



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: October 31, 2022

Certificate Number: 3022.01

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 Quantities

Parameter/Range	Frequency	CMC ² (±)	Comments
Sound Level ³ – Measuring Equipment (74 to 114) dB	(0.125 to 2) kHz (>2 to 4) kHz	0.2 dB 0.26 dB	Sound level calibrator
Acoustical Calibrator ³ – (74 to 114) dB	(0.125 to 2) kHz (>2 to 4) kHz	0.15 dB 0.29 dB	Sound level meter

II. Chemical

Parameter/Equipment	Range	CMC ² (±)	Comments
Conductivity ³ – Measuring Equipment Fixed Points	0.65 µS/cm 4.46 µS/cm	0.32 µS/cm 0.34 µS/cm	Conductivity standard solution

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Conductivity ³ – Measuring Equipment (cont)			Conductivity standard solution
Fixed Points	25 μS/ cm 50 μS/ cm 100 μS/cm 147 μS/ cm 1000 μS/ cm 1412 μS/ cm 100 mS/cm 150 mS/cm	0.56 μS/cm 0.8 μS/cm 1.5 μS/cm 2.7 μS/cm 5.2 μS/cm 20 μS/cm 1 mS/cm 730 μS/cm	
Resistivity Simulation	(1 to 100) pS/cm (0.001 to 1) μS/cm 1 μS/cm to 1 mS/cm	0.58 pS/cm + 6 % 0.14 nS/cm + 0.57 % 0.64 μS/cm + 0.53 %	Decade box
pH ³ – Measuring Equipment			pH buffer solution
Fixed points	4.00 pH 7.00 pH 10.00 pH	0.012 pH 0.026 pH 0.018 pH	
pH (mV simulation)	(4.00 to 10.00) pH	0.00029 pH	Multifunction calibrator
TDS ³ (Total Dissolved Solid) – Measuring Equipment	0.43 ppm 2.97 ppm 66.3 ppm 665 ppm 66 509 ppm 100 000 ppm	0.2 ppm 0.2 ppm 0.56 ppm 2.6 ppm 200 ppm 400 ppm	TDS solution

III. Dimensional

Parameter/Equipment	Range	CMC ² (±)	Comments
Gage Blocks	(0.050 to 4) in (4 to 12) in	6.6 μin + 1.3 μin/in 5.4 μin + 2.1 μin/in	Gage blocks

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Cylindrical Gages	(0.0115 to 1) in	27 μin + 0.0024 μin/in	Laser micrometer and master pin gages
Calipers ³ – Outside, Inside, Step and Depth	Up to 24 in	610 μin + 0.68 μin/in	Gage blocks
Height Gages	Up to 24 in	610 μin + 0.76 μin/in	Gage blocks
Micrometers ³ – Outside, Inside, and Depth	Up to 24 in	33 μin + 4.6 μin/in	Gage blocks
Three Point Inside	(0.5 to 2) in	40 μin + 32 μin/in	Ring gages
Dial Indicators ³	Up to 8 in	100 μin + 1.9 μin/in	Gage blocks
Precision Levels – Bubble Levels	(0 to 15) in	0.00096 in/ft	Surface plate, sine bar, gage blocks
Electronic Levels	(0 to 45)°	0.0042°	
Protractor	(0 to 360)°	0.0053°	Surface plate, sine bar, gage blocks
Surface Plate ^{3,5} – Flatness Overall	Up to 161 diagonal in	77 μin + (0.69μin/in * DL)	Electronic Level System (DL = Diagonal Length in inches)
Rulers and Tapes ³	(0.05 to 36) in	0.0066 in + 6.7 μin/in	NIST SOP 10: gauge blocks, measuring microscope
	(3 to 100) ft	0.019 in + 0.015 %	NIST SOP 12: digital ruler calibrator

Parameter/Equipment	Range	CMC ² (±)	Comments
Microscope ³ – Linearity (X,Y,Z)	(100 x 100 x 100) mm	0.0013 mm	CEM DI-006-19 gage blocks, length reticle
Angular	Up to 180°	0.095°	Angle block, angle reticle
Optical Comparator ³ – Linearity (X,Y)	(100 x 100) mm	0.0013 mm	Gage blocks, length reticle
Angular	Up to 180°	0.095°	Angle block, angle reticle
Sieves – Opening Size Wire Diameter	(0.020 to 125) mm (0.020 to 125) mm	1.6 μm + 0.025 ppm 14 μm	ASTM E11: Measuring microscope Caliper

IV. Dimensional Testing⁹

Parameter/Equipment	Range	CMC ² (±)	Comments
Luer Conical Fittings – Diameter and Length	Up to 50 mm	1.7 μm + 0.097 μm/m	ISO 594/1 and ISO 594/2: Measuring microscope
1D Dimensional Measurement – Length	Up to 4 in (4 to 8) in (8 to 24) in	87 μin 770 μin 1700 μin	Measuring microscope Digital caliper
Radius	Up to 4 in (4 to 8) in (8 to 24) in	87 μin 770 μin 1800 μin	Measuring microscope

Parameter/Equipment	Range	CMC ² (±)	Comments
1D Dimensional Measurement – (cont)			
Angle	(0 to 180)°	0.26°	Measuring microscope

V. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
DC Current ³ – Generate	(0 to 220) µA	7.1 nA + 25 µA/A	Multifunction calibrator
	(0.22 to 2.2) mA	26 nA + 32 µA/A	
	(2.2 to 22) mA	97 nA + 36 µA/A	
	(22 to 220) mA	1.7 µA + 45 µA/A	
	Multifunction calibrator with transconductance amplifier	220 mA to 2.2 A	16 µA + 85 µA/A
		(2.2 to 10) A	380 µA + 580 µA/A
		(10 to 20) A	510 µA + 440 µA/A
		(11 to 1000) A	240 mA + 2.3 mA/A
DC Current ³ – Measure	(0 to 100) µA	1.6 nA + 7.5 µA/A	8.5-digit digital multimeter
	(0.1 to 1) mA	15 nA + 67 µA/A	
	(1 to 10) mA	86 nA + 11 µA/A	
	(10 to 100) mA	710 µA + 40 µA/A	
	8.5-digit digital multimeter with shunt	(0.1 to 1) A	100 µA + 140 µA/A
		(1 to 10) A	400 µA + 440 µA/A
		(10 to 30) A	5 mA + 580 µA/A
		(30 to 1000) A	1.9 mA + 5 mA/A
DC Voltage ³ – Generate	(0 to 0.22) V	1.2 µV + 4.8 µV/V	Multifunction calibrator
	(0.22 to 2.2) V	2.3 µV + 5.4 µV/V	
	(2.2 to 22) V	14 µV + 4.5 µV/V	
	(22 to 220) V	520 µV + 7.5 µV/V	
	(220 to 1100) V	1.2 mV + 6.5 µV/V	

Parameter/Equipment	Range	CMC ^{2,5} (\pm)	Comments
DC Voltage ³ – Generate (cont)	(1.1 to 10) kV	4.1 V + 2.3 %	High voltage generator (hypot)/ high voltage probe
DC Voltage ³ – Measure	(0 to 0.1) V (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1000) V	2.9 μ V + 1.3 μ V/V 4.4 μ V + 5.8 μ V/V 14 μ V + 8.7 μ V/V 530 μ V + 16 μ V/V 1.7 mV + 99 μ V/V	Precision multimeter
DC Voltage ³ – Measure and Generate	(1 to 40) kV (40 to 100) kV	12 V + 2.5 % 5.3 V + 1.2 %	Voltage divider
DC Power ³ – Generate	0.01 mW to 337 W (0.01 to 3060) W (3.06 to 20.91) kW	0.028 % 0.027 % 0.079 %	Fluke 5522A
Resistance ³ – Generate, Fixed Points	0.0001 Ω 0.000 165 Ω 0.0002 Ω 0.000 25 Ω 0.005 Ω 0.001 Ω 0.002 Ω (0.1 to 0.9) Ω 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	8.2 $\mu\Omega$ 21 n Ω 5.8 $\mu\Omega$ 41 $\mu\Omega$ 5.9 $\mu\Omega$ 2.4 $\mu\Omega$ 2.7 $\mu\Omega$ 34 $\mu\Omega$ 48 $\mu\Omega$ 110 $\mu\Omega$ 210 $\mu\Omega$ 270 $\mu\Omega$ 520 $\mu\Omega$ 1.2 m Ω 2.3 m Ω 10 m Ω 21 m Ω 100 m Ω 0.19 Ω 1.3 Ω 2.5 Ω 24 Ω 47 Ω 470 Ω	Current shunts Resistance box with digital multimeter Multifunction calibrator

Parameter/Equipment	Range	CMC ^{2,5} (\pm)	Comments
Resistance ³ – Generate, Fixed Points (cont)	19 M Ω 100 M Ω (0.1 to 1) M Ω (1 to 10) M Ω (10 to 100) M Ω (0.1 to 1) G Ω (1 to 10) G Ω (10 to 100) G Ω (0.1 to 1) T Ω (1 to 10) T Ω	1.1 k Ω 12 k Ω 82 Ω + 0.82 % 710 Ω + 1.3 % 120 Ω + 1.7 % 1.2 M Ω + 1.5 % 420 k Ω + 1.5 % 0.8 G Ω + 1.7 % 22 G Ω + 3.3 % 8.2 G Ω + 6.5 %	Multifunction calibrator Resistance box
Resistance ³ – Measure and Generate	(0 to 1) Ω (1 to 10) Ω (10 to 100) Ω (100 to 1000) Ω (1 to 10) k Ω (10 to 100) k Ω (100 to 1000) k Ω (1 to 10) M Ω (10 to 100) M Ω (100 to 1000) M Ω (1 to 100) G Ω (100 to 1000) G Ω	14 $\mu\Omega$ + 11 $\mu\Omega/\Omega$ 10 $\mu\Omega$ + 7 $\mu\Omega/\Omega$ 750 $\mu\Omega$ + 6.9 $\mu\Omega/\Omega$ 3.5 m Ω + 7.9 $\mu\Omega/\Omega$ 22 m Ω + 11 $\mu\Omega/\Omega$ 1 Ω + 6.9 $\mu\Omega/\Omega$ 60 Ω + 2.2 $\mu\Omega/\Omega$ 120 Ω + 12 $\mu\Omega/\Omega$ 0.58 M Ω + 20 $\mu\Omega/\Omega$ 5.8 M Ω + 370 $\mu\Omega/\Omega$ 0.8 G Ω + 2 % 4.9 G Ω + 2.2 %	Precision multimeter, resistance box
Capacitance ³ – Measure 1 kHz	(0 to 10) pF (10 to 100) pF (0.1 to 1) nF (1 to 10) nF (10 to 100) nF (0.10 to 1) μ F (1 to 10) μ F (10 to 100) μ F (100 to 1000) μ F	0.0011 pF + 2 % 0.024 pF + 2.8 mF/F 24 pF + 34 μ F/F 66 pF + 82 μ F/F 34 pF + 760 μ F/F 240 pF + 720 μ F/F 2.1 nF + 870 μ F/F 75 nF + 1.3 mF/F 430 pF + 1 %	Precision LCR meter
Capacitance –Generate Fixed Points ³ 1 kHz	1 μ F 10 μ F 100 μ F 1 mF 10 mF	3.2 nF 34 nF 0.34 μ F 3.9 μ F 16 μ F	Standard capacitors

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
Capacitance –Generate Fixed Points ³ (cont)			
100 Hz, 120 Hz	1 μF 10 μF 100 μF 1 mF 10 mF 100 mF	2.9 nF 32 nF 320 nF 3.6 μF 110 μF 1.1 mF	Standard capacitors
Capacitance ³ – Generate			
1 kHz	(1 to 1000) pF (1 to 100) nF (100 to 1000) nF (1 to 10) μF (10 to 100) μF	0.3 pF + 0.89 % 34 pF + 0.087 % 93 pF + 0.11 % 2.2 nF + 0.56 % 76 nF + 0.51 %	Decade capacitance box
Inductance ³ – Measure			
(100 and 1) kHz	(1 to 100) μH (0.1 to 100) mH (0.1 to 1) H	120 nH + 0.27 % 0.69 μH + 0.45 % 41 μH + 0.091 %	Precision LCR meter
Inductance ³ – Generate			
1 kHz	(1 to 100) mH (0.1 to 1) H	0.93 mH + 0.068 % 5.1 mH + 0.012 %	Inductor decade with LCR
Electrical Simulation of Thermocouple Temperature Indicators ³ –			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.54 °C 0.40 °C 0.38 °C 0.39 °C	Temperature simulator in sourcing mode
Type C	(0 to 150) °C (150 to 650) °C (650 to 1000) °C (1000 to 1800) °C (1800 to 2316) °C	0.35 °C 0.30 °C 0.36 °C 0.58 °C 0.97 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of Thermocouple Temperature Indicators ³ – (cont)			
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.23 °C 0.21 °C 0.16 °C 0.16 °C 0.19 °C	Temperature simulator in sourcing mode
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.26 °C 0.19 °C 0.17 °C 0.17 °C 0.18 °C	
Type K	(-270 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.31 °C 0.21 °C 0.19 °C 0.30 °C 0.46 °C	
Type L	(-200 to -100) °C (-100 to 800) °C (800 to 900) °C	0.43 °C 0.30 °C 0.20 °C	
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.47 °C 0.27 °C 0.23 °C 0.21 °C 0.32 °C	
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1750) °C	0.68 °C 0.41 °C 0.39 °C 0.47 °C	
Type S	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1400) °C (1400 to 1750) °C	0.54 °C 0.46 °C 0.42 °C 0.43 °C 0.54 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.73 °C 0.28 °C 0.19 °C 0.17 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of Thermocouple Temperature Indicators ³ – (cont)			
Type U	(-200 to 0) °C (0 to 600) °C	0.65 °C 0.31 °C	Temperature simulator in sourcing mode
Electrical Simulation of Thermocouple Simulators ³ –			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.57 °C 0.45 °C 0.39 °C 0.42 °C	Temperature simulation meter in measuring mode
Type C	(0 to 150) °C (150 to 650) °C (650 to 1000) °C (1000 to 1800) °C (1800 to 2316) °C	0.37 °C 0.32 °C 0.38 °C 0.58 °C 1.00 °C	
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.58 °C 0.19 °C 0.16 °C 0.19 °C 0.24 °C	
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.32 °C 0.19 °C 0.17 °C 0.20 °C 0.27 °C	
Type K	(-270 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.39 °C 0.22 °C 0.19 °C 0.31 °C 0.47 °C	
Type L	(-200 to -100) °C (-100 to 800) °C (800 to 900) °C	0.43 °C 0.30 °C 0.20 °C	
Type N	(-200 to -100) °C (-100 to -25) °C	0.47 °C 0.27 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of Thermocouple Simulators ³ – (cont)			
Type N	(-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.23 °C 0.22 °C 0.32 °C	Temperature simulation meter in measuring mode
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.69 °C 0.45 °C 0.41 °C 0.49 °C	
Type S	(-25 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.59 °C 0.45 °C 0.46 °C 0.57 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.73 °C 0.28 °C 0.19 °C 0.17 °C	
Type U	(-200 to 0) °C (0 to 600) °C	0.65 °C 0.31 °C	
Electrical Simulation of RTD Temperature Simulators ³ –			
PT100 (385)	(-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	0.012 °C 0.044 °C 0.041 °C 0.043 °C 0.046 °C 0.049 °C 0.053 °C	Temperature simulation meter in measuring mode
PT100 (3926)	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.0045 °C 0.0046 °C 0.040 °C 0.040 °C 0.045 °C 0.048 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of RTD Temperature Simulators ³ – (cont)			
PT100 (3916)	(-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	0.0044 °C 0.0044 °C 0.0047 °C 0.040 °C 0.043 °C 0.043 °C 0.045 °C 0.047 °C 0.048 °C	Temperature simulation meter in measuring mode
PT200 (385)	(-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 630) °C	0.024 °C 0.028 °C 0.025 °C 0.027 °C 0.027 °C 0.028 °C 0.031 °C	
PT500 (385)	(-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 630) °C	0.023 °C 0.024 °C 0.025 °C 0.025 °C 0.035 °C 0.036 °C 0.038 °C	
PT1000 (385)	(-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 630) °C	0.012 °C 0.016 °C 0.016 °C 0.017 °C 0.018 °C 0.018 °C 0.019 °C	
PtNi (385), 120Ω	(-80 to 0) °C (0 to 100) °C (100 to 260) °C	0.012 °C 0.013 °C 0.012 °C	
Cu 427, 10Ω	(-100 to 260) °C	0.088 °C	
YS1400	(15 to 50) °C	0.0083 °C	
25 Ω SPRT3	(-200 to 660) °C	0.052 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of RTD Indicators ³ –			
PT100 (385)	(-200 to -80) °C (-80 to 0) °C (-80 to 100) °C (100 to 630) °C (630 to 800) °C	0.036 °C 0.054 °C 0.060 °C 0.14 °C 0.21 °C	Temperature simulator in source mode
PT100 (3926)	(-200 to 0) °C (0 to 300) °C (300 to 630) °C	0.054 °C 0.085 °C 0.15 °C	
PT100 (3916)	(-200 to -190) °C (-190 to 300) °C (300 to 630) °C	0.032 °C 0.087 °C 0.13 °C	
PT200 (385)	(-200 to 260) °C (260 to 400) °C (400 to 630) °C	0.17 °C 0.22 °C 0.28 °C	
PT500 (385)	(-200 to -80) °C (-80 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.036 °C 0.061 °C 0.096 °C 0.10 °C 0.14 °C	
PT1000 (385)	(-200 to -80) °C (-80 to 260) °C (260 to 630) °C	0.034 °C 0.10 °C 0.28 °C	
PtNi 385, 120Ω (Ni120)	(-80 to 0) °C (0 to 100) °C (100 to 260) °C	0.03 °C 0.043 °C 0.035 °C	
Cu 427, 10 Ω	(-100 to 260) °C	0.87 °C	
YS1400	(15 to 50) °C	0.0083 °C	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Current ³ – Generate (0 to 20) μA	(0.1 to 1) kHz (1 to 10) kHz	9.9 nA + 19 μA/A 13 nA + 15 μA/A	Multifunction calibrator

Parameter/Range	Frequency	CMC ^{2,5} (\pm)	Comments
AC Current ³ – Generate (cont)			
(20 to 220) μ A	(0.04 to 1 kHz (1 to 5) kHz (5 to 10) kHz	13 nA + 94 μ A/A 22 nA + 240 μ A/A 84 nA + 940 μ A/A	Multifunction calibrator
(0.22 to 2.2) mA	40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	72 nA + 110 μ A/A 180 nA + 160 μ A/A 840 nA + 940 μ A/A	
(2.2 to 22) mA	40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	680 pA + 380 μ A/A 1.7 μ A + 170 μ A/A 8.1 μ A + 950 μ A/A	
(22 to 220) mA	(0.04 to 1) kHz (1 to 5) kHz (5 to 10) kHz	7.4 μ A + 110 μ A/A 17 μ A + 170 μ A/A 58 μ A + 1 mA/A	
(0.22 to 2.2) A	(0.04 to 1) kHz (1 to 5) kHz (5 to 10) kHz	130 μ A + 260 μ A/A 280 μ A + 410 μ A/A 0.97 mA + 7.7 mA/A	
(2.2 to 11) A	(0.040 to 1) kHz (1 to 5) kHz (5 to 10) kHz	2.7 mA + 930 μ A/A 1.5 mA + 970 μ A/A 1.6 mA + 4 mA/A	
(11 to 20) A	(0.040 to 1) kHz	7.6 mA + 1.4 mA/A	
AC Current ³ – Measure			
(0 to 100) μ A	40 Hz to 1 kHz	26 nA + 810 μ A/A	8.5-digit digital multimeter
(0.1 to 1) mA	40 Hz to 1 kHz	380 nA + 290 μ A/A	
(1 to 10) mA	40 Hz to 1 kHz	2.7 μ A + 390 μ A/A	
(10 to 100) mA	40 Hz to 1 kHz	30 μ A + 370 μ A/A	
(0.1 to 1.05) A	40 Hz to 1 kHz	220 μ A + 510 μ A/A	
(1.05 to 10) A	(0.04 to 1) kHz	20 mA + 88 μ A/A	
(10 to 30) A	(0.04 to 1) kHz	130 mA + 150 μ A/A	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage ³ – Generate			
(0 to 2.2) mV	(0.04 to 1) kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (500 to 1000) kHz	4.7 μV + 2 μV/V 4.7 μV + 2 μV/V 4.7 μV + 12 μV/V 5.9 μV + 62 μV/V 12 μV + 130 μV/V 23 μV + 120 μV/V 25 μV + 420 μV/V	Multifunction calibrator
(2.2 to 22) mV	(0.04 to 1) kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (500 to 1000) kHz	4.6 μV + 20 μV/V 4.6 μV + 24 μV/V 4.6 μV + 100 μV/V 6.5 μV + 350 μV/V 13 μV + 760 μV/V 27 μV + 810 μV/V 26 μV + 2.2 mV/V	
(22 to 220) mV	(0.04 to 1) kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (500 to 1000) kHz	9 μV + 60 μV/V 9 μV + 60 μV/V 11 μV + 190 μV/V 22 μV + 440 μV/V 30 μV + 910 μV/V 66 μV + 1.3 mV/V 64 μV + 2.8 mV/V	
(0.22 to 0.5) V	(0.04 to 1) kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (500 to 1000) kHz	15 μV + 40 μV/V 16 μV + 39 μV/V 25 μV + 50 μV/V 25 μV + 50 μV/V 100 μV + 320 μV/V 230 μV + 780 μV/V 260 μV + 1.1 mV/V	
(0.5 to 1) V	(0.04 to 1) kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (500 to 1000) kHz	17 μV + 38 μV/V 17 μV + 38 μV/V 18 μV + 70 μV/V 41 μV + 92 μV/V 93 μV + 320 μV/V 0.34 mV + 860 μV/V 0.43 mV + 1.6 mV/V	
(1 to 2) V	(0.04 to 1) kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (500 to 1000) kHz	110 μV + 470 μV/V 110 μV + 470 μV/V 61 μV + 63 μV/V 120 μV + 80 μV/V 160 μV + 410 μV/V 560 μV + 910 μV/V 0.62 mV + 1.7 mV/V	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage ³ – Generate (cont)			
(2 to 22) V	(0.04 to 1) kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (500 to 1000) kHz	230 μV + 43 μV/V 230 μV + 43 μV/V 430 μV + 69 μV/V 470 μV + 96 μV/V 1.4 mV + 260 μV/V 6.8 mV + 890 μV/V 7.4 mV + 1.4 mV/V	Multifunction calibrator
(22 to 220) V	(0.04 to 1) kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	1.9 mV + 52 μV/V 1.9 mV + 52 μV/V 6.3 mV + 68 μV/V 6.9 mV + 140 μV/V	
(220 to 1100) V	(0.05 to 1) kHz	21 mV + 64 μV/V	
(0 to 300) V	(0.04 to 20) kHz (20 to 50) kHz (50 to 100) kHz	9.5 mV + 160 μV/V 22 mV + 620 μV/V 62 mV + 2.5 mV/V	Multifunction calibrator with transconductance amplifier
(300 to 600) V	(0.04 to 20) kHz (20 to 50) kHz (50 to 100) kHz	14 mV + 170 μV/V 28 mV + 630 μV/V 84 mV + 2.5 mV/V	
(600 to 1000) V	(0.04 to 20) kHz (20 to 30) kHz	21 mV + 170 μV/V 33 mV + 660 μV/V	
(1.1 to 28) kV	(60) Hz	10 V + 5.8 %	High voltage source with multimeter and HV probe
AC Voltage ³ – Measure			
(0 to 100) mV	10 Hz to 1 kHz (1 to 20) kHz (20 to 100) kHz	31 μV + 250 μV/V 37 μV + 220 μV/V 0.17 mV + 230 μV/V	8.5-digit digital multimeter
(0.1 to 1) V	10 Hz to 1 kHz (1 to 20) kHz (20 to 100) kHz (100 to 1) MHz	140 μV + 150 μV/V 140 μV + 380 μV/V 380 μV + 0.11 % 47 mV	
(1 to 10) V	(0.01 to 1) kHz (1 to 20) kHz (20 to 100) kHz 100 kHz to 200 kHz	1.1 mV + 170 μV/V 2.8 mV + 260 μV/V 9.3 mV + 380 μV/V 0.03 V + 13 mV/V	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage ³ – Measure (cont)			
10 to 100) V	10 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz	2.1 mV + 490 μV/V 7.8 mV + 730 μV/V 36 mV + 2.5 mV/V	8.5-digit digital multimeter
(100 to 1000) V	10 Hz to 1 kHz (1 to 10) kHz	88 mV + 230 μV/V 130 mV + 510 μV/V	
(1 to 28) kV	60 Hz	10 V + 5.8 %	8.5-digit digital multimeter with high voltage probe
AC Power ³ – Generate			
(45 to 65) Hz PF =1	(0.1089 to 2.97) mW (0.297 to 10.89) mW (1.089 to 29.7) mW (2.97 to 108.9) mW (10.89 to 297) mW (29.7 to 726) mW 72.6 mW to 1.49 W 149 mW to 6.76 W 1.09 mW to 9.18 W 2.97 mW to 33.6 W 10.9 mW to 91.8 W 29.7 mW to 337 W 109 mW to 918 W 297 mW to 2244 W 72.6 mW to 4.59 kW 1.49 W to 20.91 kW	0.0017 mW + 0.2 % 0.015 mW + 0.084 % 0.017 mW + 0.12 % 0.017 mW + 0.11 % 0.17 mW + 0.11 % 0.17 mW + 0.11 % 0.14 % 0.12 % 0.13 % 0.083 % 0.13 % 0.083 % 0.12 % 0.094 % 0.13 % 0.11 %	Fluke 5522A
Phase ³ – Generate	(10 to 65) Hz (65 to 500) Hz (0.5 to 1.0) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) Hz	0.12° 0.29° 0.58° 2.9° 5.8° 12°	Fluke 5522A
AC Current ³ – Generate, Clamp-On Ammeters Toroidal	(11 to 1000) A	180 mA + 2.9 mA/A	Multifunction calibrator with 50-coils

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Current ³ – Measure, Clamp-On Ammeters Toroidal	(0 to 400) A (400 to 1000) A	0.24 A + 2.6 mA/A 0.24 A + 2.6 mA/A	Current clamp

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Oscilloscopes ³ –			
Amplitude – DC 50 Ω 1 MΩ	(-6.6 to 6.6) V (-130 to 130) V	47 μV + 0.31 % 0.3 mV + 0.061 %	Multifunction calibrator with oscilloscope calibration option
Amplitude – Square Wave 50 Ω 1 MΩ	+/- 6.6 Vpp +/- 130 Vpp	46 μV + 0.29 % 61 μV + 0.12 %	
Leveled Sine Wave (Flatness ref. 50 kHz) [5 mV to 5.5 V]	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	120 μV + 2.2 % 120 μV + 2.8 % 120 μV + 4.9 %	
Amplitude – Leveled Sine Wave 50 Ω	50 kHz Reference [5 mV to 5.5 V]	400 μV + 2.6 %	
Leveled Sine Wave – Frequency 50 Ω	(0.05 to 600) MHz	58 mHz + 4.9 ppm	
Time Marker Function – 50 Ω	5s to 50 ms 20 ms to 100 ns (20 to 50) ns 10 ns (2 to 5) ns	0.9 ns + 0.65 % 0.058 ps + 0.000 31 % 10 fs + 0.000 29 % 10 fs + 0.000 23 % 1 fs + 0.000 29 %	
Edge – Rise Time (1 to 10) MHz	≤ 300 ps	71 ps	
Pulse Width – 10 mV to 2.5 V	(4 to 500) ns	2.3 ns to 5.3 %	

Parameter/Equipment	Range	CMC ² (±)	Comments
Welders ³ – DC Volt DC Amps AC Volt AC Amps	Up to 500 V Up to 1000 A Up to 500 V Up to 1000A	27 mV + 300 μV/V 0.6 A + 1.8 mA/A 0.29 V + 2.9 mA/A 0.23 A + 2.6 mA/A	IEC 60974-14:2018 DMM, clamp meter, load bank

VI. Fluid Quantities

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Volumetric Flow ³ – Gas (Air) – Measuring Equipment Standard Conditions (Nominal) at 101.3 kPa and 21 °C	(1 to 100) cm ³ /min (100 to 250) cm ³ /min (250 to 30 000) cm ³ /min (0.02 to 6) L/min (6 to 30) L/min (60 to 300) L/min (100 to 650) ft ³ /min	0.015 cm ³ /min + 1.2 % 0.15 cm ³ /min + 1.2 % 0.15 cm ³ /min + 1.2 % 1.5 mL/min + 1.2 % 17 mL/min + 1.4 % 150 mL/min + 1.2 % 9.2 ft ³ /min + 4.1 %	Air flow bubble flowmeter Air flowmeter Air flow bubble flowmeter
Volumetric Flow ³ – Liquid – Measuring Equipment	(0 to 500) L/min Up to 21 000 L/min (5 to 1000) L/min	66 mL/min + 0.44 % 14 mL/min + 1.8 % 1.5 mL/min + 0.19 %	Weight standards with timer Ultrasonic flow meter Coriolis mass flow meter
Piston-Operated Volumetric Apparatus ³ – Pipettes and Burettes – Measuring Equipment	(>1 to 10) μL (>10 to 100) μL (>100 to 1000) μL (>1000 to 10 000) μL (>0.5 to 20) mL (>20 to 200) mL (>200 to 1000) mL	0.12 μL 0.14 μL 0.7 μL 6.2 μL 120 μL + 73 nL/L 51 μL + 1.3 μL/L 18 μL + 9.2 μL/L	Gravimetric method: ISO 8655-6:2002 NIST SOP 14

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Volumetric Ware Equipment	(>0.5 to 20) mL (>20 to 200) mL (>200 to 1000) mL (>1000 to 10 000) mL (1 to 20) L (20 to 650) L (650 to 75 000) L	99 µL + 1.4 µL/L 51 µL + 1.5 µL/L 31 µL + 8.5 µL/L 0.29 mL + 50 µL/L 35 mL + 15 µL/L 190 mL + 300 µL/L 41 L to 3.3 mL/L	NIST SOP 14 - gravimetric method Euramet Guide 21
Specific Gravity ³ (Relative Density) – Hydrometers	(0.60 to 1.00) (1.00 to 1.36) (1.36 to 1.92)	0.0012 SG 0.0012 SG 0.0012 SG	ASTM E126-19
Turbidity ³	0.5 NTU 10 NTU 20 NTU 100 NTU 500 NTU 1000 NTU 4000 NTU	0.023 NTU 0.12 NTU 0.28 NTU 2.3 NTU 5.4 NTU 10 NTU 50 NTU	Certified reference materials - turbidity
Viscosity ³ – Viscosity meter	(3.9 to 5.4) cP (34.03 to 43.25) cP (64.7 to 84.75) cP (251.2 to 776.3) cP (384.2 to 561.2) cP (2386 to 10 420) cP (3433 to 19 000) cP (6527 to 36 070) cP (10 120 to 55 970) cP (13 160 to 73 280) cP (17 860 to 99 140) cP	0.0029 cP + 0.24 % 0.035 cP + 0.55 % 0.067 cP + 0.62 % 0.61 cP + 0.75 % 0.61 cP + 0.33 % 4.9 cP + 0.99 % 8.1 cP + 1.1 % 15 cP + 1.2 % 24 cP 1.2 % 30 cP + 1.2 % 40 cP + 1.8 %	ASTM D341: Standard reference solutions Temperature (20 to 40) °C
Viscosity Cup ³ – ASTM/Ford, Zahn, Shell	(5 to 500) cP at 23 °C	1.4 cP + 0.17 %	Viscosity standard solutions, timer

VII. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Durometer ³ – (Types: A, B, C, D, DO, E, M, O, OO, OOO, OOO-S, R)			ASTM D2240: DP = Duro point
Spring Calibration Force	(0 to 100) DP	0.08 DP	Standard weights
Indenter Extension & Shape			
Diameter	Up to 0.5 in	71 μin	Measuring microscope
Radius	(0.01 to 0.5) in	71 μin	
Angle	20° to 45°	0.24°	
Extension	Up to 0.5 in	71 μin	
Indenter Display	Up to 0.2 in	470 μin + 0.081 ppm	Gage blocks
Indirect Verification of Rockwell Hardness Testers ³	HRC: Low Medium High HRBW: Low Medium High HR30N: Low Medium High	0.92 HRC 0.66 HRC 0.61 HRC 1.2 HRBW 1.2 HRBW 1.2 HRBW 1.2 HR30N 0.52 HR30N 0.72 HR30N	ASTM E18
Balances and Scales ³ –	(0.001 to 5) g (5 to 200) g (200 to 1000) g (1000 to 5000) g (5 to 25) kg (25 to 500) kg (500 to 15 000) kg	10 μg + 0.53 μg/g 30 μg + 0.83 μg/g 1 mg + 0.37 μg/g 10 mg + 0.21 μg/g 17 mg + 3.4 μg/g 10 g + 1.4 g/25 kg 5.8 kg + 0.058 kg/500 kg	Standards weights

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Balances and Scales ³ – (cont)	(15 000 to 60 000) kg	5.8 kg + 7.5 kg/15 000 kg	Standard weights and substitution method
	(0 to 100 000) kg	9 kg + 0.058 g/kg	Electrical simulation for capacities exceeding 60 000 kg, process meter
Nuclear Surface Moisture and Density Gauge ^{3,8} –	Density		
	Moisture		
	(1786 to 2600) kg/m ³	0.61 %	ASTM D7759
	(32.9 to 37.8) %	1.3 %	
Tachometers - Rotational Velocity ³ –			
Contact	(5 to 1000) rpm (1000 to 10 000) rpm (10 000 to 100 000) rpm (100 000 to 500 000) rpm	0.33 rpm + 0.0024 % 1.2 rpm + 0.0013 % 1.2 rpm + 0.0057 % 1.6 rpm + 0.0059 %	Standard tachometer
Non-contact (Optical)	(0 to 9 000) rpm (9 000 to 100 000) rpm (100 000 to 500 000) rpm	0.027 rpm + 0.002 % 1.2 rpm + 0.0024 % 1.2 rpm + 0.0021 %	Standard stroboscope
Air Velocity – Measuring Equipment	(0 to 20) m/s	1.6 m/s + 8 %	IEC 61400Annex F Standard anemometer
Torque Analyzers/ Testers ³	Up to 2.5 in·lbf (2.5 to 25) in·lbf (25 to 250) in·lbf (250 to 12 000) in·lbf	0.011 in·lbf + 0.014 % 0.051 in·lbf + 0.028 % 0.15 in·lbf + 0.065 % 1.2 in·lbf + 0.1 %	ASTM E2624-17: torque arms, torque wheels and standards weights

Parameter/Equipment	Range	CMC ^{2, 4, 10} (±)	Comments
Torque Tools ³	(1 to 44) in·lbf (25 to 250) in·lbf (250 to 12 000) in·lbf (12 000 to 18 000) in·lbf	0.043 in·lbf + 1.1 % 0.1 in·lbf + 1.3 % 0.82 in·lbf + 1.2 % 1.0 in·lbf + 1.2 %	Torque analyzers
Force ^{3, 10} –			
Testing Machines Tension	(4 to 100) lbf (100 to 1000) lbf (1000 to 10 000) lbf	1.2R + 0.74 % 1.2R + 0.59 % 1.2R + 0.23 %	ASTM E4-16 with standard load cells
Compression Testing Machines	(4 to 100) lbf (100 to 1000) lbf (1000 to 10 000) lbf (10 000 to 100 000) lbf (100 000 to 500 000) lbf	1.2R + 0.74 % 1.2R + 0.59 % 1.2R + 0.23 % 1.2R + 0.58 % 58 lbf + 0.57 %	
Force Gauges ³ – Compression and Tension	Up to 100 lbf (100 to 30 000) lbf	0.82R + 0.01 % 0.82R + 0.046 %	Weight standards
Pressure and Vacuum ³ – Measuring Equipment			EURAMET Guide 17
Pneumatic	(-14 to 0) psig	0.0072 psig	Vacuum gauge
	(-1 to 1) inH ₂ O	0.0063 inH ₂ O + 1.6 μinH ₂ O/inH ₂ O	Digital pressure gauge
	(-5 to 5) inH ₂ O	0.0075 inH ₂ O + 3.6 μinH ₂ O/inH ₂ O	
	(0 to 10) inH ₂ O	0.0055 inH ₂ O + 0.15 μinH ₂ O/inH ₂ O	Silicon pressure transducer
	(10 to 300) mmHg (1 to 300) psig	0.03 mmHg + 0.049 % 0.021 psig + 0.014 %	Dead weight ball gauge
	(0 to 1000) psia	0.11 psia + 0.0081 %	Pressure transducer

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Pressure and Vacuum ³ – Measuring Equipment (cont)			EURAMET Guide 17
Hydraulic	(14.5 to 530) psig (530 to 10 150) psig	0.12 psig + 0.011 % 0.062 psig + 0.024 %	Hydraulic dead weight tester
Pneumatic/Hydraulic	(10 150 to 36 000) psig	12 psig + 0.0005 %	Digital pressure gauge
Barometric	(60 to 110) kPaA	0.036 kPaA + 0.0018 %	Digital pressure gauge
Mass –			NIST SOPs 4, 5 and 8
ASTM Classes 1, 2, 3, 4, 5, 6 & 7 OIML Classes E2, F1, F2, M1, M2 & M3	(1 to 500) mg (1 to 5) g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg (20 to 25) kg 500 kg	0.0021 mg 0.01 mg 0.014 mg 0.015 mg 0.037 mg 0.05 mg 0.077 mg 0.34 mg 0.66 mg 4.4 mg 7.7 mg 39 mg 99 mg 950 mg	Mass standards and analytical balances

VIII. Optical Quantities

Parameter/Equipment	Range	CMC ² (±)	Comments
Colorimeters ³	(0 to 0.15) mg/L (0.15 to 0.48) mg/L (0.48 to 0.69) mg/L (0.69 to 2.4) mg/L (2.4 to 4.0) mg/L (4.0 to 7.0) mg/L	0.051 mg/L 0.061 mg/L 0.071 mg/L 0.23 mg/L 0.32 mg/L 0.61 mg/L	Ozone (Mid-Range) color standards, DPD chlorine HR color standards

Parameter/Equipment	Range	CMC ² (±)	Comments
Illuminance – Light Meters Visible Spectrum	(4 to 450) fc	0.0091 fc + 3.9 %	Reference light meter
Polarimeter ³ – Optical Rotation Wavelength (325 to 633) nm	(10.818 to 46.736)°	0.0065°	Quartz control plate
Refraction Index ³	(0 to 15)° Brix (15 to 40)° Brix (40 to 97.05)° Brix	0.026° Brix 0.027° Brix 0.036° Brix	Refractive index calibration standards
Transmittance ³ /Absorbance ³ – Spectrophotometers (250 -2800) nm	90 % T/0.0362 A 30 % T/0.5229 A 10 % T/1.000 A	0.0022 A 0.0041 A 0.0046 A	Transmission and absorbance glass filter certified reference materials
Wavelength ³ – Spectrophotometers	(240 to 642) nm	0.11 nm	Holmium Oxide solution wavelength certified reference material
Aerosol Particle Counter ³ – Counting Efficiency Particle Size Setting	(0.2 to 1) µm 0.3 µm 0.5 µm 1.0 µm 5.0 µm 10.0 µm	 5.4 % 0.018 µm 0.012 µm 0.016 µm 0.075 µm 0.1 µm	ISO 21501-4 Comparison against a standard particle counter. Uncertainty counting efficiency derived from the formula stated in 21501-4 Annex E Uncertainty of size setting error derived from the formula stated in ISO 21501-4 Annex E

IX. Thermodynamics

Parameter/Equipment	Range	CMC ^{2,6} (±)	Comments
Temperature – Measuring Equipment ³ – Digital and mechanical Thermometers and Temperature probes	(-200 to -40) °C (-38 to 0) °C (0 to 232) °C (232 to 420) °C (420 to 660) °C (660 to 1 200) °C	0.074 °C 0.043 °C 0.076 °C 0.071 °C 0.082 °C 3.0 °C	Digital indicator with PRT, liquid baths, dry blocks Dry block calibrator
Temperature ³ – Liquid-in-Glass Thermometers	(-38 to 105) °C (95 to 205) °C (195 to 405) °C	0.098 °C 0.11 °C 0.14 °C	Digital indicator with PRT
Temperature ³ – Measure Temperature Chambers, Ovens, Freezers	(-40 to 0) °C (0 to 232) °C (232 to 420) °C (420 to 660) °C (660 to 1200) °C	0.03 °C 0.047 °C 0.066 °C 0.097 °C 3.0 °C + 170 µ°C/°C	Digital indicator with PRT Digital indicator with thermocouple
Infrared Temperature Thermometer ³	(-15 to 0) °C (0 to 100) °C (100 to 200) °C (200 to 500) °C	0.56 °C + 0.13 µ°C/ °C 0.32 °C + 35 µ°C/ °C 0.86 °C + 270 µ°C/ °C 1.9 °C + 24 µ°C/ °C	Black body IR calibrators
Relative Humidity ³ – Measuring Equipment	(0.25 to 10) % RH (10 to 35) % RH (35 to 80) % RH (80 to 95) % RH	0.97 % RH 0.97 % RH 0.99 % RH 1.1 % RH	Hygrometer standard, humidity generator
Relative Humidity ³ – Measure	(0.25 to 10) % RH (10 to 35) % RH (35 to 80) % RH (80 to 95) % RH	0.97 % RH 0.97 % RH 0.99 % RH 1.1 % RH	Hygrometer

X. Time & Frequency

Parameter/Equipment	Range	CMC ^{2,6} (±)	Comments
Frequency ³ – Measure	(0 to 300) MHz	0.27 ppm	Frequency counter
Frequency ³ – Measuring Equipment	Up to 600 MHz	2.8 μHz + 2.9 ppm	Multifunction calibrator
Time ³ – Measure Stopwatch and Timing Device	Up to 86 400 s	27 ms + 0.045 μs/s	Frequency counter, frequency generator NIST SP-960-12

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 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.

⁴ In the statement of CMC, percentage indicates percent of reading, unless otherwise noted.

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*.

⁸ This accreditation includes those field service representatives located in the Dominican Republic and Costa Rica at Av 61, La Guaria, San José, San Vicente reporting to Phoenix Calibration, Santo Domingo, Dominican Republic.

⁹ This laboratory meets R205 – Specific Requirements: Calibration Laboratory Accreditation Program for the types of dimensional tests listed above and is considered equivalent to that of a calibration.

¹⁰ In the statement of CMC, R is the resolution of the unit under calibration.

MECHANICAL TESTING

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory¹¹ to perform the following test on fume hoods, bio-safety cabinets, HEPA Filter.

Test:	Test Methods:
BioSafety Cabinets, Class II, Type A1, A2, B1 and B2	NSF/ANSI 49 Annex 5 except 5.7 (site installation assessment) and 5.8 (electrical leakage and ground circuit resistance and polarity)
Laboratory Fume Hood (as installed, as used)	ASHRAE 110
Cleanrooms and Associated Controlled environments – Test Methods	ISO 14644-3 at Annex B.13.2.1 photometer method

¹¹ Accreditation is granted for field testing activities at this location only, and only applies to field technicians that are based out of this location.



Accredited Laboratory

A2LA has accredited

PHOENIX CALIBRATION

Santo Domingo, DOMINICAN REPUBLIC

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 11th day of January 2021.

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

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3022.01
Valid to October 31, 2022

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