



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: July 31, 2024

Certificate Number: 3316.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations<sup>1, 6</sup>:

I. Chemical

Parameter/Equipment	Range	CMC <sup>2, 7</sup> (±)	Comments
CO <sub>2</sub> – Measure <sup>3</sup>	(0 to 4) % CO <sub>2</sub> (4 to 6) % CO <sub>2</sub> (6 to 10) % CO <sub>2</sub>	0.31 % CO <sub>2</sub> 0.35 % CO <sub>2</sub> 0.45 % CO <sub>2</sub>	Vaisala GMP 221
Gas Detection Equipment <sup>3</sup> – CO <sub>2</sub>	5 % CO <sub>2</sub> 10 % CO <sub>2</sub>	0.06 % CO <sub>2</sub> 0.11 % CO <sub>2</sub>	Reference CO <sub>2</sub> gas – EPA protocol
pH Meters	4 pH 7 pH 10 pH	0.012 pH 0.013 pH 0.017 pH	Standard solutions
Conductivity Meters	1 µS/cm 5 µS/cm 10 µS/cm 100 µS/cm 1000 µS/cm 1413 µS/cm 10 mS/cm 100 mS/cm 150 mS/cm 200 mS/cm	0.30 µS/cm 0.30 µS/cm 0.30 µS/cm 1.0 µS/cm 3.3 µS/cm 3.7 µS/cm 38 µS/cm 350 µS/cm 700 µS/cm 750 µS/cm	Standard solutions



## II. Dimensional

Parameter/Equipment	Range	CMC <sup>2,7</sup> (±)	Comments
Angle Indicator <sup>3</sup> (Wave Bioreactor) – Measure	(0 to 10)° (10 to 90)°	0.22° 0.29°	Mitutoyo Pro 360

## III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC <sup>2,4,5</sup> (±)	Comments
DC Current – Measure <sup>3</sup>	Up to 200 µA 200 µA to 2 mA (2 to 20) mA (20 to 200) mA 200 mA to 2 A	12 µA/A + 0.4 nA 12 µA/A + 4 nA 13 µA/A + 40 nA 36 µA/A + 0.8 µA 0.017 % + 16 µA	Fluke 8508A
	(2 to 20) A	0.038 % + 0.4 mA	Fluke 8508A
	(2 to 50) A	0.012 %	Fluke 8508A w/ Ohm Labs CS-50 shunt
DC Current – Generate <sup>3</sup>	(0 to 330) µA 330 µA to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1.1 A (1.1 to 2.3) A (2.3 to 11) A (11 to 20.5) A	0.015 % + 20 nA 0.01 % + 50 nA 0.01 % + 250 nA 0.01 % + 2.5 µA 0.02 % + 40 µA 0.038 % + 40 µA 0.05 % + 500 µA 0.1 % + 750 µA	Fluke 5522A
DC Voltage – Measure <sup>3</sup>	Up to 200 mV 200 mV to 2 V (2 to 20) V (20 to 200) V (200 to 1000) V	4.5 µV/V + 110 nV 3.0 µV/V + 500 nV 3.0 µV/V + 4 µV 4.5 µV/V + 50 µV 4.5 µV/V + 500 µV	Fluke 8508A
DC Voltage– Generate <sup>3</sup>	(0 to 330) mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (330 to 1020) V	20 µV/V + 1 µV 11 µV/V + 2 µV 12 µV/V + 20 µV 18 µV/V + 150 µV 18 µV/V + 1.5 mV	Fluke 5522A

Parameter/Equipment	Range	CMC <sup>2,5</sup> (±)	Comments
Resistance – Measure <sup>3</sup>	Up to 2 Ω (2 to 20) Ω (20 to 200) Ω 200 Ω to 2 kΩ (2 to 20) kΩ (20 to 200) kΩ 200 kΩ to 2 MΩ (2 to 20) MΩ (20 to 200) MΩ 200 MΩ to 2 GΩ	15 μΩ/Ω + 5 μΩ 9 μΩ/Ω + 16 μΩ 7.5 μΩ/Ω + 50 μΩ 7.5 μΩ/Ω + 0.5 mΩ 7.5 μΩ/Ω + 5 mΩ 7.5 μΩ/Ω + 50 mΩ 8.5 μΩ/Ω + 1 Ω 15 μΩ/Ω + 100 Ω 60 μΩ/Ω + 10 kΩ 0.053 % + 1 MΩ	Fluke 8508A
Resistance – Generate <sup>3</sup>	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω 110 Ω to 1.1 kΩ (1.1 to 11) kΩ (11 to 110) kΩ 110 kΩ to 1.1 MΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ (330 to 1100) MΩ	40 μΩ/Ω + 0.001 Ω 30 μΩ/Ω + 0.0015 Ω 28 μΩ/Ω + 0.0014 Ω 28 μΩ/Ω + 0.002 Ω 28 μΩ/Ω + 0.02 Ω 28 μΩ/Ω + 0.2 Ω 32 μΩ/Ω + 2 Ω 60 μΩ/Ω + 30 Ω 0.013 % + 50 Ω 0.025 % + 2.5 kΩ 0.05 % + 3 kΩ 0.3 % + 100 kΩ 1.5 % + 500 kΩ	Fluke 5522A

Parameter/Range	Frequency	CMC <sup>2,5</sup> (±)	Comments
AC Voltage – Measure <sup>3</sup>			
Up to 200 mV	(1 to 10) Hz (10 to 20) Hz (20 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.1 % + 100 μV 0.1 % + 100 μV 0.025 % + 50 μV 0.011 % + 4 μV 0.011 % + 2 μV 0.011 % + 4 μV 0.031 % + 8 μV 0.071 % + 20 μV	Fluke 8508A
200 mV to 2 V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz 100 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	0.014 % + 120 μV 0.011 % + 20 μV 85 μV/V + 20 μV 65 μV/V + 20 μV 85 μV/V + 20 μV 0.021 % + 40 μV 0.051 % + 200 μV 0.3 % + 2 mV 1 % + 20 mV	

Parameter/Range	Frequency	CMC <sup>2, 5</sup> ( $\pm$ )	Comments
AC Voltage – Measure <sup>3</sup> (cont)			
(2 to 20) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz 100 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	0.014 % + 1.2 mV 0.011 % + 200 $\mu$ V 85 $\mu$ V/V + 200 $\mu$ V 65 $\mu$ V/V + 200 $\mu$ V 85 $\mu$ V/V + 200 $\mu$ V 0.021 % + 400 $\mu$ V 0.051 % + 2 mV 0.3 % + 20 mV 1 % + 200 mV	Fluke 8508A
(20 to 200) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz 100 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	0.014 % + 12 mV 0.011 % + 2 mV 85 $\mu$ V/V + 2 mV 65 $\mu$ V/V + 2 mV 85 $\mu$ V/V + 2 mV 0.021 % + 4 mV 0.051 % + 20 mV 0.3 % + 200 mV 1 % + 2 V	
(200 to 1000) V	(1 to 10) Hz (10 to 40) Hz 40 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.014 % + 70 mV 0.011 % + 20 mV 95 $\mu$ V/V + 20 mV 0.021 % + 40 mV 0.051 % + 200 mV	



Parameter/Range	Frequency	CMC <sup>2, 5</sup> (±)	Comments
AC Voltage – Generate <sup>3</sup>			
(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	0.08 % + 23 μV 0.015 % + 6 μV 0.02 % + 6 μV 0.1 % + 6 μV 0.35 % + 12 μV 0.8 % + 50 μV	Fluke 5522A
(33 to 330) mV	(10 to 20) Hz (20 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.2 % + 8 μV 0.03 % + 8 μV 0.015 % + 8 μV 0.016 % + 8 μV 0.035 % + 8 μV 0.08 % + 32 μV 0.2 % + 70 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	0.03 % + 50 μV 0.015 % + 60 μV 0.019 % + 60 μV 0.03 % + 50 μV 0.07 % + 130 μV 0.24 % + 600 μV	
(3.3 to 33) V	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.03 % + 650 μV 0.015 % + 600 μV 0.024 % + 600 μV 0.035 % + 600 μV 0.09 % + 1.6 mV	
(33 to 330) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.019 % + 2 mV 0.02 % + 6 mV 0.025 % + 6 mV 0.03 % + 6 mV 0.2 % + 50 mV	
(330 to 1020) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.03 % + 10 mV 0.025 % + 10 mV 0.03 % + 10 mV	

Parameter/Range	Frequency	CMC <sup>2,5</sup> ( $\pm$ )	Comments
AC Current – Generate <sup>3</sup>			
(29 to 330) $\mu$ A	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.2 % + 100 nA 0.15 % + 100 nA 0.13 % + 100 nA 0.3 % + 150 nA 0.8 % + 200 nA 1.6 % + 400 nA	Fluke 5522A
300 $\mu$ A to 3.3 mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.2 % + 150 nA 0.13 % + 150 nA 0.1 % + 150 nA 0.2 % + 200 nA 0.5 % + 300 nA 1.0 % + 600 nA	
(3.3 to 33.3) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.18 % + 2 $\mu$ A 0.09 % + 2 $\mu$ A 0.04 % + 2 $\mu$ A 0.08 % + 2 $\mu$ A 0.2 % + 3 $\mu$ A 0.4 % + 4 $\mu$ A	
(33.3 to 330) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.18 % + 20 $\mu$ A 0.09 % + 20 $\mu$ A 0.04 % + 20 $\mu$ A 0.10 % + 50 $\mu$ A 0.2 % + 100 $\mu$ A 0.4 % + 200 $\mu$ A	
330 mA to 1.1 A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.18 % + 100 $\mu$ A 0.05 % + 100 $\mu$ A 0.6 % + 1 mA 2.5 % + 5 mA	
(1.1 to 3.0) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.18 % + 100 $\mu$ A 0.06 % + 100 $\mu$ A 0.6 % + 1 mA 2.5 % + 5 mA	
(3.0 to 11) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.06 % + 2 mA 0.1 % + 2 mA 3.0 % + 2 mA	
(11 to 20.5) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.12 % + 5 mA 0.15 % + 5 mA 3.0 % + 5 mA	

Parameter/Range	Frequency	CMC <sup>2, 5</sup> (±)	Comments
AC Current – Measure <sup>3</sup>			
Up to 200 µA	1 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.048 % + 20 nA 0.065 % + 20 nA 0.4 % + 20 nA	Fluke 8508A
200 µA to 2 mA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.029 % + 200 nA 0.028 % + 200 nA 0.065 % + 200 nA 0.4 % + 200 nA	
(2 to 20) mA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.029 % + 2 µA 0.028 % + 2 µA 0.065 % + 2 µA 0.4 % + 2 µA	
(20 to 200) mA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz	0.029 % + 20 µA 0.025 % + 20 µA 0.06 % + 20 µA	
200 mA to 2 A	10 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz	0.06 % + 200 µA 0.071 % + 200 µA 0.3 % + 200 µA	
(2 to 20) A	10 Hz to 2 kHz (2 to 10) kHz	0.08 % + 2 mA 0.25 % + 2 mA	
	(1 to 10) Hz (10 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 20) kHz	0.022 % + 1.6 mA 0.022 % + 5 mA 0.022 % + 2.4 mA 0.022 % + 5 mA 0.025 % + 10 mA	Fluke 8508A w/ Ohm Labs CS-50 shunt
(20 to 50) A	(1 to 10) Hz 10 Hz to 10 kHz (10 to 20) kHz	0.022 % + 14 mA 0.022 % + 2.4 mA 0.024 % + 5 mA	
Distortion – Measure <sup>3</sup>			
(-99.9 to 0) dB	20 Hz to 20 kHz	1.1 dB	Keithley 2015

Parameter/Equipment	Range	CMC <sup>2, 5</sup> (±)	Comments
Capacitance – Generate <sup>3</sup>	(220 to 400) pF (0.4 to 1.1) nF (1.1 to 3.3) nF (3.3 to 11) nF (11 to 33) nF (33 to 110) nF (110 to 330) nF (0.33 to 1.1) μF (1.1 to 3.3) μF (3.3 to 11) μF (11 to 33) μF (33 to 110) μF (110 to 330) μF (0.33 to 1.1) mF (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	0.5 % + 10 pF 0.5 % + 0.01 nF 0.5 % + 0.01 nF 0.25 % + 0.01 nF 0.25 % + 0.01 nF 0.25 % + 0.01 nF 0.25 % + 0.03 nF 0.25 % + 1 nF 0.25 % + 3 nF 0.25 % + 10 nF 0.40 % + 30 nF 0.45 % + 100 nF 0.45 % + 300 nF 0.45 % + 1 μF 0.45 % + 3 μF 0.45 % + 10 μF 0.75 % + 30 μF 1.1 % + 100 μF	Fluke 5522A
Electrical Calibration of Thermocouples – Generate and Measure <sup>3</sup>			
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 5522A
Type E	(-250 to -100) °C (-100 to 650) °C (650 to 1000) °C	0.40 °C 0.13 °C 0.17 °C	
Type J	(-210 to -100) °C (-100 to 760) °C (760 to 1200) °C	0.22 °C 0.14 °C 0.18 °C	
Type K	(-200 to -100) °C (-100 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.26 °C 0.15 °C 0.21 °C 0.32 °C	
Type N	(-200 to -100) °C (-100 to 410) °C (410 to 1300) °C	0.32 °C 0.19 °C 0.22 °C	





Electrical Calibration of Thermocouples – Generate and Measure <sup>3</sup> (cont)			
Type R	(0 to 250) °C (250 to 1000) °C (1000 to 1767) °C	0.45 °C 0.28 °C 0.32 °C	Fluke 5522A
Type S	(0 to 250) °C (250 to 1400) °C (1400 to 1767) °C	0.39 °C 0.29 °C 0.36 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 400) °C	0.50 °C 0.19 °C 0.13 °C	
Type U	(-200 to 0) °C (0 to 600) °C	0.44 °C 0.22 °C	

#### IV. Fluid Quantities

Parameter/Equipment	Range	CMC <sup>2, 4, 7</sup> (±)	Comments
Flow Rate – Measure			
Liquid Mass Flow <sup>3</sup>	(0 to 250) g/min (250 to 7500) g/min	0.5 g/min 0.21%	Endress & Hauser Promass Coriolis flow meters
	(0 to 9) kg/min (9 to 300) kg/min	15 g/min 0.17%	
Liquid Volume Flow <sup>3</sup>	(0 to 250) ml/min (250 to 7500) ml/min	0.5 ml/min 0.21%	Endress & Hauser Promass Coriolis flow meters
	(0 to 9) l/min (9 to 300) l/min	15 ml/min 0.17%	
Liquid Mass Flow (15 to 4000) g/min	(0 to 3200) g	0.63 g	Gravimetric flow bench with balance

V. Mechanical

Parameter/Equipment	Range	CMC <sup>2, 4, 7</sup> (±)	Comments
Pneumatic/Hydraulic Gage Pressure – Measuring Equipment <sup>3</sup>	(0 to 0.25) in·H <sub>2</sub> O	0.000 48 in·H <sub>2</sub> O	Heise ST-2H / HQS-1
	(0 to 3) in·H <sub>2</sub> O	0.0027 in·H <sub>2</sub> O	
	(0 to 15) in·H <sub>2</sub> O	0.011 in·H <sub>2</sub> O	Heise ST-2H / HQS-2
	(0 to 25) in·H <sub>2</sub> O	0.031 in·H <sub>2</sub> O	
	(0 to 60) psig	0.019 psig	
	(0 to 100) psig	0.060 psig	
(0 to 300) psig	0.090 psig	Crystal/Ametek APM30PSI	
(0 to 600) psig	0.19 psig		
(0 to 1000) psig	0.31 psig	Crystal/Ametek AMP300PSI	
(0 to 9) psig	0.0028 psig		
(9 to 30) psig	0.03 %	Ametek PKII	
(0 to 90) psig	0.03 psig		
(90 to 300) psig	0.031 %	Ametek T-150	
(4 to 10) in·H <sub>2</sub> O	0.065 %		
(10 to 854) in·H <sub>2</sub> O	0.037 %		
(100 to 15 000) psig	0.03 %		
Pneumatic Absolute Pressure – Measuring Equipment <sup>3</sup>	Up to 15 psia	0.0061 psia	Heise ST-2H / HQS-2
Vacuum – Measuring Equipment <sup>3</sup>	Up to 30 in·Hg	0.013 in·Hg	Heise ST-2H / HQS-2
Rotational Speed – Measure (Optical) <sup>3</sup>	(6 to 99 999) RPM	0.05 % + 0.6R	Ametek 1726C
Rotational Speed – Measuring Equipment (Optical) <sup>3</sup>	(6 to 99 999) RPM	0.0024 % + 0.6R	Agilent 33120A

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Scales & Balances <sup>3</sup> (1 g to 35 kg)	10 to 500 mg	12 µg	ASTM Class 1 mass pieces, fixed values. Uncertainties are per weight.
	1 g	41 µg	
	2 g	41 µg	
3 g	41 µg		
5 g	41 µg		
10 g	60 µg		
20 g	87 µg		
30 g	87 µg		
50 g	0.15 mg		
100 g	0.30 mg		
200 g	0.60 mg		
500 g	1.5 mg		
1 kg	3.0 mg		
2 kg	5.9 mg		
5 kg	14 mg		
	1 g	0.13 mg	OIML Class F1 mass pieces, fixed values. Uncertainties are per weight.
	2 g	0.15 mg	
	5 g	0.19 mg	
	10 g	0.24 mg	
	20 g	0.30 mg	
	50 g	0.36 mg	
	100 g	0.59 mg	
	200 g	1.2 mg	
	500 g	2.9 mg	
	1 kg	5.9 mg	
	2 kg	12 mg	
	5 kg	29 mg	
	10 kg	58 mg	
	20 kg	120 mg	
	(10 to 500) mg	7 µg	
	1 g	10 µg	
	2 g	12 µg	
	3 g	16 µg	
	5 g	16 µg	
	10 g	21 µg	
	20 g	38 µg	
	30 g	38 µg	
	50 g	38 µg	
	100 g	79 µg	
	200 g	89 µg	
	500 g	0.34 mg	
	1 kg	0.67 mg	
	2 kg	1.1 mg	
	5 kg	1.3 mg	

Parameter/Equipment	Range	CMC <sup>2,4</sup> (±)	Comments
Scales & Balances <sup>3</sup> (10 kg to 600 kg)	10 kg 20 kg  (10 to 3000) kg	1.5 g 2.5 g  0.16%	ASTM Class 6 mass pieces and correction factors, fixed values. Uncertainties are per weight.  Liquid flow totalized by Endress & Hauser Promass 83F Coriolis flow meter

## VI. Thermodynamics

Parameter/Equipment	Range	CMC <sup>2,7</sup> (±)	Comments
Temperature – Measure <sup>3</sup>	(-196 to -100) °C (-100 to 50) °C (50 to 200) °C (200 to 400) °C (400 to 660) °C	0.013 °C 0.014 °C 0.022 °C 0.033 °C 0.047 °C	Hart Scientific 5628 w/ Hart Scientific 1502A
Temperature – Measuring Equipment <sup>3</sup>	-196 °C (-95 to -80) °C (-80 to -20) °C (-20 to 100) °C (100 to 200) °C (200 to 650) °C	0.013 °C 0.019 °C 0.018 °C 0.025 °C 0.033 °C 0.13 °C	Hart Scientific 5628 w/ Hart Scientific 1502A with LN <sub>2</sub> , dry ice / ethanol slurry and baths
Controlled Temperature Units – Measure <sup>3</sup>			
Refrigerators	(2 to 8) °C	0.25 °C	RTD w/ temperature readout
-20 °C Freezers	(-30 to -10) °C	0.27 °C	
-80 °C Freezers	(-90 to -60) °C	0.30 °C	
Cryo Freezers	(-196 to -120) °C	0.52 °C	
Incubators	(0 to 65) °C	0.22 °C	
Glass Washers and Ovens	(0 to 260) °C	0.85 °C	

Parameter/Equipment	Range	CMC <sup>2, 7</sup> ( $\pm$ )	Comments
Relative Humidity – Measure <sup>3</sup>	Up to 90 % RH (90 to 100) % RH	1.4 % RH 2.1 % RH	Vaisala HMP77B
Relative Humidity – Measuring Equipment	LiCl 11 % RH MgCl <sub>2</sub> 33 % RH NaCl 75 % RH K <sub>2</sub> SO <sub>4</sub> 97 % RH	0.57 % RH 0.90 % RH 0.95 % RH 1.2 % RH	Salt solutions

## VII. Time & Frequency

Parameter/Equipment	Range	CMC <sup>2, 4, 7</sup> ( $\pm$ )	Comments
Frequency – Measuring Equipment <sup>3</sup>	100 $\mu$ Hz to 15 MHz	24 $\mu$ Hz/Hz	Agilent 33120A
	0.01 Hz to 2 MHz	2 $\mu$ Hz/Hz + 5 $\mu$ Hz	Fluke 5522A
Frequency – Measure <sup>3</sup>	10 Hz to 1 MHz	12 parts in 10 <sup>6</sup> Hz + 2 digits	Fluke 8508A
Time – Measure <sup>3</sup>	1 s to 9:59:59:99 hr	0.001 % + 67 ms	Control Company 1221

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

<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. 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, the value is defined as the percentage of reading unless otherwise noted. In the statement of CMC,  $R$  is resolution of the unit under test.

<sup>5</sup> 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.

<sup>6</sup> This scope meets A2LA's *P112 Flexible Scope Policy*.

<sup>7</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.



# Accredited Laboratory

A2LA has accredited

## INSTRUMENT TECHNOLOGIES, INC.

Boise, ID

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 11<sup>th</sup> day of August 2022.

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

Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 3316.01  
Valid to July 31, 2024

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