



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: 1395.15

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. Acoustical

Parameter/Range	Frequency	CMC ^{2,8} (±)	Comments
Sound Pressure Level Acoustic Calibrators – (74 to 130) dB	31.5 Hz to 6.309 kHz (6.31 to 16) kHz	0.22 dB 0.27 dB	HBK 4191 0.5” NI PXI-4462
(74 to 130) dB	(31.5 to 125) Hz (0.125 to 2) kHz (2.0 to 8.0) kHz	0.12 dB 0.08 dB 0.14 dB	HBK 4160 1.0” NI PXI-4462
Acoustic Level – Generate (74 to 114) dB	Frequency: 125 Hz to 4 kHz	0.15 dB	GENRAD 1986 HBK microphone NI PXI-4462
124 dB	Frequency: 251.2 Hz	0.12 dB	
Pistonphones – Sound Pressure Level Frequency 250 Hz, SPL Re: 20 µPa	124 dB @ 250 Hz 250 Hz	0.12 dB 0.0085 Hz	HBK 4228 HBK 4160 1.0” NI PXI-4462

Parameter/Equipment	Range	CMC ² (±)	Comments
Microphone Open Circuit Sensitivity –	(-60 to -24) dB re 1V/Pa 1" Microphone ½" Microphone ¼" Microphone	0.035 dB re 1V/Pa 0.074 dB re 1V/Pa 0.031 dB re 1V/Pa	HBK 4228 HBK 4160 1.0" HBK 4191 0.5" HBK 4938 0.25" NI PXI-4462
Microphone Electrostatic Response	(0.02 to 2) kHz (2 to 6.309) kHz (6.309 to 20) kHz (20 to 80) kHz	0.17 dB 0.19 dB 0.22 dB 0.31 dB	HBK 5001, 5935L HP 3325B NI PXI-4462 Mensor 15000
Weighting Networks –			
A	Frequency: 10 Hz to 20 kHz	0.013 dB	NI PXI-4462
B	Frequency: 10 Hz to 20 kHz	0.0041 dB	HP 3325B
C	Frequency: 10 Hz to 20 kHz	0.0019 dB	HP 3458A
D	Frequency: 10 Hz to 20 kHz	0.0055 dB	
Linear	Frequency: 1 Hz to 200 kHz	0.0019 dB	
Microphone Preamp Frequency Response	(1 to 200 000) Hz	0.0074 dB	HP 3325B HP 3458A

II. Dimensional

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
Calipers ³	Up to 20 in (20 to 60) in	(7.6 + 20L) μin (7.6 + 38L) μin	Gage blocks, master rings
Micrometers ³ –			
Linearity	Up to 36 in	(8.9 + 5.4L) μin	Gage blocks, optical flats
Flatness	Up to 1 in Ø ⁹	6.5 μin	
Parallelism	Up to 0.001 in	6.5 μin	

Parameter/Equipment	Range	CMC ^{2, 6} ($\pm$)	Comments
Threaded Plugs – Major Diameter	Up to 12 in	$(19 + 4.1L) \mu\text{in}$	P&W USM, gage blocks
Pitch Diameter	Up to 12 in, (4 to 80) TPI	$(68 + 3.7L) \mu\text{in}$	Thread wires
Linear Indicators (Dial, Test, LVDT's)	Up to 2 in	22 μin	P&W USM
Flatness	Up to 1 in $\varnothing^9$	6.5 μin	Optical flats
Cylindrical Gages (Plain Pins, Plugs, Discs)	Up to 12 in	$(7.0 + 2.6L) \mu\text{in}$	P&W USM, gage blocks
Gage Blocks	Up to 0.04 in (0.04 to 4) in (4 to 24) in	$(2.0 + 1.9L) \mu\text{in}$ $(1.3 + 1.6L) \mu\text{in}$ $(2.9 + 1.5L) \mu\text{in}$	Federal 130B-24 master gage blocks
Height Gages ³	Up to 48 in	$(31 + 2.6L) \mu\text{in}$	Gage blocks
Ring Gages	(0.125 to 0.25) in (0.250 to 1) in (1 to 10) in	$(7.7 + 2.5L) \mu\text{in}$ $(7.4 + 3.5L) \mu\text{in}$ $(17 + 3.2L) \mu\text{in}$	P&W USM, gage blocks
Length Standards	Up to 48 in	$(20 + 0.58L) \mu\text{in}$	Laser interferometer
Linear Scale Measurement	Up to 48 in increments	$(32 + 0.58L) \mu\text{in}$	Laser interferometer
Thread Wires	(4 to 80) TPI	8.8 μin	P&W USM, gage blocks or master cylinders
Surface Plates ³ – Flatness	Up to 7 ft diagonal	$(6.7 + 0.58D) \mu\text{in}$	Renishaw XL-80 LI Renishaw XC-80 TC Angular optics/straight edge
Repeat Reading	(36 x 36) in	28 μin	Repeatmeter

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 5, 6} ($\pm$)	Comments
DC Voltage – Generate ³	(0 to 220) mV 220 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V (220 to 1000) V	8.7 μ V/V + 0.4 μ V 5.9 μ V/V + 0.71 μ V 4.2 μ V/V + 2.8 μ V 4.2 μ V/V + 4.2 μ V 5.9 μ V/V + 42 μ V 7.7 μ V/V + 420 μ V	Fluke 5720A
DC Voltage – Measure ³	(0 to 202) mV (0.202 to 2.02) V (2.02 to 20.2) V (20.2 to 202) V (202 to 1050) V	7.7 μ V/V + 0.23 μ V 3 μ V/V + 0.35 μ V 2.9 μ V/V + 0.58 μ V 4.7 μ V/V + 35 μ V 5 μ V/V + 580 μ V	Fluke 8588A
Digitize – Measure ³	(0 to 1050) V	57 μ V/V + 31 mV	
DC Current – Generate ³	(0 to 220) μ A (0.22 to 2.2) mA (2.2 to 22) mA (0.22 to 220) mA (0.22 to 2.2) A (2.2 to 11) A (11 to 20.5) A (20 to 149.999) A (150 to 1025) A	48 μ A/A + 6.0 nA 43 μ A/A + 7.0 nA 43 μ A/A + 40 nA 54 μ A/A + 0.7 μ A 93 μ A/A + 12 μ A 0.38 mA/A + 0.37 mA 0.81 mA/A + 0.75 mA 0.36 % 0.35 %	Fluke 5720A 55XXA [2] Floor spec. doubles >30 seconds Fluke 55XXA, Fluke 5500A/COIL

Parameter/Equipment	Range	CMC ^{2, 5, 6} ($\pm$)	Comments
DC Current – Measure ³	(0 to 20.2) μ A (20.2 to 202) μ A (0.202 to 2.02) mA (2.02 to 20.2) mA (20.2 to 202) mA (0.202 to 2.02) A (2.02 to 20.2) A (20.2 to 30.2) A	28 μ A/A + 4.6 pA 9.5 μ A/A + 0.46 nA 8.8 μ A/A + 4.6 nA 10 μ A/A + 46 nA 38 μ A/A + 1.2 μ A 120 μ A/A + 120 μ A 200 μ A/A + 0.46 mA 570 μ A/A + 5.1 mA	Fluke 8588A
Digitize – Measure ³	(0 to 202) mA (0.202 to 2.02) A (2.02 to 20.2) A (20.2 to 30.2) A	55 μ A/A + 9.2 μ A 130 μ A/A + 140 μ A 210 μ A/A + 2.4 mA 580 μ A/A + 8 mA	
Shunt – Measure ^{3, 4}	(20 to 100) A	0.023 %	Fluke 5522A, L&N 4221B, Fluke 8588A
Resistance – Generate ³	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω 330 Ω to 1.1 k Ω (1.1 to 3.3) k Ω (3.3 to 11) k Ω (11 to 33) k Ω (33 to 110) k Ω (110 to 330) k Ω 330 Ω to 1.1 M Ω (1.1 to 3.3) M Ω (3.3 to 11) M Ω (11 to 33) M Ω (33 to 110) M Ω (110 to 330) M Ω 330 M Ω to 1.1 G Ω	31 $\mu\Omega/\Omega$ + 0.000 78 Ω 23 $\mu\Omega/\Omega$ + 0.0012 Ω 22 $\mu\Omega/\Omega$ + 0.0011 Ω 22 $\mu\Omega/\Omega$ + 0.0016 Ω 22 $\mu\Omega/\Omega$ + 0.0016 Ω 22 $\mu\Omega/\Omega$ + 0.016 Ω 22 $\mu\Omega/\Omega$ + 0.016 Ω 22 $\mu\Omega/\Omega$ + 0.16 Ω 22 $\mu\Omega/\Omega$ + 0.16 Ω 25 $\mu\Omega/\Omega$ + 1.6 Ω 25 $\mu\Omega/\Omega$ + 1.6 Ω 47 $\mu\Omega/\Omega$ + 23 Ω 0.010 % + 39 Ω 0.019 % + 1.9 k Ω 0.039 % + 2.3 k Ω 0.23 % + 0.078 M Ω 1.2 % + 0.39 M Ω	Fluke 55XXA

Parameter/Equipment	Range	CMC ^{2, 5, 6} ($\pm$)	Comments
Resistance – Generate ³ Fixed Points	0 Ω 1 Ω 1.9 Ω 10 Ω 19 Ω 100 Ω 190 Ω 1 k Ω 1.9 k Ω 10 k Ω 19 k Ω 100 k Ω 190 k Ω 1 M Ω 1.9 M Ω 10 M Ω 19 M Ω 100 M Ω	54 $\mu\Omega$ 95 $\mu\Omega/\Omega + 11 \mu\Omega$ 50 $\mu\Omega/\Omega + 11 \mu\Omega$ 2.3 $\mu\Omega/\Omega + 11 \mu\Omega$ 1.2 $\mu\Omega/\Omega + 11 \mu\Omega$ 0.1 $\mu\Omega/\Omega + 11 \mu\Omega$ 0.053 $\mu\Omega/\Omega + 82 \mu\Omega$ 8.5 $\mu\Omega/\Omega + 82 \mu\Omega$ 4.5 $\mu\Omega/\Omega + 0.82 \text{ m}\Omega$ 0.85 $\mu\Omega/\Omega + 0.82 \text{ m}\Omega$ 0.45 $\mu\Omega/\Omega + 8.2 \text{ m}\Omega$ 0.11 $\mu\Omega/\Omega + 8.2 \text{ m}\Omega$ 0.058 $\mu\Omega/\Omega + 82 \text{ m}\Omega$ 20 $\mu\Omega/\Omega + 82 \text{ m}\Omega$ 11 $\mu\Omega/\Omega + 0.82 \Omega$ 4 $\mu\Omega/\Omega + 0.82 \Omega$ 2.5 $\mu\Omega/\Omega + 8.2 \Omega$ 1.0 $\mu\Omega/\Omega + 8.2 \Omega$	Fluke 5720A
Resistance – Measure ³	(0 to 2.02) Ω (2.02 to 20.2) Ω (20.2 to 202) Ω (0.202 to 2.02) k Ω (2.02 to 20.2) k Ω (20.2 to 202) k Ω (0.202 to 2.02) M Ω (2.02 to 20.2) M Ω (20.2 to 202) M Ω (0.202 to 2.02) G Ω (20.2 to 202) G Ω	13 $\mu\Omega/\Omega + 4.6 \mu\Omega$ 8.9 $\mu\Omega/\Omega + 16 \mu\Omega$ 8.3 $\mu\Omega/\Omega + 58 \mu\Omega$ 8.2 $\mu\Omega/\Omega + 580 \mu\Omega$ 8.3 $\mu\Omega/\Omega + 5.8 \text{ m}\Omega$ 8.4 $\mu\Omega/\Omega + 58 \text{ m}\Omega$ 9.5 $\mu\Omega/\Omega + 1.2 \Omega$ 13 $\mu\Omega/\Omega + 120 \Omega$ 45 $\mu\Omega/\Omega + 12 \text{ k}\Omega$ 580 $\mu\Omega/\Omega + 1.2 \text{ M}\Omega$ 610 $\mu\Omega/\Omega + 12 \text{ M}\Omega$	Fluke 8588A
Capacitance – Generate ³	(0.19 to 0.3999) nF (0.4 to 1.0999) nF (1.1 to 3.2999) nF (3.3 to 10.999) nF (11 to 32.999) nF (33 to 109.99) nF (110 to 329.99) nF (0.33 to 1.0999) μF (1.1 to 3.2999) μF (3.3 to 10.999) μF (11 to 32.999) μF (33 to 109.99) μF (110 to 329.99) μF (0.33 to 1.0999) mF	0.48 % + 0.0097 nF 0.41 % + 0.0097 nF 0.39 % + 0.0097 nF 0.23 % + 0.015 nF 0.19 % + 0.078 nF 0.21 % + 0.078 nF 0.20 % + 0.23 nF 0.20 % + 0.0058 μF 0.20 % + 0.0062 μF 0.20 % + 0.0097 μF 0.33 % + 0.024 μF 0.42 % + 0.078 μF 0.36 % + 0.23 μF 0.35 % + 0.0058 mF	Fluke 55XXA

Parameter/Equipment	Range	CMC ^{2, 5, 6} ($\pm$)	Comments
Capacitance – Measure ³	(0 to 2.02) nF (2.02 to 20.2) nF (20.2 to 202) nF (0.202 to 2.02) μ F (2.02 to 20.2) μ F (20.2 to 202) μ F (0.202 to 2.02) mF (2.02 to 20.2) mF (20.2 to 202) mF	1200 μ F/F + 1.2 pF 700 μ F/F + 2.3 pF 470 μ F/F + 10 pF 470 μ F/F + 0.12 nF 470 μ F/F + 1.2 nF 700 μ F/F + 12 nF 700 μ F/F + 0.12 μ F 810 μ F/F + 1.2 μ F 810 μ F/F + 12 μ F	Fluke 8588A
Oscilloscopes ³ – Level Sine Amp – 50 kHz Reference Level Sine Flatness – 5 mV to 5.5 V Relative to 50 kHz Reference Square Wave – (0.010 to 10) kHz Into 50 Ω Into 1 M Ω , 1 kHz Into 1 M Ω , >1 kHz DC Into 50 Ω Into 1 M Ω Time Marker Output into 50 Ω Edge Rise Time	5 mV to 5.5 V _{p-p} 50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz (600 to 1100) MHz 1 mV to 6.6 V _{p-p} 1 mV to 130 V _{p-p} 1 mV to 130 V _{p-p} (0 to 6.6) V _{p-p} (0 to 130) V _{p-p} 20 ns to 20 ms (0.05 to 5) s 1 kHz to 10 MHz	1.6 % of output 1.2 % of output 1.6 % of output 3.1 % of output 4.7 % of output 0.25 % of output 0.10 % of output 0.25 % of output 2.6 mV 0.51 mV 2.5 parts in 10 ⁶ 51 parts in 10 ⁴ 40 ps	Fluke 55XXA

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of Thermocouples ³ –			
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.40 °C 0.14 °C 0.13 °C 0.14 °C 0.18 °C	Fluke 55XXA
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.25 °C 0.17 °C 0.15 °C 0.15 °C 0.20 °C	
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.28 °C 0.16 °C 0.14 °C 0.24 °C 0.32 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.51 °C 0.20 °C 0.14 °C 0.13 °C	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage – Generate ³			
(0.22 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 1MHz	0.024 % + 4 µV 0.0090 % + 4 µV 0.0080 % + 4 µV 0.020 % + 4 µV 0.050 % + 5 µV 0.11 % + 10 µV 0.14 % + 20 µV 0.27 % + 20 µV	Fluke 5720A

Parameter/Range	Frequency	CMC ^{2, 5} (±)	Comments
AC Voltage – Generate ³ (cont)			
(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	0.025 % + 4 µV 0.0090 % + 4 µV 0.0080 % + 4 µV 0.020 % + 4 µV 0.050 % + 5 µV 0.11 % + 10 µV 0.14 % + 20 µV 0.27 % + 20 µV	Fluke 5720A
(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	0.024 % + 12 µV 0.0090 % + 7 µV 0.0080 % + 7 µV 0.022 % + 7 µV 0.048 % + 17 µV 0.095 % + 20 µV 0.16 % + 25 µV 0.33 % + 45 µV	
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	0.024 % + 40 µV 0.0090 % + 15 µV 0.0045 % + 8 µV 0.0075 % + 10 µV 0.012 % + 30 µV 0.044 % + 80 µV 0.11 % + 200 µV 0.18 % + 300 µV	
(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	0.024 % + 400 µV 0.0090 % + 150 µV 0.0045 % + 50 µV 0.0075 % + 100 µV 0.013 % + 200 µV 0.031 % + 600 µV 0.11 % + 2 mV 0.17 % + 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	0.044 % + 4 mV 0.0090 % + 1.5 mV 0.0052 % + 0.6 mV 0.0080 % + 1 mV 0.020 % + 2.5 mV 0.092 % + 16 mV 0.44 % + 40 mV 0.88 % + 80 mV	

Parameter/Range	Frequency	CMC ^{2, 5, 6} ($\pm$)	Comments
AC Voltage – Generate ³ (cont)			
(220 to 1100) V	(15 to 40) Hz (40 to 50) Hz 50 Hz to 1 kHz (1 to 20) kHz (20 to 30) kHz	0.095 % + 16 mV 0.028 % + 4 mV 0.037 % + 3.5 mV 0.030 % + 6 mV 0.10 % + 11 mV	Fluke 5720A Fluke 5725A
(220 to 750) V	(30 to 50) kHz (50 to 100) kHz	0.080 % + 11 mV 0.30 % + 45 mV	
AC Voltage – Generate ³ Wideband			
Up to 1.1 mV (1.1 to 3) mV (3 to 11) mV (11 to 33) mV (33 to 110) mV (110 to 330) mV (0.33 to 1.1) V (1.1 to 3.5) V	10 Hz to 30 MHz 10 Hz to 30 MHz 10 Hz to 30 MHz 10 Hz to 30 MHz 10 Hz to 30 MHz 10 Hz to 30 MHz 10 Hz to 30 MHz 10 Hz to 30 MHz	0.80 % + 2 μ V 0.70 % + 3 μ V 0.70 % + 8 μ V 0.60 % + 16 μ V 0.60 % + 40 μ V 0.50 % + 0.1 mV 0.50 % + 0.4 mV 0.40 % + 0.5 mV	Fluke 5720A
AC Voltage – Generate ³ Wideband Flatness			
Up to 1.1 mV	(0.30 to 120) kHz (0.120 to 2) MHz (2 to 10) MHz (10 to 20) MHz (20 to 30) MHz	0.10 % 0.20 % + 3 μ V 0.40 % + 3 μ V 0.60 % + 3 μ V 1.5 % + 15 μ V	Fluke 5720A
(1.1 to 3) mV	(0.30 to 120) kHz (0.120 to 2) MHz (2 to 10) MHz (10 to 20) MHz (20 to 30) MHz	0.10 % 0.10 % + 3 μ V 0.30 % + 3 μ V 0.50 % + 3 μ V 1.5 % + 3 μ V	
3 mV to 3.5 V	(0.30 to 120) kHz (0.120 to 2) MHz (2 to 10) MHz (10 to 20) MHz (20 to 30) MHz	0.10 % 0.10 % + 3 μ V 0.20 % + 3 μ V 0.40 % + 3 μ V 1.0 % + 3 μ V	

Parameter/Range	Frequency	CMC ^{2, 5, 6} ($\pm$)	Comments
AC Voltage – Measure ³			
(0.014 to 12.12) mV	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz	250 μ V/V + 1.3 μ V 330 μ V/V + 1.3 μ V 340 μ V/V + 1.3 μ V 0.3 % + 1.3 μ V 1.0 % + 4.6 μ V 2.0 % + 4.6 μ V	Fluke 8588A
(12.12 to 121.2) mV	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz (2 to 4) MHz (4 to 8) MHz (8 to 10) MHz	68 μ V/V + 0.58 μ V 110 μ V/V + 0.58 μ V 210 μ V/V + 1.2 μ V 510 μ V/V + 5.8 μ V 0.2 % + 35 μ V 1.0 % + 120 μ V 1.5 % + 580 μ V 4.0 % + 1.2 mV 8.0 % + 1.2 mV 15 % + 1.2 mV	
121.2 mV to 12.12 V	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz (2 to 4) MHz (4 to 8) MHz (8 to 10) MHz	65 μ V/V + 58 μ V 110 μ V/V + 58 μ V 210 μ V/V + 120 μ V 510 μ V/V + 580 μ V 0.2 % + 3.5 mV 1.0 % + 12 mV 1.5 % + 58 mV 4.0 % + 120 mV 8.0 % + 120 mV 15 % + 120 mV	
(12.12 to 121.2) V	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz	70 μ V/V + 0.58 mV 91 μ V/V + 0.58 mV 210 μ V/V + 1.2 mV 510 μ V/V + 5.8 mV 0.35 % + 58 mV 1.1 % + 580 mV	
(121.2 to 1050) V	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	90 μ V/V + 29 mV 91 μ V/V + 29 mV 210 μ V/V + 29 mV 510 μ V/V + 120 mV	

Parameter/Range	Frequency	CMC ^{2, 5} ($\pm$)	Comments
AC Current – Generate ⁴ @ 60 Hz	(20 to 100) A	0.10 % of setting	Fluke 5522A w/ Valhalla 2555A
AC Current – Generate ⁴ @ 400 Hz	(20 to 100) A	0.10 % of setting	Fluke 5522A w/ Valhalla 2555A
AC Current – Generate ³ @ 1kHz	(29 to 330) μ A (0.33 to 3.3) mA (3.3 to 33) mA (33 to 330) mA (0.33 to 1.1) A (1.1 to 3) A (3 to 11) A (11 to 20.5) A	0.13 % + 0.10 μ A 0.11 % + 0.20 μ A 0.040 % + 3.0 μ A 0.039 % + 27 μ A 0.051 % + 0.10 mA 0.014 % + 0.59 mA 0.021 % + 2.0 mA 0.048 % + 5.0 mA	Fluke 55XXA
	(20 to 100) A	0.70 % of setting	Fluke 55XXA w/ Valhalla 2555A
	(3 to 11) A (11 to 20.5) A	0.041 % + 2.1 mA 0.061 % + 5.6 mA	Fluke 55XXA
AC Current – Measure ³			
(0.04 to 20.2) μ A	1 Hz to 30 kHz	2000 μ A/A + 2.9 nA	Fluke 8588A
20.2 μ A to 20.2 mA	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	260 μ A/A + 0.58 μ A 510 μ A/A + 0.58 μ A 720 μ A/A + 0.58 μ A 4 mA/A + 1.2 μ A	
(20.2 to 202) mA	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz	260 μ A/A + 5.8 μ A 500 μ A/A + 5.8 μ A 700 μ A/A + 5.8 μ A	
202 mA to 2.02 A	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz	260 μ A/A + 120 μ A 510 μ A/A + 120 μ A 710 μ A/A + 120 μ A	
(2.02 to 20.2) A	1 Hz to 10 kHz	800 μ A/A + 580 μ A	
(20.2 to 30.2) A	1 Hz to 2 kHz (2 to 10) kHz	0.8 mA/A + 14 mA 1.2 mA/A + 14 mA	

IV. Mechanical

Parameter/Equipment	Range	CMC ^{2, 6, 8} (±)	Comments
Pressure – Measuring Equipment	(0.7 to 50.8) psi (1.4 to 253.8) psi (14.5 to 1102.3) psi (0.2 to 18.7) psi (1.7 to 75.6) psi (1 to 742.1) psi (100 to 3000) psi (1.2 to 55.1) psi (3.6 to 275.6) psi (14.5 to 1102.3) psi (0.2 to 18.7) psi (1.7 to 75.7) psi (0 to 742.1) psi (0 to 3000) psi (0 to 10 000) psi	0.0016 % + 0.000 095 psi 0.0020 % + 0.000 050 psi 0.0036 % + 0.000 17 psi 0.0018 % + 0.000 004 9 psi 0.0019 % + 0.000 017 psi 0.0023 % + 0.000 17 psi 0.0028 % + 0.0058 psi 0.0015 % + 0.000 099 psi 0.0018 % + 0.000 084 psi 0.0036 % + 0.000 33 psi 0.018 % + 0.000 004 2 psi 0.0019 % + 0.000 017 psi 0.0023 % + 0.000 17 psi 0.011 % + 0.11 psi 0.011 % + 0.37 psi	DHI PG-7601
Pressure Gauges – Hydraulic	(100 to 10 000) psig (500 to 50 000) psig	0.021 % 0.021 %	DHI 5306 S
Vacuum – Measuring Equipment, Nitrogen Gas	Up to 1 Torr Up to 10 Torr Up to 100 Torr	0.087 % 0.087 % 0.087 %	MKS 390HA-00010SP05
Force – Measuring Equipment			
Tension	(5 to 500) lbf (97 to 2000) lbf (200 to 10 000) lbf	0.012 % + 0.044 lbf 0.006 % + 0.056 lbf 0.0061 % + 0.34 lbf	Sensotronics 60001-500 Morehouse 300-2K BLH C3P1
Compression	(5 to 500) lbf (97 to 2000) lbf (200 to 10 000) lbf (2180 to 50 000) lbf	0.012 % + 0.044 lbf 0.006 % + 0.076 lbf 0.006 % + 0.14 lbf 0.006 % + 1.3 lbf	Sensotronics 60001-500 Morehouse 300-2K Morehouse 5K-10K Morehouse 25K-50K

Parameter/Equipment	Range	CMC ^{2, 6, 8} (±)	Comments
Torque – Wrenches & Screwdrivers	(2 to 20) lbf·in (20 to 240) lbf·in (10 to 100) lbf·ft (200 to 2000) lbf·ft	0.14 % 0.29 % 0.12 % 0.31 %	AKO torque system
Dynamic Acceleration – Measure	5 Hz to 10 kHz; 100 g peak	2.4 %	UD 106A Sunstrand 979-0900-001A Agilent 3458A
Dynamic Acceleration Linearity – Measure	(0.5 to 100) g peak; 200 Hz	0.71 %	UD 106A Sunstrand 979-0900-001A Agilent 3458A

V. Thermodynamics

Parameter/Equipment	Range	CMC ^{2, 8} (±)	Comments
Temperature – Measuring Equipment	-196 °C (-50 to 120) °C (35 to 100) °C (100 to 300) °C (300 to 420) °C	0.0035 °C 0.0062 °C 0.058 °C 0.066 °C 0.26 °C	ISOTECH microK 250 L&N 8167-25B Hart 9122 LN ₂ Liquid Bath Dry Well
Relative Humidity – Measuring Equipment	(10 to 65) % RH (65 to 95) % RH	0.53 % RH 0.58 % RH	Thunder Scientific 2500 Thunder Scientific 2500

VI. Time & Frequency

Parameter/Equipment	Frequency	CMC ^{2, 8} (±)	Comments
Frequency – Reference	10 MHz Reference Signal	3.6 x 10 ⁻¹¹ Hz/Hz	Fluke 910R

Parameter/Equipment	Frequency	CMC ^{2, 8} ($\pm$)	Comments
Frequency – Measuring Equipment	DC to 20 MHz	$13 \times 10^{-10} \text{ Hz/Hz} + 50 \text{ } \mu\text{Hz}$	Fluke 910R HP 3325B
	20 MHz to 20 GHz	$5.5 \times 10^{-5} \text{ Hz/Hz}$	HP 8340A
Frequency – Measure	DC to 3 GHz	$1.3 \times 10^{-6} / \text{Hz} + 50 \text{ } \mu\text{Hz}$	Fluke 910R Agilent 53131A

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

² Calibration and Measurement Capability (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. 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 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 Based on using the standard at the temperature the Fluke 5522A was calibrated ($t_{cal} \pm 5 \text{ } ^\circ\text{C}$) and assuming the instrument is zeroed at least every seven days or when the ambient temperature changes more than $5 \text{ } ^\circ\text{C}$. For resistance, a zero calibration is performed at least every 12 hours within $\pm 1 \text{ } ^\circ\text{C}$ of use.

⁵ The measurands stated are generated using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure the measurand in the ranges indicated. CMCs are expressed as either a specific value that covers the full range or as a fraction of the reading plus a fixed floor specification.

⁶ In the statement of CMC, L is the numerical value of the nominal length of the device measured in inches; R is the resolution of the unit under test; D is the numerical value of the nominal diagonal length of the surface plate in inches; % is defined as the percent of reading, unless otherwise noted.

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

⁸ 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.

⁹ $\varnothing$ is Diameter in inches



Accredited Laboratory

A2LA has accredited

SIMCO ELECTRONICS

Hampton, VA

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 1st day of November 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 1395.15
Valid to September 30, 2025

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