



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: September 30, 2022

Certificate Number: 3630.03

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations<sup>1, 7</sup>:

I. Dimensional

Parameter/Equipment	Range	CMC <sup>2, 4</sup> (±)	Comments
Hand Tools <sup>3</sup> –			
Calipers (OD/ID/Depth)	Up to 40 in (1000 mm)	300 µin (7.7 µm)	Gauge blocks
Depth Gages	Up to 6 in (150 mm)	300 µin (7.7 µm)	Gauge blocks
Height Gages	Up to 40 in (1000 mm)	300 µin (7.7 µm)	Gauge blocks
Indicators	Up to 2 in (50 mm)	26 µin	ULM
Micrometers (OD/ID/Depth)	Up to 6 in (150 mm) (6 to 24) in (600 mm)	(31 + 1.2L) µin (8 + 4.6L) µin	Gauge blocks
Flatness – Anvils and Spindles	Up to 0.001 in	10 µin	Optical flat

## II. Dimensional Testing

Parameter/Equipment	Range	CMC <sup>2,4</sup> (±)	Comments
Length – 1D	Up to 12 in	(16 + 1.7L) μin	Universal length machine

## III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC <sup>2,5,6</sup> (±)	Comments
DC Voltage <sup>3</sup> – Measure	(0 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1020) V	11 μV/V + 0.35 μV 9.6 μV/V + 0.34 μV 9.6 μV/V + 0.57 μV 12 μV/V + 35 μV [12 + (14·V/1000) <sup>2</sup> ] μV/V + 120 μV	Agilent 3458A  V = voltage
	(1 to 10) kV	0.05 %	Vitretek 4700
DC Voltage <sup>3</sup> – Generate	(0 to 329.9999) mV (0.33 to 3.299 99) V (3.3 to 32.999 99) V (33 to 329.9999) V (330 to 1000.000) V	16 μV/V + 0.78 μV 8.6 μV/V + 1.6 μV 9.4 μV/V + 16 μV 14 μV/V + 120 μV 14 μV/V + 1200 μV	Fluke 552X series calibrator
DC Current <sup>3</sup> – Measure	(10 to 100) μA 100 μA to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	24 μA/A + 0.93 nA 24 μA/A + 5.8 nA 24 μA/A + 58 nA 41 μA/A + 0.58 μA 0.013 % + 12 μA	Agilent 3458A
	DC Current <sup>3</sup> – Generate	(0 to 329.999) μA (0.330 to 3.299 99) mA (3.3 to 32.9999) mA (33 to 329.999) mA (0.33 to 1.099 99) A (1.1 to 2.999 99) A (3 to 10.9999) A (11 to 20.5) A	0.012 % + 0.016 μA 78 μA/A + 0.039 μA 78 μA/A + 0.20 μA 78 μA/A + 2.0 μA 0.016 % + 32 μA 0.03 % + 32 μA 0.039 % + 390 μA 0.078 % + 580 μA

Parameter/Equipment	Range	CMC <sup>2, 5, 6</sup> ( $\pm$ )	Comments
DC Current <sup>3</sup> – Generate (cont)  Clamp-On Meters	(20 to 149.999) A (150 to 549.999) A (550 to 1025) A	0.58 % + 0.17 A 0.58 % + 0.58 A 0.59 % + 0.58 A	Fluke 552X series w/ Fluke 5500A/coil
Resistance <sup>3</sup> – Measure	(0 to 10) $\Omega$ (10 to 100) $\Omega$ 100 $\Omega$ to 1 k $\Omega$ (1 to 10) k $\Omega$ (10 to 100) k $\Omega$ 100 k $\Omega$ to 1 M $\Omega$ (1 to 10) M $\Omega$ (10 to 100) M $\Omega$ 100 M $\Omega$ to 1 G $\Omega$	18 $\mu\Omega/\Omega$ + 58 $\mu\Omega$ 15 $\mu\Omega/\Omega$ + 0.58 m $\Omega$ 13 $\mu\Omega/\Omega$ + 0.57 m $\Omega$ 13 $\mu\Omega/\Omega$ + 5.7 m $\Omega$ 13 $\mu\Omega/\Omega$ + 56 m $\Omega$ 18 $\mu\Omega/\Omega$ + 2.3 $\Omega$ 58 $\mu\Omega/\Omega$ + 120 $\Omega$ 0.058 % + 1200 $\Omega$ 0.58 % + 12 k $\Omega$	Agilent 3458A
Resistance <sup>3</sup> – Generate	(0 to 10.9999) $\Omega$ (11 to 32.9999) $\Omega$ (33 to 109.9999) $\Omega$ (110 to 329.9999) $\Omega$ (330 to 1.099 999) k $\Omega$ (1.1 to 3.299 999) k $\Omega$ (3.3 to 10.999 99) k $\Omega$ (11 to 32.999 99) k $\Omega$ (33 to 109.9999) k $\Omega$ (110 to 329.9999) k $\Omega$ 330 k $\Omega$ to 1.099 999 M $\Omega$ (1.1 to 3.299 999) M $\Omega$ (3.3 to 10.999 99) M $\Omega$ (11 to 32.999 99) M $\Omega$ (33 to 109.9999) M $\Omega$ (110 to 329.9999) M $\Omega$ (330 to 1100) M $\Omega$	32 $\mu\Omega/\Omega$ + 0.78 m $\Omega$ 24 $\mu\Omega/\Omega$ + 1.2 m $\Omega$ 22 $\mu\Omega/\Omega$ + 1.1 m $\Omega$ 22 $\mu\Omega/\Omega$ + 1.6 m $\Omega$ 22 $\mu\Omega/\Omega$ + 1.6 m $\Omega$ 22 $\mu\Omega/\Omega$ + 16 m $\Omega$ 22 $\mu\Omega/\Omega$ + 16 m $\Omega$ 22 $\mu\Omega/\Omega$ + 0.16 $\Omega$ 22 $\mu\Omega/\Omega$ + 0.16 $\Omega$ 25 $\mu\Omega/\Omega$ + 1.6 $\Omega$ 25 $\mu\Omega/\Omega$ + 1.6 $\Omega$ 47 $\mu\Omega/\Omega$ + 24 $\Omega$ 0.011 % + 36 $\Omega$ 0.02 % + 2.0 k $\Omega$ 0.039 % + 2.4 k $\Omega$ 0.24 % + 78 k $\Omega$ 1.2 % + 390 k $\Omega$	Fluke 552X series calibrator

Parameter/Range	Frequency	CMC <sup>2, 5, 6</sup> (±)	Comments
AC Voltage <sup>3</sup> – Measure			
(1 to 10) 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	0.035 % + 3.5 μV 0.024 % + 1.3 μV 0.035 % + 1.3 μV 0.12 % + 1.3 μV 0.58 % + 1.3 μV 4.7 % + 2.4 μV	Agilent 3458A
(10 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 300 kHz to 1 MHz (1 to 2) MHz	0.0081 % + 4.7 μV 0.0081 % + 2.4 μV 0.017 % + 2.4 μV 0.035 % + 2.4 μV 0.093 % + 2.4 μV 0.35 % + 12 μV 1.2 % + 12 μV 1.8 % + 12 μV	
(0.1 to 1.0) 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 300 kHz to 1 MHz (1 to 2) MHz	0.0081 % + 47 μV 0.0081 % + 24 μV 0.017 % + 24 μV 0.035 % + 24 μV 0.093 % + 24 μV 0.35 % + 120 μV 1.2 % + 120 μV 1.8 % + 120 μV	
(1.0 to 10.0) 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 300 kHz to 1 MHz (1 to 2) MHz	0.0081 % + 0.47 mV 0.0081 % + 0.24 mV 0.017 % + 0.24 mV 0.035 % + 0.24 mV 0.093 % + 0.24 mV 0.35 % + 1.2 mV 1.2 % + 1.2 mV 1.8 % + 1.2 mV	
(10.0 to 100.0) 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 300 kHz to 1 MHz	0.024 % + 4.7 mV 0.024 % + 2.4 mV 0.024 % + 2.4 mV 0.041 % + 2.4 mV 0.14 % + 2.4 mV 0.47 % + 12 mV 1.8 % + 12 mV	

Parameter/Range	Frequency	CMC <sup>2, 5, 6</sup> (±)	Comments
AC Voltage <sup>3</sup> – Measure (cont)			
(100.0 to 700) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.047 % + 47 mV 0.047 % + 24 mV 0.07 % + 24 mV 0.14 % + 24 mV 0.35 % + 24 mV	Agilent 3458A
(1 to 10) kV	60 Hz	0.15 %	Vitretek 4700
AC Voltage <sup>3</sup> – Generate			
(1 to 32.999) 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	0.063 % + 4.7 μV 0.012 % + 4.7 μV 0.016 % + 4.7 μV 0.078 % + 4.7 μV 0.28 % + 9.4 μV 0.63 % + 39 μV	Fluke 552X series calibrator
(33 to 329.999) 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	0.024 % + 6.3 μV 0.012 % + 6.3 μV 0.013 % + 6.3 μV 0.028 % + 6.3 μV 0.063 % + 25 μV 0.16 % + 55 μV	
(0.33 to 3.299 99) 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	0.024 % + 39 μV 0.012 % + 47 μV 0.015 % + 47 μV 0.024 % + 39 μV 0.055 % + 97 μV 0.19 % + 470 μV	
(3.3 to 32.9999) V	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.024 % + 510 μV 0.012 % + 470 μV 0.019 % + 470 μV 0.028 % + 470 μV 0.07 % + 1300 μV	

Parameter/Range	Frequency	CMC <sup>2, 5, 6</sup> (±)	Comments
AC Voltage <sup>3</sup> – Generate (cont)			
(33 to 329.999) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.015 % + 1600 μV 0.016 % + 4700 μV 0.02 % + 4700 μV 0.024 % + 4700 μV 0.16 % + 39 000 μV	Fluke 552X series calibrator
(330 to 1020) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.024 % + 7800 μV 0.02 % + 7800 μV 0.024 % + 7800 μV	
AC Current <sup>3</sup> – Measure			
(5 to 100) μA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz	0.47 % + 0.035 μA 0.18 % + 0.035 μA 0.07 % + 0.035 μA 0.07 % + 0.035 μA	Agilent 3458A
(0.05 to 1) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz	0.47 % + 0.24 μA 0.18 % + 0.24 μA 0.07 % + 0.24 μA 0.035 % + 0.24 μA	
(0.5 to 10) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz	0.47 % + 2.4 μA 0.18 % + 2.4 μA 0.07 % + 2.4 μA 0.035 % + 2.4 μA	
(5 to 100) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz	0.47 % + 24 μA 0.18 % + 24 μA 0.07 % + 24 μA 0.035 % + 24 μA	
(0.05 to 1) A	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz	0.47 % + 240 μA 0.19 % + 240 μA 0.093 % + 240 μA 0.12 % + 240 μA	

Parameter/Range	Frequency	CMC <sup>2, 5, 6</sup> (±)	Comments
AC Current <sup>3</sup> – Generate			
(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	0.16 % + 0.078 μA 0.12 % + 0.078 μA 0.097 % + 0.078 μA 0.24 % + 0.12 μA 0.63 % + 0.16 μA 1.3 % + 0.32 μA	Fluke 552X series calibrator
(0.33 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	0.16 % + 0.12 μA 0.097 % + 0.12 μA 0.078 % + 0.12 μA 0.16 % + 0.16 μA 0.39 % + 0.24 μA 0.78 % + 0.47 μA	
(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	0.14 % + 1.6 μA 0.07 % + 1.6 μA 0.032 % + 1.6 μA 0.063 % + 1.6 μA 0.16 % + 2.4 μA 0.32 % + 3.2 μA	
(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	0.14 % + 16 μA 0.07 % + 16 μA 0.032 % + 16 μA 0.078 % + 39 μA 0.16 % + 78 μA 0.32 % + 160 μA	
(0.33 to 1.099 99) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.14 % + 78 μA 0.039 % + 78 μA 0.47 % + 780 μA 2.0 % + 3900 μA	
(1.1 to 2.999 99) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.14 % + 78 μA 0.047 % + 78 μA 0.47 % + 780 μA 2.0 % + 3900 μA	
(3 to 10.9999) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.047 % + 1600 μA 0.078 % + 1600 μA 2.4 % + 1600 μA	
(11 to 20.5) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.094 % + 3900 μA 0.12 % + 3900 μA 2.4 % + 3900 μA	

Parameter/Range	Frequency	CMC <sup>2, 5, 6</sup> (±)	Comments
AC Current <sup>3</sup> – Generate (cont)			
Clamp-On Meters: (Toroidal Type)			
(20 to 54.999) A (55 to 149.999) A (150 to 1025) A	(45 to 65) Hz	0.31 % + 0.054 A 0.34 % + 0.042 A 0.34 % + 0.13 A	Fluke 552X series w/ Fluke 5500A/coil
(20 to 54.999) A (55 to 149.999) A (150 to 400) A	(65 to 440) Hz	0.93 % + 0.054 A 0.94 % + 0.046 A 1.2 % + 0.22 A	
(Non-Toroidal Type)			
(20 to 149.999) A (150 to 549.999) A (550 to 1025) A	(45 to 65) Hz	0.65 % + 0.30 A 0.66 % + 1.1 A 0.65 % + 1.1 A	
(20 to 149.999) A (150 to 400) A	(65 to 440) Hz	1.2 % + 0.30 A 1.4 % + 1.1 A	
Capacitance <sup>3</sup> – Generate			
(0.22 to 0.399 99) nF (0.4 to 1.0999) nF (1.1 to 3.2999) nF (3.3 to 10.999) 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 3.2999) 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	0.39 % + 0.0078 nF 0.39 % + 0.0078 nF 0.39 % + 0.0078 nF 0.20 % + 0.0078 nF 0.20 % + 0.078 nF 0.20 % + 0.078 nF 0.20 % + 0.24 nF 0.20 % + 0.78 nF 0.20 % + 2.4 nF 0.20 % + 7.8 nF 0.32 % + 24 nF 0.35 % + 78 nF 0.35 % + 240 nF 0.35 % + 0.78 μF 0.35 % + 2.4 μF 0.35 % + 7.8 μF 0.59 % + 24 μF 0.86 % + 78 μF	Fluke 552X series calibrator



Parameter/Equipment	Range	CMC <sup>2,5</sup> (±)	Comments
Electrical Simulation of Thermocouples & Thermocouple Indicating Devices <sup>3</sup> – Generate			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.35 °C 0.27 °C 0.24 °C 0.26 °C	Fluke 552X series calibrator
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.39 °C 0.13 °C 0.11 °C 0.13 °C 0.17 °C	
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.21 °C 0.13 °C 0.11 °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 0.14 °C 0.13 °C 0.21 °C 0.32 °C	
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.32 °C 0.18 °C 0.15 °C 0.14 °C 0.21 °C	
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.45 °C 0.28 °C 0.26 °C 0.32 °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	



IV. Mechanical

Parameter/Equipment	Range	CMC <sup>2, 6</sup> ( $\pm$ )	Comments
Pneumatic and Hydraulic Gage Pressure <sup>9</sup>	(-14.2 to 0) psig (0 to 6) psig (6 to 15 000) psig	0.036 psi 0.006 psi 0.10 %	Digital pressure standard
Torque Wrenches	10 in.oz to 1000 lbf ft	0.6 %	Norbar 43236 torque standard, CDI – DTT transducers

V. Time & Frequency

Parameter/Equipment	Range	CMC <sup>2, 6, 8</sup> ( $\pm$ )	Comments
Frequency <sup>3</sup> – Measure	(1 to 40) Hz 40 Hz to 10 MHz	0.058 % 0.12 %	Agilent 3458A
Frequency <sup>3</sup> – Measuring Equipment	0.01 Hz to 2 MHz Up to 500 MHz	2 $\mu$ Hz/Hz + 3.9 $\mu$ Hz 2 $\mu$ Hz/Hz	Fluke 5522A Fluke 5522A/SC1100

<sup>1</sup> This laboratory offers commercial calibration service and field calibration service where noted.

<sup>2</sup> 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.

<sup>3</sup> Field calibration service is available for this calibration and this laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. 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.

<sup>4</sup> In the statement of CMC,  $L$  is the numerical value of the nominal length of the device measured in inches for Imperial units, or in millimeters for metric units.

<sup>5</sup> 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.

<sup>6</sup> In the statement of CMC, percentages are to be read as percent of reading, unless otherwise noted.

<sup>7</sup> This scope meets A2LA's *P112 Flexible Scope Policy*

<sup>8</sup> 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.

<sup>9</sup> The contributions attributed to the repeatability of the "best existing device" are not included in the CMC claim.



# Accredited Laboratory

A2LA has accredited

## PYLON ELECTRONICS INC.

Mississauga, Ontario, CANADA

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 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 21<sup>st</sup> day of September 2020.

A blue ink signature of the Vice President of Accreditation Services.

Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 3630.03  
Valid to September 30, 2022

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