



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017
& ANSI/NCSL Z540-1-1994

PROBATA CORPORATION
P.O. Box 4090
14600 Metro Plaza Blvd.
Edmond, OK 73013
Greg Chambers Phone: 405 607 4813

CALIBRATION

Valid To: September 30, 2025

Certificate Number: 1166.01

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. Chemical

Parameter/Equipment	Range	CMC ^{2,5} (\pm)	Comments
PH Meters	4 pH 7 pH 10 pH	0.02 pH 0.02 pH 0.02 pH	Standard PH Fluids

II. Dimensional

Parameter/Equipment	Range	CMC ^{2,4} (\pm)	Comments
Micrometer ³	Up to 1 in (1 to 12) in (12 to 50) in	57 μ in (52 + 2L) μ in (360 + 3L) μ in	Gage blocks, optical flats, length standards
Caliper ³	Up to 6 in (6 to 12) in (12 to 50) in	60 μ in (45 + 2.5L) μ in (32 + 4L) μ in	Gage blocks, surface plate, steel balls
Gage Blocks – Length Only	Up to 4 in	(3.8 + 2L) μ in	Comparator, gage blocks, optical flat
	(4 to 20) in	(6.9 + 2.4L) μ in	Mahr ULM

Parameter/Equipment	Range	CMC ^{2, 4, 5} (\pm)	Comments
Indicators ³	Up to 0.07 in (0.07 to 1.0) in (1.0 to 10.0) in	13 μ in 14 μ in (14 + 3.7L) μ in	Gage blocks
Cylindrical Gages – Outside Diameter (O.D.) Inside Diameter (I.D.)	Up to 16 in Up to 16 in	(8.3 + 4.4D) μ in (9.6 + 4.3D) μ in	Gage blocks, ULM
Angle ³	$\pm 180^\circ$	12" + 0.6R	Gage blocks, sine plate, surface plate, angle blocks
Thread Wires	Up to 0.25 in	9.5 μ in	ULM, plain plug gages
Thread Plug – Simple Pitch, (4 to 80) TPI Pitch Diameter Major Diameter	Up to 16 in Up to 16 in	(52 + 3D) μ in (21 + 4.3D) μ in	Gage blocks, ULM, thread wires
Thread Rings – Simple Pitch Pitch Diameter Minor Diameter	Up to 16 in Up to 16 in	(45 + 3.2D) μ in (45 + 3.2D) μ in	Gage blocks, ULM (If set plug is used, CMC is that of set plug tolerance)
Granite Surface Plate ³ – Flatness Repeat Reading	12 in to 10 ft 12 in to 10 ft	(11 + 2.1DL) μ in 21 μ in	Wyler electronic levels Repeat-o-meter
Optical Comparators ³ – Linearity Magnification Table Angular Alignment	Up to 12 in 10x, 20x, 31.25x, 50x, 62.5x Up to 12 in	58 μ in + 0.58R 0.14 % 82 μ in	Master glass scale Magnification checker Dial indicator

Parameter/Equipment	Range	CMC ^{2,4} (\pm)	Comments
Length Standards	Up to 16 in	$(7.2 + 3.7L) \mu\text{in}$	ULM, gage blocks
	Up to 24 in	$(22 + 3.4L) \mu\text{in}$	Gage blocks, Supermicrometer TM
	Up to 50 in	$(32 + 3.4L) \mu\text{in}$	Gage blocks, linear amplifier
Height Gages ³	Up to 5 in Up to 10 in Up to 20 in Up to 30 in Up to 40 in Up to 50 in	45 μin 56 μin 88 μin 130 μin 160 μin 200 μin	Master long blocks
Gage Block Comparator ³			
Repeatability	1 μin resolution	3 μin	Gage blocks
Anvil Pressure	3 oz·ft	0.4 oz·ft	Mechanical force gage
Linearity	± 0.002 in	3 μin	Gage blocks
Length Measuring Machines ³ (ULMs & Micrometer Heads)			
Linearity	Up to 4 in	$(8 + 0.8L) \mu\text{in}$	Gage blocks
Anvil Pressure	3 oz·ft	0.8 oz·ft	Mechanical force gage
Flatness (Anvil, Base, & Spindle)	Up to 1 in diameter	3.2 μin	Optical flat under helium-discharge (yellow-orange) monochromatic light
Taper Sine Block	Up to 3 in	38 μin	ULM, master plug gages
Bore Gages ³	Up to 7 in	$(68 + 2.3D) \mu\text{in}$	Plain rings, ULM

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Torque Arms/Wheels & Cables			
Length	2.5 in Up to 40 in	140 μin 290 μin	Height gage, reference bar, optical comparator, gage blocks
Cable Diameter	0.035 in Up to 0.2 in	63 μin 81 μin	Micrometer

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,5,6} (±)	Comments
DC Voltage – Generate ³			
Low Voltage	(0 to 1) mV (0 to 10) mV (0 to 220) mV (0 to 2.2) V (0 to 11) V (0 to 22) V (0 to 220) V (0 to 1100) V	76 nV 410 nV 9 μV/V + 0.4 μV 6 μV/V + 0.7 μV 4 μV/V + 2.5 μV 4 μV/V + 4 μV 6 μV/V + 40 μV 8 μV/V + 400 μV	Fluke 5730A, Kelvin- Varley divider Fluke 5730A
High Voltage	(1 to 100) kV	0.13 %	Ross VD120Y, Fluke 8508A, HV power supply
DC Voltage – Measure ³			
High Voltage	(0 to 200) mV (0.2 to 2) V (2 to 20) V (20 to 200) V (200 to 1050) V (1 to 100) kV	7.5 μV/V + 0.1 μV 4.1 μV/V + 0.4 μV 4.1 μV/V + 4 μV 6.5 μV/V + 40 μV 6.4 μV/V + 0.5 mV 0.13 %	Fluke 8508A Ross VD120Y, Fluke 8508A

Parameter/Equipment	Range	CMC ^{2,5,6} (±)	Comments
DC Current – Generate ³	(0 to 220) µA (0 to 2.2) mA (0 to 22) mA (0 to 220) mA (0 to 2.2) A (0 to 11) A (11 to 20.5) A	46 µA/A + 6 nA 41 µA/A + 7 nA 41 µA/A + 40 nA 52 µA/A + 0.7 µA 93 µA/A + 12 µA 0.042 % + 480 µA 0.12 % + 750 µA	Fluke 5730A/5725 Fluke 5522A
	(0 to 2) A (2 to 20) A (20 to 120) A	0.01 % + 80 µA 0.01 % + 0.8 mA 0.01 % + 4.8 mA	55120A
	Clamp Meters (Toroidal) (20 to 5000) A	0.80 % + 1 A	52120A with coils
DC Current – Measure ³	(2 to 200) µA (0.2 to 2) mA (2 to 20) mA (20 to 200) mA (0.2 to 2) A (2 to 20) A	25 µA/A + 0.4 nA 17 µA/A + 4 nA 15 µA/A + 0.04 µA 60 µA/A + 0.4 µA 210 µA/A + 16 µA 500 µA/A + 0.4 mA	Fluke 8508A
	(2 to 100) A (100 to 300) A	0.06 % 0.12 %	Guildline 9211A
	(300 to 3000) A	0.3 %	Empro shunt
Inductance – Generate Fixed Points: 100 µH 1 mH 10 mH 100 mH 1 H	1 kHz 1 kHz 1 kHz 1 kHz 1 kHz	0.011 % 0.011 % 0.011 % 0.011 % 0.011 %	IET (GenRad) 1482 standard inductors
Resistance – Generate ³	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω 330 Ω to 1.1 kΩ (1.1 to 3.3) kΩ (3.3 to 11) kΩ (11 to 33) kΩ (33 to 110) kΩ	50 µΩ/Ω + 1 mΩ 36 µΩ/Ω + 1.5 mΩ 33 µΩ/Ω + 1.4 mΩ 32 µΩ/Ω + 2 mΩ 33 µΩ/Ω + 2 mΩ 32 µΩ/Ω + 20 mΩ 33 µΩ/Ω + 0.02 Ω 33 µΩ/Ω + 0.2 Ω 33 µΩ/Ω + 0.2 Ω	Fluke 5522A

Parameter/Equipment	Range	CMC ^{2, 5, 6} (\pm)	Comments	
Resistance – Generate ³ (cont)	(110 to 330) k Ω	37 $\mu\Omega/\Omega$ + 2 Ω	Fluke 5522A	
	330 k Ω to 1.1 M Ω	37 $\mu\Omega/\Omega$ + 2 Ω		
	(1.1 to 3.3) M Ω	70 $\mu\Omega/\Omega$ + 30 Ω		
	(3.3 to 11) M Ω	0.015 % + 50 Ω		
	(11 to 33) M Ω	0.029 % + 2.5 k Ω		
	(33 to 110) M Ω	0.06 % + 3 k Ω		
	(110 to 330) M Ω	0.33 % + 100 k Ω		
	(330 to 1100) M Ω	1.7 % + 500 k Ω		
	(10 to 100) M Ω	0.12 %		IET HRRS decade
	100 M Ω to 1 G Ω	0.23 %		
	(1 to 10) G Ω	0.6 %		
	(10 to 100) G Ω	1.2 %		
Fixed Points	(100 to 1000) G Ω	2.9 %	Fluke 5320A & HV adapter	
	(1 to 10) T Ω	4.6 %		
	1 Ω	110 $\mu\Omega/\Omega$	Fluke 5730A	
	1.9 Ω	110 $\mu\Omega/\Omega$		
	10 Ω	27 $\mu\Omega/\Omega$		
	19 Ω	27 $\mu\Omega/\Omega$		
	100 Ω	12 $\mu\Omega/\Omega$		
	190 Ω	12 $\mu\Omega/\Omega$		
	1 k Ω	8 $\mu\Omega/\Omega$		
	1.9 k Ω	8 $\mu\Omega/\Omega$		
	10 k Ω	8 $\mu\Omega/\Omega$		
	19 k Ω	8 $\mu\Omega/\Omega$		
	100 k Ω	10 $\mu\Omega/\Omega$		
	190 k Ω	10 $\mu\Omega/\Omega$		
	1 M Ω	15 $\mu\Omega/\Omega$		
	1.9 M Ω	21 $\mu\Omega/\Omega$		
	10 M Ω	46 $\mu\Omega/\Omega$		
	19 M Ω	54 $\mu\Omega/\Omega$		
100 M Ω	120 $\mu\Omega/\Omega$			
Resistance – Measure ³	1 m Ω to 2 Ω	20 $\mu\Omega/\Omega$ + 4 $\mu\Omega$		Fluke 8508A
	(2 to 20) Ω	16 $\mu\Omega/\Omega$ + 14 $\mu\Omega$		
	(20 to 200) Ω	10 $\mu\Omega/\Omega$ + 50 $\mu\Omega$		
	200 Ω to 2 k Ω	9 $\mu\Omega/\Omega$ + 0.05 m Ω		
	(2 to 20) k Ω	9 $\mu\Omega/\Omega$ + 5 m Ω		
	(20 to 200) k Ω	9 $\mu\Omega/\Omega$ + 50 m Ω		
	200 k Ω to 2 M Ω	11 $\mu\Omega/\Omega$ + 1 Ω		
	(2 to 20) M Ω	23 $\mu\Omega/\Omega$ + 100 Ω		
	(20 to 200) M Ω	140 $\mu\Omega/\Omega$ + 10 k Ω		
	200 M Ω to 2 G Ω	0.18 % + 1 M Ω		
	(2 to 100) G Ω	1.2 %	Quadtech 1865+	
	(100 to 1000) G Ω	1.3 %		

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of Thermocouple Indicating Systems ³ –			
Type E	(-250 to -100) °C (-100 to 650) °C (650 to 1000) °C	0.51 °C 0.17 °C 0.22 °C	Fluke 5522A, AMS 2750E
Type J	(-210 to -100) °C (-100 to 760) °C (760 to 1200) °C	0.28 °C 0.18 °C 0.24 °C	
Type K	(-200 to -100) °C (-100 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.34 °C 0.19 °C 0.27 °C 0.41 °C	
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.41 °C 0.23 °C 0.20 °C 0.19 °C 0.28 °C	
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.58 °C 0.36 °C 0.36 °C 0.41 °C	
Type S	(0 to 250) °C (250 to 1400) °C (1400 to 1767) °C	0.48 °C 0.38 °C 0.47 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.64 °C 0.25 °C 0.17 °C 0.16 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of RTDs ³ –			
Pt 385, 100 Ω	(-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	0.05 °C 0.05 °C 0.07 °C 0.09 °C 0.10 °C 0.12 °C 0.23 °C	Fluke 5522A
Pt 3926, 100 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.05 °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 0.05 °C 0.05 °C 0.06 °C 0.07 °C 0.08 °C 0.09 °C 0.10 °C 0.23 °C	
Pt 385, 1000 Ω	(-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 600) °C (600 to 630) °C	0.04 °C 0.04 °C 0.05 °C 0.05 °C 0.06 °C 0.07 °C 0.07 °C 0.23 °C	

Parameter/Range	Frequency	CMC ^{2, 5, 6} (\pm)	Comments
Capacitance – Generate ³ Up to 1.111 11 μ F (0.19 to 0.4) nF (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) μ F (1.1 to 3.3) μ F (3.3 to 11) μ F (11 to 33) μ F (33 to 110) μ F (110 to 330) μ F (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	1 kHz 10 Hz to 10 kHz 10 Hz to 10 kHz 10 Hz to 3 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz (10 to 600) Hz (10 to 300) Hz (10 to 150) Hz (10 to 120) Hz (10 to 80) Hz (0 to 50) Hz (0 to 20) Hz (0 to 6) Hz (0 to 2) Hz (0 to 0.6) Hz (0 to 0.2) Hz	0.08 % 0.6 % + 0.01 nF 0.58 % + 0.01 nF 0.58 % + 0.01 nF 0.29 % + 0.01 nF 0.29 % + 0.1 nF 0.29 % + 0.1 nF 0.29 % + 0.1 nF 0.29 % + 0.3 nF 0.29 % + 1 nF 0.29 % + 3 nF 0.29 % + 10 nF 0.46 % + 30 nF 0.52 % + 100 nF 0.52 % + 300 nF 0.52 % + 1 μ F 0.52 % + 3 μ F 0.52 % + 10 μ F 0.88 % + 30 μ F 1.3 % + 100 μ F	GenRad 1413 Fluke 5522A
Capacitance – Measure Up to 1000 pF (1 to 10) nF (10 to 100) nF 100 nF to 1.2 μ F	1 kHz	6 μ F/F 16 μ F/F 35 μ F/F 71 μ F/F	Andeen Hagerling 2500A
AC Voltage – Generate ³ (0.22 to 2.2) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.04 % + 4 μ V 0.03 % + 4 μ V 0.03 % + 4 μ V 0.04 % + 4 μ V 0.06 % + 5 μ V 0.13 % + 10 μ V 0.16 % + 20 μ V 0.33 % + 20 μ V	Fluke 5730A

Parameter/Range	Frequency	CMC ^{2,6} (±)	Comments
AC Voltage – Generate ³ (cont)			
(2.2 to 22) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.03 % + 4 μV 0.011 % + 4 μV 0.01 % + 4 μV 0.024 % + 4 μV 0.058 % + 5 μV 0.12 % + 10 μV 0.16 % + 20 μV 0.31 % + 20 μV	Fluke 5730A
(22 to 220) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.028 % + 12 μV 0.01 % + 7 μV 70 μV/V + 7 μV 0.014 % + 7 μV 0.036 % + 17 μV 0.076 % + 20 μV 0.16 % + 25 μV 0.31 % + 45 μV	
(0.22 to 2.2) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.028 % + 40 μV 0.01 % + 15 μV 50 μV/V + 8 μV 80 μV/V + 10 μV 0.01 % + 30 μV 0.04 % + 80 μV 0.12 % + 0.20 mV 0.2 % + 0.30 mV	
(2.2 to 22) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.028 % + 0.40 mV 0.01 % + 0.15 mV 50 μV/V + 50 μV 80 μV/V + 0.10 mV 0.01 % + 0.20 mV 0.029 % + 0.60 mV 0.12 % + 2.0 mV 0.17 % + 3.2 mV	
(22 to 220) V ¹⁰	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.028 % + 4.0 mV 0.01 % + 1.5 mV 60 μV/V + 0.60 mV 90 μV/V + 1.0 mV 0.017 % + 2.5 mV 0.017 % + 2.5 mV 0.017 % + 2.5 mV 0.017 % + 2.5 mV	Fluke 5730A/5725A

Parameter/Range	Frequency	CMC ^{2, 5, 6} (\pm)	Comments
AC Voltage – Generate ³ (cont) (220 to 750) V ¹⁰ (750 to 1100) V ¹⁰	40 Hz to 1 kHz (1 to 20) kHz (20 to 30) kHz (30 to 50) kHz (50 to 100) kHz 40 Hz to 1 kHz (1 to 20) kHz (20 to 30) kHz	0.011 % + 4 mV 0.019 % + 6 mV 0.069 % + 11 mV 0.069 % + 11 mV 0.27 % + 45 mV 0.011 % + 4 mV 0.019 % + 6 mV 0.069 % + 11 mV	Fluke 5730A/5725A
AC Voltage Flatness – Generate 0.3 mV to 3.5 V (0.3 to 1.1) mV (1.1 to 3.3) mV 3.3 mV to 3.5 V	(10 to 30) Hz 30 Hz to 119.999 kHz 120 kHz to 2 MHz (2 to 11.9) MHz (12 to 20) MHz (20 to 30) MHz 120 kHz to 2 MHz (2 to 11.9) MHz (12 to 20) MHz (20 to 30) MHz 120 kHz to 2 MHz (2 to 11.9) MHz (12 to 20) MHz (20 to 30) MHz	0.035 % 0.12 % 0.23 % + 3 μ V 0.46 % + 3 μ V 0.69 % + 3 μ V 1.7 % + 15 μ V 0.12 % + 3 μ V 0.35 % + 3 μ V 0.58 % + 3 μ V 1.7 % + 3 μ V 0.12 % + 3 μ V 0.23 % + 3 μ V 0.46 % + 3 μ V 1.2 % + 3 μ V	Fluke 5730A/3
AC Voltage – Measure ³ (0 to 2.2) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	2.8 mV/V + 1.3 μ V 2.2 mV/V + 1.3 μ V 2.1 mV/V + 1.3 μ V 2.2 mV/V + 2 μ V 2.4 mV/V + 2.5 μ V 3.3 mV/V + 4 μ V 3.4 mV/V + 8 μ V 4.5 mV/V + 8 μ V	Fluke 5790B/5

Parameter/Range	Frequency	CMC ^{2,6} (±)	Comments
AC Voltage – Measure ³ (cont)			
(2.2 to 7) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	1.2 mV/V + 1.3 μV 0.74 mV/V + 1.3 μV 0.65 mV/V + 1.3 μV 0.76 mV/V + 2 μV 0.92 mV/V + 2.5 μV 1.5 mV/V + 4 μV 1.6 mV/V + 8 μV 2.7 mV/V + 8 μV	Fluke 5790B/5
(7 to 22) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.39 mV/V + 1.3 μV 0.3 mV/V + 1.3 μV 0.24 mV/V + 1.3 μV 0.32 mV/V + 2 μV 0.41 mV/V + 2.5 μV 0.96 mV/V + 4 μV 1.0 mV/V + 8 μV 2.0 mV/V + 8 μV	
(22 to 70) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.28 mV/V + 1.5 μV 0.15 mV/V + 1.5 μV 96 μV/V + 1.5 μV 0.16 mV/V + 2 μV 0.31 mV/V + 2.5 μV 0.59 mV/V + 4 μV 0.78 mV/V + 8 μV 1.3 mV/V + 8 μV	
(70 to 220) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.24 mV/V + 1.5 μV 0.1 mV/V + 1.5 μV 48 μV/V + 1.5 μV 82 μV/V + 2 μV 0.19 mV/V + 2.5 μV 0.29 mV/V + 4 μV 0.44 mV/V + 8 μV 1.2 mV/V + 8 μV	
(220 to 700) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.25 mV/V + 1.5 μV 0.11 mV/V + 1.5 μV 71 μV/V + 1.5 μV 84 μV/V + 2 μV 0.11 mV/V + 2.5 μV 0.22 mV/V + 4 μV 0.35 mV/V + 8 μV 1.1 mV/V + 8 μV	

Parameter/Range	Frequency	CMC ^{2,6} (±)	Comments
AC Voltage – Measure ³ (cont)			
700 mV to 2.2 V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.23 mV/V 79 μV/V 34 μV/V 57 μV/V 84 μV/V 0.19 mV/V 0.3 mV/V 1 mV/V	Fluke 5790B/5
(2.2 to 22) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.23 mV/V 80 μV/V 34 μV/V 59 μV/V 96 μV/V 0.22 mV/V 0.46 mV/V 1.4 mV/V	
(22 to 70) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.24 mV/V 99 μV/V 71 μV/V 89 μV/V 0.12 mV/V 0.24 mV/V 0.48 mV/V 1.4 mV/V	
(70 to 220) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz	0.23 mV/V 81 μV/V 41 μV/V 82 μV/V 0.11 mV/V 0.24 mV/V 0.58 mV/V	
(220 to 700) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz	0.23 mV/V 0.12 mV/V 62 μV/V 0.16 mV/V 0.58 mV/V	
(700 to 1000) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz	0.23 mV/V 0.12 mV/V 59 μV/V 0.16 mV/V 0.58 mV/V	

Parameter/Range	Frequency	CMC ^{2, 5, 6} (\pm)	Comments
AC Voltage – Measure ³ (cont) High Voltage: (1 to 85) kV	(50 to 60) Hz	0.14 %	Fluke 8508A with Ross VD120Y
AC Voltage Flatness – Measure ³ Up to 2.2 mV	(10 to 30) Hz 30 Hz to 120 kHz 120 kHz to 2 MHz (2 to 10) MHz (10 to 20) MHz (20 to 30) MHz (30 to 50) MHz	0.2 % 0.1 % 0.1 % + 1 μ V 0.2 % + 1 μ V 0.4 % + 1 μ V 0.8 % + 2 μ V 1.2 % + 2 μ V	Fluke 5790B/5
(2.2 to 7) mV	(10 to 30) Hz 30 Hz to 120 kHz 120 kHz to 2 MHz (2 to 10) MHz (10 to 20) MHz (20 to 30) MHz (30 to 50) MHz	0.1 % 0.07 % 0.09 % + 1 μ V 0.1 % + 1 μ V 0.2 % + 1 μ V 0.4 % + 2 μ V 0.6 % + 1 μ V	
(7 to 22) mV	(10 to 30) Hz 30 Hz to 120 kHz 120 kHz to 2 MHz (2 to 10) MHz (10 to 20) MHz (20 to 30) MHz (30 to 50) MHz	0.1 % 0.06 % 0.08 % 0.1 % 0.2 % 0.4 % 0.7 %	
(22 to 70) mV	(10 to 30) Hz 30 Hz to 2 MHz (2 to 10) MHz (10 to 20) MHz (20 to 30) MHz (30 to 50 MHz)	0.1 % 0.07 % 0.1 % 0.2 % 0.4 % 0.7 %	

Parameter/Range	Frequency	CMC ^{2, 5, 6} (±)	Comments
AC Voltage Flatness – Measure ³ (cont)			
(70 to 220) mV	(10 to 30) Hz	0.1 %	Fluke 5790B/5
	30 Hz to 500 kHz	0.05 %	
	500 kHz to 2 MHz	0.06 %	
	(2 to 10) MHz	0.1 %	
	(10 to 20) MHz	0.2 %	
	(20 to 30) MHz	0.4 %	
	(30 to 50) MHz	0.7 %	
(220 to 700) mV	(10 to 30) Hz	0.1 %	
	30 Hz to 500 kHz	0.05 %	
	500 kHz to 2 MHz	0.07 %	
	(2 to 10) MHz	0.1 %	
	(10 to 20) MHz	0.2 %	
	(20 to 30) MHz	0.4 %	
	(30 to 50) MHz	0.7 %	
700 mV to 2.2 V	(10 to 30) Hz	0.1 %	
	30 Hz to 500 kHz	0.04 %	
	500 kHz to 2 MHz	0.06 %	
	(2 to 10) MHz	0.1 %	
	(10 to 20) MHz	0.2 %	
	(20 to 30) MHz	0.4 %	
	(30 to 50) MHz	0.7 %	
(2.2 to 7) V	(10 to 30) Hz	0.1 %	
	30 Hz to 500 kHz	0.05 %	
	500 kHz to 2 MHz	0.07 %	
	(2 to 10) MHz	0.1 %	
	(10 to 20) MHz	0.2 %	
	(20 to 30) MHz	0.4 %	
	(30 to 50) MHz	0.7 %	

Parameter/Range	Frequency	CMC ^{2, 5, 6} (\pm)	Comments
AC Current – Generate ³			
(9 to 220) μ A	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.029 % + 16 nA 0.018 % + 10 nA 0.012 % + 8 nA 0.032 % + 12 nA 0.12 % + 65 nA	Fluke 5730A
(0.22 to 2.2) mA	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.029 % + 40 nA 0.018 % + 35 nA 0.012 % + 35 nA 0.023 % + 110 nA 0.12 % + 650 nA	
(2.2 to 22) mA	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.029 % + 400 nA 0.018 % + 350 nA 0.012 % + 350 nA 0.023 % + 550 nA 0.13 % + 5 μ A	
(22 to 220) mA	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.029 % + 4 μ A 0.018 % + 3.5 μ A 0.012 % + 2.5 μ A 0.023 % + 3.5 μ A 0.13 % + 10 μ A	
(0.22 to 2.2) A	20 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.028 % + 35 μ A 0.052 % + 80 μ A 0.81 % + 0.16 mA	
(2 to 20) A	(10 to 65) Hz (65 to 300) Hz 300 Hz to 1 kHz (1 to 3) kHz (3 to 6) kHz	0.01 % + 0.8 mA 0.027 % + 9.4 mA 0.09 % + 9.4 mA 0.27 % + 31 mA 0.9 % + 62 mA	
(20 to 120) A	(10 to 65) Hz (65 to 300) Hz 300 Hz to 1 kHz (1 to 3) kHz (3 to 6) kHz	0.015 % + 19 mA 0.027 % + 28 mA 0.09 % + 94 mA 0.27 % + 0.23 A 0.9 % + 0.42 A	
Up to 6000 A (Torroidal)	10 Hz to 1 kHz	0.81 %	

Parameter/Range	Frequency	CMC ^{2, 5, 6} (±)	Comments
AC Current – Measure ³			
Up to 200 µA	(1 to 10) Hz 10 Hz to 10 kHz	0.058 % + 0.02 µA 0.058 % + 0.02 µA	Fluke 8508A
Up to 2 mA	(1 to 10) Hz 10 Hz to 10 kHz	0.036 % + 0.2 µA 0.035 % + 0.2 µA	
Up to 20 mA	(1 to 10) Hz 10 Hz to 10 kHz	0.036 % + 2 µA 0.035 % + 2 µA	
Up to 200 mA	(1 to 10) Hz 10 Hz to 10 kHz	0.036 % + 20 µA 0.034 % + 20 µA	
Up to 2 A	10 Hz to 2 kHz (2 to 10) kHz	0.072 % + 200 µA 0.085 % + 200 µA	
Up to 20 A	10 Hz to 2 kHz (2 to 10) kHz	0.095 % + 2 mA 0.29 % + 2 mA	
(20 to 30) A	45 Hz to 1 kHz (1 to 5) kHz	0.35 % 5.8 %	Fluke 8508A, Agilent 34330A
(30 to 2500) A	(45 to 500) Hz	4 %	Clamp meter with Iflex

Parameter/Equipment	Range	CMC ^{2, 5, 6} (±)	Comments
DC Power – Generate ^{3,9}			
(0.33 to 330) mA	11 µW to 336 W	0.026 %	Fluke 5522A
(> 0.33 to 3) A	11 mW to 3 kW	0.025 %	
(> 3 to 20.5) A	100 mW to 20.9 kW	0.08 %	

Parameter/Equipment	Range	CMC ^{2, 5, 6} (±)	Comments
AC Power Generate ^{3,9}			
(3.3 to 9) mA	(0.11 to 3) mW > 3 mW to 9 W	0.16 % 0.14 %	Fluke 5522A (PF = 1, $\Phi = 0^\circ$ @ 45 to 65 Hz)
(> 9 to 33) mA	(0.3 to 10) mW > 10 mW to 33 W	0.12 % 0.10 %	
(> 33 to 90) mA	(1 to 30) mW > 30 mW to 90 W	0.16 % 0.14 %	
(> 90 to 330) mA	(3 to 100) mW (300 to 900) mW	0.12 % 0.10 %	
(> 0.33 to 0.9) A	(11 to 330) mW > 300 mW to 900 W	0.15 % 0.13 %	
(> 0.9 to 2.2) A	(30 to 720) mW > 720 mW to 2 kW	0.13 % 0.11 %	
(> 2.2 to 4.5) A	80 mW to 1.4 W > 1.4 W to 4.5 kW	0.15 % 0.14 %	
(> 4.5 to 20.5) A	150 mW to 6.7 W > 6.7 W to 20 kW	0.13 % 0.12 %	
Oscilloscopes –			
Voltage Amplitude – DC – 1 M Ω DC – 50 Ω	1 mV to 200 V 1 mV to 5 V	0.03 % + 25 μ V 0.03 % + 25 μ V	Fluke 9500B with active heads
Square Wave – 50 Ω	(0.04 to 1) mV 1 mV to 5 V	1.2 % + 10 μ V 0.23 % + 10 μ V	
Rise Time	150 ps @ 5 mV to 3 V 70 ps @ 25 mV to 2 V	29 ps 23 ps	
Timing	Narrow Triangle 900.91 ms to 55 s	3 μ s/s	
Leveled Sine Wave Amplitude	5 mV to 5 V	1.8 %	
Bandwidth (Flatness)	0.1 Hz to 300 MHz (300 to 550) MHz 550 MHz to 3.0 GHz (3.0 to 6.0) GHz	2.4 % 3 % 4.5 % 5.5 %	
Pulse Width	(1 to 100) ns	5.8 % + 200 ps	

IV. Fluid

Parameter/Equipment	Range	CMC ² (±)	Comments
Viscometers ³ – Fixed Points	C20 C60 C100 RT100 RT1000 RT5000 RT12500 RT30000 RT100000	0.46 % 0.46 % 0.46 % 0.46 % 0.5 % 0.55 % 0.6 % 0.6 % 0.6 %	Standard viscosity fluids

V. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Direct Verification of Type A & D Durometers –			ASTM D2240
Indentor Extension & Shape –			
Extension	0.098 in	100 µin	Gage blocks
Spring & Display Calibration –			
Type – A	Up to 100 Duro points	0.59 Duro points	Durocalibrator
Type – D	Up to 100 Duro points	0.53 Duro points	
Diameter	(0.05 to 0.111) in	0.0003 in	Optical comparator
Angle	(30 to 35)°	0.05°	
Durocalibrator (A & D Scales)	(0 to 20 000) g	1.4 g	Class 1 & 2 weights

Parameter/Equipment	Range	CMC ^{2, 4, 5, 7} (±)	Comments
Force ³ –			
Force Gages	Up to 1000 lbf	0.017 %	ASTM Class 6 weights
	Up to 1000 lbf	0.11 %	Universal test machine
Force Measuring Equipment – Tension & Compression	Up to 250 lbf	0.15 %	Interface 9840 readout with load cell standards
	Up to 1000 lbf	0.12 %	
	Up to 25 000 lbf	0.13 %	
	Up to 100 000 lbf	0.14 %	
	Up to 2000 lbf (10 to 10 000) lbf (10 to 100 000) lbf	0.02 % 0.01 % 0.04 %	Morehouse universal calibrating machine
Pressure – Measure & Measuring Equipment ³ –			
Vacuum ³	(-15 to 0) psi	0.003 psi	Additel ADT681
Gage Pressure	Up to 1 inH ₂ O Up to 10 inH ₂ O	0.003 inH ₂ O + 0.6R 0.009 inH ₂ O + 0.6R	Additel ADT761
Absolute	(11 to 17) psia	0.02 % + 0.6R	Mensor DPG2320
	Up to 150 psia	0.1 % + 0.6R	Additel ADT681
	(3 to 850) inH ₂ O	0.014 % + 0.6R	Ruska T9000-850
	Up to 36 psi (10 to 1600) psi Up to 3,000 psi Up to 10 000 psi Up to 15 000 psi Up to 30 000 psi	0.001 psi + 0.6R 0.014 % + 0.6R 0.17 psi + 0.6R 0.59 psi + 0.6R 0.016 % + 0.6R 16 psi	ADT161 module DH Budenburg ADT161 module ADT161 module Fluke E-DWT ADT949, ADT681
Torque –			
Measuring Equipment	Up to 2000 lbf-ft	0.06 %	Torque arm, torque wheel, ASTM6 weights
Torque Wrenches ³	Up to 2000 lbf-ft	1 %	CDI multitest system

Parameter/Equipment	Range	CMC ^{2,5,7} (±)	Comments
Scales ³	Up to 10 lbs Up to 50 lbs Up to 100 lbs Up to 200 lbs Up to 500 lbs Up to 1000 lbs	0.0003 lbs 0.0007 lbs 0.0013 lbs 0.0025 lbs 0.0065 lbs 0.012 lbs	ASTM Class 6 weights
Balances ³	Up to 20 g Up to 100 g Up to 200 g Up to 500 g Up to 1000 g Up to 3000 g Up to 5000 g Up to 10 000 g Up to 20 000 g	0.27 mg 0.13 mg 0.29 mg 0.63 mg 1.4 mg 2.5 mg 2.7 mg 14 mg 16 mg	ASTM Class 1 weights ASTM Class 1 & 2 weights
Indirect Verification of Rockwell Hardness Testers ³	HRBW: (40 to 59) HRBW (60 to 79) HRBW (80 to 100) HRBW HRC: (20 to 30) HRC (35 to 55) HRC (60 to 65) HRC HR15N: (70 to 77) HR15N (78 to 88) HR15N (90 to 92) HR15N HR15TW: (74 to 80) HR15TW (81 to 86) HR15TW (87 to 93) HR15TW HRA: (20 to 65) HRA (70 to 78) HRA (80 to 84) HRA	0.5 HRBW 0.5 HRBW 0.5 HRBW 0.5 HRC 0.5 HRC 0.5 HRC 0.5 HR15N 0.5 HR15N 0.5 HR15N 0.5 HR15TW 0.6 HR15TW 0.5 HR15TW 0.5 HRA 0.6 HRA 0.5 HRA	Indirect verification per ASTM E18

Parameter/Equipment	Range	CMC ² (±)	Comments
Indirect Verification of Rockwell Hardness Testers ³ (cont)	HRE: (70 to 79) HRE (84 to 90) HRE (93 to 100) HRE HRMW: 93 HRMW 112 HRMW	0.6 HRE 0.5 HRE 0.7 HRE 0.7 HRMW 0.6 HRMW	Indirect verification per ASTM E18
Indirect Verification of Brinell Hardness Testers ³ HBW 10/3000	HBW: < 196 HBW (196 to 650) HRMW	2.1 HBW 2.7 HBW	Indirect verification per ASTM E10
Indirect Verification of Vickers Hardness Testers ³	HV: >600 HV	12 HV	Indirect verification per ASTM E384 with ASTM E92

VI. Thermodynamics

Parameter/Equipment	Range	CMC ^{2,5,7} (±)	Comments
Relative Humidity – Measuring Equipment	(10 to 95) % RH	0.6 % RH	Thunder Scientific 2500
Measure ³ (15 to 25) °C	Up to 90 % RH (> 90 to 100) % RH	1.5 % RH 2.1 % RH	Vaisala M170/HMP76
Temperature Measuring Equipment ³ –	(-200 to 670) °C	0.019 °C	Accumac AM1751, Additel 282
Surface Temperature Measuring Equipment ³	(35 to 400) °C	0.16 °C	Hart 3125-400, Additel 282, Accumac AM1751
Temperature – Measurement Equipment ³	(-45 to 150) °C (-40 to 160) °C (50 to 660) °C Triple Point of Water	0.024 °C 0.025 °C 0.14 °C 0.0075°C	Fluke 7341, Accumac AM1751, Additel 282, 878, Accumac AM1751 Fluke 9144, Additel 282, TPW cell

Parameter/Equipment	Range	CMC ^{2,5,7} (±)	Comments
Infrared Non-Contact – Measuring Equipment ³	(-35 to 500) °C	0.45 °C	Fluke 4180/4181 black body $\epsilon = 0.9$ to 1.0 $\lambda = (8$ to $14)$ μm

V. Time & Frequency

Parameter/Equipment	Range	CMC ^{2,7} (±)	Comments
Frequency – Measuring Equipment			
GPS	10 MHz	2.1×10^{-8} Hz/Hz	Datum 9300
Tachometers ³	(0.1 to 100 000) RPM	0.035 RPM	Agilent 33522B & LED
Timers/Stopwatches ³	1 s to 24 hr	37 ms	GPS receiver, totalize method

¹ This laboratory offers commercial 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 the CMC, R is the resolution of the device under test, 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, and DL is the dimensional length measured in inches.

⁵ In the statement of CMC, percentages are to be read as 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 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.

⁸ This scope meets A2LA's *P112 Flexible Scope Policy*.

⁹ Uncertainties are listed at optimal conditions (PF = 1, $\Phi = 0^\circ$ at 10 to 65 Hz). Under different conditions, the uncertainty of the power measurement will vary based on the laboratory's AC voltage and current measurement uncertainties. PFs of less than one will increase the uncertainty of the power measurement, ramping up as PF approaches zero. Probata may also report reactive power, apparent power, and power factor under this accreditation. Uncertainties at other conditions can be obtained from the laboratory.

¹⁰ Not all Voltages and Frequencies available for listed parameter, see Volt-Hertz capability Figure of the Manufacturer's manual.



Accredited Laboratory

A2LA has accredited

PROBATA CORPORATION

Edmond, OK

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 ANSI/NC SL Z540-1-1994 and 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 9th day of November 2023.

A blue ink signature of Trace McInturff, written over a horizontal line.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1166.01
Valid to September 30, 2025
Revised February 21, 2024

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