0.1 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 (0.3 to 1) MHz (1 to 2) MHz	12 μV + 0.000 07 mV/mV 2.7 μV + 0.000 07 mV/mV 11 μV + 0.000 14 mV/mV 12 μV + 0.0003 mV/mV 17 μV + 0.0008 mV/mV 47 μV mV + 0.003 mV/mV 0.12 mV + 0.01 mV/mV 3.8 mV + 0.01 mV/mV	
(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 (0.3 to 1) MHz (1 to 2) MHz	0.12 mV + 0.000 07 V/V 0.1 mV + 0.000 07 V/V 0.11 mV + 0.000 14 V/V 0.12 mV + 0.0003 V/V 0.17 mV + 0.0008 V/V 0.47 mV + 0.003 V/V 1.2 mV + 0.010 V/V 38 mV + 0.015 V/V	
(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 (0.3 to 1) MHz (1 to 2) MHz	1.2 mV + 0.000 07 V/V 1 mV + 0.000 07 V/V 1 mV + 0.000 14 V/V 1.2 mV + 0.0003 V/V 1.7 mV + 0.0008 V/V 4.7 mV + 0.003 V/V 12 mV + 0.01 V/V 0.38 V + 0.015 V/V	
(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 (100 to 300) kHz (0.3 to 1) MHz	13 mV + 0.0002 V/V 11 mV + 0.0002 V/V 11 mV + 0.0002 V/V 13 mV + 0.000 35 V/V 21 mV + 0.0012 V/V 57 mV + 0.004 V/V 0.17 V + 0.015 V/V	
	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	98 mV + 0.0004 V/V 84 mV + 0.0004 V/V 98 mV V + 0.0006 V/V 0.14 V + 0.0012 V/V 0.27 V + 0.003 V/V	

Parameter/Range	Frequency	CMC ^{2, 4, 5} (±)	Comments
Capacitance ³ – Generate (0.19 to 0.3999) nF (0.4 to 1.0999) nF (1.1 to 3.2999) nF (3.3 to 10.9999) nF (11 to 32.9999) nF (33 to 109.999) nF (110 to 329.999) nF (0.33 to 1.099 99) μF (1.1 to 3.299 99) μF (3.3 to 10.9999) μF (11 to 32.9999) μF (33 to 109.999) μF (110 to 329.999) μF (0.33 to 1.099 99) mF (1.1 to 3.299 99) mF (3.3 to 10.9999) mF (11 to 32.9999) mF (33 to 110) mF	10 Hz to 10 kHz 10 Hz to 10 kHz 10 Hz to 3 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz (10 to 600) Hz (10 to 300) Hz (10 to 150) Hz (10 to 120) Hz (10 to 80) Hz (0 to 50) Hz (0 to 20) Hz (0 to 6) Hz (0 to 2) Hz (0 to 0.6) Hz (0 to 0.2) Hz	8.8 pF + 4 pF/nF 9.7 pF + 4 pF/nF 13 pF + 4 pF/nF 15 pF + 2 pF/nF 0.1 nF + 2 pF/nF 0.15 nF + 2 pF/nF 0.46 nF + 2 pF/nF 1.5 nF + 2 nF/μF 4.6 nF + 2 nF/μF 15 nF + 2 nF/μF 59 nF + 3.2 nF/μF 0.2 μF + 3.6 nF/μF 0.64 μF + 3.6 nF/μF 2 μF + 3.6 μF/mF 7 μF + 3.5 μF/mF 38 μF + 2.6 μF/mF 90 μF + 6 μF/mF 0.37 mF + 8.8 μF/mF	Fluke 5520A
Capacitance – Generate, Fixed Points ³ 1 nF 2 nF 10 nF 1 μF	100 Hz 1 kHz 100 Hz 1 kHz 100 Hz 1 kHz 100 Hz 1 kHz	0.042 % 0.024 % 0.015 % 0.024 % 0.042 % 0.024 % 0.042 % 0.024 %	GenRad 1409 standard capacitors

Parameter/Range	Frequency	CMC ^{2, 4, 5} (±)	Comments	
Inductance – Generate, Fixed Points ³	100 µH	100 Hz to 1 kHz	0.052 %	GenRad 1482 standard inductors
		10 kHz	0.053 %	
	500 µH	100 Hz	0.62 %	
		200 Hz	0.32 %	
		400 Hz	0.11 %	
		1 kHz	0.03 %	
		10 kHz	0.5 %	
	1 mH	100 Hz to 1 kHz	0.052 %	
		10 kHz	0.053 %	
	5 mH	100 Hz	0.071 %	
		200 Hz	0.042 %	
		400 Hz	0.033 %	
		1 kHz	0.024 %	
		10 kHz	0.5 %	
50 mH	100 Hz	0.042 %		
	200 Hz	0.042 %		
	400 Hz	0.033 %		
	1 kHz	0.024 %		
	10 kHz	0.5 %		
500 mH	100 Hz to 1 kHz	0.052 %		
1 H	100 Hz	0.042 %		
	200 Hz	0.042 %		
	400 Hz	0.034 %		
	1 kHz	0.025 %		
	10 kHz	0.17 %		

Parameter/Equipment	Range	CMC ^{2, 4, 5} (\pm)	Comments
DC Current – Generate ³	(0 to 329.999) μ A 330 μ A to 3.299 99 mA (3.3 to 32.9999) mA (33 to 329.999) mA 330 mA to 1.099 99 A (1.1 to 2.999 99) A (3 to 10.9999) A (11 to 20.5) A	16 nA + 0.12 nA/ μ A 41 nA + 80 nA/mA 0.21 μ A + 80 nA/mA 2.1 μ A + 80 nA/mA 33 μ A + 0.16 mA/A 0.37 mA + 0.13 mA/A 0.49 mA + 0.39 mA/A 9.4 mA + 0.8 mA/A	Fluke 5520A
	(20 to 120) A	0.024 %	5520A, 3458A amplifier w/shunt
	(10 to 16.5) A (16.5 to 150) A (150 to 1025) A	50 mA + 6.5 mA/A 0.18 A + 3.4 mA/A 0.83 A + 3.3 mA/A	Fluke 5520A w/5500 coil
Clamp Meters	(120 to 3000) A	0.095 %	5520A, 3458A, amplifier, shunt w/3KA coil
DC High Voltage – Measure ³	(1 to 2) kV (2 to 20) kV	0.94 V + 0.46 mV/V 5.6 V + 0.46 mV/V	Vitretek 4620B
DC Current – Measure ³	100 nA 100 nA to 1 μ A (1 to 10) μ A (10 to 100) μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	41 pA + 89 μ A/A 70 pA + 21 μ A/A 0.7 nA + 18 μ A/A 5.8 nA + 9.2 μ A/A 58 nA + 9.7 μ A/A 0.58 μ A + 8 μ A/A 5.8 μ A + 17 μ A/A 59 μ A + 81 μ A/A	HP 3458A
	(1 to 3) A (3 to 10) A	4 mA + 0.54 mA/A 5.6 mA + 1 mA/A	Fluke 8845A
DC Current – Measure & Generate ³	(10 to 300) A (300 to 1000) A	0.0053 % 0.17 %	Shunts, 3458A

Parameter/Equipment	Range	CMC ^{2, 4, 5} (±)	Comments
DC Power – Generate ³ (0.33 to 3.2999) mA (3.3 to 32.999) mA (33 to 329.99) mA (0.33 to 2.2999) A (3 to 20.5) A	33 mV to 1020 V Up to 3 W (3 to 30) W (30 to 300) W (300 to 3) kW (3 to 20.9) kW	0.017 % 0.014 % 0.014 % 0.033 % 0.14 %	Fluke 5520A
DC Voltage – Generate ³	(0 to 329.9999) μV 330 μV to 3.299 999 V (3.3 to 32.999 99) V (33 to 329.9999) V (330 to 1000) V	0.8 μV + 16 nV/mV 17 μV + 5 μV/V 88 μV + 7 μV/V 0.56 mV + 14 μV/V 2.7 mV + 14 μV/V	Fluke 5520A
DC Voltage – Measure ³	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1000) V	0.33 μV + 17 μV/V 0.52 μV + 8 μV/V 8.8 μV + 8.1 μV/V 35 μV + 10 μV/V 1.2 mV + 11 μV/V	HP 3458A
Electrical Simulation of RTDs 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	0.057 °C 0.056 °C 0.068 °C 0.081 °C 0.088 °C 0.1 °C 0.19 °C	Fluke 5520A
Pt 3926, 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	0.056 °C 0.056 °C 0.068 °C 0.081 °C 0.088 °C 0.1 °C	
PtNi 385, 120 Ω	(-80 to 0) °C (0 to 100) °C (100 to 260) °C	0.062 °C 0.062 °C 0.11 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of RTDs ³ – (cont)			
Pt 385, 200 Ω	(-200 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	0.051 °C 0.051 °C 0.051 °C 0.057 °C 0.1 °C 0.11 °C 0.12 °C 0.13 °C	Fluke 5520A
Pt 385, 500 Ω	(-200 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	0.051 °C 0.056 °C 0.056 °C 0.062 °C 0.074 °C 0.074 °C 0.081 °C 0.095 °C	
Pt 385, 1000 Ω	(-200 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	0.047 °C 0.047 °C 0.051 °C 0.057 °C 0.062 °C 0.068 °C 0.068 °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	0.2 °C 0.051 °C 0.056 °C 0.062 °C 0.068 °C 0.074 °C 0.081 °C 0.041 °C 0.18 °C	
Electrical Simulation of Thermocouple ³ –			
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	Fluke 5520A
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 0.18 °C	

Parameter/Equipment	Range	CMC ^{2,4,5} (±)	Comments	
Electrical Simulation of Thermocouple 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 5520A	
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.37 °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 0.21 °C 0.15 °C 0.14 °C		
Oscilloscope ³ –				
DC Signal Into 50 Ω	(0 to 6.6) V	33 μV + 2 mV/V		Fluke 5520A/SC1100
DC Signal Into 1 MΩ	(0 to 130) V	33 μV + 0.39 μV/V		
Squarewave Into 50 Ω	1 mV to 6.6 V _{p-p} 10 Hz to 10 kHz	91 μV + 4.3 mV/V		
Squarewave Into 1 MΩ	1 mV to 130 V _{p-p} 10 Hz to 10 kHz	0.2 mV + 0.8 mV/V		
Edge into 50 Ω	(200 to 300) ps (1 to 2) MHz	82 ps		
	(200 to 350) ps (2 to 10) MHz	82 ps		
Leveled Sine Wave Amplitude – Range: 5 mV to 5.5 V _{p-p}	50 kHz reference 50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	0.33 mV + 18 mV/V 0.4 mV + 31 mV/V 0.43 mV + 36 mV/V 0.53 mV + 57 mV/V		
Range: 4 mV to 3.5 V _{p-p}	(600 to 1100) MHz	0.58 mV + 67 mV/V		
Time Marker Into 50 Ω Generate & Measure	5 s to 50 ms 20 ms to 1 ns	0.002 % + (t/1000) % 0.000 36 %	t = seconds Fluke 5520A/ SC1100	

Parameter/Equipment	Range	CMC ^{2, 5} (±)	Comments
Resistance – Generate ³	(0 to 10.9999) Ω (11 to 32.9999) Ω (33 to 109.9999) Ω (110 to 329.9999) Ω (330 to 1099.999) Ω (1.1 to 3.299 999) kΩ (3.3 to 10.999 99) kΩ (11 to 32.999 99) kΩ (33 to 109.9999) kΩ (110 to 329.9999) kΩ (330 to 1099.999) kΩ (1.1 to 3.299 999) MΩ (3.3 to 10.999 99) MΩ (11 to 32.999 99) MΩ (33 to 109.9999) MΩ (110 to 329.9999) MΩ (330 to 1100) MΩ	1.2 mΩ + 24 μΩ/Ω 1.5 mΩ + 24 μΩ/Ω 1.9 mΩ + 22 μΩ/Ω 4.1 mΩ + 22 μΩ/Ω 9.1 mΩ + 22 μΩ/Ω 41 mΩ + 22 μΩ/Ω 92 mΩ + 22 μΩ/Ω 0.41 Ω + 22 μΩ/Ω 0.9 Ω + 22 μΩ/Ω 8.4 Ω + 26 μΩ/Ω 14 Ω + 26 μΩ/Ω 93 Ω + 48 μΩ/Ω 0.4 kΩ + 0.1 mΩ/Ω 4.4 kΩ + 0.2 mΩ/Ω 16 kΩ + 0.4 mΩ/Ω 0.35 MΩ + 2.4 mΩ/Ω 4.4 MΩ + 12 mΩ/Ω	Fluke 5520A
Resistance – Generate ³	(1 to 10) MΩ (10 to 100) MΩ 100 MΩ to 1 GΩ (1 to 10) GΩ (10 to 100) GΩ	1.2 kΩ + 1.2 mΩ/Ω 12 kΩ + 1.2 mΩ/Ω 0.23 MΩ + 2.3 mΩ/Ω 5.8 MΩ + 5.8 mΩ/Ω 0.12 GΩ + 12 mΩ/Ω	Decade resistor
Resistance – Generate, Fixed Point ³	1 mΩ 10 mΩ 100 mΩ 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ	0.061 μΩ 0.38 μΩ 5 μΩ 33 μΩ 0.21 mΩ 2.2 mΩ 21 mΩ 0.21 Ω 2.1 Ω 24 Ω	Standard resistors

Parameter/Range	Frequency	CMC ^{2, 5} (±)	Comments
Distortion – Measure ³	20 Hz to 20 kHz (20 to 100) kHz	1.2 dB 2.3 dB	8903B
	100 kHz to 1.8 GHz	1.9 dB	8591E

Parameter/Equipment	Range	CMC ^{2, 5} (±)	Comments
DC Resistance – Measure ³	(0 to 10) Ω (10 to 100) Ω (0.1 to 1) kΩ (1 to 10) kΩ (10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ (10 to 100) MΩ (0.1 to 1) GΩ	55 μΩ + 15 μΩ/Ω 0.52 mΩ + 13 μΩ/Ω 0.53 mΩ + 10 μΩ/Ω 5.3 mΩ + 10 μΩ/Ω 53 mΩ + 11 μΩ/Ω 2.3 Ω + 17 μΩ/Ω 0.1 kΩ + 55 μΩ/Ω 1 kΩ + 0.52 mΩ/Ω 10 kΩ + 5.1 mΩ/Ω	Agilent 3458A

IV. RF/Microwave

Parameter/Equipment	Range	CMC ^{2, 4, 6} (±)	Comments
Absolute Power – Measure 100 kHz to 4.2 GHz	(+10 to +20) dBm (-30 to +10) dBm	3.6 % 1.1 %	E4418B w/8482A

V. Fluid Quantities

Parameter/Equipment	Range	CMC ^{2, 4, 6} (±)	Comments
Gas Flow – Measuring Equipment	(100 to 1000) sccm (1 to 50) SLM	0.41 % 0.41 %	DHI Molbloc System

VI. Mechanical

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
Force ³ – Measure (Compression)	(250 to 1000) lbf (1000 to 5000) lbf (5000 to 10 000) lbf (10 000 to 25 000) lbf	0.069 lb + 0.000 041 lb/lb 0.18 lb + 0.000 19 lb/lb 0.52 lb + 0.000 26 lb/lb 0.77 lb + 0.000 077 lb/lb	Load cells

Parameter/Equipment	Range	CMC ^{2, 4, 6} (±)	Comments
Force ³ – Measuring Equipment			
Force Gages	Up to 250 lbf	0.026 %	Class F deadweights
Load Cells	(250 to 1000) lbf (1000 to 5000) lbf (5000 to 10 000) lbf (10 000 to 25 000) lbf	0.07 lb + 0.000 056 lb/lb 0.19 lb + 0.000 19 lb/lb 0.58 lb + 0.000 26 lb/lb 0.92 lb + 0.000 092 lb/lb	Load cells, 8845A
Mass –			
Direct Weigh	Up to 6000 g (6 to 8) kg (8 to 16) kg (16 to 34) kg	26 mg 0.24 g 0.26 g 0.38 g	Balances
Substitution	200 mg to 200 g 200 g to 1 kg (1 to 3) kg (3 to 5) kg Up to 50 lb	8.3 mg 8.4 mg 8.6 mg 8.8 mg 23 mg	Balances, ASTM Class 3 Weights
Pressure – Measuring Equipment ³			
Pneumatic	(2.5 to 10 inH ₂ O (10 to 200) inH ₂ O (0.5 to 30) psia (30 to 60) psia (60 to 100) psia (100 to 300) psia (300 to 600) psia (600 to 1000) psia (0.5 to 30) psig (30 to 60) psig (60 to 100) psig (100 to 300) psia (300 to 600) psig (600 to 1000) psig	0.072 inH ₂ O 0.16 inH ₂ O 0.0065 psi 0.012 psi 0.021 psi 0.062 psi 0.12 psi 0.21 psi 0.0034 psi 0.01 psi 0.021 psi 0.062 psi 0.12 psi 0.21 psi	Ashcroft ASQ-1 DHI PPC 2

Parameter/Equipment	Range	CMC ^{2, 4, 6} (±)	Comments
Pressure – Measuring Equipment ³ (cont)			
Pneumatic	(8 to 17) psia (-15 to 15) psia (-15 to 50) psig (> 50 to 150) psig (-15 to 100) psig (> 100 to 300) psig (-15 to 330) psig (> 330 to 1000) psig	0.01 % 0.003 psi 0.0044 psi 0.008 % 0.0083 psi 0.008 % 0.027 psi 0.008 %	Mensor CPC6050
Hydraulic	(1000 to 5000) psig (5000 to 10 000) psig (10 000 to 30 000) psig	1.5 psi + 0.000 11 psi/psi 3.4 psi + 0.000 12 psi/psi 36 psi	Druck DPI610 Additel 681
Scales ³	(2 to 750) lb	0.82 x Resolution	Class F weights
Balances ³ with Display Resolutions of (0.0001 to 10) g	Up to 5 kg	0.82 x Resolution	Class 2 & 3 weights
Scales ³ – Substitution Testing	(750 to 1500) lb (1500 to 2250) lb	1.2 x Resolution 1.4 x Resolution	Class F weights, test loads
Torque Transducers – Measuring Equipment ³	(5 to 200) ozf·in (12 to 150) lbf·in 150 lbf·in to 250 lbf·ft (250 to 1000) lbf·ft	0.037 % 0.035 % 0.035 % 0.11 %	Torque arms, Class F weights
Torque Wrenches – Measuring Equipment ³	(2.5 to 10) lbf·in (10 to 100) lbf·in (8.3 to 100) lbf·ft (100 to 1000) lbf·ft	0.58 % 0.14 % 0.14 % 0.15 %	Torque calibrator

VII. Thermodynamics

Parameter/Equipment	Range	CMC ^{2, 6} (\pm)	Comments
Temperature – Measure	(-200 to 660) °C	0.018 °C + 0.000 043 x T _{Change} from -200 °C	1524 DRO, 5609 PRT
Temperature – Measuring Equipment	(-30 to 140) °C (140 to 660) °C	0.071 °C + 0.000 096 x T _{Change} from -30 °C 0.081 °C + 0.000 08 x T _{Change} from 140 °C	Drywell, 1524 DRO, 5609 PRT
Temperature – Measure, Climatic (Temperature Uniformity Survey) ³	(-30 to 260) °C	1.2 °C + 0.0015 x T _{Change} from -30 °C	Fluke 2638A, input module, thermocouples
Relative Humidity – Measure ³	(15 to 80) % RH	1.4 % RH	Vaisala MI70 w/ HMP77 probe

VII. Time & Frequency

Parameter/Equipment	Range	CMC ^{2, 6} (\pm)	Comments
Frequency – Measuring Equipment	100 μ Hz to 15 MHz	29 nHz + 6.5 pHz/Hz	HP 33120A function generator
	15 MHz to 3 GHz	0.59 mHz + 6.4 pHz/Hz	HP 8648C signal generator
	10 MHz	65 μ Hz	Agilent 58503B GPS
Frequency – Measure ³	0.1 Hz to 3 GHz	0.86 nHz + 12 pHz/Hz	Frequency counter, phase locked to Agilent 58503BA

Parameter/Equipment	Range	CMC ² (±)	Comments
Stop Watches & Timers	± 19.99 sec/day	0.037 sec/day	Timometer
Tachometers ³ – Photo	Up to 100 000 rpm	0.000 35 rpm + 0.000 055 rpm/rpm	Function generator, GPS receiver
Stroboscope ³	2 Hz to 2000 kHz (120 to 100 000) rpm	12 nHz + 1.2 μHz/Hz	Frequency counter, pickup

¹ This laboratory offers 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 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 In the statement of CMC, L is the linear displacement in inches; R is the resolution of the unit under test; D is the linear displacement in inches; percentages are to be read as percent of reading, unless noted otherwise.

⁵ 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 percent or fraction of the reading plus a fixed floor specification.

⁶ 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.

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



Accredited Laboratory

A2LA has accredited

TRESCAL, INC.

Dade City, FL

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 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 21st day of December 2023.

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 1078.02
Valid to September 30, 2025

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