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

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CALIBRATION

Valid To: October 31, 2026 Certificate Number: 0513.01

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, 4, 8] (±)	Comments
Calipers[3]	Up to 72 in	(7.5 + 6.1*L*) µin + 0.6*R*	Gage blocks
Coating Thickness Gages[3]	Up to 0.2 in	120 µin	Master shims
Cylindrical Pins – Outside Diameter	Up to 1 in	26 µin	Laser micrometer
Cylindrical Plugs – Outside Diameter	Up to 4 in	(9 + 1.7*L*) µin	SIP 550 ULM
Cylindrical Ring Gages	(0.25 to 12) in	(18 + 1.5*L*) µin	SIP 550 ULM

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Parameter/Equipment	Range	CMC[2, 4, 8] (±)	Comments
CMM[3] – Linearity Repeatability Squareness Volumetric	 Up to 1600 in	 (4.1 + 0.4*L*) µin 150 µin 180 µin 84 µin	 Laser interferometer, master sphere, granite square, ball bar
End Standards	(1 to 20) in	(23 + 1.5*L*) µin	SIP 550 ULM
Extensometer[3]	Up to 2 in	68 µin	Micrometer head, gage blocks, extensometer calibrator
Flatness[3]	Up to 2 in	5 µin	Optical flats & monochromatic light
Gage Blocks Long Gage Blocks	Up to 1 in (1 to 4) in (4 to 20) in	4.3 µin (4 + 1.5*L*) µin (10 + 1.5*L*) µin	Mechanical comparison SIP 550 ULM
Height Gage[3]	Up to 40 in	(21 + 7.5*L*) µin + 0.6*R*	Gage blocks
Hole Test/Hole Mike Gages[3]	Up to 2.5 in	(26 + 78*L*) µin + 0.6*R*	Ring gages
Indicators[3]	Up to 1 in Up to 4 in	(12 + 0.32*L*) µin + 0.6*R* (12 + 0.74*L*) µin + 0.6*R*	Gage blocks
Level – Bubble[3]	Up to 24 in Length	110 µin/10 in	Surface plate, sine bar & gage blocks

Parameter/Equipment	Range[6]	CMC[2, 4, 8] (±)	Comments
Linear Measurement Machines[3] –			
Linearity	Up to 1600 in	(6.4 + 0.7*L*) µin	Laser interferometer
	Up to 72 in	(11 + 5.6*L*) µin + 0.6*R*	Gage blocks
Micrometers[3]	Up to 20 in	(3.1 + 7.3*L*) µin + 0.6*R*	Gage blocks
Optical Comparator[3] –			
Axis Linearity	Up to 12 in	(120 + 1.2*L*) µin	Glass master scales, angle blocks
Axis Squareness	Up to 12 in	130 µin	
Magnification	(10, 20, 31.25, 62.5, 75,100) X	120 µin	
Angle	(0 to 360)°	0.017°	
Protractors – Digital[3]	(0 to 90)°	0.0057° + 0.6*R*	Sine plate, gage blocks, granite surface plate
Rulers & Tape Measures[3]	Up to 72 in	0.0045 in	Gage blocks
Spheres	Up to 4 in	(13 + 3*D*) µin	SIP 550 ULM
Surface Plate[3]			Laser interferometer; *DF* is the length of the diagonal in feet
Flatness	Up to 590 in	10*DF* µin	
Repeatability	-----	13 µin	Repeat-o-meter
Thread Wires	Up to 1 in	12 µin	SIP 550 ULM w/ master plug
Threaded Plug Gages –			
Pitch Diameter	Up to 4 in	(70 + 3*L*) µin	SIP 550 ULM, three-wire method
Major Diameter	Up to 4 in	(9 + 1.7*L*) µin	

Parameter/Equipment	Range	CMC[2, 8] (±)	Comments
Adjustable Thread Ring Gages[3, 10]	Up to 1.5 in	W (Set Plug Tolerance)	Master plugs gages
Glass Scales	Up to 12 in	27 µin	Laser interferometer w/ vision system

II. Dimensional Testing[1]

Parameter/Equipment	Range	CMC[2, 4, 8, 12] (±)	Comments
Angle Measurements[7]	(0 to 180)°	0.005°	DCC CMM
Caliper Measurements[3, 7] – Claw & Fixed Gages	Up to 24 in	300 µin	Digital caliper
Micrometer Measurements[3, 7] – Feeler, Slot & Fixed Gages	Up to 2 in	58 µin	Digital micrometer
Indicator Measurement[3, 7]	Up to 4 in	(51 + 1.9L) µin	Digital indicator
Protractor Measurements[3, 7]	(0 to 360)°	0.14°	Digital protractor
1D Measurement[7]	Up to 24 in	(21 + 1.6L) µin	Transfer stand w/ electronic indicator comparison to gage blocks
2D Measurement[7]	Up to 12 in Dia.: Up to 2 in Length: Up to 12 in Up to 25 mm (> 25 to 100) mm	(180 + 0.5L) µin (79 + 11D) µin (200 + 11L) µin 2.2 µm 5.1 µm	Vision system Jenoptik Opticline Keyence IM system

Parameter/Equipment	Range	CMC[2, 4, 8, 12] (±)	Comments
3D Measurement[7]	Up to 990 mm Up to 2506 mm	(3.7 + 0.0072*L*) µm (4.0 + 0.0094*L*) µm	Zeiss DCC CMM B&S DCC CMM

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC[2, 8, 9] (±)	Comments
DC Voltage – Generate	(0 to 330) mV (0 to 3.3) V (0 to 33) V (0 to 330) V (100 to 1000) V	0.002 % + 1 µV 0.0014 % + 2 µV 0.0008 % + 120 µV 0.0022 % + 150 µV 0.0021 % + 1500 µV	Fluke 5520A
DC Voltage – Measure[3]	(0 to 100) mV (0 to 1) V (0 to 10) V (0 to 100) V (0 to 1000) V	0.007 % + 3.5 µV 0.005 % + 7 µV 0.004 % + 50 µV 0.006 % + 600 µV 0.006 % + 10 mV	Agilent 34401A
DC Current – Measure[3]	(0 to 10) mA (0 to 100) mA (0 to 1) A (0 to 3) A	0.06 % + 2.0 µA 0.06 % + 5.0 µA 0.12 % + 100 µA 0.15 % + 600 µA	Agilent 34401A
DC Current – Generate	(0 to 330) µA (0 to 3.3) mA (0 to 33) mA (0 to 330) mA (0 to 1.1) A (1.1 to 3) A (0 to 11) A (11 to 20.5) A	0.017 % + 0.02 µA 0.012 % + 0.05 µA 0.012 % + 0.25 µA 0.012 % + 2.5 µA 0.026 % + 40 µA 0.044 % + 40 µA 0.057 % + 500 µA 0.12 % + 750 µA	Fluke 5520A

Parameter/Equipment	Range	CMC[2, 8, 9] (±)	Comments
DC Current – Generate (cont)			
Clamp-On Coil Only	(0.2 to 0.33) A (0.33 to 3.0) A (3.0 to 20.5) A	0.0028 A 0.023 A 0.11 A	Fluke 5520A/5500A coil
Resistance – Generate	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω (0.33 to 1.1) kΩ (1.1 to 3.3) kΩ (3.3 to 11) kΩ (11 to 33) kΩ (33 to 110) kΩ (110 to 330) kΩ (0.33 to 1.1) MΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ (0.33 to 1.1) GΩ	0.009 % + 0.001 Ω 0.005 % + 0.0015 Ω 0.004 % + 0.0014 Ω 0.003 % + 0.002 Ω 0.003 % + 0.002 Ω 0.014 % + 0.02 Ω 0.003 % + 0.02 Ω 0.003 % + 0.2 Ω 0.003 % + 0.2 Ω 0.004 % + 2 Ω 0.004 % + 2 Ω 0.012 % + 30 Ω 0.016 % + 50 Ω 0.029 % + 2.5 kΩ 0.35 % + 3 kΩ 0.78 % + 0.1 MΩ 1.8 % + 0.5 MΩ	Fluke 5520A
Resistance – Measure[3]	(0 to 100) Ω (0 to 1) kΩ (0 to 10) kΩ (0 to 100) kΩ (0 to 1) MΩ (0 to 10) MΩ (0 to 100) MΩ	0.014 % + 4.0 mΩ 0.012 % + 10 mΩ 0.012 % + 0.10 Ω 0.012 % + 1.0 Ω 0.018 % + 10 Ω 0.051 % + 100 Ω 1.1 % + 10 kΩ	Agilent 34401A

Parameter/Range	Frequency	CMC[2, 8, 9] (±)	Comments
Capacitance – Generate			
(0.19 to 3.3) nF (3.3 to 330) nF (0.33 to 1.1) µF (1.1 to 11) µF (11 to 33) µF (33 to 110) µF	10 Hz to 3 kHz 10 Hz to 1 kHz (10 to 600) Hz (10 to 120) Hz (10 to 120) Hz (10 to 80) Hz	0.58 % + 0.01 nF 0.29 % + 0.3 nF 0.29 % + 1 nF 0.29 % + 10 nF 0.46 % + 30 nF 0.52 % + 100 nF	Fluke 5520A

Parameter/Range	Frequency	CMC[2, 5, 8, 9] (±)	Comments
Capacitance – Generate (cont.)			
(110 to 330) µF	(0 to 50) Hz	0.52 % + 300 nF	Fluke 5520A
(0.33 to 1.1) mF	(0 to 20) Hz	0.46 % + 1 µF	
(1.1 to 3.3) mF	(0 to 6) Hz	0.46 % + 3 µF	
(3.3 to 11) mF	(0 to 2) Hz	0.46 % + 10 µF	
(11 to 33) mF	(0 to 0.6) Hz	0.76 % + 30 µF	
(33 to 110) mF	(0 to 0.2) Hz	1.1 % + 100 µF	
Oscilloscopes –			
Square Wave Signal			
(1 kHz Input)			
50 Ω	(0 to 6.6) V:		Fluke 5520A/SC1100
	10 Hz to 10 kHz or DC Level	0.29 % + 40 µV	
1 MΩ	(0 to 130) V:		
	10 Hz to 1 kHz	0.12 % + 40 µV	
	DC Level	0.06 % + 40 µV	
Leveled Sine Wave Amplitude:			
5 mV to 5.5 V	50 kHz (Reference)	3.1 % + 300 µV	
	50 kHz to 100 MHz	4.7 % + 300 µV	
	(100 to 300) MHz	4.6 % + 300 µV	
	(300 to 600) MHz	6.9 % + 300 µV	
4 mV to 3.5 V	(600 to 1100) MHz	8.1 % + 300 µV	
Flatness:			
5 mV to 5.5 V	50 kHz to 100 MHz	1.8 % + 100 µV	
	(100 to 300) MHz	2.3 % + 100 µV	
	(300 to 600) MHz	4.6 % + 100 µV	
4 mV to 3.5 V	(600 to 1100) MHz	5.8 % + 100 µV	
Time Marker	5 s to 50 ms	(25 + 1000t) parts in 10^6	t is the time in seconds.
	20 ms to 1 ns	2.5 parts in 10^6	
Rise Time	≥ 300 ps	120 ps	

Parameter/Range	Frequency	CMC[2, 8, 9] (±)	Comments
AC Voltage – Generate			
(1 to 33) mV	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.09 % + 6 µV 0.017 % + 6 µV 0.022 % + 6 µV 0.12 % + 6 µV 0.40 % + 12 µV 0.92 % + 50 µV	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 500) kHz	0.03 % + 8 µV 0.02 % + 8 µV 0.02 % + 8 µV 0.04 % + 8 µV 0.09 % + 32 µV 0.23 % + 70 µV	
(0.33 to 3.3) V	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.03 % + 50 µV 0.02 % + 60 µV 0.02 % + 60 µV 0.04 % + 50 µV 0.08 % + 130 µV 0.28 % + 600 µV	
(3.3 to 33) V	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.04 % + 650 µV 0.02 % + 600 µV 0.03 % + 600 µV 0.04 % + 600 µV 0.1 % + 1600 µV	
(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	0.02 % + 2000 µV 0.02 % + 6000 µV 0.03 % + 6000 µV 0.04 % + 6000 µV 0.23 % + 50 mV	
(330 to 1020) V	45 Hz to 10 kHz	0.03 % + 10 mV	
AC Voltage – Measure[3]			
(0 to 100) mV	10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.08 % + 40 µV 0.15 % + 50 µV 0.71 % + 80 µV 4.6 % + 500 µV	Agilent 34401A

Parameter/Range	Frequency	CMC[2, 8, 9] (±)	Comments
AC Voltage – Measure[3] (cont)			
(0 to 1) V	10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.08 % + 300 µV 0.15 % + 500 µV 0.71 % + 800 µV 4.6 % + 5 mV	Agilent 34401A
(0 to 10) V	10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.08 % + 3.0 mV 0.15 % + 5.0 mV 0.71 % + 8.0 mV 4.7 % + 50 mV	
(0 to 100) V	10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz	0.08 % + 30 mV 0.15 % + 50 mV 0.79 % + 80 mV	
(0 to 300) V	45 Hz to 10 kHz	0.08 % + 230 mV	
AC Current – Generate			
(29 to 330) 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	0.23 % + 0.1 µA 0.17 % + 0.1 µA 0.14 % + 0.1 µA 0.35 % + 0.15 µA 0.92 % + 0.2 µA 1.9 % + 0.4 µA	Fluke 5520A
(0.33 to 3.3) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.23 % + 0.15 µA 0.14 % + 0.15 µA 0.2 % + 0.15 µA 0.26 % + 0.2 µA 0.58 % + 0.3 µA 1.2 % + 0.6 µA	
(3.3 to 33) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.21 % + 2 µA 0.1 % + 2 µA 0.05 % + 2 µA 0.09 % + 2 µA 0.23 % + 3 µA 0.46 % + 4 µA	

Parameter/Range	Frequency	CMC[2, 8, 9] (±)	Comments
AC Current – Generate (cont)			
(33 to 330) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.2 % + 20 µA 0.1 % + 20 µA 0.05 % + 20 µA 0.12 % + 50 µA 0.23 % + 100 µA 0.46 % + 200 µA	Fluke 5520A
(0.33 to 1.1) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.21 % + 100 µA 0.06 % + 100 µA 0.69 % + 1 mA 2.9 % + 5 mA	
(1.1 to 3) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.21 % + 100 µA 0.07 % + 100 µA 0.69 % + 1 mA 2.9 % + 5 mA	
(3 to 11) A	(45 to 100) Hz (0.1 to 1) kHz (1 to 5) kHz	0.08 % + 2 mA 0.12 % + 2 mA 3.5 % + 2 mA	
(11 to 20.5) A	(45 to 100) Hz (0.1 to 1) kHz (1 to 5) kHz	0.14 % + 5 mA 0.18 % + 5 mA 3.5 % + 5 mA	
Clamp-On Coil Only:			
(0.2 to 0.33) A (0.33 to 3.0) A (3.0 to 20.5) A	(45 to 65) Hz	0.0039 A 0.033 A 0.15 A	Fluke 5520A/5500A coil
(0.2 to 0.33) A (0.33 to 3.0) A (3.0 to 20.5) A	(65 to 440) Hz	0.0056 A 0.051 A 0.26 A	
AC Current – Measure[3]			
(0 to 1) A (0 to 3) A	50 Hz to 5 kHz 50 Hz to 5 kHz	1.6 % + 400 µA 0.68 % + 1.8 mA	Agilent 34401A

Parameter/Equipment	Range	CMC[2, 8] (±)	Comments
Electrical Calibration of Thermocouple Indicating Systems –			
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.52 °C 0.21 °C 0.19 °C 0.21 °C 0.25 °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	0.34 °C 0.21 °C 0.19 °C 0.22 °C 0.30 °C	
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.40 °C 0.23 °C 0.20 °C 0.29 °C 0.42 °C	
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.41 °C 0.22 °C 0.19 °C 0.18 °C 0.28 °C	
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.58 °C 0.38 °C 0.36 °C 0.43 °C	
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.52 °C 0.38 °C 0.39 °C 0.48 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.64 °C 0.27 °C 0.20 °C 0.19 °C	

Parameter/Equipment	Range	CMC[2, 8] (±)	Comments
Electrical Calibration of Thermocouple Indicators[3] –			
Type E	(-250 to 1000) °C	0.7 °C	Process calibrator
Type J	(-210 to 1200) °C	0.5 °C	
Type K	(-200 to 1372) °C	0.6 °C	
Type N	(-190 to -45) °C	0.71 °C	
Type N	(-45 to 1275) °C	0.40 °C	
Type T	(-250 to 400) °C	0.9 °C	
Electrical Calibration of RTD Indicators[3] –			
Pt 385, 100 Ω	(-200 to 800) °C	0.1 °C	Process calibrator, PRT indicators
Pt 385, 1 kΩ	(-190 to 630) °C	0.1 °C	
Pt 3916, 100 Ω	(-200 to 630) °C	0.1 °C	
Pt 3926, 100 Ω	(-200 to 630) °C	0.1 °C	
Electrical Calibration of RTD Indicating Systems –			
Pt 385, 100 Ω	(-200 to -80) °C	0.08 °C	Fluke 5520A
	(-80 to 0) °C	0.08 °C	
	(0 to 100) °C	0.09 °C	
	(100 to 300) °C	0.11 °C	
	(300 to 400) °C	0.12 °C	
	(400 to 630) °C	0.14 °C	
	(630 to 800) °C	0.27 °C	
Electrical Calibration of Relative Humidity Indicators[3]	(0 to 100) % RH	0.26 % RH	Fluke 725

V. Mechanical

Parameter/Equipment	Range	CMC[2, 4, 5, 8, 12] (±)	Comments
Force Tension & Compression[3] – Measure	(0.25 to 5) lbs Up to 300 lbf Up to 1000 lbf (1001 to 10 000) lbf (10 001 to 25 000) lbf (25 001 to 100 000) lbf	0.0075 lbs + 0.0015 lb/lbs 0.05 % 0.07 % 0.075 % 0.066 % 0.076 %	Force gage Class F weights ASTM E4 w/ load cells
Pressure Gauges & Transducers[3]	Up to 10 000 psi	0.12 %	Crystal pressure gage
Scales & Balances[3]	Up to 18 000 g Up to 10 000 lbs	(0.000 15 % + 0.000 031 g) + 0.6*R* (0.000 14 % + 0.000 056 lbs) + 0.6*R*	Reference weights
RPM – Measure[3]	(6 to 90 000) RPM	0.5 %	Contact & reflective pickup tachometer
Torque Wrenches[3]	(1 to 50) lbf·in Up to 50 lbf·in (30 to 400) lbf·in (80 to 1000) lbf·in (20 to 250) lbf·ft (60 to 600) lbf·ft	0.58 % + 0.0067 lbf·in 0.52 % 0.21 % 0.32 % 0.31 % 0.26 % + 0.5*R*	CDI DTT tester, CDI torque tester
Torque Transducers[3]	Up to 250 lbf·ft	0.044 %	CDI torque arms & weights
Weight Measurement[3]	Up to 10 kg Up to 12 000g (26 lbs)	0.16 g 0.51 g (0.0011 lbs)	Digital balance

Parameter/Equipment	Range[6]	CMC[2] (±)	Comments
Indirect Verification of Brinell Hardness Testers[3] – HBW 10/3000/15	 (100 to 200) HBW (300 to 400) HBW (500 to 600) HBW	 2.7 HBW 6.2 HBW 14 HBW	 Indirect verification per ASTM E10 using standardized test blocks
Indirect Verification Rockwell & Rockwell Superficial Hardness Testers[3]	HRBW: Low Medium High HRC: Low Medium High HR15N: Low Medium High HR30N: Low Medium High HR15TW: Low Medium High HR30TW: Low Medium High	 0.87 HRBW 0.83 HRBW 0.72 HRBW 0.69 HRC 0.53 HRC 0.54 HRC 0.52 HR15N 0.56 HR15N 0.58 HR15N 0.50 HR30N 0.56 HR30N 0.44 HR30N 0.63 HR15TW 0.63 HR15TW 0.62 HR15TW 0.79 HR30TW 0.60 HR30TW 0.60 HR30TW	Indirect verification per ASTM E18

VI. Thermodynamics

Parameter/Equipment	Range	CMC[2, 8, 12] (±)	Comments
Temperature – Measuring Equipment[3] (RTD, Thermocouples, Thermometers, Thermistors)	(-30 to 600) °C	0.071 °C	PRT comparison
Infrared Temperature Devices[3]	(50 to 400) °C	(0.94 + 0.000 49*x*) °C	Hart dry cell. *x* is the temperature in degrees centigrade
Temperature – Environmental Chambers[3]	(-71 to 500) °F	0.6 ° F	RTD comparison
Relative Humidity[3] – Measure	(10 to 95) % RH (10 to 95) % RH	1.4 % RH 1.1 % RH	Vaisala HMP235, Rotronic sensor

VII. Time & Frequency

Parameter/Equipment	Range	CMC[2, 4, 12] (±)	Comments
Frequency – Generate	(0.01 to 119.99) Hz (120 to 1199.9) Hz (1.200 to 11.999) kHz (12 to 119.999) kHz	0.000 27 % + 32 µHz + 0.6R 0.000 32 % + 48 µHz + 0.6R 0.000 33 % + 160 µHz + 0.6R 0.000 34 % + 0.0024 Hz + 0.6R	Fluke 5520A
Frequency – Measure	40 Hz to 300 kHz	0.012 % + 0.0046 Hz + 0.6*R*	HP 34401A
Tachometers	(0 to 100 000) RPM	0.0002 % + 0.0022 RPM + 0.6*R*	Fluke 5520A w/ LED

Parameter/Equipment	Range	CMC[2] (±)	Comments
Stopwatches[3]	(0 to 86 400) s	43 µs	53131A frequency counter

[1] This laboratory offers dimensional testing, commercial calibration 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 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 numerical value of the nominal length of the device measured in inches for uncertainties given in conventional units and *L* is the numerical value of the nominal length of the device measured in millimeters for uncertainties given in metric units; *D* is the diameter of the device in inches; *R* is the resolution of the device.

[5] In the statement of CMC, the value is defined as the percentage of reading.

[6] Where ranges are not specified, the CMC stated is for the cardinal points only.

[7] This test is not equivalent to that of a calibration.

[8] The contributions from the "best existing device" are not included in the CMC claim.

[9] 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. CMC are expressed as either a specific value that covers the full range or as a fraction or percentage of the reading plus a fixed floor specification.

[10] Adjustable Thread rings are set applicable to specifications using calibrated master set plug gages.

[11] This scope meets A2LA's *P112 Flexible Scope Policy*.

[12] 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.

Accredited Laboratory

A2LA has accredited

METROCAL, INC

Kentwood, MI

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 November 2024.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 0513.01
Valid to October 31, 2026
Revised September 21, 2026

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