SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

CERTIFIED MEASUREMENTS, INC.
510 N Houston Lake Blvd.
Centerville, GA 31028
Deborah J. Nazimiec Phone: 478 953 5171

CALIBRATION

Valid To: May 31, 2024 Certificate Number: 1297.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations and dimensional inspections[1, 9]:

I. Dimensional

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Gage Blocks – Length Only	0.01 to 1 in (1 to 4) in (4 to 20) in	(2.4 + 0.78*L*) µin (3.0 + 0.78*L*) µin (6.0 + 0.78*L*) µin	Mechanical comparison
Measuring Wires	(2 to 120) TPI	8.0 µin	Standard measuring machine
Plain Rings	(0.125 to 0.25) in (0.25 to 11) in (11 to 16) in	(30 + 1.6*L*) µin (20 + 1.6*L*) µin (27 + 1.6*L*) µin	Master ring and standard measuring machine
Plain Plugs	(0.125 to 16) in	(8.0 + 1.6*L*) µin	Master plug and standard measuring machine

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Threaded Plugs/Rings –			
Plug Pitch Diameter	(0.1 to 10) in	(54 + 2.2*D*) µin	Gage blocks, standard measuring machine, master thread wires
Plug Major Diameter	(0.1 to 10) in	22 µin	Gage blocks and standard measuring machine.
Ring Major Diameter[8]	(0.06 to 2) in	Master Set plug "W" tolerance	Set using master plug gages. ASME/ANSI B1.2-1983 and ASME/B1.3-2007
Length Standards	Up to 12 in (12 to 49) in	(19 + 2.9*L*) µin (60 + 3.6*L*) µin	Gage blocks and standard measuring machine
Indicators[3]	Up to 2 in (2 to 4) in	32 µin 250 µin	Indicator calibrator gage blocks
Comparators	0.002 in	11 µin	UMM, American SIP 550M
Micrometers[3] –			
Digital & Vernier	Up to 36 in	(62 + 2.5*L*) µin	Gage blocks
Tape Measures	(6 to 100) ft	(0.002 + 0.000 04*L*) in	CMM/master rule
Glass Scales	Up to 3 in (3 to 16) in (> 16 to 20) in	35 µin (40 + 1.5*L*) µin (60 + 11*L*) µin	Standard measuring machine and microscope
Height Measures	(6 to 24) in (> 24 to 48) in	95 µin 400 µin	Gage amp/probe and gage blocks
Angle Blocks	Up to 45°	2.0″	Sine bar, gage blocks, and gage amp/probe

Parameter/Equipment	Range	CMC[2, 4, 6] (±)	Comments
Protractors, Levels and Clinometers	Up to 359°	6.0″	Rotary tilting table
Calipers[3]	Up to 12 in (12 to 60) in	380 µin (620 + 18*L*) µin	Gage blocks and ring gages
Steel Rules	Up to 72 in	(0.001 + 0.000 03*L*) in	Manual CMM
Optical Flats and Parallels –			
Flatness	Up to 4 in	3.0 µin	Master flat
Parallelism	Up to 100 µin	2.0 µin	Gage block comparator
Length – 3D[7]	X: Up to 20 in Y: Up to 16 in Z: Up to 12 in	170 µin	CMM
Length – 2D[7]	X: Up to 6 in Y: Up to 2 in	170 µin 140 µin	Optical comparator
Angle[7] – Measure	Up to 360°	0.022°	Optical comparator

III. Electrical – DC/Low Frequency

Parameter/Range	Frequency	CMC[2, 5, 6] (±)	Comments
AC Current – Measure and Generate			
(0.001 to 2) A	40 Hz to 20 kHz	0.01 %	AC current shunts, Fluke A40, Fluke 792A and Agilent 3458A
(> 2 to 20) A		0.04 %	
High Current – Generate (> 20 to 975) A	(45 to 65) Hz	0.44 %	AC/DC current calibrator Valhalla Scientific 2555A and Fluke 50-turn coil
AC Voltage – Measure and Generate			
22 mV:			
(10, 20) mV	10 Hz 20 Hz to 20 kHz 50 kHz	0.038 % 0.033 % 0.036 %	AC/DC transfer standard 792A with Datron 1271 DMM and Datron 4808 calibrator
220 mV:			
20 mV	10 Hz 20 Hz 40 Hz to 20 kHz 50 kHz	0.042 % 0.028 % 0.024 % 0.027 %	
60 mV	10 Hz 20 Hz 40 Hz to 20 kHz 50 kHz	0.025 % 0.015 % 0.010 % 0.013 %	
(100, 200) mV	10 Hz 20 Hz 40 Hz to 20 kHz (50 to 100) kHz (300 to 500) kHz 800 kHz to 1 MHz	0.025 % 0.012 % 0.010 % 0.019 % 0.072 % 0.072 %	

Parameter/Range	Frequency	CMC[2, 5, 6] (±)	Comments
AC Voltage – Measure and Generate (cont)			
700 mV:			
(200, 600) mV	10 Hz 20 Hz 40 Hz to 20 kHz (50 to 100) kHz 300 kHz to 1 MHz	0.026 % 0.010 % 0.008 % 0.019 % 0.072 %	AC/DC transfer standard 792A with Datron 1271 DMM and Datron 4808 calibrator
2.2 V:			
(0.6, 1, 2) V	10 Hz 20 Hz 40 Hz to 20 kHz (50 to 100) kHz 300 kHz to 1 MHz	0.025 % 0.010 % 0.065 % 0.008 % 0.064 %	
7 V:			
(2, 6) V	10 Hz 20 Hz 40 Hz to 20 kHz (50 to 100) kHz 300 kHz to 1 MHz	0.025 % 0.010 % 0.006 % 0.009 % 0.055 %	

Parameter/Range	Frequency	CMC[2, 6] (±)	Comments
AC Voltage – Measure and Generate (cont)			
22 V:			
(6, 10) V	10 Hz 20 Hz 40 Hz to 20 kHz (50 to 100) kHz 300 kHz to 1 MHz	0.025 % 0.010 % 0.007 % 0.010 % 0.056 %	AC/DC transfer standard 792A with Datron 1271 DMM and Datron 4808 calibrator
20 V	10 Hz 20 Hz 40 Hz to 50 kHz	0.025 % 0.010 % 0.070 %	
70 V:			
(20, 60) V	10 Hz 20 Hz 40 Hz to 20 kHz 50 kHz	0.025 % 0.010 % 0.007 % 0.010 %	
220 V:			
(60, 100, 200) V	10 Hz 20 Hz 40 Hz to 20 kHz 50 kHz	0.025 % 0.012 % 0.008 % 0.010 %	
1000 V:			
(200, 600, 1000) V	10 Hz 20 Hz 40 Hz to 20 kHz	0.025 % 0.012 % 0.008 %	
(200, 600, 700) V	50 kHz	0.01 %	
(1 to 3) V	(1 to 13) MHz (13 to 30) MHz (30 to 80) MHz (80 to 100) MHz	0.14 % 0.29 % 0.58 % 1.4 %	Reference thermal converter
(1 to 10) kV	(30 to 200) Hz	0.30 %	Vitrek 4700
Measure Only (> 10 to 50) kV	(30 to 100) Hz	0.40 %	Vitrek 4700 w/ HVL-70

Parameter/Equipment	Range	CMC[2, 5, 6] (±)	Comments
DC Current – Measure and Generate	0.1 µA to 2 A	0.01 %	Datron 4808, Datron 1271
	(2 to 20) A	0.03 %	Precision shunts, L&N 4300 and Guildline 9711A
Generate	(20 to 100) A	0.07 %	Valhalla 2555A
High Current – Generate	(100 to 975) A	0.38 %	Valhalla 2555A and Fluke 50-turn coil
DC Voltage – Measure and Generate	100 µV to 100 mV	8 µV/V + 0.4 µV	Kelvin-Varley divider
	100 mV to 1 V	3.4 µV/V + 0.4 µV	Fluke 720A
	(1 to 10) V	3.0 µV/V + 3.0 µV	Fluke 720A/Fluke 732A
	10 V	1.0 µV/V	Fluke 732A
	(10 to 100) V	5.0 µV/V + 50 µV	Fluke 752A divider, Fluke
	(100 to 1000) V	3.9 µV/V + 500 µV	732A and Datron 4808
	(1 to 10) kV	0.02 %	Vitrek 4700 w/ HVL-70
	(10 to 20) kV	0.07 %	Vitrek 4700 w/ HVL-70
Measure Only	(20 to 50) kV	0.20 %	
Resistance – Measure and Generate, Fixed Values	0.001 Ω	0.01 %	Measurement Intl 9331 series reference standard resistors with Agilent 3458A
	0.01 Ω	0.01 %	
	0.1 Ω	10 µΩ/Ω	
	1 Ω	7.4 µΩ/Ω	
	10 Ω	7.0 µΩ/Ω	
	100 Ω	7.3 µΩ/Ω	
	1 kΩ	7.2 µΩ/Ω	
	10 kΩ	7.0 µΩ/Ω	
	100 kΩ	7.3 µΩ/Ω	
	1 MΩ	10 µΩ/Ω	
	10 MΩ	12 µΩ/Ω	
	100 MΩ	32 µΩ/Ω	
	1 GΩ	0.058 %	Measurement International
	10 GΩ	0.08 %	9331G
Measure Only	100 GΩ	0.12 %	Guildline 9520/6500A
	1 TΩ	0.23 %	

Parameter/Equipment	Range	CMC[2, 5, 6] (±)	Comments
Resistance – Measure and Generate[3]	(0 to 1) Ω (1 to 10) Ω (10 to 100) Ω 100 Ω to 1 kΩ (1 to 10) kΩ (10 to 100) kΩ 100 kΩ to 1 MΩ (1 to 100) MΩ	0.007 % + 0.000 05 Ω 0.002 % 0.002 % 0.001 % 0.001 % 0.001 % 0.0015 % 0.005 %	Decade Box, Measurement International 9331x series resistors 1Ω thru 100 MΩ and Agilent 3458A
Capacitance – Measure and Generate 50 Hz to 1 kHz	 (1 to 100) µF 100 µF to 1 mF	 0.1 % 0.15 %	 GenRad 1689 capacitance bridge
Capacitance – Measure and Generate @ 1 kHz	1 pF to 1.1 µF	0.017 % + 0.000 03 pF	GenRad 1615 capacitance bridge and GenRad 1404-A standard capacitor
Inductance – Generate 100 µH to 10 mH (10 to 100) mH 100 mH to 1 H (1 to 10) H Fixed Point: 200 mH	 1 kHz 500 Hz 200 Hz 100 Hz 100 Hz, 200 Hz, 400 Hz, 1 kHz, and 10 kHz	 2.0 % 1.6 % 0.8 % 0.8 % 0.15 %	 GenRad 1491G decade inductor GenRad 1482M std inductor
Inductance[3] – Measure 100 µH to 10 H	 100 Hz, 200 Hz, 400 Hz, 1 kHz, and 10 kHz	 0.20 %	 GenRad 1689 RLC Digibridge

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of Thermocouple Indicators –			
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.12 °C 0.16 °C 0.14 °C 0.16 °C 0.21 °C	Fluke 5500A/ ice reference
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.27 °C 0.16 °C 0.14 °C 0.17 °C 0.23 °C	
Type K	(-200 to 100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.33 °C 0.18 °C 0.16 °C 0.26 °C 0.4 °C	
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.4 °C 0.22 °C 0.19 °C 0.18 °C 0.27 °C	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of Thermocouple Indicators – (cont)			
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.57 °C 0.35 °C 0.33 °C 0.40 °C	Fluke 5500A/ ice reference
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.47 °C 0.36 °C 0.37 °C 0.46 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.63 °C 0.24 °C 0.16 °C 0.14 °C	
Electrical Simulation of Thermocouple Indicators[3] –			
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	Fluke 5500A or Fluke 744 process calibrator
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.31 °C 0.19 °C 0.16 °C 0.20 °C 0.27 °C	
Type K	(-200 to 100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.38 °C 0.21 °C 0.19 °C 0.30 °C 0.46 °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 0.16 °C	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of RTD Indicating Systems and Measure[3] –			
Pt 385, 100 Ω	(-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C	0.05 °C 0.07 °C 0.09 °C 0.10 °C 0.12 °C 0.23 °C	Decade resistors and Datron 1271, Wavetek 1281, Fluke 744
Pt 3926, 100 Ω	(-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.05 °C 0.07 °C 0.09 °C 0.10 °C 0.12 °C	
Pt 3916, 100 Ω	(-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	0.25 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.08 °C 0.09 °C 0.10 °C 0.23 °C	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of RTD Indicating Systems and Measure[3] – (cont)			
Pt 385, 200 Ω	(-200 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.04 °C 0.05 °C 0.12 °C 0.13 °C 0.14 °C 0.16 °C	Decade resistors and Datron 1271, Wavetek 1281, Fluke 744
Pt 385, 500 Ω	(-200 to -80) °C (-80 to 100) °C (100 to 260) °C (260 to 400) °C (400 to 600) °C (600 to 630) °C	0.04 °C 0.05 °C 0.06 °C 0.08 °C 0.09 °C 0.11 °C	
Pt 385, 1000 Ω	(-200 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 600) °C (600 to 630) °C	0.03 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.23 °C	
Ni 120, 120 Ω	(-80 to 100) °C (100 to 260) °C	0.08 °C 0.14 °C	
Cu 427, 10 Ω	(-100 to 260) °C	0.30 °C	

Parameter/Equipment	Range	CMC[2, 5, 6] (±)	Comments
Oscilloscopes[3] –			
Squarewave Signal –			
50 Ω @ 1 kHz	1 mV to 6.6 V_{p-p}	0.25 % + 40 µV	Fluke 5500A/SC600
1 MΩ @ 1 kHz	1 mV to 130 V_{p-p}	0.1 % + 40 µV	
Leveled Sine Wave –	50 kHz reference	2.0 % + 300 µV	
Amplitude (50 kHz ref)	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	3.5 % + 300 µV 4.0 % + 300 µV 6.0 % + 300 µV	
Flatness (50 kHz ref)	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	1.5 % + 100 µV 2.0 % + 100 µV 4.0 % + 100 µV	
Time Marker – Measuring Equipment and Period @ 50Ω	5 s to 50 ms 20 ms to 2 ns	0.12 % 2.5 µs/s	
Rise Time	≤ 1 ns	+0 / -500 ps	

IV. Electrical – Microwave/RF

Parameter/Range	Frequency	CMC[2, 5, 6] (±)	Comments
RF Power – Measure			
(1 to 10) mW	(10 to 20) MHz (20 to 50) MHz 50 MHz to 8 GHz (8 to 18) GHz	1.6 % 1.5 % 1.4 % 1.5 %	Tegam F1109 coaxial power standard and Agilent E4418B power meter
RF Attenuation – Measure			
(0 to -10) dB -20 dB -30 dB -40 dB -50 dB -60 dB -70 dB -80 dB -90 dB -100 dB	10 MHz to 18 GHz	0.065 dB 0.076 dB 0.092 dB 0.12 dB 0.14 dB 0.16 dB 0.18 dB 0.20 dB 0.47 dB 0.58 dB	Weinschel VM-4A attenuation calibrator

V. Fluid Quantities

Parameter/Equipment	Range	CMC[2] (±)	Comments
Hydrometers	(0.7 to 2.0) g/cm^3 (sg)	0.000 40 g/cm^3 (sg)	Verification of hydrometers in accordance with hydrostatic weighing using Westphall balance
Volumetric Ware –			
(To Contain or Deliver)	(1.0 to 10) mL (> 10 to 25) mL (> 25 to 50) mL (> 50 to 100) mL (> 100 to 200) mL (> 200 to 250) mL (> 250 to 500) mL (> 500 to 1000) mL (> 1000 to 2000) mL	0.0054 mL 0.0063 mL 0.0085 mL 0.016 mL 0.026 mL 0.032 mL 0.064 mL 0.13 mL 0.19 mL	NISTIR 7383 SOP #14 by gravimetric determination
Pipettes	10 µL (> 10 to 20) µL (> 20 to 50) µL (> 20 to 100) µL (> 100 to 200) µL (> 200 to 500) µL (> 500 to 1000) µL (> 1000 to 5000) µL	0.19 µL 0.27 µL 0.35 µL 0.48 µL 0.74 µL 1.5 µL 2.8 µL 4.8 µL	NISTIR 7383 SOP #14 by gravimetric determination

VI. Mechanical

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Balance	Up to 100 g (100 to 300) g (300 to 500) g 500 g to 1 kg (1 to 2) kg (2 to 3) kg (3 to 4) kg (4 to 5) kg (5 to 10) kg (10 to 20) kg (20 to 50) kg	0.21 mg 0.57 mg 0.96 mg 2.0 mg 3.9 mg 5.9 mg 7.8 mg 9.8 mg 14 mg 30 mg 59 mg	Class 1 standards
Scale	Up to 1 kg (1 to 2) kg (2 to 5) kg (5 to 10) kg (10 to 20) kg (20 to 50) kg (50 to 100) kg (100 to 200) kg (200 to 300) kg (300 to 400) kg (400 to 500) kg	44 mg 64 mg 130 mg 200 mg 320 mg 640 mg 1.6 g 3.3 g 3.9 g 4.9 g 6.5 g	Class F standards
Torque –			
Wrenches[3], Screwdrivers	(0.4 to 1000) lbf·ft	0.47 %	Torque transducers indicator
Watches	(0.6 to 100) ozf·in	0.33 %	Torque arms with ASTM Class 4 dead weight
Torque Analyzers, Transducers	(1 to 100) ozf·in (5 to 50) lbf·in (50 to 1200) lbf·in (100 to 600) lbf·ft (600 to 1000) lbf·ft	0.053 % 0.049 % 0.046 % 0.049 % 0.068 %	Torque arms with ASTM Class 4 dead weight
Force – Tension and Compression	(5 to 1800) lbf	0.029 %	NIST Class F dead weights
	(500 to 5000) lbf (5000 to 50 000) lbf	0.065 % 0.072 %	Load cell comparison

Parameter/Equipment	Range	CMC[2, 5, 6] (±)	Comments
Direct Verification of Durometers –			ASTM D2240 with:
Scale Accuracy			
Type A, B, C, D, DO, E, M, O, OOO,	(0 to 100) duros	0.30 duro points	Balance
OOO-S, R Type OO	(0 to 100) duros	0.62 duro points	
Indenter Geometry –			
Length	Up to 0.2 in	0.000 10 in	Gage blocks and optical comparator
Diameter	Up to 0.5 in	0.000 20 in	
Angle	(30 to 35)°	0.038°	
Radius	Up to 0.25 in	0.000 20 in	
Indenter Display	(0 to 100) duro units	0.30 duro units	Gage blocks
Spring Calibration – Force	(0 to 10) N (> 10 to 50) N	0.0004 N 0.011 N	Balance
Cable Tensiometers/ Wire Tension Meters	(5 to 1000) lbf	0.74 %	NIST Class F dead weights
Pressure – Measure Water Medium	(0.2 to 4) inH_2O	0.01 %	Micrometer standard barometer
Pressure – Measuring Equipment			
Gas Medium	(0.2 to 25) psi (25 to 100) psi (100 to 1000) psi	17 x 10^{-6} psi 19 x 10^{-6} psi 21 x 10^{-6} psi	Dead weight tester
Oil Medium	(1000 to 20 000) psi	49 x 10^{-6} psi	
Vacuum – Measuring Equipment			
Air/Gas Medium	(0.04 to 0.40) inHg	0.06 %	Absolute pressure gage
	(0.5 to 30) inHg	19 x 10^{-6} inHg	Dead weight tester

Parameter/Equipment	Range	CMC[2] (±)	Comments
Mass	1 mg 2 mg 3 mg 5 mg 10 mg 20 mg 30 mg 50 mg 0.10 g 0.20 g 0.30 g 0.50 g 1.0 g 2.0 g 3.0 g 5.0 g 10.0 g 20.0 g 30.0 g 50.0 g 100 g 200 g 300 g 500 g 1.0 kg 2.0 kg 3.0 kg 5.0 kg 10 kg 20 kg 25 kg 1 oz 2 oz 4 oz 8 oz 1 lb 2 lb 3 lb 5 lb 10 lb 20 lb 30 lb 50 lb	0.60 µg 0.58 µg 0.60 µg 0.70 µg 0.80 µg 0.75 µg 0.80 µg 0.90 µg 1.1 µg 1.2 µg 1.2 µg 1.5 µg 2.2 µg 2.5 µg 3.4 µg 4.0 µg 6.3 µg 7.8 µg 11 µg 17 µg 29 µg 40 µg 60 µg 90 µg 0.17 mg 0.73 mg 2.0 mg 2.9 mg 6.5 mg 10 mg 13 mg 4.2×10^{-7} oz (0.012 mg) 5.6×10^{-7} oz (0.016 mg) 8.1×10^{-7} oz (0.023 mg) 3.9×10^{-6} oz (0.11 mg) 3.3×10^{-7} lb (0.15 mg) 4.4×10^{-7} lb (0.20 mg) 2.6×10^{-6} lb (1.2 mg) 4.6×10^{-6} lb (2.1 mg) 7.7×10^{-6} lb (3.5 mg) 2.9×10^{-5} lb (13 mg) 3.7×10^{-5} lb (17 mg) 4.9×10^{-5} lb (22 mg)	NISTIR 5672 SOP # 5 and SOP# 28 with OIML Class E1 weights

VII. Thermodynamic

Parameter/Equipment	Range	CMC[2, 6] (±)	Comments
Relative Humidity –			
Measuring Equipment	(10 to 95) % RH	0.46 % RH + 0.04 % of nominal RH	Thunder Scientific 1200
Measure	(10 to 90) % RH	1.0 % RH	Vaisala HMI 41/HMP 46 standard RH probe
Temperature – Measure and Measuring Equipment	0.01 °C	0.006 °C	Ice point reference
	(-40 to 0) °C (0 to 200) °C (200 to 300) °C	0.01 °C 0.01 °C 0.02 °C	SPRT and Hart Scientific super-thermometer
	(300 to 400) °C (400 to 550) °C	0.03 °C 0.20 °C	PRT and Hart Scientific super-thermometer

VIII. Time & Frequency

Parameter/Equipment	Range	CMC[2, 6] (±)	Comments
Frequency Dissemination	10 MHz	2.5 parts in 10^{11} Hz/Hz	Fluke 910 GPS controlled frequency standard
Frequency – Measure	1 Hz to 500 MHz	3.6 µHz/Hz (+ 500 µHz for non-square/pulse signals)	HP 5345A/Fluke 910R GPS
	(0.4 to 1.6) GHz	5.8 µHz/Hz	HP 5345A/HP 5355A
	(1.5 to 18) GHz	6.3 µHz/Hz	HP 5345A/HP 5355A/HP 5356A
Stop Watches	(0.4 to 24) hr	0.02 s	Witschi New Tech Handy II watch calibrator

[1] This laboratory offers commercial dimensional testing/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. 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.

[5] In the statement of CMC, percentage is the percent of reading, unless otherwise noted.

[6] 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.

[7] This laboratory meets R205 – *Specific Requirements: Calibration Laboratory Accreditation Program* for the types of dimensional calibrations listed above. Accredited test reports issued containing appropriate statements of measurement results, measurement uncertainty, and traceability are considered equivalent to a "calibration" certificate.

[8] As this involves a functional check that may include an adjustment, this is not considered a calibration and therefore the CMC value is not applicable (N/A). Adjustable thread rings are set to applicable specification using calibrated master plug gages.

[9] This scope meets A2LA's *P112 Flexible Scope Policy*.

Accredited Laboratory

A2LA has accredited

CERTIFIED MEASUREMENTS, INC.

Centerville, GA

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 19th day of April 2022

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1297.01
Valid to May 31, 2024

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