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

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CALIBRATION

Valid To: August 31, 2027 Certificate Number: 1848.01

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 to perform the following calibrations[1,7]:

I. Chemical

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
pH Meter – Fixed Points[3]	4 pH 7 pH 10 pH	0.12 pH 0.12 pH 0.12 pH	Method: ACP-071; pH buffer solutions
Conductivity – Fixed Points	(0 to 1) µS (1 to 10) µS (10 to 100) µS (100 to 1000) µS (1000 to 10 000) µS (10 000 to 100 000) µS	4.8 % 1.2 % 1.0 % 0.6 % 0.6 % 0.5 %	Method: ACP-071; conductivity standards

II. Dimensional

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Gage Blocks	Up to 4 in (5 to 20) in	(1.6 + 2*L*) µin (19 + 0.8*L*) µin	Method: ACP-023; by mechanical comparison UMM DMS680, Pratt & Whitney 1000M
Length Bars	Up to 80 in	(18 + 2.2*L*) µin	Method: ACP-010; By UMM, Pratt & Whitney 1000M
Plug Gages (OD) –	Up to 12 in	(17 + 3.9*D*) µin	Method: ACP-024; UMM, DMS 680, Pratt & Whitney 1000M
Taper	(0.039 to 5.7) in	5 µin	IAC Masterscanner
Diameter	(0.039 to 5.7) in	(80 + 2*L*) µin	IAC Masterscanner
Taper Pipe Thread Plugs –			
Effective Pitch Diameter	(0.039 to 5.7) in	(80 + 5*L*) µin	Method: ACP-025; IAC masterscanner
Simple Pitch Diameter	(0.039 to 5.7) in	(80 + 5*L*) µin	
Major Diameter	(0.039 to 5.7) in	(80 + 5*L*) µin	
Minor Diameter	(0.039 to 5.7) in	(100 + 5*L*) µin	
Thread Pitch	(0.039 to 5.7) in	(40 + 5*L*) µin	
Accumulated Pitch Deviation	(0.039 to 5.7) in	(40 + 5*L*) µin	
Flank Angles	Pitch ≤ 0.0394 in (1 mm)	(0° 6" 0')/*p*	*p* = Pitch
	Pitch > 0.0394 in (1 mm)	0° 6" 0'	
Taper	(0.039 to 5.7) in	22 µin	

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Taper Pipe Thread Rings –			
Effective Pitch Diameter	(0.118 to 6) in	(80 + 5*L*) µin	Method: ACP-024; IAC Masterscanner
Simple Pitch Diameter	(0.118 to 6) in	(80 + 5*L*) µin	
Major Diameter	(0.118 to 6) in	(80 + 5*L*) µin	
Minor Diameter	(0.118 to 6) in	(100 + 5*L*) µin	
Thread Pitch	(0.118 to 6) in	(40 + 5*L*) µin	
Accumulated Pitch Deviation	(0.118 to 6) in	(40 + 5*L*) µin	
Flank Angles	Pitch ≤ 0.0394 in (1 mm)	(0° 6" 0')/*p*	*p* = Pitch
	Pitch > 0.0394 in (1 mm)	0° 6" 0'	
Taper	(0.118 to 6) in	22 µin	
Thread Plug Gages & Setting Plug Gages –	(2 to 120) TPI Up to 12 in	(100 + 2*D*) µin	Method: ACP-025; UMM, DMS 680 & thread wires
Effective Pitch Diameter	(0.039 to 5.7) in	(80 + 5*L*) µin	IAC masterscanner
Simple Pitch Diameter	(0.039 to 5.7) in	(80 + 5*L*) µin	
Major Diameter	(0.039 to 5.7) in	(80 + 5*L*) µin	
Minor Diameter	(0.039 to 5.7) in	(100 + 5*L*) µin	
Thread Pitch	(0.039 to 5.7) in	(40 + 5*L*) µin	
Accumulated Pitch Deviation	(0.039 to 5.7) in	(40 + 5*L*) µin	
Flank Angles	Pitch ≤ 0.0394 in (1 mm)	(0° 6" 0')/*p*	*p* = Pitch
	Pitch > 0.0394 in (1 mm)	0° 6" 0'	
Taper	(0.039 to 5.7) in	22 µin	

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Ring Gages (ID) –	(0.06 to 12) in	(19 + 2*D*) µin	Method: ACP-026; UMM, DMS 680, Pratt & Whitney 1000M
Taper	(0.039 to 6) in	5 µin	IAC masterscanner
Diameter	(0.039 to 6) in	(40 + 2*L*) µin	IAC Masterscanner
Thread Ring Gages –	Up to 6 in	(100 + 2*D*) µin	Method: ACP-027; Setting plugs
Effective Pitch Diameter	(0.118 to 6) in	(80 + 5*L*) µin	IAC masterscanner
Simple Pitch Diameter	(0.118 to 6) in	(80 + 5*L*) µin	
Major Diameter	(0.118 to 6) in	(80 + 5*L*) µin	
Minor Diameter	(0.118 to 6) in	(100 + 5*L*) µin	
Thread Pitch	(0.118 to 6) in	(40 + 5*L*) µin	
Accumulated Pitch Deviation	(0.118 to 6) in	(40 + 5*L*) µin	
Flank Angles	Pitch ≤ 0.0394 in (1 mm)	(0° 6" 0')/*p*	*p* = Pitch
	Pitch > 0.0394 in (1 mm)	0° 6" 0'	
Taper	(0.118 to 6) in	22 µin	
Bore Gages	Up to 6 in	48 µin	Ring gages
Calipers[3]	Up to 80 in	(400 + 2.5*L*) µin	Method: ACP-004; gage blocks & rod standards
Height Gages[3]	Up to 40 in	400 µin	Method: ACP-013; gage blocks, length rods
Digital, Dial & Test Indicators[3]	Up to 2 in	70 µin	Method: ACP-007; gage blocks
LVDT	Up to 8 in	0.002 in	Method: ACP-007A

Parameter/Equipment	Range[4]	CMC[2, 4] (±)	Comments
Micrometers[3] –			
Outside	Up to 36 in (37 to 60) in	33 + 10*L*) µin (360 + 21*L*) µin	Method: ACP-016; Gage blocks & rod standards
Inside	Up to 40 in	(51 + 1.4*L*) µin	Universal measuring machine, Pratt & Whitney 1000M
Depth	Up to 12 in	60 µin	Gage blocks
Laser Micrometers	Up to 2 in	39 µin	Plug gages
Parallels	Up to 30 in.	45 µin	Surface plate LVDT Indicator
Pin Gages[3]	(0.011 to 1) in (0.011 to 1) in	(19 + 2*D*) µin 56 µin	Method: ACP-019; universal measuring machine, DMS 680 Micrometer
Surface Roughness Standards	(15 to 150) µin Ra	1.7 µin	Verification of specimens per ASME B46.1
Profilometers	17 µin Ra 119 µin *Ra*	1.5 µin	Method: ACP-021; roughness specimen
Clinometers & Inclinometers, & Electronic Levels	Up to 90°	0.075 °	Sine plate/gage blocks
Levels (Spirit, Bubble, Machinist)[3]	Up to 15 in	400 µin	Surface plate & gage blocks
Rules & Tapes[3]	Up to 100 ft	0.04 in	Method: ACP-046; steel rule/optical scale

Parameter/Equipment	Range[4]	CMC[2] (±)	Comments
Optical Comparators & Measuring Machines[3] –			Method: ACP-018;
Axis Linearity	Up to 12 in	80 µin	Master calibration artifact
Magnification	5x 10x 20x 50x 100x	440 µin 440 µin 440 µin 440 µin 440 µin	Magnification checker scale
Angularity	Up to 360°	0’65”	Sine bar & gage blocks or angle blocks

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC[2, 4, 5] (±)	Comments
DC Voltage – Generate[3]	(0 to 330) mV 330 mV to 3.3 V (3.3 to 33) V (3 to 330) V (330 to 1000) V	27 µV/V + 1 µV 4 µV/V + 2 µV 15 µV/V + 20 µV 22 µV/V + 150 µV 23 µV/V + 1.5 mV	Method: ACP-070; Fluke 5522A
DC Voltage – Measure[3]	(0 to 100) mV 100mV to 1V (1 to 10) V (10 to 100) V (100 to 1000) (1000 to 150 000) V	12 µV/V + 0.2 µV 2 µV/V + 0.3 µV 2 µV/V + 0.5 µV 7uV/V + 30 µV 19uV/V + 5 mV 1.2 mV/V + 12 µV	Method: ACP-070; Fluke 8588A Ross VD150 Voltage Divider, Keithley DMM7510
DC Current – Generate[3]	(0 to 330) µA 330 µA to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1 A (1 to 3) A (3 to 10) A (10 to 20) A	170 µA/A + 0.02 µA 130 µA/A + 0.05 µA 120 µA/A + 0.25 µA 120 µA/A + 2.5 µA 230 µA/A + 40 µA 430 µA/A + 40 µA 510 µA/A + 500 µA 1.2 mA/A + 750 µA	Method: ACP-070; Fluke 5522A
Non-Toroidal Type	(10 to 1000) A	0.8 %	Fluke 5522A plus coil, clamp-on only

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
DC Current – Measure[3]	(0 to 10) µA (10 to 100) µA 100 µA to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A (1 to 10) A (10 to 100) A (100 to 1000) A	9 µA/A + 0.4 nA 18 u/A + 1 nA 16 µA/A + 4 nA 17 µA/A + 40 nA 57 µA/A + 1 µA 300 µA/A + 100 µA 270 µA/A + 0.4 µA 3 mA/A + 1 µA 3 mA/A + 1 µA	Method: ACP-070; Fluke 8588A Keithley DMM7510 with Empro shunts
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 (110 to 330) kΩ 330 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	0.005 % + 1 mΩ 0.004 % + 1.5 mΩ 0.004 % + 1.4 mΩ 0.033 % + 2 mΩ 0.004 % + 20 mΩ 0.004 % + 20 mΩ 0.004 % + 20 mΩ 0.004 % + 0.2 Ω 0.004 % + 0.2 Ω 0.004 % + 2 Ω 0.011 % + 2 Ω 0.015 % + 30 Ω 0.041 % + 50 Ω 0.056 % + 2500 Ω 0.07 % + 3 kΩ 0.38 % + 100 kΩ 1.8 % + 500 kΩ	Method: ACP-070; Fluke 5522A
Resistance – Measure[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 10) MΩ (10 to 100) MΩ 100 MΩ to 1 GΩ	0.003 % + 4 µΩ 0.002 % + 0.02 mΩ 0.002 % + 0.05 mΩ 0.002 % + 0.5 mΩ 0.002 % + 5 mΩ 0.002 % + 50 mΩ 0.002 % + 1 Ω 0.02 % + 100 Ω 0.03 % + 10 kΩ 0.3 % + 1 MΩ	Method: ACP-070; Fluke 8588A

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Calibration of RTD Indicators & Indicating System[3] – Generate Simulation			
Pt 385, 100 Ω	(-200 to 800) °C	0.08 °C	Method: ACP-070; Fluke 5522A
Electrical Calibration of RTD Indicators & Indicating System[3] – Measure Simulation			
Pt 385, 100 Ω	(-200 to 800) °C	0.08 °C	Method: ACP-070 Keithley DMM7510
Electrical Calibration of Thermocouple Indicators & Indicating Systems[3] –			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1500 to 1820) °C	0.44 °C 0.35 °C 0.34 °C 0.34 °C	Method: ACP-070; Fluke 5522A
Type E	(-250 to 1000) °C	0.24 °C	
Type J	(-210 to -100) °C (-100 to 760) °C (760 to 1200) °C	0.31 °C 0.16 °C 0.27 °C	
Type K	(-200 to 100) °C (-100 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.38 °C 0.19 °C 0.30 °C 0.46 °C	
Type N	(-200 to 1300) °C	0.31 °C	
Type R	(0 to 1767) °C	0.65 °C	
Type S	(0 to 1767) °C	0.54 °C	
Type T	(-250 to 400) °C (-150 to 400) °C	0.72 °C 0.16 °C	

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
AC Voltage – Generate[3]			
(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	0.018 % + 6 µV 0.018 % + 6 µV 0.025 % + 6 µV 0.12 % + 6 µV 0.4 % + 12 µV 0.91 % + 50 µV	Method: ACP-070; Fluke 5522A
(33 to 330) 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	0.034 % + 8 µV 0.017 % + 8 µV 0.019 % + 8 µV 0.04 % + 8 µV 0.091 % + 32 µV 0.23 % + 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	0.02 % + 60 µV 0.02 % + 60 µV 0.035 % + 50 µV 0.08 % + 50 µV 0.28 % + 600 µV 0.28 % + 600 µV	
(3.3 to 33) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.018 % + 600 µV 0.018 % + 600 µV 0.03 % + 600 µV 0.04 % + 600 µV 0.11 % + 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	0.022 % + 2 mV 0.017 % + 8 µV 0.029 % + 6 mV 0.036 % + 6 mV 0.23 % + 50 mV	
(330 to 1000) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.035 % + 10 mV 0.03 % + 10 mV 0.035 % + 10 mV	

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
AC Voltage – Measure[3]			
(0 to 10) mV	1 Hz to 10 Hz 10 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (300 to 500) kHz	0.6 % + 2 µV 0.06 % + 2 µV 0.06 % + 2 µV 0.07 % + 2 µV 0.45 % + 2 µV 1.40 % + 4 µV 3.4 % + 4 µV	Method: ACP-070; Fluke 8588A
(10 to 100) mV	1 Hz to 10 Hz 10 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (300 to 500) kHz	0.011 % + 0.5uV 0.011 % + 0.5uV 0.02 % + 0.5uV 0.03 % + 1uV 0.08 % + 5uV 0.3 % + 30uV 1.5 % + 0.1 mV	
100 mV to 1 V	1 Hz to 10 Hz 10 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (300 to 500) kHz	0.01 % + 5uV 0.01 % + 5uV 0.015 % + 5uV 0.03 % + 5uV 0.08 % + 50uV 0.31 % + 0.3mV 1.5 % + 1mV	
(1 to 10) V	1 Hz to 10 Hz 10 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (300 to 500) kHz	0.01 % + 50uV 0.01 % + 50uV 0.015 % + 50uV 0.03 % + 100uV 0.08 % + 500uV 0.31 % + 3mV 1.40 % + 10mV	
(10 to 100) V	1 Hz to 10 Hz 10 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz	0.01 % + 500uV 0.01 % + 500uV 0.013 % + 500uV 0.03 % + 1mV 0.08 % + 5mV 0.16 % + 50mV	
(100 to 1000) V	1 Hz to 50 Hz 50 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.02 % + 10mV 0.02 % + 25mV 0.02 % + 25mV 0.031 % + 25mV 0.05 % + 25mV	

Parameter/Range	Frequency	CMC[2, 4, 5] (±)	Comments
AC Voltage – Measure[3] (cont.)			
(1000 to 10 000) V	(50 to 1) kHz	6 mV/V + 3mV	Ross VD150 Voltage Divider, Keithley DMM7510
AC Current – Generate[3]			
(29 to 330) µA 330 µA to 3.3 mA (3.3 to 33) mA (33 to 330) mA	10 Hz to 30 kHz	0.15 % + 0.1 µA 0.12 % + 0.15 µA 0.042 % + 2 µA 0.047 % + 20 µA	Method: ACP-070; Fluke 5522A
330 mA to 1 A	5 Hz to 10 Hz 10 Hz to 1 kHz 1 kHz to 10 kHz	0.21 % + 100 µA 0.06 % + 100 µA 2.9 % + 5 mA	
330 mA to 3 A	50 Hz to 1 kHz 1 kHz to 5 kHz	0.074 % + 100 µA 0.7 % + 1 mA	
(2 to 20) A	1 Hz to 5 kHz	0.18 % + 5 mA	
Up to 10 A (10 to 300) A (300 to 1000) A	60 Hz to 440 Hz 60 Hz to 440 Hz 60 Hz	1.3 % 1.0 % 0.4 %	Fluke 5522A plus coil, clamp-on only

Parameter/Range	Frequency	CMC[2, 4, 5] (±)	Comments
AC Current – Measure[3]			
(5 to 100) µA	40 Hz to 5 kHz (5 to 10) kHz	0.07 % + 300 nA 0.11 % + 300 nA	Method: ACP-070; Keithley DMM7510
100 µA to 1 mA	40 Hz to 10 kHz	0.15 % + 300 nA	
(1 to 10) mA	40 Hz to 10 kHz	0.11 % + 3 µA	
(10 to 100) mA	40 Hz to 10 kHz	0.11 % + 30 µA	
100 mA to 1 A	40 Hz to 10 kHz (5 to 10) kHz	1.1 % + 400 µA 2.3 % + 400 µA	
(1 to 3) A	40 Hz to 5 kHz (5 to 10) kHz	1 % + 1.5 mA 2.3 % + 1.5mA	
(3 to 10) A	40 Hz to 5 kHz (5 to 10) kHz	1 % + 5 mA 2.3 % + 5 mA	

IV. Mechanical

Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Brinell Hardness Testers[3]	HBW 10/500 (15.9 to 109) HBW 10/3000 (95.5 to 650)	1.1 HBW 2.0 HBW	Method: ACP-020D; ASTM E10
Brinell Force (Direct Verification)[3]	(0 to 3000) kg load	0.16 kg	Method: ACP-020F load cell
Brinell Scope (Direct Verification)	(0 to 7) mm	0.029 mm	Stage micrometer ASTM E10
Indirect Verification of Microindentation Hardness Testers[3] –			Method: ACP-020A
Vickers:			
≥ 1 kgf	(200 to 850) HV	2 HV	ASTM E92 / E384
< 1 kgf	(200 to 850) HV	12 HV	
Knoop:			
≥ 1 kgf	(200 to 850) HK	9 HK	ASTM E92 / E384
< 1 kgf	(200 to 850) HK	13 HK	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Rockwell Hardness Testers[3]	(80 to 84) HRA (70 to 78) HRA (20 to 65) HRA (80 to 100) HRBW (60 to 79) HRBW (40 to 59) HRBW (60 to 65) HRC (35 to 55) HRC (20 to 30) HRC (93 to 100) HREW (84 to 90) HREW (70 to 79) HREW (94 to 100) HRFW (80 to 90) HRFW (60 to 75) HRFW (< 96) HRHW (≥ 96) HRHW (90 to 92) HR15N (78 to 88) HR15N (70 to 77) HR15N (87 to 93) HR15TW (81 to 86) HR15TW (74 to 80) HR15TW (77 to 82) HR30N (55 to 73) HR30N (42 to 50) HR30N (70 to 83) HR30TW (57 to 69) HR30TW (43 to 56) HR30TW (66 to 72) HR45N (37 to 61) HR45N (20 to 31) HR45N (66 to 72) HR45TW (37 to 61) HR45TW (20 to 31) HR45TW (60 to 70) HR45XW 70 to 100) HR45XW	0.15 HRA 0.17 HRA 0.27 HRA 0.42 HRBW 0.26 HRBW 0.35 HRBW 0.32 HRC 0.33 HRC 0.41 HRC 0.57 HREW 0.57 HREW 0.44 HREW 0.57 HRFW 0.53 HRFW 0.53 HRFW 0.42 HRHW 0.35 HRHW 0.51 HR15N 0.42 HR15N 0.30 HR15N 0.30 HR15TW 0.28 HR15TW 0.27 HR15TW 0.31 HR30N 0.32 HR30N 0.40 HR30N 0.21 HR30TW 0.22 HR30TW 0.62 HR30TW 0.23 HR45N 0.27 HR45N 0.33 HR45N 0.43 HR45TW 0.47 HR45TW 0.70 HR45TW 0.75 HR45XW 0.24 HR45XW	Method: ACP-020; ASTM E18

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
EQUOTIP (Leeb) – Indirect Verification, Fixed Point[3]	801 Leeb D Hardness	16 Leeb D Hardness	Method: ACP-020C; ASTM A956
Scales & Balances[3]	 1 mg to 320 g (> 320 to 5000) g (> 5 to 10) kg (> 10 to 30) kg (30 to 20 000) lbs (> 20 000 to 200 000) lbs	 3.0 µg/g + 20µg 3.0 µg/g + 1 mg 4.7 µg/g + 1 mg 0.72 g 0.015 % of I.V. 0.03 % of I.V.	Method: ACP-047 Class 1 weights Class 1 weights Class 1 & 2 weights Class 4 weights Class F weights Class F weights
Direct Verification of Durometers – Indenter Extension & Shape: Radius Angle Extension Spring Calibration Force: Type A, O Type D, C Type OO, OOO	 Up to 1 in Up to 90° Up to 1 in Up to 8.9 N Up to 45 N Up to 1.2 N	 0.0002 in 0.05° 0.0002 in 0.0008 N 0.03 N 0.0007 N	Method: ASTM D2240 Optical inspection under 50x magnification Gage blocks Load force stand
Rheometer[3] – Torque @ (0.5, 1, 3) degrees arc	 (0 to 200) lbf·in	 0.25 lbf·in	 Torque ASTM D5289 ASTM D2084
Mooney Viscometer[3]	(0 to 200) Mooney	0.12 Mooney	ASTM D1646

Parameter/Equipment	Range	CMC[2, 6] (±)	Comments
Pressure Measure & Generate, Transducers & Transmitters[3]	(-14.7 to 300) psig (> 300 to 1000) psig (> 1000 to 5000) psig (> 5000 to 15 000) psig (5 to 15 000) psig (500 to 60 000) psig	0.009 psi 0.040 psi 0.005 % rdg + 0.06 psig 0.002 % rdg + 2.3 psig 0.014 % rdg 0.042 % rdg	Method: ACP-038; Druck DPI-611 Druck CR2200 Druck DPI104 Ametek T-150 DWT Fluke P3860 DWT
Force, Measure[3] – Transducers & Load Cells (Tension & Compression)	Up to 100 000 lbf Up to 500 000 lbf Up to 600 000 lbf Compression Only	0.4 % of Indicated Value 0.05 % of Indicated Value 0.02 % of Indicated Value	Method: ACP-049; ASTM E4 & loadcells
Extensometer[3] Displacement	Up to 2 in	18 µin	Method: ACP-051; ASTM E83 ASTM E399
Material Testing System Crosshead Displacement or Actuator Stroke[3]	Up to 24 in	0.001 in	Method: ACP-052; ASTM E2309/E2309M
Material Testing System Crosshead/Actuator Speed[3]	12 in/min	0.006 in/min	Method: ACP-052 ASTM 2658
Load Cells – Tension & Compression[3]	Up to 5000 lbf (5001 to 100 000) lbf	0.02 % Indicated Value 0.02 % Indicated Value	Method: ACP-050 ASTM E74

Parameter/Equipment	Range	CMC[2] (±)	Comments
Force Gauges[3]	Up to 1000 lbf	0.15 % of Indicated Value	Method: ACP-049A; NIST Class F weights
Dynamometer	Up to 100 000 lbf	0.03 % of Indicated Value	Morehouse machine
Torque – Calibration of Torque Meters & Sensors	5 lbf·in to 1000 lbf·ft	0.05 % of Applied Load	Method: ACP-031; torque arms with weights, including specific arms
Torque Wrenches[3]	(4 to 50) lbf·in (30 to 400) lbf·in (80 to 1000) lbf·in (20 to 250) lbf·ft (250 to 1000) lbf·ft	0.17 lbf·in 1.2 lbf·in 1.4 lbf·in 1.2 lbf·ft 1.4 lbf·ft	Method: ACP-030; CDI torque calibrator using load cells
Mass – Fixed Points	1 mg 10 mg 20 mg 30 mg 50 mg 100 mg 200 mg 300 mg 500 mg 1 g 2 g 3 g 5 g 10 g 20 g 30 g 50 g 100 g 200 g 500 g 1000 g 2000 g 5000 g	16 µg 16 µg 9.9 µg 16 µg 13 µg 23 µg 11 µg 9.9 µg 17 µg 12 µg 14 µg 15 µg 16 µg 22 µg 26 µg 28 µg 32 µg 55 µg 100 µg 670 µg 1.3 mg 10 mg 10 mg	Method: ACP-001; Comparison to Class 1 weights

Parameter/Equipment	Range	CMC[2] (±)	Comments
Mass – Fixed Points (cont)	10 kg 0 g 0.001 lb (0.453 592 37 g) 0.002 lb (0.907 184 74 g) 0.005 lb (2.267 961 9 g) 0.01 lb (4.535 924 g) 0.02 lb (9.071 847 g) 0.05 lb (22.679 62 g) 0.1 lb (45.3592 g) 0.2 lb (90.7185 g) 0.5 lb (226.796 g) 1 lb (453.592 g) 2 lb (907.185 g) 5 lb (2267.96 g) 10 lb (4535.92 g) 25 lb (11 339.8 g) 30 lb (13 607.8 g) 50 lb (22 679.6 g) 500 lb (226 796 g) 1000 lb (453 592 g)	280 mg 340 mg 12 µg 38 µg 16 µg 22 µg 47 µg 34 µg 90 µg 54 µg 190 µg 6.2 mg 9.1 mg 22 mg 25 mg 280 mg 260 mg 320 mg 6.2 g 7.6 g	Comparison to Class 4 weights Comparison to Class F weights

V. Thermodynamics

Parameter/Equipment	Range	CMC[2, 6] (±)	Comments
Relative Humidity – Measure[3]			
Hygrometers, Chart Recorders, Thermo-Hygrometers, Data Loggers [3]	(10 to 95) % RH	1.3 % RH	Method: ACP-037; Vaisala SP2000-20R, Red Lion PAX panel meter
Temperature Measure – Chart Recorders, Thermo-Hygrometers, Data Loggers, Controllers, Thermometers[3]	(-40 to 100) °C (> 100 to 300) °C (> 300 to 1205) °C	0.08 °C 0.13 °C 0.9 °C	Method: ACP-037; Vaisala SP2000-20R, 7510DMM with RTD probe
Infrared Temperature – Measuring Equipment[3] λ = (8 to 14) µm	(35 to 100) °C (100 to 200) °C (200 to 350) °C (350 to 500) °C (500 to 1200) °C	0.6 °C 0.66 °C 0.86 °C 1.2 °C 2.0 °C	Method: ACP-037; Fluke 4181 precision infrared calibrator ε = 0.95 Pegasus R ε = 0.995
Ovens, Furnaces, Chambers & Freezers[3]	(-30 to 0) °C (0 to 1200) °C	1.4 °C 1.7 °C	Method: ACP-037 ASTM E145; uniformity Keithley DMM7510 with RTD probe Omega DAQ56 data acquisition system & thermocouples

VI. Time & Frequency

Parameter/Equipment	Range	CMC[2, 6] (±)	Comments
Digital / Mechanical Tachometer[3]	(40 to 300) rpm (300 to 3000) rpm (3000 to 99 999) rpm	0.5 % rdg + 1 LSD 0.1 % rdg + 1 LSD 0.1 % rdg + 1 LSD	Method: ACP-041; direct reflective pickup tachometer (LSD = least significant digit)
Time Interval – Timers & Stopwatches[3]	15 s to 24 hr	0.36 s 24 hr test	Method: ACP-048; NIST synchronized time
Frequency Generate – Measuring Equipment[3]	0.01 Hz to 2 MHz	3 µHz/Hz + 5 µHz	Method: ACP-070; Fluke 5522A
Frequency – Measure[3]	(1 to 10) Hz (10 to 1000) Hz (1 to 10) kHz (10 to 100) kHz 100 kHz to 10 MHz	2 µHz/Hz 69 nHz/Hz 32 nHz/Hz 15 nHz/Hz 14 nHz/Hz	Method: ACP-070; Fluke 8588A

[1] This laboratory offers commercial calibration & field calibration services.

[2] Calibration & 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 & 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 & 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 & 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, percentages are percentage of reading, unless otherwise indicated, *L* is the numerical value of the nominal length of the device measured in inches, *R* is the numerical value of the resolution of the device in microinches, *D* is the numerical value of the nominal diameter of the device measured in inches, I.V. represents "Indicated Value", & *Ra* is the numerical value of the nominal roughness of the surface measured in micrometers roughness.

[5] The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMCs are expressed as either a specific value that covers the full range or as a fraction/percentage of the reading plus a fixed floor specification.

[6] The type of instrument or material being calibrated is defined by the parameter. This indicates the laboratory is capable of calibrating instruments that measure or generate the values in the ranges indicated for the listed measurement parameter.

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

Accredited Laboratory

A2LA has accredited

ALL AMERICAN SCALES & CALIBRATION INC.

Paris, OH

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 22nd day of August 2025.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1848.01
Valid to August 31, 2027

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