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

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CALIBRATION

Valid To: September 30, 2027 Certificate Number: 1078.02

In recognition of the successful completion of the A2LA evaluation process (including an assessment of the organization's compliance with R205 – A2LA's Calibration Program Requirements), 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 ≈ 100 mS/cm	0.62 µS/cm 2.1 µS/cm 4.6 µS/cm 40 µS/cm 360 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 Inside	 Up to 80 in Up to 1 in	 16 µin + 4.8 µin/in 25 µin	 Gage blocks Master ring gage

Parameter/Equipment	Range	CMC[2] (±)	Comments
Cylindrical Plugs / Pins	Up to 1 in	27 µin + 5.4 µin/in	Laser mic w/ master pins
Height Gages[3]	Up to 48 in	13 µin + 5.3 µin/in	Gage blocks
Indicators[3]	Up to 4 in	6.5 µin + 3.2 µin/in	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
Protractors[3]			
Digital & Bevel	(0 to 90)°	0.085°	Sine bar, gage blocks, cylindrical square, surface plate
Surface Plate[3] –			
Flatness	Up to 100 in diagonal	$\sqrt{DL}$ x 12 µin	Level meters (*DL* is the diagonal in inches)
Repeatability	Up to 0.001 in	31 µin	Repeat-o-meter

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, 4, 5] (±)	Comments
AC Current – Generate[3]			
Toroidal:			
(10 to 16.5) A	(45 to 65) Hz	26 mA + 2.1 mA/A	Fluke 5520A w/ 5500A coil
(16.5 to 150) A		50 mA + 1.9 mA/A	
(150 to 1025) A		0.34 A + 1.9 mA/A	
(10 to 16.5) A	(65 to 440) Hz	60 mA + 6 mA/A	
(16.5 to 150) A		0.11 A + 5.3 mA/A	
(150 to 1025) A		0.86 A + 5.3 mA/A	
Nontoroidal:			
(10 to 16.5) A	(45 to 65) Hz	60 mA + 3.8 mA/A	
(16.5 to 150) A		0.23 A + 3.7 mA/A	
(150 to 1025) A		1.2 A + 3.7 mA/A	
(10 to 16.5) A	(65 to 440) Hz	90 mA + 7.2 mA/A	
(16.5 to 150) A		0.28 A + 6.7 mA/A	
(150 to 1025) A		1.6 A + 6.7 mA/A	
(20 to 120) A	(45 to 65) Hz	0.16 %	5520A, 3458A, amplifier & shunt
(120 to 3000) A	(45 to 65) Hz	0.13 %	5520A, amplifier, Shunt, 3458A w/3KA coil
AC Current – Measure[3]			
(5 to 100) µA	(10 to 20) Hz	58 nA + 4 mA/A	HP 3458A
	(20 to 45) Hz	45 nA + 1.5 mA/A	
	45 Hz to 5 kHz	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	0.31 µA + 0.0016 mA/mA	
	(45 to 100) Hz	0.26 µA + 0.000 67 mA/mA	
	(0.1 to 5) kHz	0.25 µA + 0.000 37 mA/mA	
	(5 to 20) kHz	0.26 µA + 0.000 67 mA/mA	
	(20 to 50) kHz	0.63 µA + 0.0042 mA/mA	
	(50 to 100) kHz	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	2.3 µA + 0.0016 mA/mA	
	(45 to 100) Hz	2.3 µA + 0.000 67 mA/mA	
	(0.1 to 5) kHz	2.3 µA + 0.000 37 mA/mA	
	(5 to 20) kHz	2.3 µA + 0.000 67 mA/mA	
	(20 to 50) kHz	4.5 µA + 0.0041 mA/mA	
	(50 to 100) kHz	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 10) kV (10 to 50) kV	50/60/400 Hz	1.6 V + 1.4 mV/V 14 V + 1.2 mV/V	Vitrek 4700 w/HVL-70 probe

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

Parameter/Range	Frequency	CMC[2, 4, 5] (±)	Comments
AC Flatness – Measure[3]	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]			
(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	Fluke 5520A
(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	

Parameter/Range	Frequency	CMC[2, 4, 5] (±)	Comments
Capacitance[3] – Generate			
(0.19 to 0.3999) nF	10 Hz to 10 kHz	8.8 pF + 4 pF/nF	Fluke 5520A
(0.4 to 1.0999) nF	10 Hz to 10 kHz	9.7 pF + 4 pF/nF	
(1.1 to 3.2999) nF	10 Hz to 3 kHz	13 pF + 4 pF/nF	
(3.3 to 10.9999) nF	10 Hz to 1 kHz	15 pF + 2 pF/nF	
(11 to 32.9999) nF	10 Hz to 1 kHz	0.1 nF + 2 pF/nF	
(33 to 109.999) nF	10 Hz to 1 kHz	0.15 nF + 2 pF/nF	
(110 to 329.999) nF	10 Hz to 1 kHz	0.46 nF + 2 pF/nF	
(0.33 to 1.099 99) µF	(10 to 600) Hz	1.5 nF + 2 nF/µF	
(1.1 to 3.299 99) µF	(10 to 300) Hz	4.6 nF + 2 nF/µF	
(3.3 to 10.9999) µF	(10 to 150) Hz	15 nF + 2 nF/µF	
(11 to 32.9999) µF	(10 to 120) Hz	59 nF + 3.2 nF/µF	
(33 to 109.999) µF	(10 to 80) Hz	0.2 µF + 3.6 nF/µF	
(110 to 329.999) µF	(0 to 50) Hz	0.64 µF + 3.6 nF/µF	
(0.33 to 1.099 99) mF	(0 to 20) Hz	2 µF + 3.6 µF/mF	
(1.1 to 3.299 99) mF	(0 to 6) Hz	7 µF + 3.5 µF/mF	
(3.3 to 10.9999) mF	(0 to 2) Hz	38 µF + 2.6 µF/mF	
(11 to 32.9999) mF	(0 to 0.6) Hz	90 µF + 6 µF/mF	
(33 to 110) mF	(0 to 0.2) Hz	0.37 mF + 8.8 µF/mF	
Capacitance – Generate, Fixed Points[3]			
1 nF	100 Hz 1 kHz	0.042 % 0.024 %	GenRad 1409 & 509 standard capacitors
2 nF	100 Hz 1 kHz	0.015 % 0.024 %	
10 nF	100 Hz 1 kHz	0.042 % 0.024 %	
20 nF	100 Hz 1 kHz	0.042 % 0.024 %	
500 nF	100 Hz 1 kHz	0.042 % 0.024 %	
1 µF	100 Hz 1 kHz	0.042 % 0.024 %	

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

Parameter/Equipment	Range	CMC[2, 4, 5] (±)	Comments
DC Current – Generate[3]	(0 to 329.999) µ A 330 µA 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/µA 41 nA + 80 nA/mA 0.21 µA + 80 nA/mA 2.1 µA + 80 nA/mA 33 µA + 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

Parameter/Equipment	Range	CMC[2, 4, 5] (±)	Comments
DC Current – Generate[3] (cont)	(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 10) kV (10 to 70) kV	0.68 V + 0.33 mV/V 7.8 V + 0.47 mV/V	Vitrek 4700 w/HVL-70 probe
DC Current – Measure[3]	100 nA 100 nA to 1 µA (1 to 10) µA (10 to 100) µA 100 µA to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A (1 to 3) A (3 to 10) A	41 pA + 89 µA/A 70 pA + 21 µA/A 0.7 nA + 18 µA/A 5.8 nA + 9.2 µA/A 58 nA + 9.7 µA/A 0.58 µA + 8 µA/A 5.8 µA + 17 µA/A 59 µA + 81 µA/A 4 mA + 0.54 mA/A 5.6 mA + 1 mA/A	HP 3458A Fluke 8845A
DC Current – Measure & Generate[3]	(10 to 300) A (300 to 1000) A	0.0053 % 0.17 %	Shunts, 3458A
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

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
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	
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	
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	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of RTDs[3] – (cont)			
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	Fluke 5520A
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	
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	
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	

Parameter/Equipment	Range	CMC[2, 4, 5] (±)	Comments
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
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

Parameter/Equipment	Range	CMC[2, 4, 5] (±)	Comments
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
DC Resistance[3] – Generate, Fixed Points, High Voltage			
< 20 V	1 kΩ 10 kΩ 100 kΩ 1 MΩ	0.0013 % 0.0013 % 0.0013 % 0.0022 %	IET VRS-100-11-1K-BP
Up to 1000 V	10 MΩ 100 MΩ 1 GΩ 10 GΩ 100 GΩ 1 TΩ 10 TΩ	0.004 % 0.012 % 0.062 % 0.24 % 0.36 % 0.51 % 1.5 %	
(1 to 5) kV	10 MΩ	0.54 %	
(1 to 10) kV	100 MΩ 1 GΩ 10 GΩ 100 GΩ 1 TΩ 10 TΩ	0.5 % 0.5 % 0.5 % 0.51 % 0.51 % 2.8 %	

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
Distortion – Measure[3]	20 Hz to 20 kHz (20 to 100) kHz 100 kHz to 1.8 GHz	1.2 dB 2.3 dB 1.9 dB	8903B 8591E
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
Bandwidth – High Frequency Oscilloscopes 100 kHz to 3.2 GHz	 (-30 to +10) dBm	 4.1 %	 E4418B w/8482A, power splitter & signal generator

V. Fluid Quantities

Parameter/Equipment	Range	CMC[2, 4, 6] (±)	Comments
Gas Flow – Measuring Equipment	(100 to 1000) sccm (1 to 50) SLM	0.28 % 0.28 %	DHI Molbloc system

VI. Mechanical

Parameter/Equipment	Range	CMC[2, 4, 6] (±)	Comments
Force[3] – Measuring Equipment			
Force Gages	Up to 250 lbf	0.026 %	Class F deadweights
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	(0 to 1) inH_2O (2.5 to 10 inH_2O (10 to 200) inH_2O	0.0008 inH_2O 0.072 inH_2O 0.16 inH_2O	Ashcroft ASQ-1
	(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
	(0 to 2000) psig (0 to 5000) psig	0.57 psi 1.4 psi	Additel 681
Hydraulic	(1000 to 5000) psig (5000 to 10 000) psig	1.5 psi + 0.000 11 psi/psi 3.4 psi + 0.000 12 psi/psi	Druck DPI610

Parameter/Equipment	Range	CMC[2, 4, 6] (±)	Comments
Scales[3]	(2 to 1250) lbs	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	(1250 to 2500) lbs (2500 to 3750) lbs	1.2 x Resolution 1.4 x Resolution	Class F weights, test loads
Torque Transducers – Measuring Equipment[3]	(5 to 200) ozf·in (10 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] (±)	Comments
Temperature – Measure	(-200 to 660) °C	0.018 °C + 0.000 043 x $T_{\text{Change from -200 °C}}$	1524 DRO, 5609 PRT
Temperature – Measuring Equipment	(-30 to 140) °C (140 to 660) °C	0.071 °C + 0.000 096 x $T_{\text{Change from -30 °C}}$ 0.081 °C + 0.000 08 x $T_{\text{Change from 140 °C}}$	Drywell, 1524 DRO, 5609 PRT
Temperature – Measure, Climatic (Temperature Uniformity Survey)[3]	(-30 to 260) °C	1.2 °C + 0.0015 x $T_{\text{Change from -30 °C}}$	Fluke 2638A, input module, thermocouples

Parameter/Equipment	Range	CMC[2, 6] (±)	Comments
Relative Humidity – Measure[3]	(15 to 80) % RH	1.4 % RH	Vaisala MI70 w/ HMP77 probe
Relative Humidity – Measuring Equipment	(0 to 30) %RH (30 to 70) %RH (70 to ≤ 80) %RH (> 80 to 95) %RH	1.2 % RH 1.3 % RH 1.4 % RH 1.7 % RH	Fluke 5128A

VII. Time & Frequency

Parameter/Equipment	Range	CMC[2, 6] (±)	Comments
Frequency – Measuring Equipment	100 µHz to 15 MHz 15 MHz to 3 GHz 10 MHz	29 nHz + 6.5 pHz/Hz 0.59 mHz + 6.4 pHz/Hz 65 µHz	HP 33120A function generator HP 8648C signal generator 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
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, 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.

Tampa, 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 15th day of September 2025.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1078.02
Valid to September 30, 2027

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