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

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CALIBRATION

Valid To: June 30, 2028 Certificate Number: 1509.01

In recognition of the successful completion of the A2LA evaluation process (including an assessment of the organization's compliance with R205 – A2LA's Calibration Program Requirements) accreditation is granted to this laboratory at the location listed above as well as the satellite laboratory location listed below to perform the following calibrations[1, 10]:

I. Chemical

Parameter/Equipment	Range	CMC[2] (±)	Comments
Conductivity Meters[3]	1 µS/cm 10 µS/cm 100 µS/cm 1000 µS/cm 10 000 µS/cm 100 000 µS/cm	0.56 µS/cm 0.41 µS/cm 2.9 µS/cm 20 µS/cm 190 µS/cm 1900 µS/cm	Reference conductivity standards
pH Meters[3]			
Electrical Calibration	(0 to 14) pH	0.015 pH	mV/pH calibrator
Probe/Meter Standardization	4 pH 7 pH 10 pH	0.030 pH 0.030 pH 0.030 pH	Reference buffer standards

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II. Dimensional

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Calipers[3]	Up to 24 in (24 to 48) in Up to 48 in (48 to 96) in	550 µin 1100 µin 77 µin 1500 µin	Gage blocks (field) Gage blocks (lab)
Dial & Test Indicators[3]	Up to 1 in Up to 3 in Up to 3 in	20 µin 59 µin 90 µin	Gage blocks (lab) Gage blocks, ULM, SuperMicrometer[9] (lab) Gage blocks (field)
Gage Blocks	Up to 1 in (1 to 4) in (4 to 20) in	(3.3 + 1.5*L*) µin (7.7 + 1.5*L*) µin (7 + 2*L*) µin	Master gage block set, Federal 130B-24 comparator Maser gage block set, ULM
Angle Blocks	Up to 90°	0.005°	Sine bar & gage blocks
Squares	Up to 18 in	99 µin	Master square, amplified gage head
Height Gages[3]	Up to 48 in	280 µin 89 µin	Gage blocks (field) Gage blocks (lab)
Length Standards	Up to 18 in Up to 48 in	(37 + 1.5*L*) µin (65 + 1.5*L*) µin	ULM/SuperMicrometer[9], gage blocks
Levels[3]	Up to 12 in	(40 + 14*L*) µin	Surface plate, granite square
Micrometers[3]	Up to 4 in (4 to 24) in (24 to 48) in Up to 4 in (4 to 24) in (24 to 96) in	92 µin 550 µin 1100 µin 15 µin 60 µin 1500 µin	Gage blocks (field) Gage blocks (lab)

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Plain Ring Gages	(0.060 to 12) in	(22 + 1.5*L*) µin	ULM, gage blocks
Protractors[3]	Up to 90°	0.049°	Surface plate, angle blocks, sine bar w/ gage blocks
Thread Plugs –			
Pitch Diameter	(0.040 to 4) in (4 to 12) in	(71 + 1.5*L*) µin (94 + 1.5*L*) µin	Three-wire method, direct measure
Major Diameter	(0.040 to 4) in (4 to 12) in	(19 + 1.5*L*) µin (35 + 1.5*L*) µin	
Tapered Thread Plugs –			
Pitch Diameter	(0.040 to 12) in	(77 + 1.5*L*) µin	Two-wire method, direct measure
Adjustable Thread Rings[5]	Up to 3.125 in	(W) Master Plug Tolerance	Set using master plug gages. ASME/ANSI B1.2-1983 & ASME/ANSI B1.3- 2007
Taper Thread Rings – Pitch Diameter	Up to 3 in	120 µin	Setting plug, standoff to master
Thread Wires	(4 to 80) TPI	(11 + 1.5*L*) µin	Master thread wire set
Surface Plates – Flatness & Repeatability[3]	Up to 107 in *DL*	(48 + 0.41*DL*) µin	Leveling system (*DL* is diagonal of the plate)
Indicator Stands	(-0.002 to 0.002) in	31 µin	Repeat reading gage
	(-0.002 to 0.002) in	45 µin	Repeat reading gage, triangular gage block base
	(-0.01 to 0.01) in	580 µin	Indicator, triangular gage block base

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Optical Comparators[3] X-Axis Y-Axis Angle	 Up to 12 in Up to 12 in Up to 90°	 (250 + 91*L*) µin (250 + 91*L*) µin 0.029°	 Glass scale Angle blocks
Rulers[3]	Up to 40 in	0.013 in	Standard ruler
Radius Gages[3]	Up to 0.75 in	1300 µin	Optical comparator & overlay
Angle Gages[3]	Up to 180°	0.044°	Optical comparator & vernier
Torque Arms	Up to 48 in	0.0048 in	Height gage, test indicator & gage blocks
Coating/Electromagnetic Thickness[3]	Up to 120 mils	0.25 mils	Shims
Tape Measures[3]	Up to 40 in Up to 100 ft	0.013 in 0.062 in	Standard ruler Standard tape
PI Tapes	Up to 72 in	910 µin	Gage blocks

III. Electrical – DC/Low Frequency

Parameter/Range	Frequency	CMC[2, 6, 12] (±)	Comments
AC Current – Measure[3] Up to 1 A (1 to 3) A	 60 Hz to 1 kHz	 0.16 % + 0.4 mA 0.14 % + 1.8 mA	 HP 34401A

Parameter/Range	Frequency	CMC[2, 6, 12] (±)	Comments
AC Current – Generate[3]			
(10 to 120) µA	3 Hz to 5 kHz (5 to 10) kHz (10 to 30) kHz	190 µA/A + 10 nA 1.2 mA/A + 40 nA 3.9 mA/A + 1 µA	Fluke 5560A
(0.12 to 1.2) mA	3 Hz to 5 kHz (5 to 10) kHz (10 to 30) kHz	190 µA/A + 0.1 µA 1.2 mA/A + 0.1 µA 3.9 mA/A + 5 µA	
(1.2 to 12) mA	3 Hz to 5 kHz (5 to 10) kHz (10 to 30) kHz	190 µA/A + 1 µA 1.2 mA/A + 1 µA 3.9 mA/A + 10 µA	
(12 to 120) mA	(3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	190 µA/A + 10 µA 120 µA/A + 5 µA 190 µA/A + 8 µA 1.2 mA/A + 10 µA 3.9 mA/A + 0.1 mA	
(0.12 to 1.2) A	(3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	190 µA/A + 0.1 mA 190 µA/A + 50 µA 190 µA/A + 80 µA 1.9 mA/A + 0.3 mA 3.9 mA/A + 0.3 mA	
(1.2 to 3.1) A	(3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	290 µA/A + 0.5 mA 230 µA/A + 0.3 mA 290 µA/A + 0.3 mA 1.9 mA/A + 0.5 mA	
(3.1 to 12) A	(3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	290 µA/A + 0.5 mA 230 µA/A + 0.3 mA 290 µA/A + 0.3 mA 1.9 mA/A + 1 mA	
(12 to 30.2) A	(3 to 45) Hz 45 Hz 1 kHz (1 to 5) kHz	0.78 mA/A + 10 mA 0.54 mA/A + 8 mA 3.9 mA/A + 8 mA	
(16 to 150) A (150 to 1000) A	(45 to 440) Hz	1 % + 0.25 A 1 % + 0.9 A	Using 50 turn coil

Parameter/Range	Frequency	CMC[2, 6, 12] (±)	Comments
AC Voltage – Generate[3]			
(1 to 12) mV	(3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	1.9 mV/V + 7 µV 0.68 mV/V + 7 µV 0.12 mV/V + 6 µV 0.29 mV/V + 6 µV 1.2 mV/V + 15 µV 6.2 mV/V + 30 µV	Fluke 5560A
(12 to 120) mV	(3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	1.9 mV/V + 7 µV 0.68 mV/V + 7 µV 0.11 mV/V + 6 µV 0.27 mV/V + 8 µV 0.62 mV/V + 20 µV 1.6 mV/V + 30 µV	
(0.12 to 1.2) V	(3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	1.9 mV/V + 0.75 mV 0.68 mV/V + 70 µV 0.11 mV/V + 60 µV 0.23 mV/V + 14 µV 0.54 mV/V + 40 µV 1.5 mV/V + 80 µV	
(1.2 to 12) V	(3 to 5) Hz (5 to 10) Hz (10 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	1.9 mV/V + 0.75 mV 0.68 mV/V + 0.75 mV 0.11 mV/V + 0.35 mV 0.11 mV/V + 50 µV 0.23 mV/V + 50 µV 0.54 mV/V + 130 µV 1.6 mV/V + 0.6 mV	
(12 to 120) V	(3 to 5) Hz (5 to 10) Hz (10 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	1.9 mV/V + 7.5 mV 0.68 mV/V + 7.5 mV 0.11 mV/V + 3.5 mV 0.11 mV/V + 0.5 mV 0.23 mV/V + 0.5 mV 0.54 mV/V + 1.25 mV 1.6 mV/V + 20 mV	
(120 to 330) V	(3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz	1.9 mV/V + 75 mV 0.68 mV/V + 75 mV 0.11 mV/V + 8 mV 0.23 mV/V + 8 mV 1.2 mV/V + 12.5 mV	
(330 to 1020) V	(3 to 5) Hz (5 to 10) Hz 10 Hz to 10 kHz	1.9 mV/V + 75 mV 0.68 mV/V + 75 mV 0.11 mV/V + 80 mV	

Parameter/Range	Frequency	CMC[2, 6, 12] (±)	Comments
AC Voltage – Measure[3]			
Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 750) V	60 Hz to 3 kHz	0.063 % + 40 µV 0.063 % + 300 µV 0.062 % + 3 mV 0.064 % + 30 mV 0.075 % + 230 mV	HP 34401A
Up to 10 kV Up to 50 kV		0.12 % + 100 mV 0.1 % + 400 mV	Vitrek 4700 w/ HVL-70
Capacitance – Generate[3]			
(0.2 to 1.2) nF (1.2 to 12) nF (12 to 120) nF (0.12 to 1.2) µF (1.2 to 12) µF (12 to 120) µF (0.12 to 1.2) mF (1.2 to 12) mF (12 to 120) mF	100 Hz to 10 kHz 150 Hz to 5 kHz 200 Hz to 1.3 kHz (2 to 310) Hz (0.5 to 110) Hz (0.5 to 40) Hz (0.1 to 11) Hz (0.03 to 4) Hz (0.01 to 1.3) Hz	0.09 % + 2 pF 0.09 % + 5 pF 0.1 % + 30 pF 0.1 % + 0.3 nF 0.1 % + 3 nF 0.12 % + 25 nF 0.19 % + 0.25 µF 0.19 % + 3 µF 0.39 % + 30 µF	Fluke 5560A

Parameter/Equipment	Range	CMC[2, 6, 8, 12] (±)	Comments
DC Current – Generate[3]	(0 to 120) µA (0 to 1.2) mA (0 to 12) mA (12 to 120) mA (0.12 to 1.2) A (1.2 to 3.1) A (3.1 to 12) A (12 to 30.2) A	97 µA/A + 6 nA 78 µA/A + 15 nA 78 µA/A + 80 nA 78 µA/A + 0.8 µA 120 µA/A + 10 µA 230 µA/A + 150 µA 230 µA/A + 250 µA 780 µA/A + 500 µA	Fluke 5560A
	(10 to 150) A (150 to 1000) A	0.5 % + 0.14 A 0.5 % + 0.5 A	Using 50 turn coil

Parameter/Equipment	Range	CMC[2, 6, 8, 12] (±)	Comments
DC Current – Measure[3]	Up to 10 mA (10 to 100) mA 100 mA to 1 A (1 to 3) A	0.075 % + 6 µA 0.051 % + 5 µA 0.11 % + 100 µA 0.13 % + 600 µA	HP 34401A
DC Voltage – Generate[3]	(0 to 120) mV (0.12 to 1.2) V (1.2 to 12) V (12 to 120) V (120 to 1020) V	9.3 µV/V + 0.8 µV 6.4 µV/V + 1 µV 6.2 µV/V + 10 µV 8.5 µV/V + 100 µV 8.5 µV/V + 1 mV	Fluke 5560A
DC Voltage – Measure[3]	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1000) V Up to 10 kV Up to 70 kV	0.0054 % + 3.5 µV 0.0042 % + 7 µV 0.0037 % + 50 µV 0.0048 % + 600 µV 0.0049 % + 10 mV 0.041 % + 30 mV 0.049 % + 200 mV	HP 34401A Vitrek 4700 w/ HVL-70
Oscilloscopes[3] Square Wave Amplitude: 50 Ω at 1 kHz 1 MΩ at 1 kHz DC Voltage Amplitude: 50 Ω Load 1 MΩ Load Level Sine Wave: Frequency Amplitude Flatness	 1 mV to 6.6 V pk-pk 1 mv to 130 V pk-pk Up to ± 6.6 V Up to ± 130 V Up to 1100 MHz 50 kHz Reference 50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz (600 to 1100) MHz 50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz (600 to 1100) MHz	 0.34 % + 40 µV 0.25 % + 40 µV 0.25 % + 40 µV 0.05 % + 40 µV 2.5 parts × 10^6 2.8 % + 300 µV 4.2 % + 300 µV 4.6 % + 300 µV 6.4 % + 300 µV 7.4 % + 300 µV 2.7 % + 100 µV 3.0 % + 100 µV 4.6 % + 100 µV 5.5 % + 100 µV	 Fluke 5522A/ SC1100

Parameter/Equipment	Range	CMC[2, 12] (±)	Comments
Oscilloscopes[3] – (cont)			Fluke 5522A/ SC1100
Time Markers:			
50 Ω Load	5 s to 50 ms 20 ms to 1 ns	28 + 1000*t* µs/s 3.2 µs/s	*t* = time in seconds
Rise Time – Generate	1 kHz to 2 MHz (200 to 300) ps	120 ps	
	(2 to 10) MHz (200 to 300) ps	120 ps	
Amplitude – DC:			
50 Ω Load 1 MΩ Load	1 mV to 6.6 V 1 mV to 130 V	1.9 mV/V + 40 µV 0.4 mV/V + 40 µV	Fluke 5560A/600
Amplitude – Square Wave:			
10 Hz to 1 kHz 50 Ω Load 1 MΩ Load	1 mVp-p to 6.6 Vp-p 1 mVp-p to 130 Vp-p	1.9 mV/V + 40 µV 0.8 mV/V + 40 µV	
Amplitude – Leveled Sine Wave Flatness 5 mV to 5.5 V (Relative to 50 kHz)	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	16 mV/V + 0.1 mV 19 mV/V + 0.1 mV 33 mV/V + 0.1 mV	
Time Marker:			
50 Ω Load 5 mV to 5.5 V (Relative to 50 kHz) (Spike, Square Wave Spike, Square, 20 % Pulse Spike or Square Wave Square or Sine Wave)	50 ms to 5 s 100 ns to 20 ms (20 to 50) ns 10 ns (1 to 5) ns	(20 + 1000t) µs/s 2 µs/s 2 µs/s 2 µs/s 2 µs/s	
Edge Characteristics:			
50 Ω Rise Time	< 300 ps	7.5 ps	
Electrical Calibration of Temperature Controllers[3]			
Thermocouple Types J, K, T, & E	(-200 to < 0) °C (0 to 1370) °C	1.2 °C 0.85 °C	Fluke 725
PT 385, 100 Ω	(-200 to 800) °C	0.66 °C	

Parameter/Equipment	Range	CMC[2, 6, 12] (±)	Comments
Resistance – Generate[3]	0.3333 mΩ 1 mΩ 10 mΩ 100 mΩ 1 Ω 10 Ω 100 Ω 1000 Ω 10 000 Ω (0 to 12) Ω (12 to 120) Ω (0.12 to 1.2) kΩ (1.2 to 12) kΩ (12 to 120) kΩ (0.12 to 1.2) MΩ (1.2 to 12) MΩ (12 to 120) MΩ (120 to 1200) MΩ	110 µΩ 88 µΩ 60 µΩ 61 µΩ 590 µΩ 5.9 mΩ 59 mΩ 590 mΩ 1.3 Ω 19 µΩ/Ω + 10 mΩ 19 µΩ/Ω + 15 mΩ 19 µΩ/Ω + 20 mΩ 19 µΩ/Ω + 200 mΩ 19 µΩ/Ω + 1 Ω 19 µΩ/Ω + 10 Ω 27 µΩ/Ω + 150 Ω 330 µΩ/Ω + 2.5 kΩ 3.1 mΩ/Ω + 0.1 MΩ	Guildline 9211A Fluke 5560A
Resistance – Measure[3]	Up to 100 Ω 100 Ω to 1 kΩ (1 to 10) kΩ (10 to 100) kΩ 100 kΩ to 1 MΩ (1 to 10) MΩ (10 to 100) MΩ	0.066 % + 4 mΩ 0.031 % + 10 mΩ 0.031 % + 100 mΩ 0.011 % + 1 Ω 0.012 % + 10 Ω 0.048 % + 100 Ω 0.8 % + 10 kΩ	HP 34401A
Electrical Simulation of RTD[3]			
PT385, 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	0.04 °C 0.05 °C 0.07 °C 0.08 °C 0.09 °C 0.18 °C	Fluke 5560A
Pt 3926, 100 Ω	(-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.04 °C 0.04 °C 0.07 °C 0.08 °C 0.09 °C	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of RTD[3], – (cont)			
Pt 3916, 100 Ω	(-200 to -190) °C (-190 to -80) °C (-80 to 0) °C (0 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.19 °C 0.03 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.08 °C 0.18 °C	Fluke 5560A
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	0.03 °C 0.04 °C 0.09 °C 0.10 °C 0.11 °C 0.12 °C	
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	0.03 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.09 °C	
PtNi 385, 120 Ω (Ni 120)	(-80 to 100) °C (100 to 260) °C	0.06 °C 0.11 °C	
Pt 385, 1000 Ω	(-200 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 600) °C (600 to 630) °C	0.02 °C 0.03 °C 0.04 °C 0.05 °C 0.18 °C	
Cu 427, 10 Ω	(-100 to 0) °C	0.23 °C	
Electrical Simulation of Thermocouples & Indicators[3]			
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1 000) °C	0.32 °C 0.11 °C 0.09 °C 0.12 °C 0.16 °C	Fluke 5560A

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of Thermocouples & Indicators[3] – (cont)			
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1 200) °C	0.19 °C 0.10 °C 0.09 °C 0.11 °C 0.16 °C	Fluke 5560A
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1 000) °C (1000 to 1 372) °C	0.23 °C 0.10 °C 0.11 °C 0.16 °C 0.28 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.48 °C 0.16 °C 0.10 °C 0.09 °C	
Welding Devices[3]	(0 to 350) Amps DC (0 to 100) Volts DC (100 to 700) Feed Rate IPM	0.87 ADC 0.012 VDC 3.6 IPM	Load bank, current shunt, DMM

IV. Fluid Quantities

Parameter/Equipment	Range	CMC[2] (±)	Comments
POVA (Piston/Plunger Operated Volumetric Apparatus)[3] –	(0.1 to 50) µL (50 to 100) µL (100 to 500) µL (500 to 1000) µL	0.31 µL 0.31 µL 0.56 µL 0.72 µL	Gravimetric method
Including But Not Limited To: Pipettes, Syringes, Dispensers, & Burettes	(1000 to 5000) µL (5000 to 10 000) µL (10 000 to 20 000) µL (20 000 to 50 000) µL	5.4 µL 18 µL 30 µL 72 µL	

V. Mechanical

Parameter/Equipment	Range	CMC[2, 8, 11] (±)	Comments
Accelerometers (Amplitude Response)	(5 to 9) Hz (10 to 99) Hz (100 to 1999) Hz (2000 to 10 000) Hz (10 001 to 15 000) Hz	2.1 % 1.3 % 1.5 % 2.0 % 2.5 %	Back-to-back comparison
Balances[3, 13]	Up to 20 g Up to 200 g Up to 200 g Up to 1000 g Up to 5000 g Up to 20 g Up to 200 g Up to 1000 g Up to 5000 g Up to 10 000 g Up to 20 000 g	0.11 mg 0.69 mg 1.3 mg 6.6 mg 34 mg 0.81 mg 4.8 mg 24 mg 130 mg 370 mg 460 mg	Class 1 weights Class 2 weights Class 4 weights
Force – Measuring Equipment[3]			
Tension/Compression	Up to 100 lbf	0.0064 lbf	Class F weights
Compression	(100 to 1000) lbf (1000 to 10 000) lbf (10 000 to 50 000) lbf (10 000 to 100 000) lbf (50 000 to 500 000) lbf	0.26 % Indication 0.24 % Indication 0.33 % Indication 0.20 % Indication 0.4 % Indication	Load cells
Tension	(100 to 1000) lbf (1000 to 10 000) lbf (10 000 to 50 000) lbf (10 000 to 100 000) lbf	0.23 % Indication 0.23 % Indication 0.29 % Indication 0.20 % Indication	

Parameter/Equipment	Range[7]	CMC[2] (±)	Comments
Mass, Fixed Points	1 mg	2.2 µg	Modified double substitution
	2 mg	2.1 µg	
	5 mg	2.9 µg	
	10 mg	1.4 µg	
	20 mg	1.5 µg	
	30 mg	2.2 µg	
	50 mg	1.6 µg	
	100 mg	1.7 µg	
	200 mg	1.6 µg	
	300 mg	1.6 µg	
	500 mg	2.1 µg	
	1 g	11 µg	
	2 g	3.3 µg	
	5 g	5.7 µg	
	10 g	7.2 µg	
	20 g	13 µg	
	50 g	11 µg	
	100 g	39 µg	
	200 g	140 µg	
	500 g	320 µg	
	1 kg	390 µg	
	2 kg	1.7 mg	
	5 kg	2.6 mg	
	10 kg	93 mg	Direct comparison
	20 kg	94 mg	
	25 kg	140 mg	
	0.8859 g ($^1/_{32}$ oz)	12 µg	
	1.772 g ($^1/_{16}$ oz)	94 µg	
	3.544 g ($^1/_8$ oz)	240 µg	
	7.087 g ($^1/_4$ oz)	170 µg	
	14.17 g ($^1/_2$ oz)	170 µg	
	28.35 g (1 oz)	370 µg	
	56.7 g (2 oz)	150 µg	
	113.4 g (4 oz)	740 µg	
	226.8 g (8 oz)	5.1 mg	
	0.4536 g (0.001 lb)	130 µg	
	0.9072 g (0.002 lb)	56 µg	
	2.27 g (0.005 lb)	26 µg	
	4.54 g (0.01 lb)	16 µg	
	9.07 g (0.02 lb)	56 µg	
	22.68 g (0.05 lb)	79 µg	
	45.36 g (0.1 lb)	37 µg	
	90.72 g (0.2 lb)	87 µg	

Parameter/Equipment	Range[7]	CMC[2, 11] (±)	Comments
Mass, Fixed Points (cont)	453.6 g (1 lb) 907.2 g (2 lb) 2267.96 g (5 lb) 4535.9 g (10 lb) 9071.8 g (20 lb) 11 339.8 g (25lb) 22 679.62 g (50 lb) 45 359.237 g (100 lb) 90 718.475 g (200 lb) 226 796.185 g (500 lb) 453 592.37 g (1000 lb)	3.8 mg 7.9 mg 8.3 mg 7.4 mg 94 mg 94 mg 95 mg 0.43 g 0.43 g 0.45 g 0.47 g	Direct comparison
Optical Tachometer[3]	Up to 200 FPM Up to 3000 FPM Up to 29 999 FPM	0.12 FPM 0.39 FPM 3.9 FPM	Calibrated strobe (FPM = flashes per minute)
Pressure – Measuring Equipment, Gages, Transducers & Transmitters[3]	Up to 300 psig Up to 3000 psig Up to 5000 psig Up to 10 000 psig Up to 30 000 psig Up to 2 in H_2O Up to 300 psig Up to 3000 psig Up to 10 000 psig (10 to 17) psia	0.18 psig 3.8 psig 3.9 psig 12 psig 43 psig 0.0026 in H_2O 0.051 psig 0.4 psig 1.3 psig 0.000 78 psia	Digital pressure gage Dwyer hook gage GE/Pace 1003 Barometric reference
Scales[3, 13]	Up to 10 lb Up to 20 lb Up to 50 lb Up to 100 lb Up to 200 lb Up to 500 lb Up to 1000 lb Up to 5000 lb Up to 20 000 lb	0.000 25 lb 0.000 25 lb 0.0063 lb 0.0063 lb 0.0064 lb 0.0064 lb 0.18 lb 0.19 lb 0.21 lb	Class 4 weights Class F weights

Parameter/Equipment	Range	CMC[2, 8, 11] (±)	Comments
Torque Wrenches – Measure[3]	(1 to 10) lbf·in (10 to 50) lbf·in (30 to 400) lbf·in (80 to 1000) lbf·in (240 to 3000) lbf·in (1200 to 6000) lbf·in (2400 to 12 000) lbf·in	0.33 lbf·in 0.17 lbf·in 1.8 lbf·in 5.1 lbf·in 21 lbf·in 23 lbf·in 58 lbf·in	CDI/Norbar torque calibrator Norbar torque calibrator
Torque – Measuring Equipment, Transducers	Up to 200 lbf·in Up to 1200 lbf·in Up to 12 000 lbf·in	0.10 % 0.091 % 0.10 %	Torque arm & weights
Vacuum – Measuring Equipment, Gauges[3]	Up to -13 psig	0.033 psig	Digital vacuum gauge
Rotations Speed – Measure[3]	Contact: Up to 200 RPM (200 to 3000) RPM (3000 to 20 000) RPM Optical: Up to 3000 RPM (3000 to 30 000) RPM	 0.67 RPM 13 RPM 16 RPM 0.5 RPM 5.0 RPM	Monarch PLT200
Indirect Verification of Rockwell Hardness Testers[3]	HRB: Low Medium High HRC: Low Medium High	 1.0 HRB 0.65 HRB 0.49 HRB 0.45 HRC 0.36 HRC 0.37 HRC	Indirect verification
Indirect Verification of Brinell Hardness Testers[3]	HBW 10/500: Low HBW 10/3000: High	 4.0 HBW 4.8 HBW	Indirect verification

VI. Thermodynamics

Parameter/Equipment	Range	CMC[2, 11] (±)	Comments
Temperature – Measuring Equipment[3]	(-100 to 300) °C (-148 to 572) °F	0.09 °C 0.16 °F	Hart 1502A/5614 PRT or Fluke 1523
Temperature – Measuring Equipment	(-40 to 200) °C (-40 to 392) °F	0.061 °C 0.11 °F	Hart 1502A/5614 PRT in wet bath
Temperature –Measure[3]	(-100 to 600) °C (-148 to 1112) °F (> 600 to 1200) °C (> 1112 to 2192) °F	1.5 °C 2.7 °F 10 °C 18 °F	Fluke 51 or 725 with thermocouple
IR Thermometer[3]	(-20 to 150) °C (Amb + 10 to 400) °C	1.1 °C 2.1 °C	Mikron M340 (lab only) Omega BB703 Emissivity ≈ 0.95 Wavelength (8 to 14) µm
Humidity – Measure & Measuring Equipment[3]	(20 to 90) % RH	3.4 % RH	SensoScientific B13-200

VII. Time & Frequency

Parameter/Equipment	Range	CMC[2, 6, 11] (±)	Comments
Frequency – Measuring Equipment[3]	0.01 Hz to 1100 MHz 0.01 Hz to 600 MHz	2.5 parts × 10^6 Hz 1.9 parts × 10^6 Hz	Fluke 5522A/SC1100 Fluke 5560A/600M
Frequency – Measure[3]	40 Hz to 300 kHz	0.014 % Indication	HP 34401
Timers & Stopwatches[3]	Up to 1 hr (> 1 to 24) hr	0.14 s 0.59 s	Reference stopwatch
Stroboscopes[3]	Up to 3600 FPM Up to 30 000 FPM	0.11 FPM 0.72 FPM	Universal counter

SATELLITE

ALDINGER COMPANY
3130 Rogerdale Rd. STE 186
Houston, TX 77042
Dustin Detten Phone: 214 638 1808

CALIBRATION

I. Chemical

Parameter/Equipment	Range	CMC[2] (±)	Comments
Conductivity Meters[3]	1 µS/cm 10 µS/cm 100 µS/cm 1000 µS/cm 10 000 µS/cm 100 000 µS/cm	0.56 µS/cm 0.41 µS/cm 2.9 µS/cm 20 µS/cm 190 µS/cm 1900 µS/cm	Reference conductivity standards
pH Meters[3]			
Electrical Calibration	(0 to 14) pH	0.015 pH	mV/pH calibrator
Probe/Meter Standardization	4 pH 7 pH 10 pH	0.030 pH 0.030 pH 0.030 pH	Reference buffer standards

II. Dimensional

Parameter/Equipment	Range	CMC[2] (±)	Comments
Calipers[3]	Up to 24 in (24 to 48) in Up to 48 in (48 to 96) in	550 µin 1100 µin 77 µin 1500 µin	Gage blocks (field) Gage blocks (lab)

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Dial & Test Indicators[3]	Up to 3 in	90 µin	Gage blocks
Height Gages[3]	Up to 48 in	280 µin	Gage blocks
Micrometers[3]	Up to 4 in (4 to 24) in (24 to 48) in	92 µin 550 µin 1100 µin	Gage blocks
Surface Plates – Flatness & Repeatability[3]			
Indicator Stands	(-0.002 to 0.002) in	31 µin	Repeat reading gage
	(-0.002 to 0.002) in	45 µin	Repeat reading gage, triangular gage block base
	(-0.01 to 0.01) in	580 µin	Indicator, triangular gage block base
Optical Comparators[3]			
X-Axis Y-Axis	Up to 12 in Up to 12 in	(250 + 91*L*) µin (250 + 91*L*) µin	Glass scale
Angle	Up to 90°	0.029°	Angle blocks
Rulers[3]	Up to 72 in	0.013 in	Standard ruler
Coating/Electromagnetic Thickness[3]	Up to 120 mils	0.25 mils	Shims
Tape Measures[3]	Up to 40 in Up to 100 ft	0.013 in 0.062 in	Standard ruler Standard tape

III. Fluid Quantities

Parameter/Equipment	Range	CMC[2] (±)	Comments
POVA (Piston/Plunger Operated Volumetric Apparatus)[3] – Including But Not Limited To: Pipettes, Syringes, Dispensers, & Burettes	(0.1 to 50) µL (50 to 100) µL (100 to 500) µL (500 to 1000) µL (1000 to 5000) µL (5000 to 10 000) µL (10 000 to 20 000) µL (20 000 to 50 000) µL	0.31 µL 0.31 µL 0.56 µL 0.72 µL 5.4 µL 18 µL 30 µL 72 µL	Gravimetric method

IV. Mechanical

Parameter/Equipment	Range	CMC[2, 11] (±)	Comments
Balances[3]	Up to 20 g Up to 200 g Up to 200 g Up to 1000 g Up to 5000 g Up to 20 g Up to 200 g Up to 1000 g Up to 5000 g Up to 10 000 g Up to 20 000 g	0.11 mg 0.69 mg 1.3 mg 6.6 mg 34 mg 0.81 mg 4.8 mg 24 mg 130 mg 370 mg 460 mg	Class 1 weights Class 2 weights Class 4 weights
Optical Tachometer[3]	Up to 200 FPM Up to 3000 FPM Up to 29 999 FPM	0.12 FPM 0.39 FPM 3.9 FPM	Calibrated strobe (FPM = Flashes per minute)
Pressure – Measuring Equipment, Gages, Transducers & Transmitters[3]	Up to 300 psig Up to 3000 psig Up to 5000 psig Up to 10 000 psig	0.18 psig 3.8 psig 3.9 psig 12 psig	Digital pressure gage

Parameter/Equipment	Range	CMC[2, 11] (±)	Comments
Scales[3]	Up to 10 lb Up to 20 lb Up to 50 lb Up to 100 lb Up to 200 lb Up to 500 lb Up to 1000 lb Up to 5000 lb Up to 20 000 lb	0.000 25 lb 0.000 25 lb 0.0063 lb 0.0063 lb 0.0064 lb 0.0064 lb 0.18 lb 0.19 lb 0.21 lb	Class 4 weights Class F weights
Torque Wrenches – Measure[3]	(1 to 10) lbf·in (10 to 50) lbf·in (30 to 400) lbf·in (80 to 1000) lbf·in (240 to 3000) lbf·in (1200 to 6000) lbf·in (2400 to 12 000) lbf·in	0.33 lbf·in 0.17 lbf·in 1.8 lbf·in 5.1 lbf·in 21 lbf·in 23 lbf·in 58 lbf·in	CDI/Norbar torque calibrator Norbar torque calibrator
Vacuum – Measuring Equipment, Gauges[3]	Up to -13 psig	0.033 psig	Digital vacuum gauge
Rotations Speed – Measurement[3]	Contact: Up to 200 RPM (200 to 3000) RPM (3000 to 20 000) RPM Optical: Up to 3000 RPM (3000 to 30 000) RPM	 0.67 RPM 13 RPM 16 RPM 0.5 RPM 5.0 RPM	Digital tachometer
Indirect Verification of Rockwell Hardness Testers[3]	HRB: Low Medium High HRC: Low Medium High	 1.0 HRB 0.65 HRB 0.49 HRB 0.45 HRC 0.36 HRC 0.37 HRC	Indirect verification
Indirect Verification of Brinell Hardness Testers[3]	HBW 10/500: Low HBW 10/3000: High	 4.0 HBW 4.8 HBW	Indirect verification

V. Thermodynamic

Parameter/Equipment	Range	CMC[2, 11] (±)	Comments
Temperature – Measuring Equipment[3]	(-100 to 300) °C (-148 to 572) °F	0.09 °C 0.16 °F	Hart 1502A/5614 PRT or Fluke 1523
Temperature –Measure[3]	(-100 to 600) °C (-148 to 1112) °F (> 600 to 1200) °C (> 1112 to 2192) °F	1.5 °C 2.7 °F 10 °C 18 °F	Fluke 51 or 725 with thermocouple

VI. Time & Frequency

Parameter/Equipment	Range	CMC[2] (±)	Comments
Timers & Stopwatches[3]	Up to 1 hr (> 1 to 24) hr	0.14 s 0.59 s	Reference stopwatch

SATELLITE

ALDINGER COMPANY
8023 Interstate 30
Little Rock, AR 72209
Dustin Detten Phone: 214 638 1808

CALIBRATION

I. Chemical

Parameter/Equipment	Range	CMC[2] (±)	Comments
Conductivity Meters[3]	1 µS/cm 10 µS/cm 100 µS/cm 1000 µS/cm 10 000 µS/cm 100 000 µS/cm	0.56 µS/cm 0.41 µS/cm 2.9 µS/cm 20 µS/cm 190 µS/cm 1900 µS/cm	Reference conductivity standards
pH Meters[3]			
Electrical Calibration	(0 to 14) pH	0.015 pH	mV/pH calibrator
Probe/Meter Standardization	4 pH 7 pH 10 pH	0.030 pH 0.030 pH 0.030 pH	Reference buffer standards

II. Dimensional

Parameter/Equipment	Range	CMC[2] (±)	Comments
Calipers[3]	Up to 24 in (24 to 48) in	550 µin 1100 µin	Gage blocks
Dial & Test Indicators[3]	Up to 3 in	90 µin	Gage blocks

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Height Gages[3]	Up to 48 in	280 µin	Gage blocks
Micrometers[3]	Up to 4 in (4 to 24) in (24 to 48) in	92 µin 550 µin 1100 µin	Gage blocks
Protractors[3]	Up to 90°	0.049°	Surface plate, angle blocks, sine bar w/ gage blocks
Surface Plates – Flatness & Repeatability[3]			
Indicator Stands	(-0.002 to 0.002) in	31 µin	Repeat reading gage
	(-0.002 to 0.002) in	45 µin	Repeat reading gage, triangular gage block base
	(-0.01 to 0.01) in	580 µin	Indicator, triangular gage block base
Optical Comparators[3]			
X-Axis Y-Axis	Up to 12 in Up to 12 in	(250 + 91*L*) µin (250 + 91*L*) µin	Glass scale
Angle	Up to 90°	0.029°	Angle blocks
Rulers[3]	Up to 72 in	0.013 in	Standard ruler
Radius Gages[3]	Up to 0.75 in	1300 µin	Optical comparator & overlay
Angle Gages[3]	Up to 180°	0.044°	Optical comparator & vernier
Coating/Electromagnetic Thickness[3]	Up to 120 mils	0.25 mils	Shims
Tape Measures[3]	Up to 40 in Up to 100 ft	0.013 in 0.062 in	Standard ruler Standard tape

III. Electrical – DC/Low Frequency

Parameter/Range	Frequency	CMC[2, 6, 12] (±)	Comments
AC Current – Measure[3]			
Up to 1 A	60 Hz to 1 kHz	0.16 % + 0.4 mA	HP 34401A
(1 to 3) A		0.14 % + 1.8 mA	
AC Current – Generate[3]			
(29 to 330) µA	45 Hz to 1 kHz	0.13 % + 0.1 µA	Multi-product calibrator
330 µA to 3.3 mA		0.10 % + 0.15 µA	
(3.3 to 33) mA		0.07 % + 2 µA	
(33 to 330) mA		0.083 % + 20 µA	
(0.33 to 3) A		0.10 % + 100 µA	
(3 to 10) A		0.21 % + 2 mA	
(10 to 20) A		0.21 % + 5 mA	
(16 to 150) A	(45 to 440) Hz	1 % + 0.25 A	Using 50 turn coil
(150 to 1000) A		1 % + 0.9 A	
AC Voltage – Generate[3]			
(1 to 330) mV	45 Hz to 10 kHz	0.018 % + 8 µV	Multi-product calibrator
(0.330 to 3.3) V	45 Hz to 10 kHz	0.018 % + 60 µV	
(3.3 to 33) V	45 Hz to 10 kHz	0.017 % + 0.6 mV	
(33 to 330) V	45 Hz to 1 kHz	0.023 % + 2 mV	
	(1 to 10) kHz	0.023 % + 6 mV	
(330 to 1020) V	45 Hz to 1 kHz	0.046 % + 10 mV	
	(1 to 5) kHz	0.040 % + 10 mV	
AC Voltage – Measure[3]			
Up to 100 mV	60 Hz to 3 kHz	0.063 % + 40 µV	HP 34401A
100 mV to 1 V		0.063 % + 300 µV	
(1 to 10) V		0.062 % + 3 mV	
(10 to 100) V		0.064 % + 30 mV	
(100 to 750) V		0.075 % + 230 mV	
Up to 10 kV		0.12 % + 100 mV	Vitrek 4700 w/ HVL-70
Up to 50 kV		0.1 % + 400 mV	

Parameter/Equipment	Range	CMC[2, 6, 12] (±)	Comments
Capacitance – Generate[3]			
Low	(0.22 to 3.3) nF (3.3 to 33) nF (33 to 330) nF (330 to 3300) nF	0.5 % + 10 pF 0.26 % + 100 pF 0.26 % + 300 pF 0.26 % + 3 nF	Multi-product calibrator
High	(3.3 to 33) µF (33 to 330) µF (330 to 3300) µF (3.3 to 110) mF	0.4 % + 30 nF 0.45 % + 300 nF 0.45 % + 3 µF 1.1 % + 10 µF	
DC Current – Generate[3]	(0 to 330) µA Up to 3.3 mA Up to 33 mA Up to 330 mA Up to 3 A (1.1 to 11) A (11 to 20.5) A (10 to 150) A (150 to 1000) A	0.015 % + 20 nA 0.010 % + 50 nA 0.014 % + 250 nA 0.010 % + 2.5 µA 0.038 % + 40 µA 0.050 % + 500 µA 0.1 % + 750 µA 0.5 % + 0.14 A 0.5 % + 0.5 A	Multi-product calibrator Using 50 turn coil
DC Current – Measure[3]	Up to 10 mA (10 to 100) mA 100 mA to 1 A (1 to 3) A	0.075 % + 6 µA 0.051 % + 5 µA 0.11 % + 100 µA 0.13 % + 600 µA	HP 34401A
DC Voltage – Generate[3]	(0 to 330) mV Up to 3.3 V Up to 33 V (30 to 330) V (100 to 1000) V	0.002 % + 1 µV 0.0012 % + 2 µV 0.0013 % + 20 µV 0.0018 % + 0.15 mV 0.0019 % + 1.5 mV	Multi-product calibrator
DC Voltage – Measure[3]	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1000) V Up to 10 kV Up to 70 kV	0.0054 % + 3.5 µV 0.0042 % + 7 µV 0.0037 % + 50 µV 0.0048 % + 600 µV 0.0049 % + 10 mV 0.041 % + 30 mV 0.049 % + 200 mV	HP 34401A Vitrek 4700 w/ HVL-70

Parameter/Equipment	Range	CMC[2, 6, 12] (±)	Comments
Electrical Calibration of Temperature Controllers[3]			
Thermocouple types J, K, T & E	(-200 to < 0) °C (0 to 1370) °C	1.2 °C 0.85 °C	Fluke 725
PT 385, 100 Ω	(-200 to 800) °C	0.66 °C	
Resistance – Generate[3]	Up to 330 Ω (330 to 3300) Ω (3300 to 33 000) Ω (33 to 330) kΩ (330 to 3300) kΩ (3.3 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ (330 to 1100) MΩ	0.065 % + 20 mΩ 0.029 % + 100 mΩ 0.029 % + 1.0 Ω 0.0037 % + 10 Ω 0.0063 % + 150 Ω 0.026 % + 2500 Ω 0.063 % + 3.0 kΩ 0.14 % + 100 kΩ 0.14 % + 500 kΩ	Multi-product calibrator
Resistance – Measure[3]	Up to 100 Ω 100 Ω to 1 kΩ (1 to 10) kΩ (10 to 100) kΩ 100 kΩ to 1 MΩ (1 to 10) MΩ (10 to 100) MΩ	0.066 % + 4 mΩ 0.031 % + 10 mΩ 0.031 % + 100 mΩ 0.011 % + 1 Ω 0.012 % + 10 Ω 0.048 % + 100 Ω 0.8 % + 10 kΩ	HP 34401A
Electrical Simulation of RTD[3]			
PT 385, 100 Ω	(-200 to 0) °C (0 to 100) °C (100 to 400) °C (400 to 630) °C (630 to 800) °C	0.058 °C 0.17 °C 0.12 °C 0.14 °C 0.28 °C	Multi-product calibrator

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of Thermocouples & Indicators[3]			
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.51 °C 0.16 °C 0.19 °C 0.20 °C 0.24 °C	Multi-function calibrator
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.28 °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 0.20 °C 0.24 °C 0.40 °C	
Type T	(-250 to -150) °C (-150 to 0.0) °C (0.0 to 120) °C (120 to 400) °C	0.63 °C 0.24 °C 0.16 °C 0.14 °C	
Welding Devices[3]	(0 to 350) Amps DC (0 to 100) Volts DC (100 to 700) Feed Rate IPM	0.87 ADC 0.012 VDC 3.6 IPM	Load bank, current shunt, DMM

IV. Fluid Quantities

Parameter/Equipment	Range	CMC[2] (±)	Comments
POVA (Piston/Plunger Operated Volumetric Apparatus)[3] –	(0.1 to 50) µL (50 to 100) µL (100 to 500) µL (500 to 1000) µL	0.31 µL 0.31 µL 0.56 µL 0.72 µL	Gravimetric method
Including But Not Limited To: Pipettes, Syringes, Dispensers, & Burettes	(1000 to 5000) µL (5000 to 10 000) µL (10 000 to 20 000) µL (20 000 to 50 000) µL	5.4 µL 18 µL 30 µL 72 µL	

V. Mechanical

Parameter/Equipment	Range	CMC[2, 11] (±)	Comments
Balances[3]	Up to 20 g Up to 200 g Up to 200 g Up to 1000 g Up to 5000 g Up to 20 g Up to 200 g Up to 1000 g Up to 5000 g Up to 10 000 g Up to 20 000 g	0.11 mg 0.69 mg 1.3 mg 6.6 mg 34 mg 0.81 mg 4.8 mg 24 mg 130 mg 370 mg 460 mg	Class 1 weights Class 2 weights Class 4 weights
Force – Measuring Equipment[3]			
Tension/Compression	Up to 100 lbf	0.0064 lbf	Class F weights
Compression	(100 to 1000) lbf (1000 to 10 000) lbf (10 000 to 50 000) lbf (10 000 to 100 000) lbf (50 000 to 500 000) lbf	0.26 % Indication 0.24 % Indication 0.33 % Indication 0.20 % Indication 0.4 % Indication	Load cells
Tension	(100 to 1000) lbf (1000 to 10 000) lbf (10 000 to 50 000) lbf (10 000 to 100 000) lbf	0.23 % Indication 0.23 % Indication 0.29 % Indication 0.20 % Indication	
Optical Tachometer[3]	Up to 200 FPM Up to 3000 FPM Up to 29 999 FPM	0.12 FPM 0.39 FPM 3.9 FPM	Calibrated strobe (FPM = Flashes per minute)
Pressure – Measuring Equipment, Gages, Transducers & Transmitters[3]	Up to 300 psig Up to 3000 psig Up to 5000 psig Up to 10 000 psig	0.18 psig 3.8 psig 3.9 psig 12 psig	Digital pressure gauge
Scales[3]	Up to 10 lb Up to 20 lb	0.000 25 lb 0.000 25 lb	Class 4 weights

Parameter/Equipment	Range	CMC[2, 11] (±)	Comments
Scales[3] – (cont)	Up to 50 lb Up to 100 lb Up to 200 lb Up to 500 lb Up to 1000 lb Up to 5000 lb Up to 20 000 lb	0.0063 lb 0.0063 lb 0.0064 lb 0.0064 lb 0.18 lb 0.19 lb 0.21 lb	Class F weights
Torque Wrenches – Measure[3]	(1 to 10) lbf·in (10 to 50) lbf·in (30 to 400) lbf·in (80 to 1000) lbf·in (240 to 3000) lbf·in (1200 to 6000) lbf·in (2400 to 12 000) lbf·in	0.33 lbf·in 0.17 lbf·in 1.8 lbf·in 5.1 lbf·in 21 lbf·in 23 lbf·in 58 lbf·in	CDI/Norbar torque calibrator Norbar torque calibrator
Vacuum – Measuring Equipment, Gauges[3]	Up to -13 psig	0.033 psig	Digital vacuum gauge
Rotations Speed – Measurement[3]	Contact: Up to 200 RPM (200 to 3000) RPM (3000 to 20 000) RPM Optical: Up to 3000 RPM (3000 to 30 000) RPM	 0.67 RPM 13 RPM 16 RPM 0.5 RPM 5.0 RPM	Digital tachometer
Indirect Verification of Rockwell Hardness Testers[3]	HRB: Low Medium High HRC: Low Medium High	 1.0 HRB 0.65 HRB 0.49 HRB 0.45 HRC 0.36 HRC 0.37 HRC	Indirect verification
Indirect Verification of Brinell Hardness Testers[3]	HBW 10/500: Low HBW 10/3000: High	 4.0 HBW 4.8 HBW	Indirect verification

VI. Thermodynamic

Parameter/Equipment	Range	CMC[2, 11] (±)	Comments
Temperature –Measure[3]	(-100 to 600) °C (-148 to 1112) °F (> 600 to 1200) °C (> 1112 to 2192) °F	1.5 °C 2.7 °F 10 °C 18 °F	Fluke 51 or 725 with thermocouple
IR Thermometer[3]	(Amb + 10 to 400) °C	2.1 °C	Emissivity ≈ 0.95 Wavelength (8 to 14) µm

VII. Time & Frequency

Parameter/Equipment	Range	CMC[2, 6, 11] (±)	Comments
Frequency – Measuring Equipment[3]	Up to 1100 MHz	2.5 parts × 10^6	Multi-product calibrator
Frequency – Measure[3]	40 Hz to 300 kHz	0.014 % Indication	HP 34401
Timers & Stopwatches[3]	Up to 1 hr (> 1 to 24) hr	0.14 s 0.59 s	Reference stopwatch

[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. 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, repeatability) 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 and *R* is the numerical value of the resolution of the device in microinches unless otherwise noted.

[5] Adjustable thread rings are set to applicable specification using calibrated master set plug gages.

[6] CMC for the HP 34401 is based on 1-year specifications within a temperature range of 18 °C to 28 °C. Field calibrations will be performed within 18 °C to 28 °C, 30 % to 55 % humidity.

[7] Where ranges are not specified, the CMC stated is for the cardinal points only.

[8] In the statement of CMC, percentage (%) refers to percent of reading, unless otherwise noted.

[9] "Supermicrometer" is a registered trademark with a last listed owner of Pratt & Whitney Measurement Systems, Inc., Connecticut U.S.A.

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

[11] 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.

[12] 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.

[13] Aldinger Company is also doing business as Utah Scale Center for field calibration services, with administrative offices located at 199 W Cottage Avenue, Sandy, UT 84070.

Accredited Laboratory

A2LA has accredited

ALDINGER COMPANY

Dallas, TX

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/NCSL 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 29th day of June 2026.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1509.01
Valid to June 30, 2028

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