



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

WESCAN CALIBRATION
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CALIBRATION

Valid To: January 31, 2025

Certificate Number: 1500.03

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1, 8}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Length Standards	(1 to 24) in	(17 + 2.2L) µin	Gauge blocks, gauging head & amplifier
Crimp Tools	(0.011 to 0.25) in Above 0.25 in	0.000 23 in 0.000 23 in	Pin gauges, precision micrometer, digital caliper
Diameter – External	Up to 1 in	40 µin	Digital micrometer
Height Gauges ^{3, 5}	Up to 24 in (24 to 40) in	(1.0 + 3.7L) µin (13 + 3.5L) µin	Gauge blocks
Calipers ^{3, 5}	Up to 40 in	(5.6 + 4.1L) µin	Gauge blocks

Parameter/Equipment	Range	CMC ^{2,4} (\pm)	Comments
Micrometers ^{3,5} – OD ID Depth	Up to 60 in Up to 24 in Up to 12 in	(8.2 + 3.8L) μ in (5.5 + 4.0L) μ in (2.9 + 3.4L) μ in	Gauge blocks
Indicators ^{3,5}	Up to 3 in	(7.0 + 2.8L) μ in	Gauge blocks
Indicator Calibrators ⁵	Up to 2 in	12 μ in	Gauge blocks
Gauge Head/Amplifier (MU Checker)	(0.0001 to 0.2) in	5.4 μ in	Gauge blocks
Step Gauges	Up to 6 in	(11 + 2.7L) μ in	Gauge blocks
ID Instruments ^{3,5}	Up to 24 in	(5.5 + 4.0L) μ in	Gauge blocks, gauging head/amplifier
Thickness Gauges ^{3,5}	(0.001 to 0.6) in (> 0.6 to 1) in	4.7 μ in 11 μ in	Shims & gauge blocks
Precision Levels ⁵	Up to 12 in	27 μ in/in	Sine bar, gauge blocks, surface plate
Rulers ⁵	Up to 42 in	6.0L μ in	Gauge blocks
Protractors ⁵	At 0° and 90° (> 0° to < 90)°	0.0015° 0.0029°	Sine plate, gauge blocks, square

II. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 10} (±)	Comments
DC Voltage ³ – Generate	(0 to 329.9999) mV (0.33 to 3.299 999) 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	552X series calibrator
DC Voltage – Measure	(0 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1000) V (1 to 6) kV	8.4 µV/V + 1.4 µV 7.4 µV/V + 3.4 µV 9.7 µV/V + 2.2 9.5 µV/V + 0.29 mV 25 µV/V + 0.50 mV 0.15 % - 1.2 V	HP 3458A Fluke 80E-10 w/ HP 3458 ^a opt 002
DC Voltage – Measure	(1 to 10) kV (1 to 35) kV	0.035 % + 0.15 V 0.030 % + 0.14 V	Vitrek 4700 Vitrek 4700 & HVL-35
DC Current – Measure ³	(0 to 120) nA 100 nA to 1.2 µA (1 to 12) µA (10 to 120) µA 100 µA to 1.2 mA (1 to 12) mA (10 to 120) mA 100 mA to 1.05 A (1 to 3) A (3 to 10) A (10 to 20) A	290 µA/A + 73 pA 25 µA/A + 68 pA 23 µA/A + 0.12 nA 23 µA/A + 0.93 nA 23 µA/A + 5.9 pA 23 µA/A + 59 pA 40 µA/A 0.013 % + 12 µA 0.016 % + 48 µA 0.017 % + 16 µA 0.025 % - 0.38 mA	HP 3458A Fluke Y5020 & HP 3458A

Parameter/Equipment	Range	CMC ^{2, 7, 10} (\pm)	Comments
DC Current ³ – Generate	(0 to 329.999) μ A (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 μ A 78 μ A/A + 0.039 μ A 78 μ A/A + 0.20 μ A 78 μ A/A + 2.0 μ A 0.016 % + 32 μ A 0.03 % + 32 μ A 0.039 % + 390 μ A 0.078 % + 580 μ A	552X series calibrator
Clamp-on Meters	(1 to 3) A (3 to 10) A (10 to 20) A 20 to 149.999) A (150 to 549.999) A (550 to 1025) A	0.016 % + 47 μ A 0.017 % + 12 μ A 0.035 % - 1.4 mA 0.58 % + 0.17 A 0.58 % + 0.58 A 0.59 % + 0.58 A	Fluke 5520A w/ Fluke Y5020 & HP 3458A opt 002 552X series w/ 5500A/coil
Resistance – Measure ³	(1 to 11) m Ω 11 m Ω to 10 Ω (10 to 100) Ω 100 Ω to 1 k Ω (1 to 10) k Ω (10 to 100) k Ω 100 k Ω to 1 M Ω (1 to 10) M Ω (10 to 100) M Ω 100 M Ω to 1 G Ω	0.052 % 13 $\mu\Omega/\Omega$ + 100 $\mu\Omega$ 13 $\mu\Omega/\Omega$ + 0.72 m Ω 11 $\mu\Omega/\Omega$ + 1.6 m Ω 10 $\mu\Omega/\Omega$ + 19 m Ω 11 $\mu\Omega/\Omega$ + 120 m Ω 15 $\mu\Omega/\Omega$ + 5.4 Ω 50 $\mu\Omega/\Omega$ + 200 Ω 0.058 % + 1.4 k Ω 0.58 % + 11 k Ω	Leeds & Northrup 4300 w/HP 3458A HP 3458A
Resistance ³ – Generate	(0 to 10.9999) Ω (11 to 32.9999) Ω (33 to 109.9999) Ω (110 to 329.9999) Ω (330 to 1.099 999) k Ω (1.1 to 3.299 999) k Ω (3.3 to 10.999 99) k Ω (11 to 32.999 99) k Ω (33 to 109.9999) k Ω (110 to 329.9999) k Ω 330 k Ω to 1.099 999 M Ω (1.1 to 3.299 999) M Ω (3.3 to 10.999 99) M Ω (11 to 32.999 99) M Ω (33 to 109.9999) M Ω (110 to 329.9999) M Ω (330 to 1100) M Ω	32 $\mu\Omega/\Omega$ + 0.78 m Ω 24 $\mu\Omega/\Omega$ + 1.2 m Ω 22 $\mu\Omega/\Omega$ + 1.1 m Ω 22 $\mu\Omega/\Omega$ + 1.6 m Ω 22 $\mu\Omega/\Omega$ + 1.6 m Ω 22 $\mu\Omega/\Omega$ + 16 m Ω 22 $\mu\Omega/\Omega$ + 16 m Ω 22 $\mu\Omega/\Omega$ + 16 m 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 $\mu\Omega/\Omega$ + 24 Ω 0.011 % + 36 Ω 0.02 % + 2.0 k Ω 0.039 % + 2.4 k Ω 0.24 % + 78 k Ω 1.2 % + 390 k Ω	HP 3458A

Parameter/Range	Frequency	CMC ^{2, 10} (±)	Comments
Capacitance – Generate ³			552X series calibrator
(0.19 to 0.4) nF	10 Hz to 10 kHz	0.39 % + 0.0078 nF	
(0.4 to 1.1) nF	10 Hz to 10 kHz	0.39 % + 0.0078 nF	
(1.1 to 3.3) nF	10 Hz to 3 kHz	0.39 % + 0.0078 nF	
(3.3 to 11) nF	10 Hz to 1 kHz	0.20 % + 0.0078 nF	
(11 to 33) nF	10 Hz to 1 kHz	0.20 % + 0.078 nF	
(33 to 110) nF	10 Hz to 1 kHz	0.20 % + 0.078 nF	
(110 to 330) nF	10 Hz to 1 kHz	0.20 % + 0.24 nF	
330 nF to 1.1 μF	(10 to 300) Hz	0.20 % + 0.78 nF	
(1.1 to 3.3) μF	(10 to 300) Hz	0.20 % + 2.4 nF	
(3.3 to 11) μF	(10 to 150) Hz	0.20 % + 7.8 nF	
(11 to 33) μF	(10 to 120) Hz	0.32 % + 24 nF	
(33 to 110) μF	(10 to 80) Hz	0.35 % + 78 nF	
(110 to 330) μF	(0 to 50) Hz	0.35 % + 240 nF	
330 μF to 1.1 mF	(0 to 20) Hz	0.35 % + 0.78 μF	
(1.1 to 3.3) mF	(0 to 6) Hz	0.35 % + 2.4 μF	
(3.3 to 11) mF	(0 to 2) Hz	0.35 % + 7.8 μF	
(11 to 33) mF	(0 to 0.6) Hz	0.59 % + 24 μF	
(33 to 110) mF	(0 to 0.2) Hz	0.86 % + 78 μ	

Parameter/Equipment	Range	CMC ^{2, 10} (±)	Comments
DC Power ³ – Generate			Fluke 552X series calibrator
33 mV to 1020 V (@)			
(0.33 to 330) mA	(0.000 011 to 336.6) W	0.022 % + 48 μW	
(0.33 to 3) A	(0.011 to 3060) W	0.020 % + 0.18 mW	
(3 to 20.5) A	(0.99 to 20 910) W	0.063 % - 0.24 mW	

Parameter/Range	Frequency	CMC ^{2, 10} (±)	Comments
AC Power ³ – Generate			
(33 to 330) mV @	(45 to 65) Hz	0.27 % - 0.024 μW	Fluke 552X series calibrator
(3.3 to 9) mA	(45 to 65) Hz	0.11 % + 0.18 μW	
(9 to 33) mA	(45 to 65) Hz	0.13 % + 0.028 W	
(33 to 90) mA	(45 to 65) Hz	0.091 % + 0.032 μW	
(90 to 330) mA	(45 to 65) Hz	0.12 % - 0.42 μW	
(330 to 900) mA	(45 to 65) Hz	0.12 % - 0.42 μW	
(0.9 to 2.2) A	(45 to 65) Hz	0.10 % + 2.3 μW	
(2.2 to 4.5) A	(45 to 65) Hz	0.12 % - 1.2 μW	
(4.5 to 20.5) A	(45 to 65) Hz	0.10 % + 7.0 μW	
330 mV to 1020 V @			
(3.3 to 9) mA	(45 to 65) Hz	0.11 % + 0.29 μW	
(9 to 33) mA	(45 to 65) Hz	0.10 % - 0.27 mW	
(33 to 90) mA	(45 to 65) Hz	0.11 % - 0.035 μW	
(90 to 330) mA	(45 to 65) Hz	0.073 % - 0.65 mW	
(330 to 900) mA	(45 to 65) Hz	0.11 % - 0.59 mW	
(0.9 to 2.2) A	(45 to 65) Hz	0.084 % - 0.18 mW	
(2.2 to 4.5) A	(45 to 65) Hz	0.11 % + 21 mW	
(4.5 to 20.5) A	(45 to 65) Hz	0.091 % + 1.1 mW	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of RTD Indicators & Indicating Systems ³ –			
Pt 385, 100 Ω	(-200 to -80) °C	0.039 °C	552X series calibrator
	(-80 to 0) °C	0.039 °C	
	(0 to 100) °C	0.055 °C	
	(100 to 300) °C	0.07 °C	
	(300 to 400) °C	0.078 °C	
	(400 to 630) °C	0.094 °C	
	(630 to 800) °C	0.18 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of Thermocouple Indicators & Indicating Systems ³ –			
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	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 1000) C (1000 to 1400) C (140 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 (140 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 0.19 C 0.13 C 0.11 C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of Thermocouple Indicators & Indicating Systems ³ – (cont)			
Thermistors	(-80 to -40) °C (-40 to 100) °C (100 to 150) °C	0.084 °C 0.0063 °C 0.0095 °C	Decade resistance boxes

Parameter/Range	Frequency	CMC ^{2, 10} (±)	Comments
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 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	552X series calibrator
(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	0.024 % + 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	
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 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	
(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	

Parameter/Range	Frequency	CMC ^{2, 10} (\pm)	Comments
AC Voltage – Generate ³ (330 to 1020) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.024 % + 7800 μ V 0.02 % + 7800 μ V 0.024 % + 7800 μ V	552X series calibrator
AC Voltage – Measure ³ Up 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	0.048 % + 4.0 μ V 0.027 % + 1.5 μ V 0.040 % + 1.5 μ V 0.13 % + 1.5 μ V 0.67 % + 1.5 μ V 0.53 % + 2.7 μ V	HP 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	0.027 % + 5.8 μ V 0.0094 % + 3.2 μ V 0.019 % + 2.7 μ V 0.040 % - 2.7 μ V 0.11 % + 2.7 μ V 0.40 % + 13 μ V 1.3 % + 1.3 μ V	
100 mV 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 300 kHz to 1 MHz	0.027 % + 56 μ V 0.0094 % + 28 μ V 0.019 % + 27 μ V 0.040 % + 27 μ V 0.11 % + 27 μ V 0.40 % + 0.23 mV 1.3 % + 0.13 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 300 kHz to 1 MHz	0.0096 % + 0.55 mV 0.0095 % + 0.27 mV 0.019 % + 0.27 mV 0.040 % + 0.27 mV 0.11 % + 0.27 mV 0.40 % + 1.3 mV 1.3 % + 1.3 mV	
(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	0.027 % + 5.4 mV 0.027 % + 2.7 mV 0.027 % + 2.7 mV 0.047 % + 2.7 mV 0.16 % + 2.7 mV 0.53 % + 13 mV	

Parameter/Range	Frequency	CMC ^{2, 10} (±)	Comments
AC Voltage – Measure ³ (cont)			
(100 to 750) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.053 % + 56 mV 0.054 % + 26 mV 0.080 % + 27 mV 0.16 % + 27 mV 0.40 % + 27 mV	HP 3458A
(0.7 to 5) kV	0 Hz	0.15 % - 0.45 V	Fluke 80E-10 w/ HP3458A
(1 to 10) kV	(30 to 200) Hz (200 to 450) Hz (450 to 600) Hz	0.14 % + 0.14 V 0.46 % + 0.16 V 0.87 % - 0.47 V	Vitrek 4700
(1 to 35) kV	30 to 200) Hz (200 to 450) Hz (450 to 600) Hz	0.064 % + 0.24 V 0.69 % + 0.28 V 1.5 % - 7.4 V	Vitrek 4700 & HVL-35
AC Current ³ – Generate			
(29 to 329.99) µA	(10 to 20) Hz (20 to 45) Hz 45 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	552X series calibrator
(0.33 to 3.2999) mA	10 to 20) Hz (20 to 45) Hz 45 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 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	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Current ³ – Generate (cont)			
(33 to 329.99) mA	(10 to 20) Hz (20 to 45) Hz 45 to 1 kHz (0 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.14 % + 16 µA 0.070 % + 16 µA 0.032 % + 16 µA 0.078 % + 39 µA 0.16 % + 78 µA 0.32 % + 160 µA	552X series calibrator
(0.33 to 1.099 99) A	(10 to 45) Hz 45 to 1 kHz (0 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 to 1 kHz (0 to 5) kHz (5 to 10) kHz	0.14 % + 78 µA 0.047 % + 78 µA 0.47 % + 780 µA 2.0 % + 3900 µA	
(0 to 10.9999) A	45 to 100) Hz 100 to 1 kHz (0 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 to 1 kHz (0 to 5) kHz	0.094 % + 3900 µA 0.12 % + 3900 µA	
Clamp-On Meters:			
Toroidal Type:			552X series w/ 5500A/coil
(20 to 54.999) A	45 to 65) Hz	0.31 % + 0.054 A	
(55 to 149.999) A		0.34 % + 0.042 A	
(150 to 1025) A		0.34 % + 0.13 A	
(20 to 54.999) A	(65 to 440) Hz	0.93 % + 0.054 A	
(55 to 149.999) A		0.94 % + 0.046 A	
(150 to 400) A		1.2 % + 0.22 A	
Non-Toroidal Type:			
(20 to 149.999) A	(45 to 65) Hz	0.65 % + 0.30 A	
(150 to 549.999) A		0.66 % + 1.1 A	
(550 to 1025) A		0.65 % + 1.1 A	
(20 to 149.999) A	(65 to 440) Hz	1.2 % + 0.30 A	
(150 to 400) A		1.4 % + 1.1 A	

Parameter/Range	Frequency	CMC ^{2, 5} (±)	Comments
AC Current – Measure ³			
(0 to 100) µA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	0.46 % + 23 nA 0.17 % + 23 nA 0.070 % + 23 nA 0.070 % + 23 nA	HP 3458A opt 002
100 µA to 1 mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz	0.17 % + 23 µA 0.17 % + 0.23 µA 0.070 % + 0.23 µA 0.035 % + 0.23 µA 0.068 % + 0.25 µA 0.46 % + 0.46 µA	
(0 to 10) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz	0.46 % + 2.3 µA 0.17 % + 2.3 µA 0.070 % + 2.3 µA 0.035 % + 2.3 µA 0.070 % + 2.3 µA 0.46 % + 4.6 µA	
(10 to 100) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz	0.46 % + 23 µA 0.17 % + 23 µA 0.070 % + 23 µA 0.035 % + 23 µA 0.070 % + 23 µA 0.46 % + 46 µA	
100 mA to 1 A	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz	0.46 % + 0.23 mA 0.46 % + 0.23 mA 0.093 % + 0.23 mA 0.12 % + 0.23 mA 0.35 % + 0.23 mA	
Measure Only (0 to 20) A	45 Hz to 1 kHz (1 to 5) kHz	0.031 % + 65 µA 0.046 % + 0.21 mA	HP 3458A opt 002 w/ Fluke Y5020 shunt
Distortion (THD)	20 Hz to 20 kHz (20 to 100) kHz	14 % of Indicated THD 30 % of Indicated THD	HP 8903A

Parameter/Equipment	Range	CMC ^{2,7} (±)	Comments
Oscilloscopes ³ –			
Amplitude – DC Signal: 50 Ω Load 1 MΩ Load	1 mV to 6.6 V 1 mV to 130 V	0.20 % + 32 μV 0.039 % + 32 μV	552X/SC1100
Amplitude – Square Wave: 50 Ω Load	1 mV to 6.6 Vp-p 10 Hz to 100 kHz	0.20 % + 32 μV	
1 MΩ Load	1 mV to 130 Vp-p 10 Hz to 100 kHz	0.078 % + 32 μV	
Bandwidth Flatness	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz (600 to 1100) MHz	1.2 % + 78 μV 1.6 % + 78 μV 3.2 % + 78 μV 3.9 % + 78 μV	
Time Marker	50 ms to 5 s 2 ns to 20 ms	(20 + (t1000)) μs/s 1.9 μs/s	
Resistance – Measure	(40 to 60) Ω (0.5 to 1.5) MΩ	0.079 % 0.078 %	

III. Mechanical

Parameter/Equipment	Range	CMC ^{2,7,9} (±)	Comments
Force – Measure & Measuring Equipment ^{3,5}	Up to 450 lbf	0.026 %	Dead weight
Scales & Balances ^{3,5}	1 mg to 1 g	0.50	Troemner weights
	(0 to 10) g	(48 – 0.000 038X) %	X in g
	10 g to 11 kg	060 %	
	(11 to 200) kg	0.012 %	Class F weights

Parameter/Equipment	Range	CMC ^{2, 7, 9} (\pm)	Comments
Volume ³ – Measure & Measuring Equipment	(0.5 to 2) μ L (2 to 20) μ L (20 to 200) μ L (200 to 1000) μ L (1000 to 25 000) μ L	0.040 μ L 0.052 μ L (0.037 + 0.0033 $\cdot V$) μ L (0.26 + 0.0020 $\cdot V$) μ L (2.1 + 0.0011 $\cdot V$) μ L	Balances V is the volume in μ L
Torque – Measure ³	(0.42 to 600) lbf-ft	0.27 %	CDI torque system
Torque – Measuring Equipment ³	(1 to 2000) lbf-ft	0.060 %	Weights & arms
Pressure/Vacuum— Measure & Measuring Equipment ^{3, 5}	(0 to -14.2) psig (0 to 6) psig (> 6 to 15 000) psig	0.038 psig 0.0061 psig 0.11 %	Digital pressure gauges & pressure/vacuum pumps

IV. Thermodynamics

Parameter/Equipment	Range	CMC ^{2, 9} (\pm)	Comments
Temperature – Measure ³	(-196 to -30) $^{\circ}$ C	0.033 $^{\circ}$ C	Fluke 5609, Fluke 1529
Temperature – Measure & Measuring Equipment ³	-78 $^{\circ}$ C	0.033 $^{\circ}$ C	Fluke 5609, Fluke 1529 with solid CO ₂ & isopropyl alcohol
	(-30 to 125) $^{\circ}$ C	0.039 $^{\circ}$ C	w/ Fluke 7103
	(125 to 425) $^{\circ}$ C	0.053 $^{\circ}$ C	w/ Fluke 9172
	(425 to 650) $^{\circ}$ C	0.15 $^{\circ}$ C	w/ Omega CL700A
	Ice Point (Generate Only)	0.0027 $^{\circ}$ C	ASTM E563 ice point
Thermocouples	(-78 to 650) $^{\circ}$ C	0.057 $^{\circ}$ C	HP3458, ice bath, Fluke 5609 /1529

Parameter/Equipment	Range	CMC ^{2,9} (\pm)	Comments
Infrared Temperature – Measure & Measuring Equipment ³	(35 to 500) °C	(0.30 + 0.0040 rdg) °C	Fluke 4181
Relative Humidity – Measure & Measuring Equipment ^{3,5}	(10 to 90) % RH (90 to 95) % RH	1.3 % RH 2.1 % RH	Vaisala M170/HMP77B

V. Time & Frequency

Parameter/Equipment	Frequency	CMC ^{2,6,9} (\pm)	Comments
Frequency – Measure ^{3,5}	1 mHz to 18 GHz	3.5 parts in $10^{12} + 0.6R_s$ Hz	HP Z3801A GPS locked w/ frequency counter
Frequency – Measuring Equipment ⁵	10 MHz Reference	3.5 parts in 10^{12} Hz	HP Z3801A GPS
	1 mHz to 18 GHz	3.5 parts in $10^{12} + 0.6R_s$ Hz	HP Z3801A GPS locked w/ signal generator
Frequency – Measuring Equipment ^{3,5}	10 MHz Reference	2 parts in 10^9 Hz	PTB-100 rubidium standard
	1 mHz to 18 GHz	2 parts in $10^9 + 0.6R_s$ Hz	PTB-100 rubidium standard locked w/ signal generator or frequency counter

¹ This laboratory offers commercial calibration service and field calibration service, where noted.

- 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; D is the numerical value of the nominal diameter of the device measured in inches. R is the resolution of the unit under test.
- ⁵ The contributions from the "best existing device" are not included in the CMC claim.
- ⁶ R_s is the resolution of the signal generator or counter.
- ⁷ Unless otherwise indicated, all % means % of reading.
- ⁸ This scope meets A2LA's *P112 Flexible Scope Policy*.
- ⁹ 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.
- ¹⁰ 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's 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.



Accredited Laboratory

A2LA has accredited

WESCAN CALIBRATION

Calgary, AB, 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 the requirements of 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 30th day of May 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 1500.03
Valid to January 31, 2025

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