



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

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CALIBRATION

Valid To: July 31, 2025

Certificate Number: 1312.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1,7}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Angle Blocks	Up to 90°	1.2'	Height master & surface plate
Bore Micrometers ³	(0.05 to 12) in	53 µin	Ring gages
Calipers ³	Up to 100 in	(52 + 6.5L) µin	Gage blocks
Chamfer Check Gages ³	Up to 4 in	55 µin	Chamfer check master
Chamfer Set Master	Up to 12 in	(17 + 3.3L) µin	ULM
Concentricity Gage	Up to 2 in	27 µin	Mu checker/pin gage
Bore Gages ³	(0.05 to 12) in	30 µin	Ring gages
Electronic Indicators & Amplifiers, LVDT ³	Up to 2.36 in	8 µin	Surface plate, gage blocks

Parameter/Equipment	Range	CMC ^{2, 4} ($\pm$)	Comments
Feeler Gages	Up to 1 in	20 μ in	ULM
Gage Balls/CMM Sphere	(0.001 to 4) in	17 μ in	ULM
Gage Blocks	(0.01 to 4.0) in (5 to 20) in	(3.0 + 2L) μ in (18 + 1.1L) μ in	Mechanical comparison
Gear Wires – Pitch	(1 to 200) pitch	22 μ in	ULM
Height Gages & Height Masters ³	(1 to 60) in	(20 + 1.8L) μ in	Gage blocks, surface plate
Indicator Calibrators	Up to 2 in	(21 + 2L) μ in	Gage blocks/Mu checker
Indicators ³	(0.000 02 to 4) in	24 μ in 8 μ in	Indicator calibrator Surface plate, gage blocks
Laser Micrometer Verification ³	Up to 6 in	23 μ in	Master pin standards
Levels	(-45 to +45)°	150 μ in	Surface plate, gage blocks

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
MasterScanners ³ - XP, XPL-C & XPL Series –			
External Diameter	(1 to 35) mm (35 to 100) mm (100 to 600) mm	0.53 µm 0.75 µm 0.99 µm	HP 5530, custom fixturing, MasterScanner calibration artifacts
Internal Diameter	(2.5 to 35) mm (35 to 100) mm (100 to 600) mm	0.54 µm 0.72 µm 0.9 µm	
Flank Angles	(7 to 90)° & API Buttress Threads	3'18"	
MasterScanner Master Gages:	DIN Ring, ID	13 µin	ULM, custom fixturing, transfer masters
	Wires	9.4 µin	
-Master Gage	Height	7.5 µin	
-Round Master Gage -Reference Plane Gage -Pitch Angle Gage			

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Micrometers ³ –			
Linearity	(0.05 to 80) in	20 µin	Gage blocks
Flatness/Parallelism	Up to 1 in	20 µin	Spheres
Flatness	Up to 4 in	12 µin	Optical Flat w/ monochromatic light
Micrometer Setting Masters & Caliper Setting Masters	Up to 60 in	(40 + 4L) µin	Optical height gage, Mu checker, & surface plate
	Up to 40 in	(31 + 2L) µin	Height master, gage blocks & surface plate

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Micrometer Setting Standards, Length Standards	(1 to 40) in	$(31 + 2L) \mu\text{in}$	Height master, gage blocks
Optical Comparators & Optical Measuring Machines ³ – Magnification Up to 8 in (>8 to 16) in (>16 to 36) in Linear Axis Radius Angularity	5x, 10x, 20x, 30x, 31.25x, 50x, 62.5x X & Y Axis Up to 6 in (0 to 360)°	0.011 % of magnification 20 μin 22 μin 1'12"	Magnification standards optical linear standards angle blocks Glass scale, magnification checker Glass scale Mag checker Angle blocks
Optical Flats/Parallels – Flatness Parallelism	Up to 6 in Up to 6 in	1.2 μin 4.3 μin	Optical interferometer LVDT
Parallels	Up to 72 in	$(66 + 32L) \mu\text{in}$	Surface plate, height gage

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Plug Gages (OD) – Diameter	(0.001 to 4) in (0.001 to 48) in (0.039 to 12) in	22 μin $(11 + 3L) \mu\text{in}$ $(80 + 2L) \mu\text{in}$	ULM ULM IAC MasterScanner
Protractors/Digital	(0 to 360)°	2'	Sine bar, surface plate, gage blocks
Radius Gages	Up to 6 in	30 μin	Optical measuring machine

Parameter/Equipment	Range	CMC ^{2, 4} ($\pm$)	Comments
Railroad Track Gage – Geismar Bar			
Linearity Elevation	Up to 62 in Up to 62 in	0.030 in 0.037 in	Rail gage
Ring Gages (ID) – Diameter	(0.06 to 48) in (0.118 to 12) in	(17 + 3.3L) μ in (40 + 5L) μ in	ULM IAC MasterScanner
Screw Thread Micrometers ³	Up to 6 in	150 μ in	Master screw thread standards
Screw Thread Micrometer Standards	Up to 6 in	200 μ in	Optical comparator & ULM
Sine Bars/Sine Plates – Angle Parallelism	Up to 10” Up to 10 in	0.78’ 40 μ in	Surface plate, LVDT, angle blocks
Snap Gages ³	(0.125 to 20) in	(120 + 4.8L) μ in	Gage blocks
Square Masters	Up to 0.008 in	50 μ in	Granite square, surface plate, indicator
Squareness	Up to 0.008 in	60 μ in	Square master
Spline Gages	Up to 12 in	14 μ in	ULM with wires or balls
Stage Micrometer	Up to 4 in Up to 48 in	32 μ in 500 μ in	ULM with scope. custom optical vision linear system
Steel Rules/Tapes	Up to 100 ft	500 μ in	Optical vision measuring system

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Supermicrometers ^{TM, 3}	Up to 48 in	16 µin	Gage blocks & force gage
Surface Finish Testers ³	(2 to 500) µin	0.6 µin	Roughness standards
Surface Roughness Standards	(2 to 500) µin	0.8 µin	Roughness analyzer
Tapered Plain Gages OD/ID– (Luer Tapered Plugs, Luer Tapered Rings, Luer Ref Conical Fitting, Luer Ref Steel Male Conical Fitting, Luer Ref Steel Female Conical Fitting)			ISO 594/1, ISO 594-2, ISO 80369-3, ISO 80369-6, ISO 5356-1
Diameter (OD/ID) –	(0.118 to 12) in	(40 + 2L) µin	IAC MasterScanner
Diameter ID -	Up to 100 mm	(17 + 3.3L) µin	ULM
Taper -	(0.118 to 12) in	0°6'0"	IAC MasterScanner
Length/Step	Up to 1500 mm	20 µin	Height Master

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Thickness Gages	Up to 1 in	20 µin	ULM
Threaded Gages – (Thread Plugs, Thread Rings, Taper Thread Plugs, Taper Thread Rings, ACME/Trapezoidal Thread Plugs, ACME/Trapezoidal Thread Rings, Buttress Thread Plugs, Buttress Thread Rings)	(5 to 120) TPI Up to 36 in	85 µin	ULM & thread wires
Diameter	(5 to 120) TPI Up to 20 in	74 µin	ULM
Pitch Diameter	(0.118 to 12) in	(80 + 5L) µin	IAC MasterScanner
Simple Pitch Diameter	(0.118 to 12) in	(80 + 5L) µin	IAC MasterScanner
Major Diameter	(0.118 to 12) in	(80 + 5L) µin	IAC MasterScanner
Minor Diameter	(0.118 to 12) in	(80 + 5L) µin	IAC MasterScanner
Thread Pitch	(0.118 to 12) in	(100 + 5L) µin	IAC MasterScanner
Accumulated Pitch Deviation	(0.118 to 12) in	(40 + 5L) µin	IAC MasterScanner
Flank Angles	(0.118 to 12) in	(40 + 5L) µin	IAC MasterScanner
	Pitch ≤ 0.0394in (1 mm)	(0°6'0'')/p	IAC MasterScanner p=Pitch
	Pitch > 0.0394 in (1 mm)	0°6'0''	IAC MasterScanner
Taper	(0.118 to 12) in	22 µin	IAC MasterScanner
Thread Rings –	(5 to 120) TPI Up to 36 in	140 µin	Set plugs
Pitch Diameter	(5 to 120) TPI Up to 20 in	52 µin	ULM

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Thread Wires	(2 to 120) TPI	$(10 + 0.3L) \mu\text{in}$	ULM
Torque Arms	Up to 60 in	120 μin	Height master, surface plate, Mu checker
Universal Measuring Machines, ULM's –			
X-Axis Linearity	Up to 60 in	8.8 μin	Gage blocks, force gage, Mu checker
Z-Axis Linearity	Up to 6 in	9.1 μin	

II. Dimensional Testing/Calibration¹

Parameter/Equipment	Range	CMC ² (±)	Comments
2-D Optical Inspection ⁵ –			
Length	Up to 12 in × 12 in	700 μin	Optical comparator
	Up to 8 in	30 μin	Optical measuring machine
Angle ⁵	(0 to 360)°	60 μin	Optical comparator
	(0 to 360)°	3'3"	Optical measuring machine
Height/Diameter ⁵	Up to 60 in	$(70 + 4L) \mu\text{in}$	Height gage, indicator & gage blocks
	Up to 40 in	31 μin	Height master, gage blocks, surface plate
ID Diameter ⁵	(0.06 to 48) in	$(17 + 3.3L) \mu\text{in}$	ULM
OD Diameter/Length ⁵	Up to 36 in	22 μin	ULM
	Up to 120 in	$(11 + 3L) \mu\text{in}$	ULM

Parameter/Equipment	Range	CMC ² ($\pm$)	Comments
Parallelism ⁵	Up to 36 in	(66 + 32L) μ in	Surface plate & height gage
Radii ⁵	(0 to 360) $^{\circ}$	30 μ in	Optical measuring machine
Squareness ⁵	Up to 0.008 in	60 μ in	Surface plate & squaremaster
Threads ⁵ –			
Inside	(5 to 120) TPI Up to 36 in	140 μ in	Set plugs
Outside	(5 to 120) TPI Up to 12 in	85 μ in	ULM & thread wires
Pitch Diameter	(0.118 to 12) in	(80 + 5L) μ in	IAC MasterScanner

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 6} ($\pm$)	Comments
DC Current – Measure ³	Up to 200 μ A 200 μ A to 2 mA (2 to 20) mA (20 to 200) mA 200 mA to 2 A (2 to 20) A	58 nA 29 nA 0.31 μ A 8.2 μ A 0.36 mA 8 mA	Fluke 8508A
DC Current – Generate ³	(0 to 330) μ A 330 μ A to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1.1 A (1.1 to 2.3) A (2.3 to 11) A (11 to 20.5) A	71 nA 0.38 nA 3.6 μ A 36 μ A 0.29 mA 1.2 mA 6.1 mA 21 mA	Fluke 5522A

Parameter/Equipment	Range	CMC ^{2, 6} ($\pm$)	Comments
DC Voltage – Measure ³	Up to 200 mV 200 mV to 2 V (2 to 20) V (20 to 200) V (200 to 1000) V	1.1 μ V 6.9 μ V 64 μ V 0.99 mV 5.4 mV	Fluke 8508A
DC Voltage – Generate ³	(0 to 330) mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (330 to 1020) V	7.8 μ V 40 μ V 0.45 mV 6.4 mV 22 mV	Fluke 5522A
Resistance – Measure ³	Up to 2 Ω (2 to 20) Ω (20 to 200) Ω 200 Ω to 2 k Ω (2 to 20) k Ω (20 to 200) k Ω 200 k Ω to 2 M Ω (2 to 20) M Ω (20 to 200) M Ω 200 M Ω to 2 G Ω	69 $\mu\Omega$ 0.21 m Ω 1.6 m Ω 16 m Ω 0.16 Ω 1.6 Ω 20 Ω 0.48 k Ω 0.5 k Ω 2.6 M Ω	Fluke 8508A
Resistance – Generate ³	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω 330 Ω to 1.1 k Ω (1.1 to 3.3) k Ω (3.3 to 11) k Ω (11 to 33) k Ω (33 to 110) k Ω (110 to 330) k Ω 330 k Ω to 1.1 M Ω (1.1 to 3.3) M Ω (3.3 to 11) M Ω (11 to 33) M Ω (33 to 110) M Ω (110 to 330) M Ω 330 M Ω to 1.1 G Ω	1.2 m Ω 2.1 m Ω 3.7 m Ω 9.8 m Ω 32 m Ω 99 m Ω 0.32 Ω 0.98 Ω 3.2 Ω 12 Ω 37 Ω 0.27 k Ω 1.5 k Ω 15 k Ω 66 k Ω 1.4 M Ω 17 M Ω	Fluke 5522A

Parameter/Range	Frequency	CMC ^{2, 6} ($\pm$)	Comments
AC Voltage – Measure ³			
Up to 200 mV	(10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	48 μ V 29 μ V 26 μ V 28 μ V 72 μ V 170 μ V	Fluke 8508A
200 mV to 2V	(10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz	0.41 mV 0.21 mV 0.16 mV 0.20 mV 0.46 mV 1.2 mV 8.0 mV 40 mV	
(2 to 20) V	(10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz	4.1 mV 1.9 mV 1.5 mV 2.0 mV 4.5 mV 12 mV 80 mV 400 mV	
(20 to 200) V	(10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz	41 mV 19 mV 16 mV 20 mV 46 mV 120 mV 800 mV	
(200 to 1000) V	(10 to 40) Hz 40 Hz to 10 kHz (10 to 30) kHz	0.21 V 0.13 V 0.25 V	

Parameter/Range	Frequency	CMC ^{2, 6} ($\pm$)	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	33 μ V 11 μ V 13 μ V 39 μ V 0.13 mV 0.31 mV	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	0.12 mV 57 μ V 61 μ V 0.12 mV 0.3 mV 0.73 mV	
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	1.1 mV 0.56 mV 0.69 mV 1 mV 2.4 mV 8.6 mV	
(3.3 to 33) V	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	12 mV 5.6 mV 8.6 mV 12 mV 31 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	65 mV 73 mV 89 mV 0.11 V 0.71 V	
(330 to 1020) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.32 V 0.27 V 0.32 V	
AC Current – Measure ³			
Up to 200 μ A	10 Hz to 10 kHz (10 to 30) kHz	0.19 μ A 0.21 μ A	Fluke 8508A
200 μ A to 2 mA	10 Hz to 10 kHz (10 to 30) kHz	0.87 μ A 1.6 μ A	

Parameter/Range	Frequency	CMC ^{2, 6} ($\pm$)	Comments
AC Current – Measure ³ (cont)			
(2 to 20) mA	10 Hz to 10 kHz (10 to 30) kHz	8.2 μ A 15 μ A	Fluke 8508A
(20 to 200) mA	10 Hz to 10 kHz (10 to 30) kHz	76 μ A 140 μ A	
200 mA to 2 A	10 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz	1.4 mA 1.6 mA 6.2 mA	
(2 to 20) A	10 Hz to 2 kHz (2 to 10) kHz	18 mA 52 mA	
AC Current – Generate ³			
(29 to 330) μ A	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.83 μ A 0.64 μ A 0.56 μ A 1.2 μ A 2.8 μ A 5.7 μ A	Fluke 5522A
300 μ A to 3.3 mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	7.1 μ A 4.9 μ A 4.1 μ A 7.2 μ A 17 μ A 34 μ A	
(3.3 to 33.3) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	65 μ A 38 μ A 26 μ A 38 μ A 73 μ A 0.14 mA	
(33.3 to 330) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.62 mA 0.32 mA 0.15 mA 0.38 mA 0.76 mA 1.5 mA	

Parameter/Range	Frequency	CMC ^{2, 6} (±)	Comments
AC Current – Generate ³ (cont)			
330 mA to 1.1 A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	2.1 mA 0.66 mA 7.6 mA 33 mA	Fluke 5522A
(1.1 to 3.0) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	5.5 mA 1.9 mA 19 mA 80 mA	
(3.0 to 11) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	8.6 mA 13 mA 0.33 A	
(11 to 20.5) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	30 mA 36 mA 0.62 A	

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
Capacitance – Generate	(200 to 400) pF 400 pF 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 330 nF to 1.1 µF (1.1 to 3.3) µF (3.3 to 11) µF (11 to 33) µF (33 to 110) µF (110 to 330) µF 330 µF to 1.1 mF (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	12 pF 16 pF 27 pF 40 pF 96 pF 0.32 nF 1 nF 3.2 nF 9.1 nF 30 nF 0.14 µF 0.45 µF 1.4 µF 4.7 µF 14 µF 47 µF 0.14 mF 0.45 mF	Fluke 5522A

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of Thermocouples – Generate ³			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.44 °C 0.35 °C 0.30 °C 0.34 °C	Fluke 5522A
Type C	(0° to 150) °C (150 to 650) °C (650 to 1000) °C (1000 to 1800) °C (1800 to 2316) °C	0.31 °C 0.26 °C 0.32 °C 0.50 °C 0.84 °C	
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.50 °C 0.17 °C 0.15 °C 0.17 °C 0.22 °C	
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 0.17 °C 0.15 °C 0.18 °C 0.24 °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 0.17 °C 0.26 °C 0.40 °C	
Type L	(-200 to -100) °C (-100 to 800) °C (800 to 900) °C	0.37 °C 0.27 °C 0.20 °C	
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 °C to 1300) °C	0.40 °C 0.22 °C 0.19 °C 0.18 °C 0.27 °C	
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	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of Thermocouples - Generate ³ (cont)			
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.47 °C 0.36 °C 0.38 °C 0.46 °C	Fluke 5522A
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.63 °C 0.24 °C 0.17 °C 0.15 °C	
Type U	(-200 to 0) °C (0 to 600) °C	0.56 °C 0.29 °C	
Electrical Calibration of RTDs – Generate 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	0.064 °C 0.064 °C 0.081 °C 0.099 °C 0.11 °C 0.13 °C 0.23 °C	
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	0.065 °C 0.064 °C 0.081 °C 0.099 °C 0.11 °C 0.13 °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 0.057 °C 0.064 °C 0.072 °C 0.081 °C 0.089 °C 0.099 °C 0.11 °C 0.23 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of RTDs – Generate ³ (cont)			
Pt 385 (200 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	0.057 °C 0.057 °C 0.057 °C 0.064 °C 0.13 °C 0.14 °C 0.18 °C 0.2 °C	Fluke 5522A
Pt 385 (500 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	0.057 °C 0.064 °C 0.064 °C 0.072 °C 0.090 °C 0.090 °C 0.12 °C 0.15 °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	0.079 °C 0.077 °C 0.081 °C 0.088 °C 0.094 °C 0.11 °C 0.10 °C 0.24 °C	
PtNi 385 (120 Ω) Ni 120	(-80 to 0) °C (0 to 100) °C (100 to 260) °C	0.11 °C 0.13 °C 0.17 °C	
Cu 427 (10 Ω)	(-100 to 260) °C	0.65 °C	

IV. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Durometers – A, B, C, D, DO, E, M, O, OO, OOO, OOO-S, R			
Indenter Tip Extension	Up to 1”	7.2 µin	Gage blocks
Indenter Tip Profile - Radius	Up to 1”	30 µin	Optical measuring machine
Indenter Tip Profile - Angle	Up to 360°	3’3”	Optical measuring machine
Indenter Tip Profile – Indenter Widths	Up to 1”	28 µin	Optical measuring machine
Indenter Spring Tension	Up to 100 Duro	0.38 Duro	Force gage, durometer test stand
Durometer Test Blocks & Specimens A & D	Up to 100 Duro	0.45 Duros	Durometer, durometer test stand
Force Gages ³ – Tension	Up to 300 lbf	0.08 % of range	Weights
Pressure Gages ³	(0 to 100) PSI (100 to 1000) PSI (1000 to 3000) PSI (3000 to 10 000) PSI	0.022 PSI 0.23 PSI 0.68 PSI 2.3 PSI	Reference pressure gages, pressure application system

Parameter/Equipment	Range	CMC ² (±)	Comments
Rockwell Hardness Testers ³ , Indirect Verification	HRA: Low: Middle: High: HRB: Low Middle High HRBW: Low Middle High HRC: Low Middle High HREW: Low Middle High HRHW: Low Middle High HR15N: Low Middle High HR30N: Low Middle High HR45N: Low Middle High	0.11 HRA 0.11 HRA 0.11 HRA 0.74 HRB 0.74 HRB 0.72 HRB 0.74 HRBW 0.74 HRBW 0.72 HRBW 0.67 HRC 0.67 HRC 0.61 HRC 0.86 HREW 0.85 HREW 0.85 HREW 0.75 HRHW 0.75 HRHW 0.74 HRHW 0.63 HR15N 0.72 HR15N 0.62 HR15N 0.77 HR30N 0.66 HR30N 0.71 HR30N 0.71 HR45N 0.68 HR45N 0.71 HR45N	Hardness blocks, Indirect verification per ASTM E18

Parameter/Equipment	Range	CMC ² (±)	Comments
Rockwell Hardness Testers ³ , Indirect Verification (cont)	HR15TW: Low Middle High HR30TW: Low Middle High HRRW	0.78 HR15TW 0.78 HR15TW 0.72 HR15TW 0.84 HR30TW 0.80 HR30TW 0.76 HR30TW 120 HRRW	Hardness blocks, indirect verification per ASTM E18
Torque – Measure Testers & Transducers	Up to 1000 lbf·ft	0.1 % of range 0.1 % of range	Torque arms & weights
Torque Measuring Equipment ³ – Wrenches & Watches	(4 to 12 000) lbf·in Up to 1000 lbf·ft	2.6 % of range	Digital torque tester with loader

V. Thermodynamics

Parameter/Equipment	Range	CMC ² (±)	Comments
IR Thermometers	(35 to 75) °C (76 to 150) °C (151 to 275) °C (276 to 425) °C (426 to 500) °C	0.58 °C 0.77 °C 1.3 °C 2.2 °C 2.7 °C	Flat plate blackbody source
Temperature – Measure ³	(-200 to 0) °C (0 to 300) °C (300 to 660) °C (-25 to 0) °C (0 to 425) °C	0.023 °C 0.048 °C 0.13 °C 0.57 °C 0.27 °C	PRT with datalogger Thermocouples with datalogger

Parameter/Equipment	Range	CMC ² (±)	Comments
Temperature – Measuring Equipment ³	0 °C (-25 to 35) °C (35 to 100) °C (100 to 225) °C (225 to 425) °C (-10 to 60) °C	0.02 °C 0.39 °C 0.22 °C 0.35 °C 0.52 °C 0.40 °C	Ice point Metrology well with PRT Environmental chamber & precision hygrometer
Relative Humidity – Measuring Equipment	(10 to 80) % RH	0.93 % RH	Environmental chamber & precision hygrometer
Relative Humidity – Measure ³	(0 to 80) % RH	1.0 % RH	Precision hygrometer
Temperature Uniformity Survey ³ – Ovens & Environmental Chambers	(-25 to 0) °C (0 to 425) °C	0.57 °C 0.27 °C	AMS-2750 – temperature data logger & thermocouples

VI. Time & Frequency

Parameter/Equipment	Range	CMC ² (±)	Comments
Stopwatches & Timers ³	Up to 24 hr	0.051 s/day	Timometer

¹ This laboratory offers commercial dimensional testing, calibration 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 Calibration and Measurement Capabilities, L is the numerical value of the nominal length of the device measured in inches.
- ⁵ This laboratory meets *R205 – Specific Requirements: Calibration Laboratory Accreditation Program* for the types of dimensional tests listed above and is considered equivalent to that of a calibration.
- ⁶ The measurands stated are generated with the Fluke 5522 or 8500 series of instruments. This capability is suitable for the calibration of the devices intended to measure the stated measurand in the ranges indicated. CMCs are expressed as either a specific value that covers the full range or as a percentage of the reading plus a fixed floor specification.
- ⁷ This scope meets A2LA's *P112 Flexible Scope Policy*.



Accredited Laboratory

A2LA has accredited

MICRO LABORATORIES INC.

Mentor, 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 19th day of October 2023.

A blue ink signature of Mr. Trace McInturff.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1312.01
Valid to July 31, 2025

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