



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

MICHELLI MEASUREMENT GROUP, INC.
 275 Orange Avenue #A
 Goleta, CA 93117
 Patrick Jester Phone: 504 733 9822

CALIBRATION

Valid To: April 30, 2026

Certificate Number: 5104.04

In recognition of the successful completion of the A2LA evaluation process (including an assessment of the organization's compliance with A2LA's Calibration Program Requirements), accreditation is granted to this laboratory to perform the following calibrations^{1,4}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2, 5} (±)	Comments
Caliper Checker	Up to 8 in	(57 + 2L) μin	Mu-checker, height master, surface plate
Calipers ³			
Length	Up to 8 in (8 to 12) in (12 to 20) in (20 to 40) in (40 to 72) in	290 μin 290 μin 300 μin 600 μin 640 μin	Caliper checker, gage blocks
Depth	1 in	280 μin	
Inside Diameter	1.617 67 in	290 μin	
Chamfer Gauges ³	Up to 2 in	640 μin	Ring gauges
Depth Micrometers ³	Up to 12 in	(42 + 2L) μin	Ring gauges
Dial Caliper Gages	Up to 6 in	(280 + 15L) μin	Gage blocks, surface plate

Parameter/Equipment	Range	CMC ^{2, 5} (\pm)	Comments
Feeler Gages ³	Up to 0.01 in	35 μ in	P&W Supermic TM , gage blocks
Gage Blocks	Up to 0.11 in (0.11 to 1) in (1 to 4) in Up to 25 mm (25 to 50) mm (50 to 100) mm	4.5 μ in (4 + 0.8L) μ in (3 + 1.5L) μ in 0.11 μ m (0.1 + 0.02L) μ m (0.1 + 0.01L) μ m	Gage block comparator, Grade 1 gage blocks
Height Gages ³	Up to 8 in (8 to 24) in	(290 + 0.4L) μ in (280 + 1.3L) μ in	Mu-checker, surface plate, gage blocks
Height Master	Up to 18 in	(38 + 1.2L) μ in	Mu-checker, surface plate, gage blocks
Indicators ³ (Drop & Test)	Up to 4 in (4 to 10) in	(24 + 19L) μ in (250 + 9L) μ in	Micrometer head, gage blocks, Surface plate or P&W Supermic
Inside Micrometers	Up to 4 in (4 to 24) in	230 μ in (69 + 3L) μ in	P&W Lab Master, gage blocks, riser block, sine plate, height master
Outside Micrometers ³	Up to 3 in (3 to 20) in	33 μ in (52 + 1.8L) μ in	Gage blocks
Micrometer Heads ³	Up to 2 in	18 μ in	Mu-checker, gage blocks
Mu Checkers ³	Up to 150 μ in	5.2 μ in	Gage blocks
Optical Comparator ³			
Linear Measurement X-Axis & Y-Axis	Up to 6 in (6 to 30) in-AB	170 μ in + 0.8L 140 μ in + 6.1L	Microrule, gage blocks, glass scale
Angular Measurement	Up to 360 °	44 arcsec	Angle blocks
Magnification	10X, 20X, 31.25X, 100X	0.011 in + 0.000 02L	Magnification checker

Parameter/Equipment	Range	CMC ^{2, 5} (±)	Comments
Plugs Cylindrical – Pin Gage	Up to 6 in	(2.5 + 4L) μin	P&W LabMaster™, gage blocks
Protractors, Digital	(0 to 90)°	0.058°	Rotary table, level
Protractors, Bevel Angle Blade Parallelism	(0 to 35)° Up to 0.001 in	0.025° 34 μin	Angle blocks, Mu-checker, surface plate
Thread Plugs Gages Pitch Diameter Major Diameter Angle	Up to 6 in Up to 6 in (0 to 60)°	(130 + 0.2L) μin (10 + 1.7L) μin 1.5'	Gage blocks, thread wires, P&W Supermic™, optical comparator
Thread Ring Gauges – Adjustable Pitch Diameter Minor Diameter	Up to 4 in Up to 6 in	79 μin (11 + 1.5L) μin	Master setting plug gages, P&W Supermic™
Radius Gauge	Up to 1 in	300 μin	Optical comparator, radius screen
Rings Gages Plain, Cylindrical	Up to 1 in (1 to 11) in	5.6 μin (0.8 + 4.8L) μin	P&W LabMaster™, gage blocks
Steel Rules	Up to 72 in	(130 + 37L) μin	Optical comparator
Thread Wires	(4 to 120) TPI	29 μin	Plug gages, P&W LabMaster™, gage blocks
Tri-Micrometers ³ (Intermics)	Up to 4 in	250 μin	Ring gages

Parameter/Equipment	Range	CMC ² (±)	Comments
Vee Block			
Parallelism to Adjacent Side	Up to 0.001 in	68 μin	Plug gauge, Mu checker, surface plate
Parallelism to Opposite Side	Up to 0.001 in	36 μin	Angle block, Mu checker, surface plate
Side Squareness Surface	Up to 0.001 in	64 μin	Granite cube, Mu checker, surface plate
Flatness & Parallelism	Up to 0.001 in	34 μin	Mu checker, surface plate

II. Dimensional Testing⁷

Parameter	Range	CMC ^{2,5} (±)	Comments
Dimensional Measurement ⁷ – 1D			
Length	Up to 13 in	$(2 + 4.2L) \mu\text{in}$	Universal length measuring machine
	Up to 4 in	78 μin	Micrometer set
	Up to 4 in	$(130 + 1L) \mu\text{in}$	Optical comparator (x-axis only)
	Up to 24 in	$(32 + 2.3L) \mu\text{in}$	Gage blocks, Mu checker & surface plate
	Up to 1200 in	$(0.007 + 0.0002L) \text{ in}$	Steel rule
Height	Up to 18 in	$(60 + 2.6L) \mu\text{in}$	Height master, Mu checker & surface plate
Depth	Up to 1 in	150 μin	Drop indicator
Flatness/Parallelism	Up to 0.001 in	36 μin	Mu checker & surface plate
Go/No-Go	Up to 1 in	$(120 + 8L) \mu\text{in}$	Pin gages
Squareness	Up to 11.31 in DL	56 μin	Granite cube, Mu checker & surface

Parameter/Equipment	Range	CMC ² (±)	Comments
Dimensional Measurement ⁷ – 2D			
Angle	Up to 360°	74"	Optical comparator
Radius	Up to 1 in	260 μin	

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
DC Voltage ³ – Generate	Up to 329.9999 mV Up to 3.299 999 V Up to 32.999 99 V (30 to 329.9999) V (330 to 1020) V	13 μV/V + 0.7 μV 7 μV/V + 1.3 μV 8 μV/V + 13 μV 12 μV/V + 0.1 V 12 μV/V + 1 mV	Fluke 5522A multiproduct calibrator
DC Voltage ³ – Measure	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V 100 V to 1 kV	7.8 μV/V + 0.4 μV 6.8 μV/V + 0.35 μV 6.8 μV/V + 0.65 μV 9 μV/V + 40 μV 19 μV/V + 0.5 mV	HP 3458A Opt 002 8.5-digit multimeter
DC Current ³ – Generate	Up to 329.999 μA Up to 3.299 99 mA Up to 32.9999 mA Up to 329.999 mA Up to 1.099 99 A (1.1 to 2.999 99) A Up to 10.9999 A (11 to 20.5) A	100 μA/A + 13 nA 67 μA/A + 33 nA 67 μA/A + 0.17 μA 67 μA/A + 1.7 μA 0.13 mA/A + 27 μA 0.25 mA/A + 27 μA 0.33 mA/A + 0.33 mA 0.67 mA/A + 0.5 mA	Fluke 5522A multiproduct calibrator
DC Current ³ – Measure	Up to 100 nA 100 nA to 1 μA (1 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	39 μA/A + 46 pA 30 μA/A + 46 pA 27 μA/A + 0.11 nA 28 μA/A + 0.86 nA 28 μA/A + 5.6 nA 28 μA/A + 56 nA 45 μA/A + 0.56 μA 0.13 mA/A + 10 μA	HP 3458A Opt 002 8.5-digit multimeter

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Voltage ³ – Generate			
(1 to 32.999) 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	0.53 mV/V + 4 μV 0.1 mV/V + 4 μV 0.13 mV/V + 4 μV 0.17 mV/V + 4 μV 2.3 mV/V + 8 μV 5.3 mV/V + 33 μV	Fluke 5522A multiproduct calibrator
(33 to 329.999) 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	0.2 mV/V + 5.3 μV 0.1 mV/V + 5.3 μV 0.11 μV/V + 5.3 μV 0.23 mV/V + 5.3 μV 0.53 mV/V + 21 μV 1.3 mV/V + 47 μV	
(0.33 to 3.299 99) 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	0.2 mV/V + 33 μV 0.1 mV/V + 40 μV 0.13 mV/V + 40 μV 0.2 mV/V + 33 μV 0.43 mV/V + 83 μV 1.1 mV/V + 0.27 mV	
(3.3 to 32.9999) V	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.2 mV/V + 0.43 mV 0.1 mV/V + 0.4 mV 0.16 mV/V + 0.4 mV 0.23 mV/V + 0.4 mV 0.6 mV/V + 1.1 mV	
(33 to 329.999) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.13 mV/V + 1.3 mV 0.13 mV/V + 4 mV 0.02 mV/V + 4 mV 0.2 mV/V + 4 mV 1.3 mV/V + 33 mV	
(330 to 1020) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.2 mV/V + 6.7 mV 0.2 mV/V + 6.7 mV 0.2 mV/V + 6.7 mV	

Parameter/Range	Frequency	CMC ^{2, 4} (±)	Comments
AC Voltage ³ – Measure			
Up to 10 mV	(1 to 20) Hz (20 to 40) Hz (40 to 100) Hz 100 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 250) kHz (250 to 500) kHz 500 kHz to 1 MHz (1 to 2) MHz	4.1 μV/V + 34 μV 1.6 mV/V + 27 μV 0.77 mV/V + 27 μV 1.8 mV/V + 27 μV 1.6 mV/V + 27 μV 7.1 mV/V + 37 μV 40 mV/V + 72 μV 0.12 mV/V + 2.4 μV 0.12 mV/V + 2.4 μV 0.12 mV/V + 2.4 μV	HP 3458A Opt 002 8.5-digit multimeter
(10 to 100 mV)	(10 to 20) Hz (20 to 40) Hz (40 to 100) Hz 100 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 250) kHz (250 to 500) kHz 500 kHz to 1 MH (1 to 2) MHz	4.1 mV/V + 20 μV 1.6 mV/V + 20 μV 0.68 mV/V + 10 μV 1.8 mV/V + 10 μV 1.6 mV/V + 40 μV 6.1 mV/V + 80 μV 20 mV/V + 0.5 mV 30 mV/V + 0.6 mV 50 mV/V + 2 mV 0.1 V/V + 5 mV	
100 mV to 1 V	(10 to 20) Hz (20 to 40) Hz (40 to 100) Hz 100 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 250) kHz (250 to 500) kHz 500 kHz to 1 MHz (1 to 2) MHz	4.1 mV/V + 0.2 mV 1.6 mV/V + 0.2 mV 0.68 mV/V + 0.1 mV 1.8 mV/V + 0.1 mV 1.6 mV/V + 0.4 mV 6.1 mV/V + 0.8 mV 20 mV/V + 5 mV 30 mV/V + 6 mV 50 mV/V + 20 mV 0.1 V/V + 50 mV	
(1 to 10) V	(10 to 20) Hz (20 to 40) Hz (40 to 100) Hz 100 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 250) kHz (250 to 500) kHz 500 kHz to 1 MHz (1 to 2) MHz	4.1 mV/V + 2 mV 1.6 mV/V + 2 mV 0.68 mV/V + 1 mV 1.8 mV/V + 1 mV 1.6 mV/V + 4 mV 6.1 mV/V + 8 mV 20 mV/V + 50 mV 30 mV/V + 60 mV 50 mV/V + 0.2 V 0.1 V/V + 0.5 V	

Parameter/Range	Frequency	CMC ^{2, 4} (±)	Comments
AC Voltage ³ – Measure (cont)			
(10 to 100) V	(10 to 20) Hz (20 to 40) Hz (40 to 100) Hz 100 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 250) kHz (250 to 500) kHz 500 kHz to 1 MHz	4.1 mV/V + 20 mV 1.6 mV/V + 20 mV 0.68 mV/V + 10 mV 1.8 mV/V + 10 mV 1.6 mV/V + 40 mV 6.1 mV/V + 80 mV 20 mV/V + 0.5 V 30 mV/V + 0.6 V 50 mV/V + 2 V	HP 3458A Opt 002 8.5 digit multimeter
(100 to 1000) V	(10 to 20) Hz (20 to 40) Hz (40 to 100) Hz 100 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz	4.3 mV/V + 0.3 V 1.8 mV/V + 0.3 V 0.88 mV/V + 0.2 V 2.2 mV/V + 0.2 V 1.6 mV/V + 0.4 V 6.1 mV/V + 2 V	
AC Current ³ – Generate			
(29 to 329.99) µA	(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	0.13 µA/A + 67 nA 0.1 µA/A + 67 nA 80 nA/A + 67 nA 0.2 µA/A + 0.1 µA 0.53 µA/A + 0.13 µA 1.1 µA/A + 0.27 µA	Fluke 5522A multiproduct calibrator
(0.33 to 3.299 99) 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	0.13 µA/A + 0.1 µA 80 nA/A + 0.1 µA 0.67 µA/A + 0.1 µA 0.13 µA/A + 0.13 µA 0.33 µA/A + 0.2 µA 70 nA/A + 0.4 µA	
(3.3 to 32.9999) 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	0.12 µA/A + 0.13 µA 60 nA/A + 0.13 µA 57 nA/A + 0.13 µA 53 nA/A + 0.13 µA 0.13 µA/A + 2 µA 0.27 µA/A + 2.7 µA	

Parameter/Range	Frequency	CMC ^{2, 4} (±)	Comments
AC Current ³ – Generate (cont)			
(33 to 329.999) 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	0.12 µA/A + 13 µA 60 nA/A + 13 µA 27 nA/A + 13 µA 67 nA/A + 33 µA 0.13 µA/A + 67 µA 0.27 µA/A + 0.13 mA	Fluke 5522A multiproduct calibrator
(0.33 to 1.099 99) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.12 µA/A + 33 µA 33 nA/A + 67 µA 0.4 µA/A + 0.67 mA 1.7 µA/A + 3.3 mA	
(1.1 to 2.999 99) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	1.7 µA/A + 67 µA 1.7 µA/A + 37 µA 1.7 µA/A + 0.67 mA 1.7 µA/A + 3.3 mA	
(3 to 10.9999) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz	70 nA/A + 1.3 mA 67 nA/A + 1.3 mA 2 µA/A + 1.3 mA	
(11 to 20.5) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz	80 nA/A + 3.3 mA 0.1 µA/A + 3.3 mA 2 µA/A + 3.3 mA	
AC Current ³ – Measure			
(5 to 100) µA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz	4.5 mA/A + 34 nA 1.6 mA/A + 30 nA 0.68 mA/A + 34 nA 0.68 mA/A + 35 nA	HP 3458A Opt 002 8.5-digit multimeter
100 µA to 1 mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	4.5 mA/A + 0.23 µA 1.7 mA/A + 0.23 µA 0.68 mA/A + 0.23 µA 0.38 mA/A + 0.22 µA 0.68 mA/A + 0.23 µA 4.5 mA/A + 0.45 mA 6.3 mA/A + 2 µA	

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Current ³ – Measure (cont)			
(1 to 10) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	4.5 mA/A + 2.3 µA 1.7 mA/A + 2.3 µA 0.68 mA /A + 2.3 µA 0.38 mA /A + 2.1 µA 0.68 mA /A + 2.3 µA 4.5 mA/A + 4.5 µA 6.3 mA/A + 20 µA	HP 3458A Opt 002 8.5-digit multimeter
(10 to 100) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	4.5 mA/A + 23 µA 1.7 mA/A + 23 µA 0.69 mA/A + 23 µA 0.38 mA/A + 21 µA 0.69 mA/A + 20 µA 4.5 mA/A + 45 µA 6.2 mA/A + 0.17 mA	
100 mA to 1 A	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz	4.5 mA/A + 0.23 mA 1.8 mA/A + 0.23 mA 0.91 mA/A + 0.23 mA 1.1 mA/A + 0.25 mA 3.4 mA/A + 0.22 mA 11 mA/A + 0.45 mA	

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Resistance ³ – Generate	Up to 10.9999 Ω (11 to 32.9999) Ω (33 to 109.9999) Ω (110 to 329.9999) Ω (0.33 to 1.099 999) kΩ (1.1 to 3.299 999) kΩ (3.3 to 10.999 99) kΩ (11 to 32.999 99) kΩ (33 to 109.9999) kΩ (110 to 329.999 99) kΩ (0.33 to 1.099 999) MΩ (1.1 to 3.299 999) MΩ (3.3 to 10.999 99) MΩ (11 to 32.999 99) MΩ (33 to 109.9999) MΩ (110 to 329.9999) MΩ (330 to 1100) MΩ	27 µΩ/Ω + 6.7 mΩ 20 µΩ/Ω + 10 mΩ 19 uΩ/Ω + 10 mΩ 19 µΩ/Ω + 13 mΩ 19 µΩ/Ω + 13 mΩ 19 µΩ/Ω + 0.13 Ω 19 µΩ/Ω + 67 mΩ 19 µΩ/Ω + 0.67 Ω 19 µΩ/Ω + 0.67 Ω 21 µΩ/Ω + 6.7 Ω 21 µΩ/Ω + 6.7 Ω 40 µΩ/Ω + 0.1 kΩ 87 µΩ/Ω + 0.17 kΩ 0.17 mΩ/Ω + 1.7 Ω 0.33 mΩ/Ω + 2 Ω 2 mΩ/Ω + 17 kΩ 17 mΩ/Ω + 0.33 MΩ	Fluke 5522A multiproduct calibrator

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Resistance ³ – Generate Fixed	0.1 Ω 2 mΩ 5 mΩ 10 mΩ	3.3 μΩ 0.5 μΩ 0.5 μΩ 1.2 μΩ	Simpson current shunts
Resistance ³ – Measure	Up to 10 Ω (10 to 100) Ω 100 Ω to 1 kΩ (1 to 10) kΩ (10 to 100) kΩ 100 k Ω to 1 MΩ (1 to 10) MΩ (10 to 100) MΩ 100 M Ω to 1 GΩ	18 μΩ/Ω + 79 μΩ 17 μΩ/Ω + 0.58 mΩ 15 μΩ/Ω + 0.68 mΩ 15 μΩ/Ω + 2.1 mΩ 15 μΩ/Ω + 30 mΩ 20 μΩ/Ω + 2.4 Ω 59 μΩ/Ω + 0.13 kΩ 0.6 mΩ/Ω + 1.6 kΩ 5.6 mΩ/Ω + 54 kΩ	HP 3458A Opt 002 8.5-digit multimeter

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
Capacitance ³ – Generate (220 to 399.9) pF (0.4 to 1.0999) nF (1.1 to 3.2999) nF (3.3 to 10.9999) nF (11 to 32.9999) nF (33 to 109.999) nF (110 to 329.999) nF (0.33 to 1.099 99) μF (1.1 to 3.299 99) μF (3.3 to 10.9999) μF (11 to 32.9999) μF (33 to 109.999) μF (110 to 329.999) μF (0.33 to 1.099 99) mF (1.1 to 3.299 99) mF (3.3 to 10.9999) mF (11 to 32.9999) mF (33 to 110) mF	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 DC to 50 Hz DC to 20 Hz DC to 6 Hz DC to 2 Hz DC to 0.6 Hz DC to 0.2 Hz	0.33 % of rdg + 6.7 pF 0.33 % of rdg + 6.7 pF 0.33 % of rdg + 6.7 pF 0.17 % of rdg + 6.7 pF 0.17 % of rdg + 67 pF 0.17 % of rdg + 67 pF 0.17 % of rdg + 0.2 nF 0.17 % of rdg + 1 nF 0.17 % of rdg + 2 nF 0.17 % of rdg + 6.7 nF 0.27 % of rdg + 20 nF 0.3 % of rdg + 67 nF 0.3 % of rdg + 0.2 μF 0.3 % of rdg + 0.7 μF 0.3 % of rdg + 2 μF 0.3 % of rdg + 6.7 μF 0.5 % of rdg + 20 μF 0.7 % of rdg + 67 μF	Fluke 5522A multiproduct calibrator

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of Thermocouple Indicators ³ – Generate/Measure			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.44 °C 0.36 °C 0.32 °C 0.35 °C	Fluke 5522A multiproduct calibrator
Type C	(0 to 15) °C (150 to 650) °C (650 to 1000) °C (1000 to 1800) °C (1800 to 2316) °C	0.30 °C 0.27 °C 0.31 °C 0.44 °C 0.70 °C	
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.43 °C 0.20 °C 0.19 °C 0.20 °C 0.23 °C	
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.26 °C 0.18 °C 0.17 °C 0.21 °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 0.20 °C 0.21 °C 0.25 °C 0.37 °C	
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.40 °C 0.25 °C 0.22 °C 0.21 °C 0.27 °C	
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.51 °C 0.37 °C 0.34 °C 0.38 °C	
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.46 °C 0.36 °C 0.37 °C 0.44 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.52 °C 0.24 °C 0.18 °C 0.20 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of RTD Indicators ³ –			
Pt 385, 100 Ω	(-200 to -80) °C	0.03 °C	Fluke 5522A multiproduct calibrator
	(-80 to 0) °C	0.03 °C	
	(0 to 100) °C	0.05 °C	
	(100 to 300) °C	0.06 °C	
	(300 to 400) °C	0.07 °C	
	(400 to 630) °C	0.08 °C	
	(630 to 800) °C	0.15 °C	
Pt 3926, 100 Ω	(-200 to -80) °C	0.03 °C	
	(-80 to 0) °C	0.03 °C	
	(0 to 100) °C	0.05 °C	
	(100 to 300) °C	0.06 °C	
	(300 to 400) °C	0.07 °C	
	(400 to 630) °C	0.08 °C	
Pt 3916, 100 Ω	(-200 to -190) °C	0.17 °C	
	(-190 to -80) °C	0.03 °C	
	(-80 to 0) °C	0.03 °C	
	(0 to 100) °C	0.04 °C	
	(100 to 260) °C	0.05 °C	
	(260 to 300) °C	0.05 °C	
	(300 to 400) °C	0.06 °C	
	(400 to 600) °C	0.07 °C	
Pt 385, 200 Ω	(-200 to -80) °C	0.03 °C	
	(-80 to 0) °C	0.03 °C	
	(0 to 100) °C	0.03 °C	
	(100 to 260) °C	0.03 °C	
	(260 to 300) °C	0.18 °C	
	(300 to 400) °C	0.09 °C	
	(400 to 600) °C	0.1 °C	
	(600 to 630) °C	0.11 °C	
Pt 385, 500 Ω	(-200 to -80) °C	0.03 °C	
	(-80 to 0) °C	0.03 °C	
	(0 to 100) °C	0.03 °C	
	(100 to 260) °C	0.04 °C	
	(260 to 300) °C	0.05 °C	
	(300 to 400) °C	0.05 °C	
	(400 to 600) °C	0.06 °C	
Pt 385, 1000 Ω	(-200 to 0) °C	0.02 °C	
	(0 to 100) °C	0.02 °C	
	(100 to 260) °C	0.03 °C	
	(260 to 300) °C	0.04 °C	
	(300 to 600) °C	0.05 °C	
	(600 to 630) °C	0.05 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of RTD Indicators ³ – (cont)			
Ni 120, 120 Ω	(-80 to 0) °C (0 to 100) °C (100 to 260) °C	0.05 °C 0.05 °C 0.09 °C	Fluke 5522A multiproduct calibrator
Cu 427, 10 Ω	(-100 to 260) °C	0.2 °C	

V. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Velometers & Anemometers	(50 to 200) fpm (200 to 1200) fpm	1.7 % of rdg + 5.8 fpm 2.2 % of rdg + 1.5 fpm	Standard anemometer
Balances & Scales ³	Up to 500 mg 500 mg to 5000 mg	0.027 mg + 0.58R 0.042 mg + 0.58R	ASTM Class 1 weights & internal procedure BP042.
	(5 g to 20) g (20 g to 100) g (100 g to 200) g (200 g to 300) g	0.043 mg + 0.58R 0.044 mg + 0.58R 0.060 mg + 0.58R 0.063 mg + 0.58R	ASTM Class 4 weights & internal procedure BP042
	(300 g to 500) g (500 to 1000) g	1.3 mg + 0.58R 1.4 mg + 0.58R	
	(1 to 2) kg (2 to 5) kg (5 to 10) kg (10 to 30) kg (30 to 40) kg (40 to 50) kg (50 to 60) kg	1.5 mg + 0.58R 10 mg + 0.58R 20 mg + 0.58R 89 mg + 0.58R 91 mg + 0.58R 0.11g + 0.58R 0.11g + 0.58R	ASTM Class 6 weights & internal procedure BP042
	Up to 600 lb	0.02 % + 0.58R	

Parameter/Equipment	Range	CMC ² (±)	Comments
Durometer Force Type A, B, E, & O Types C, D, & DO Type OO & OOO	Up to 821 gf Up to 4532 gf Up to 114 gf	0.14 gf 0.14 gf 0.14 gf	Class 4 weights, analytical balance
Durometer Indenter – Length	(0.09 to 0.11) in	130 μin	Optical comparator
Dynamometer ³ –	Up to 5000 g (2 to 1000) lbf (1000 to 5000) lbf (5000 to 10 000) lbf	4.2 mg 0.06 % of rdg + 0.06 lbf 0.08 % of rdg + 0.11 lbf 0.004 % of rdg + 3.7 lbf	ASTM Class 1 & S weights ASTM Class 6 weights load cell, multimeter
Flow Meters ³	Up to 2 slpm (2 to 20) slpm Up to 4.2 SCFH (4.2 to 42.4) SCFH	0.55 % of rdg + 0.0041 slpm 0.57 % of rdg + 0.041 slpm 0.55 % of rdg + 0.0087 SCFH 0.57 % of rdg + 0.084 SCFH	Alicat flow controller
Mass, Fixed Points, ASTM Class 5 (NIST Class F)	1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g	60 μg 64 μg 59 μg 70 μg 60 μg 220 μg 94 μg 470 μg	ASTM Class 1 weights, Sartorius MC 210 S balance
	500 g 1 kg 2 kg	5.3 mg 5.7 mg 6.2 mg	ASTM Class 4 weights, Sartorius MSA3203S balance
ASTM Class 6 (NIST Class F)	5 kg 10 kg 30 kg	99 mg 0.16 g 0.2 g	ASTM Class 4 weights, & GP-30K balance
Pipettes	(0.5 to 10 000) μL	0.04 % of rdg + 0.03 μL	Precision balances, distilled water

Parameter/Equipment	Range	CMC ² (±)	Comments
Pressure Gages, Pressure Transducers ³	(-14.7 to 0) psig (-29.92 to 0) inHG Up to 30 psig (0 to 100) psig (0 to 500) psig (0 to 1000) psig (0 to 5000) psig (0 to 10 000) psig (60 to 110) kPa.a (-17.7 to 32.4) inHG (0.000 01 to 0.5) in H ₂ O	0.0051 psig 0.0084 inHG 0.004 psig 0.025 psig 0.12 psig 0.25 psig 1.3 psig 2.6 psig 0.056 kPa.a 0.017 inHG 0.000 73 inH ₂ O	Digital test gauges
Torque Transducers	Up to 27.6 lbf·in (27.6 to 150) lbf·in 150 lbf·in to 60 lbf·ft (60 to 2000) lbf·ft	0.007 % of rdg + 0.004 lbf·in 0.06 % of rdg + 0.0001 lbf·in 0.3 % of rdg + 0.009 lbf·ft 0.08 % of rdg + 0.0005 lbf·ft	Torque wheels, torque arms, Class 6 weights
Torque Tools ³	(4 to 50) lbf·in (30 to 400) lbf·in (80 to 1000) lbf·in (20 to 250) lbf·ft (60 to 600) lbf·ft (200 to 2000) lbf·ft	0.17 % of rdg + 0.11 lbf·in 0.41 % of rdg + 0.05 lbf·in 0.42 % of rdg + 0.02 lbf·in 0.39 % of rdg + 0.07 lbf·ft 0.3 % of rdg + 0.01 lbf·ft 0.3 % of rdg + 0.004 lbf·ft	CDI torque machine

VI. Thermodynamics

Parameter/Equipment	Range	CMC ^{2,6} (±)	Comments
Humidity ³ –	(10 to 90) % RH (90 to 95) % RH	1.4 % RH 2.1 % RH	Vaisala HMI70 temperature/ humidity indicator, salts
Temperature ³ – Measure	(-20 to 60) °C (-270 to -210) °C (-210 to 400) °C (400 to 1370) °C (-270 to 400) °C (400 to 1370) °C (-200 to 100) °C (100 to 300) °C (300 to 500) °C (500 to 660) °C	0.25 °C 0.7 °C 0.6 °C 1.3 °C 0.6 °C 1.3 °C 0.046 °C 0.065 °C 0.085 °C 0.12 °C	Vaisala HMI41 temperature/humidity indicator Comparison to datalogger w/ type T thermocouple probe Comparison to Fluke 5500A, w/ Type T thermocouple probe Fluke/Hart 5628 PRT w/ HP 3458A Opt 002 8.5-digit multimeter
Temperature ³ – Measuring Equipment	(-25 to 400) °C (-25 to 100) °C (100 to 300) °C (300 to 400) °C	0.6 °C 0.046 °C 0.065 °C 0.085 °C	Dry well, Fluke w/ type K thermocouple probe Dry Well, Burns engineering PRT w/ HP 3458A Opt 002 8.5-digit multimeter
Thermocouple ³ (Wires, Probes) –	(-25 to 400) °C	0.07 °C	Ice bath, Dry-well, Burns engineering PRT w/ HP 3458A Opt 002 8.5-digit multimeter, Fluke 5500A
Infrared Thermometers ³	(-20 to 660) °C 50 °C 100 °C 200 °C 300 °C 400 °C	0.3 °C 1.4 °C 1.4 °C 1.8 °C 1.5 °C 1.6 °C	Comparison to Burns Engineering PRT w/ HP 3458A Opt 002 8.5- digit multimeter, blackbody source $\epsilon = 0.96, \lambda = (8 \text{ to } 14) \mu\text{m}$ Ametek ETC-400R blackbody source (cavity) $\epsilon = 0.96, \lambda = (8 \text{ to } 14) \mu\text{m}$

VII. Time & Frequency

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
Frequency – Measure ³	(1 to 40) Hz 40 Hz to 10 kHz 10 kHz to 1 MHz (1 to 20) MHz (20 to 100) MHz	500 µHz/Hz 100 µHz/Hz 3.6 µHz/Hz + 1 Hz 0.4 Hz 2.4 Hz	HP 3458A Opt 002 8.5-digit multimeter, HP 5334A counter
Stopwatches & Timers ³	Up to 24 hr	0.12 s	Time signal receiver
Tensile Testers ³	Up to 24 in/min	0.14 % of rdg + 0.013 in/min	Steel rule, stopwatch
Rotational Indicating Devices ³	Up to 30 000 rpm	0.011 % of rdg + 1.3 rpm	Comparison to Ametek 1726 digital tachometer
Tachometers ³	(20 to 299.99) rpm (300.0 to 2999.9) rpm (3000 to 29 999) rpm	0.01 % + 0.02 rpm 0.01 % + 0.14 rpm 0.01 % + 1.4 rpm	Comparison to Ametek 1965 digistrobe

¹ This laboratory offers commercial calibration and dimensional testing.

² Calibration and Measurement Capability Uncertainty (CMC)² 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 of nearly ideal measuring equipment. CMC's 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

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 Calibration and Measurement Capability Uncertainty (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 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 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. CMC's 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.

⁵ In the statement of CMC, L is the numerical value of the nominal length of the device measured in inches, DL is the numerical value of the diagonal length of the device measured in inches and T represents the time.

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 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.



Accredited Laboratory

A2LA has accredited

MICHELLI MEASUREMENT GROUP, LLC

Goleta, CA

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 21st day of June 2024.

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

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 5104.04
Valid to April 30, 2026

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