SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

JAPAN QUALITY ASSURANCE ORGANIZATION
Kyushu Testing Laboratory
2-33, Miyanojin 3-Chome, Kurume-shi, Fukuoka, 839-0801 Japan
Shinji Wakisaka Phone: 81 942 48 7763

CALIBRATION

Valid To: March 31, 2028 Certificate Number: 1400.05

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 Quantities

Parameter/Equipment	Range	CMC[2] (±)	Comments
pH Indicator[3] –			
Instrumental Error	(0 to 14) pH units	0.0050 pH units	DC voltage
Linearity	(0 to 14) pH units	0.0060 pH units	
Repeatability	(0 to 14) pH units	0.0040 pH units	
pH Detector[3] –			
Electrode Slope	(-6.0 to +2.0) mV/pH	0.40 mV/pH	Standard solutions DC voltage
Linearity	(-30 to +30) mV	0.90 mV	
Repeatability @4 pH units @7 pH units @9 pH units	 177.0 mV (4.008 pH) 7.987 mV (6.865 pH) -129.0 mV (9.180 pH)	 0.90 mV 0.80 mV 1.9 mV	
pH Meters[3] –			
Three – Point Calibration Instrumental Error	 4 pH units 7 pH units 9 pH units	 0.022 pH units 0.023 pH units 0.030 pH units	Standard solutions
Two – Point Calibration Instrumental Error	 4 pH units, 9 pH units 7 pH units	 0.024 pH units 0.013 pH units	

5202 Presidents Court, Suite 220 | Frederick, MD 21703-8515 | Phone: 301 644 3248 | Fax: 240 454 9449 | www.A2LA.org

Parameter/Equipment	Range	CMC[2] (±)	Comments
pH Meters[3] – (cont)			
One – Point Calibration Instrumental Error	4 pH units, 7 pH units & 9 pH units	0.19 pH units	Standard solutions
Analyzer of Atmospheres Concerned[3]			
Nitrogen Oxide	(25 to 5000) parts in 10^6	2.4 % of full scale	Standard gases
Carbon Monoxide	(5 to 50 000) parts in 10^6	2.4 % of full scale	
Sulfur Dioxide	(25 to 5000) parts in 10^6	2.4 % of full scale	
Oxygen	(5 to 25) vol %	2.4 % of full scale	

II. Dimensional

Parameter/Equipment	Range	CMC[2] (±)	Comments
Outside Micrometers[3] –			
Resolution 0.1µm	Up to 25 mm Up to 50 mm (50 to 200) mm (200 to 300) mm (300 to 400) mm (400 to 500) mm (500 to 600) mm (600 to 700) mm (700 to 800) mm (800 to 900) mm (900 to 1000) mm	0.60 µm 2.0 µm 4.0 µm 6.0 µm 8.0 µm 9.0 µm 11 µm 12 µm 14 µm 15 µm 17 µm	Gauge blocks
Calipers[3]	Up to 300 mm (300 to 500) mm (500 to 600) mm (600 to 1000) mm	0.030 mm 0.040 mm 0.050 mm 0.070 mm	Gauge blocks, step gauges

Parameter/Equipment	Range	CMC[2] (±)	Comments
Height Gauges[3] –			
Resolution 0.01 mm	Up to 200 mm (200 to 500) mm (500 to 600) mm (600 to 1000) mm	0.020 mm 0.030 mm 0.040 mm 0.050 mm	Gauge blocks, step gauges
Resolution 0.001 mm	Up to 300 mm (300 to 600) mm (600 to 1000) mm	0.0090 mm 0.013 mm 0.018 mm	
Resolution 0.0001 mm	Up to 300 mm (300 to 600) mm (600 to 1000) mm	0.0092 mm 0.013 mm 0.018 mm	
Digital Indicators[3]	Up to 100 mm	3.0 µm	Gauge blocks
Depth Micrometer[3]	Up to 50 mm (50 to 150) mm (150 to 300) mm	3.0 µm 4.0 µm 7.0 µm	Gauge blocks, depth micro checker
Dial Gauges[3]	Up to 10 mm (10 to 25) mm (25 to 50) mm (50 to 100) mm	1.8 µm 1.9 µm 2.2 µm 3.2 µm	Gauge blocks, dial gauge tester
Depth Gauges[3]	Up to 300 mm (300 to 600) mm	0.040 mm 0.050 mm	Gauge blocks, step gauges, depth micro-checker
Inside Micrometers[3] –			
Calipers	Up to 200 mm (200 to 300) mm (300 to 400) mm (400 to 500) mm	5.0 µm 7.0 µm 8.0 µm 10 µm	Gauge blocks
Inside Micrometers[3] –			
Bar Inside	Up to 150 mm (150 to 200) mm (200 to 300) mm (300 to 400) mm (400 to 500) mm (500 to 600) mm (600 to 700) mm (700 to 800) mm (800 to 900) mm (900 to 1000) mm	4.0 µm 5.0 µm 7.0 µm 8.0 µm 10 µm 11 µm 13 µm 14 µm 16 µm 17 µm	Gauge blocks

Parameter/Equipment	Range	CMC[2,8] (±)	Comments
Dial Caliper Gauges[3]	Up to 25 mm (25 to 80) mm (80 to 150) mm (150 to 200) mm	0.030 mm 0.040 mm 0.050 mm 0.060 mm	Gauge blocks
Standard Bars	Up to 50 mm (50 to 100) mm (100 to 200) mm (200 to 300) mm (300 to 400) mm (400 to 500) mm	0.80 µm 0.90 µm 1.2 µm 1.6 µm 2.1 µm 2.5 µm	Gauge blocks, electrical – comparators
Thickness Gauges[3] – Dial Resolution 0.1 mm Digital Resolution 0.01 mm Resolution 0.001 mm	 Up to 50 mm Up to 50 mm Up to 20 mm (20 to 50) mm	 0.020 mm 0.020 mm 0.0020 mm 0.0030 mm	Gauge blocks
Cylinder Gauges[3]	Up to 1.6 mm	5.0 µm	Dial gauge tester, dial gauge Note: range is the effective measuring range
Precision Surface Plate[3] (Flatness Only) Diagonal Length	 Up to 430 mm (>430 to 1420) mm (>1420 to 2500) mm	 3.5 µm 3.9 µm 4.8 µm	Electronic level
Measuring Microscope[3] – Run & Parallelism Straightness Squareness Linear Accuracy	 Up to 200 mm Up to 200 mm Up to 200 mm Up to 200 mm	 7.4 µm 4.6 µm 4.6 µm 7.9 µm	Glass line standard, scales, electrical comparators, square
Coordinate Measuring Machines[3]	Up to 1000 mm	(2.0 + *L*/1200) µm	Step gauges

Parameter/Equipment	Range	CMC[2,8] (±)	Comments
Measuring Projector[3] –			
Linear Accuracy	Up to 200 mm	4.3 µm	Glass line standard, scales
Magnification	Up to 600 mm (Screen Size)	0.07 % of projected reading	
Ring gauge	(1 to 100) mm	(2.0 + *L*/100) µm	IDM machine, gauge blocks

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
DC Voltage – Generate[3]	(1 to 10) mV (10 to 100) mV (0.10 to 1) V (1 to 10) V (10 to 100) V (100 to 1000) V	0.061 % + 3.5 µV 0.013 % + 3.5 µV 69 µV/V + 5.8 µV 66 µV/V + 58 µV 74 µV/V + 0.58 mV 74 µV/V + 1.8 mV	Fluke calibrator
	(1 to 10) kV	0.25 %	Multimeter with high voltage divider
DC Voltage – Measure[3]	(1 to 10) mV (10 to 100) mV (0.10 to 1) V (1 to 10) V (10 to 100) V (100 to 1000) V	0.093 % 0.011 % 23 µV/V 19 µV/V 24 µV/V 21 µV/V	Multimeter
	(1 to 10) kV (10 to 50) kV	0.28 % 0.10 %	Multimeter with high voltage divider
DC Current – Generate[3]	(0.10 to 3) mA (3 to 30) mA (30 to 300) mA (0.3 to 2) A (2 to 10) A (10 to 20) A	0.021 % + 0.03 µA 0.016 % + 0.06 µA 0.020 % + 0.29 µA 0.020 % + 2.9 µA 0.073 % + 580 µA 0.12 % + 870 µA	Calibration of current measuring devices using: Fluke calibrator
	(20 to 30) A	0.080 % + 2.1 mA	Yokogawa calibrator
Simulated Current	(20 to 100) A (100 to 500) A (500 to 1000) A (1000 to 1500) A	0.39 % + 30 mA 0.38 % + 110 mA 0.41 % + 110 mA 0.82 % + 2 mA	Calibrator with current coil

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
DC Current – Measure[3]	(10 to 100) µA (0.10 to 1) mA (1 to 10) mA (10 to 100) mA (0.10 to 1) A (1 to 2) A (2 to 20) A (20 to 50) A (50 to 100) A	27 µA/A 26 µA/A 28 µA/A 28 µA/A 0.011 % 81 µA/A 0.015 % 0.015 % 0.017 %	Calibration of current generators using multimeter with shunts
DC Resistance – Generate[3]			Calibration of resistance meters using:
Fixed Values	1 mΩ 0.01 Ω 0.1 Ω 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ	80 µΩ/Ω 51 µΩ/Ω 28 µΩ/Ω 18 µΩ/Ω 20 µΩ/Ω 20 µΩ/Ω 16 µΩ/Ω 16 µΩ/Ω 20 µΩ/Ω 23 µΩ/Ω	Standard resistors
Ranges	(0.10 to 1) Ω (1 to 10) Ω (10 to 100) Ω (0.10 to 1) kΩ (1 to 10) kΩ (10 to 100) kΩ (0.10 to 1) MΩ (1 to 100) MΩ (0.10 to 1) GΩ (1 to 10) GΩ (10 to 100) GΩ	0.025 % 72 µΩ/Ω 72 µΩ/Ω 72 µΩ/Ω 72 µΩ/Ω 72 µΩ/Ω 0.023 % 0.027 % 0.24 % 0.32 % 1.1 %	Decade resistors
	(1 to 11) Ω (11 to 33) Ω (0.033 to 33) kΩ (33 to 110) kΩ (110 to 330) kΩ (0.33 to 1.1) MΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ	0.035 % 0.018 % 0.015 % 0.017 % 0.018 % 0.035 % 0.035 % 0.076 % 0.12 % 0.58 %	Calibrator (simulated)

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
DC Resistance – Measure[3]			Calibration of resistors using:
Fixed Values	1 mΩ 0.01 Ω 0.1 Ω 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ	0.012 % 83 µΩ/Ω 64 µΩ/Ω 18 µΩ/Ω 18 µΩ/Ω 18 µΩ/Ω 18 µΩ/Ω 18 µΩ/Ω 21 µΩ/Ω 21 µΩ/Ω	Multimeter with standard resistors
Ranges	(1 to 10) mΩ (10 to 100) mΩ (0.10 to 1) Ω (1 to 10) Ω (10 to 100) Ω (0.10 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 (1 to 10) GΩ (10 to 100) GΩ	0.012 % 90 µΩ/Ω 84 µΩ/Ω 27 µΩ/Ω 27 µΩ/Ω 27 µΩ/Ω 31 µΩ/Ω 48 µΩ/Ω 48 µΩ/Ω 0.035 % 0.13 % 0.52 % 0.52 % 0.56 %	

Parameter/Range	Frequency	CMC[2, 4] (±)	Comments
AC Voltage – Generate[3]			Calibration of AC voltmeters using:
(10 to 100) mV (0.10 to 1) V	50 Hz to 1 kHz	0.061 % + 24 µV 0.041 % + 70 µV	Fluke calibrator
(1 to 10) V (10 to 100) V (0.1 to 1) kV	50 Hz to 1 kHz	0.049 % + 0.70 mV 0.060 % + 3.5 mV 0.060 % + 24 mV	
(1 to 10) kV	(50, 60) Hz	0.40 %	Multimeter with high voltage divider
(10 to 100) mV (0.10 to 1) V (1 to 10) V (10 to 100) V (0.10 to 1) kV	(1 to 10) kHz	0.066 % + 24 µV 0.041 % + 70 µV 0.038 % + 0.70 mV 0.094 % + 11 mV 0.11 % + 0.024 V	Fluke calibrator

Parameter/Range	Frequency	CMC[2, 4] (±)	Comments
AC Voltage – Measure[3]			
(10 to 100) mV (0.1 to 0.3) V (0.3 to 1) V	50 Hz to 1 kHz (except 50, 60, 400 Hz)	0.041 % 0.025 % 0.023 %	Calibration of voltage generators using: multimeter
(1 to 10) V (10 to 100) V (100 to 1000) V	50 Hz to 1 kHz (except 50, 60, 400 Hz)	0.022 % 0.023 % 0.034 %	
(10 to 100) mV (100 to 300) mV	(1 to 10) kHz	0.047 % 0.038 %	
(0.30 to 1) V (1 to 10) V (10 to 100) V (100 to 1000) V	(1 to 10) kHz	0.024 % 0.023 % 0.024 % 0.034 %	
(10 to 100) mV (0.1 to 0.3) V (0.3 to 1) V	(50, 60, 400) Hz	0.042 % 0.025 % 0.023 %	
(1 to 10) V (10 to 100) V (100 to 1000) V	(50, 60, 400) Hz	0.022 % 0.023 % 0.034 %	
(1 to 10) kV (10 to 30) kV	(50, 60) Hz	0.57 % 0.51 %	Multimeter with high voltage divider
AC Current – Generate[3]			Calibration of AC current measuring devices using:
100 µA to 3 mA (3 to 30) mA (30 to 300) mA (0.30 to 2) A (2 to 10) A (10 to 20) A	50 Hz to 1 kHz	0.14 % + 0.18 µA 0.084 % + 2.4 µA 0.084 % + 24 µA 0.091 % + 0.16 mA 0.14 % + 2.4 mA 0.19 % + 5.8 mA	Fluke calibrator
(20 to 50) A		0.18 % + 5.8 mA	Yokogawa calibrator
(20 to 100) A (100 to 500) A (500 to 1000) A (1000 to 1500) A	(50, 60) Hz	0.40 % + 110 mA 0.40 % + 110 mA 0.42 % + 110 mA 0.91 % + 120 mA	Calibrator with current coil (ex. clampmeter)

Parameter/Range	Frequency	CMC[2, 4] (±)	Comments
AC Current – Measure[3]			
100 µA to 2 mA	50 Hz to 1 kHz	0.048 %	Calibration of current generators using multimeter with shunts
(2 to 10) mA		0.038 %	
(10 to 100) mA		0.041 %	
(0.10 to 1) A		0.045 %	
(1 to 2) A		0.054 %	
(2 to 14) A		0.062 %	
(14 to 20) A	(50, 60) Hz	0.049 %	
(20 to 50) A		0.049 %	
(50 to 100) A		0.063 %	
AC Resistance – Generate[3]			
Fixed Points			
0.01 Ω	50 Hz to 1 kHz	0.082 %	Calibration of AC resistance meters using: standard AC resistors
0.1 Ω		0.082 %	
0.2 Ω		0.082 %	
1 Ω		0.082 %	
10 Ω		0.082 %	
100 Ω		0.082 %	
1 kΩ		0.082 %	
10 kΩ		0.082 %	
100 kΩ	1 kHz	0.082 %	
AC Power – Generate[3]			Calibration of watt meters:
10 W to 6 kW Power Factor = 1	(50, 60) Hz	0.18 %	Calibrator
(6 to 950) kW clamp type Power Factor = 1		0.40 %	Calibrator & current coil
Electrical Calibration of RTDs[3] –			
Pt385, 100 Ω & JPt-100	(-200 to 850) °C	0.13 °C	Decade resistors

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Calibration of Thermocouple Temperature Indicators[3]–			
Type E	(-250 to -220) °C (-220 to -180) °C (-180 to -100) °C (-100 to -70) °C (-70 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.81 °C 0.70 °C 0.66 °C 0.37 °C 0.37 °C 0.36 °C 0.37 °C 0.40 °C	Calibration of temperature meters using: Fluke calibrator
Type J	(-210 to -170) °C (-170 to -120) °C (-120 to -20) °C (-20 to 150) °C (150 to 760) °C (760 to 1200) °C	0.54 °C 0.49 °C 0.42 °C 0.41 °C 0.43 °C 0.46 °C	
Type K	(-200 to -170) °C (-170 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.68 °C 0.55 °C 0.39 °C 0.37 °C 0.44 °C 0.56 °C	
Type R	(0 to 50) °C (50 to 250) °C (250 to 400) °C (400 to 800) °C (800 to 1000) °C (1000 to 1760) °C	1.2 °C 0.92 °C 0.77 °C 0.70 °C 0.61 °C 0.66 °C	
Type S	(0 to 50) °C (50 to 250) °C (250 to 400) °C (400 to 800) °C (800 to 1000) °C (1000 to 1400) °C (1400 to 1760) °C	1.2 °C 0.92 °C 0.77 °C 0.70 °C 0.70 °C 0.71 °C 0.77 °C	
Type T	(-250 to -230) °C (-230 to -170) °C (-170 to -150) °C (-150 to -90) °C (-90 to -20) °C (-20 to 0) °C (0 to 120) °C (120 to 400) °C	1.4 °C 0.92 °C 0.83 °C 0.48 °C 0.42 °C 0.42 °C 0.37 °C 0.36 °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 0.29 °C 0.28 °C 0.28 °C 0.32 °C	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Oscilloscope Calibration – Generate[3]			
DC Voltage - 1M Ω	±1 mV to 1000 V	0.34 %	Fluke 55XXA
DC Voltage - 50 Ω / 1M Ω	± (1 to 19) mV ± 19 mV to 120 V	0.36 % 0.11 %	Fluke 9500
AC Voltage - 1M Ω 50 Hz to 10 kHz	1 mV to 1000 V	0.48 %	Fluke 55XXA
AC Voltage - 50 Ω 50 Hz to 10 kHz 10 kHz to 1 MHz	6 mV to 5.5 V pk-pk	1.1 % 1.5 %	Fluke 9500
Time Markers	1 ns to 10 s	0.05 %	Fluke 9500
Sinewave Flatness 6 mV to 5.5 V	1 kHz to 600 MHz	3.4 %	Fluke 9500

IV. Electrical – RF/Microwave

Parameter/Equipment	Range	CMC[2] (±)	Comments
High Frequency Voltage[3] – Measure			
(0.01 to 0.1) V	10 kHz to 1 MHz (1 to 10) MHz	1.8 % 2.6 %	Rohde & Schwartz URV5
(0.10 to 1) V	10 kHz to 1 MHz (1 to 10) MHz	1.8 % 2.0 %	
(10 to 120) dB/µV	(10 to 500) MHz (500 to 1000) MHz	0.25 dB 0.30 dB	Measuring receiver with 11722A sensor

V. Mechanical

Parameter/Equipment	Range	CMC[2] (±)	Comments
Scales & Balances[3] –	1 mg 2 mg (2 to 5) mg 5 mg (5 to 10) mg 10 mg 20 mg (20 to 50) mg 50 mg (50 to 100) mg 100 mg 200 mg (200 to 500) mg 500 mg (500 to 1000) mg 1 g 2 g (2 to 5) g 5 g (5 to 10) g 10 g 20 g (20 to 50) g 50 g (50 to 100) g 100 g (100 to 200) g 200 g (200 to 20 000) g (20 to 160) kg (160 to 300) kg	3600 µg/g 1800 µg/g 1800 µg/g 710 µg/g 1400 µg/g 470 µg/g 300 µg/g 360 µg/g 150 µg/g 220 µg/g 94 µg/g 59 µg/g 59 µg/g 30 µg/g 45 µg/g 18 µg/g 12 µg/g 12 µg/g 5.9 µg/g 8.7 µg/g 3.6 µg/g 2.4 µg/g 2.8 µg/g 1.2 µg/g 1.8 µg/g 1.0 µg/g 1.4 µg/g 1.0 µg/g 1.1 µg/g 30 µg/g 31 µg/g	Calibrations performed using reference weights
Vibration Meter –			
Acceleration (1 to 50) m/s^2	(5 to 2000) Hz	3.0 % of measurement value	Secondary vibration calibration system
Velocity (1 to 50) mm/s	(5 to 2000) Hz	3.0 % of measurement value	
Displacement (0.1 to 10) mm	(5 to 160) Hz	3.0 % of measurement value	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Vibration Exciter[3] –			
Acceleration (1 to 200) m/s^2	(5 to 10) Hz (10 to 5000) Hz	4.0 % of measurement value 3.0 % of measurement value	Secondary vibration calibration system
Velocity (0.01 to 1) m/s	(5 to 10) Hz (10 to 160) Hz (160 to 1000) Hz (1 to 3) kHz	6.0 % of measurement value 3.0 % of measurement value 7.0 % of measurement value 8.0 % of measurement value	
Displacement (1 to 10) mm	(5 to 10) Hz (10 to 20) Hz (20 to 40) Hz (40 to 80) Hz (80 to 160) Hz (160 to 315) Hz	3.0 % of measurement value 4.0 % of measurement value 4.0 % of measurement value 5.0 % of measurement value 9.0 % of measurement value 16 % of measurement value	
Frequency	(5 to 2000) Hz (2 to 4) kHz (4 to 5) kHz	0.02 Hz 0.03 Hz 0.04 Hz	Frequency counter
Vibration Accelerometer			
Voltage sensitivity 0.02 to 10^3 V/(m/s^2)	(20 to 50) Hz (50 to 80) Hz (80 to 100) Hz (100 to 160) Hz (160 to 1600) Hz (1.6 to 2) kHz (2 to 2.5) kHz (2.5 to 5) kHz	1.8 % 1.7 % 1.5 % 1.5 % 1.5 % 1.5 % 1.5 % 1.6 %	Secondary vibration accelerometer calibration system
Charge sensitivity 10^{-4} to 10^6 pC/(m/s^2)	(20 to 100) Hz (100 to 160) Hz (160 to 200) Hz (200 to 315) Hz (315 to 1600) Hz (1.6 to 2) kHz (2 to 2.5) kHz (2.5 to 3.15) kHz (3.15 to 5) kHz	1.4 % 1.4 % 1.4 % 1.4 % 1.5 % 1.4 % 1.4 % 1.5 % 1.6 %	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Pressure –			
Hydraulic – Gauge Pressure[3]	(0 to 20) MPa	0.0042 MPa	Dead-weight pressure balance, digital pressure gauge
	(>20 to 100) MPa	0.021 % rdg	
Air – Gauge Pressure[3]	(-95 to 0) kPa	0.040 kPa	
	(0 to 210) kPa	0.063 kPa	
	(>210 to 350) kPa	0.030 % rdg	
	(>350 to 500) kPa	0.20 kPa	
	(>500 to 2000) kPa	0.040 % rdg	
	(>2000 to 7000) kPa	1.7 kPa	
Air – Absolute Pressure	(750 to 1150) hPa	0.50 hPa	
Dead-Weight Pressure Balances / Pressure Medium Oil / Pressure Medium – Air[3]	(0 to 30) MPa	0.0054 MPa	
	(>30 to 100) MPa	0.018 % rdg	
	(0 to 210) kPa	0.074 kPa	
	(>210 to 350) kPa	0.035 % rdg	
	(>350 to 1000) kPa	0.40 kPa	
	(>1000 to 2000) kPa	0.040 % rdg	
	(>2000 to 7000) kPa	2.0 kPa	
Liquid Column Monometer –			
Liquid – Mercury[3]	Up to 220 kPa	0.15 kPa	
Liquid – Water[3]	Up to 20 kPa	0.060 kPa	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Volumetric Ware –			
One Mark Pipettes	(0.5 to 2) ml (2 to 5) ml (5 to 10) ml (10 to 25) ml (25 to 50) ml (50 to 100) ml	0.010 ml 0.015 ml 0.020 ml 0.030 ml 0.050 ml 0.080 ml	Scales & balances, liquid-in-glass thermometer
Graduated Pipettes	(0.1 to 1) ml (1 to 2) ml (2 to 5) ml (5 to 10) ml (10 to 25) ml (25 to 50) ml	0.010 ml 0.015 ml 0.030 ml 0.050 ml 0.10 ml 0.20 ml	
Burettes	(1 to 5) ml (5 to 10) ml (10 to 25) ml (25 to 50) ml (50 to 100) ml	0.010 ml 0.020 ml 0.030 ml 0.050 ml 0.10 ml	
One Mark Volumetric Flask	(5 to 10) ml (10 to 25) ml (25 to 50) ml (50 to 100) ml (100 to 250) ml (250 to 500) ml (500 to 1000) ml (1000 to 2000) ml	0.025 ml 0.040 ml 0.040 ml 0.060 ml 0.15 ml 0.25 ml 0.40 ml 0.60 ml	
Graduated Measuring Cylinders	Up to 5 ml (5 to 25) ml (25 to 100) ml (100 to 200) ml (200 to 300) ml (300 to 500) ml (500 to 1000) ml (1000 to 2000) ml	0.10 ml 0.20 ml 0.50 ml 1.0 ml 1.5 ml 2.5 ml 5.0 ml 10 ml	
Torque Tools[3]	(0.2 to 20) N·m (20 to 500) N·m	1.0 % of reading 0.80 % of reading	Torque wrench tester, torque tester

Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Rockwell Hardness Testing Machine[3] –			Indirect calibration method per JIS B 7726 or ASTM E18 (ISO 6508-2);
B Scale	Low Medium High	0.87 HRB 0.79 HRB 0.92 HRB	
C Scale	Low Medium High	0.67 HRC 0.54 HRC 0.41 HRC	Standard blocks
Direct Verification of Rockwell Hardness Testing Machine[3] –	98.07 N Preliminary test force	0.90 N	Direct calibration method per JIS B 7726 or ASTM E18 (ISO 6508-2);
Verification of the Test Force	(588.4 to 1471) N (60 to 150) kgf B scale C scale	1.9 N	Force-proving instrument Note: this is only a partial direct calibration
Verification of the Measuring Device	(-50 to 200) µm B scale C scale	0.76 µm	Index master
Indirect Verification of Micro Vickers Hardness Testing Machine[3]	(100 to 240) HV (>240 to 600) HV >600 HV	5.1 HV 7.8 HV 17 HV	Indirect calibration method per JIS B 7725 or ASTM E92 (ISO6507-2); standard blocks
Direct Verification of Micro Vickers Hardness Testing Machine[3] –			Direct calibration method per JIS B 7725 or ASTM E92 (ISO 6507-2);
Verification of the Test Force	98.07 mN to 19.61 N 10 gf to 2 kgf	0.046 N	Scale & balances, force-proving instrument
Verification of the Measuring Device	Up to 1 mm	1.3 µm	Stage micrometer Note: this is only a partial direct calibration
Indirect Verification of Vickers Hardness Testing Machine[3]	(100 to 240) HV (>240 to 600) HV >600 HV	5.1 HV 7.8 HV 17 HV	Indirect calibration method per JIS B 7725 or ASTM E92 (ISO 6507-2); standard blocks

Parameter/Equipment	Range	CMC[2] (±)	Comments
Direct Verification of Vickers Hardness Testing Machine[3] –			Direct calibration method per JIS B 7725 or ASTM E92 (ISO 6507-2); Force-proving Instrument
Verification of the Test Force	(19.61 to 490.3) N (2 to 50) kgf	1.0 N	
Verification of the Measuring Device	Up to 1 mm	1.3 µm	Stage micrometer Note: this is only a partial direct calibration
Indirect Verification of Brinell Hardness Testing Machine[3] HBW 5/750/10 & HBW 10/3000/10	(250 to 450) HBW	8.8 HBW	Indirect calibration method per JIS B 7724 standard blocks
	(100 to 250) HBW	6.4 HBW	Indirect calibration method per ASTM E10 standard blocks
	(225 to 450) HBW	9.4 HBW	
	(125 to 225) HBW	6.6 HBW	
Direct Verification of Brinell Hardness Testing Machine[3] –			Direct calibration method per JIS B 7724;
Verification of the Test Force	(4.903 to 29.42) kN (500 to 3000) kgf	0.095 kN	Force-proving instrument
Verification of the Measuring Device	Up to 8 mm	6.6 µm	Stage micrometer
Verification of the Test Force	(4.903 to 29.42) kN (500 to 3000) kgf	0.15 kN	Direct calibration method per ASTM E10
Verification of the Measuring Device	Up to 8 mm	7.0 µm	Force-proving Instrument
Direct Verification	(225 to 450) HBW	4.0 HBW	Stage micrometer
	(125 to 225) HBW	2.3 HBW	
Force Gauge, Push-Pull Gauge	100 mN to 0.5 kN (Tension)	0.10 %	Weights
	100 mN to 0.5 kN (Compression)	0.10 %	
Tension Gauge	100 mN to 0.5 kN	0.20 % F.S.	Weights
Compression Gauge	100 mN to 0.5 kN	0.20 % F.S.	Weights

Parameter/Equipment	Range	CMC[2] (±)	Comments
Uniaxial Testing Machine[3] –			Calibration method per JIS B 7721;
Tension Force	0.1 N to 100 kN	0.30 %	Force-proving instrument, load cell, & dead weight
Compression Force	0.1 N to 2 MN (2 to 5) MN	0.30 % 0.40 %	Calibration method per ASTM E4;
	10 N to 2 MN	0.40 %	Force-proving instrument, load cell, & dead weight

VI. Thermodynamics

Parameter/Equipment	Range	CMC[2] (±)	Comments
Digital Thermometer Surface Temperature Measurement Type	(-50 to 300) °C (-50 to 500) °C	0.080 °C 1.8 °C	Digital thermometer, ice point, calibration device
Liquid-in-Glass Thermometer	(-50 to 300) °C	0.090 °C	Digital thermometer, ice point
Mechanical Thermometer	(-50 to 300) °C	0.20 °C	Digital thermometer, ice point
Temperature Installations-Furnaces, Ovens, Incubators, Stirred Water Baths, Fridges & Freezers[3, 5]	(-80 to < -50) °C (-50 to 100) °C (>100 to 300) °C (>300 to 950) °C	0.10 °C 0.05 °C 0.11 °C 2.5 °C	PRT (includes uncertainty of transfer from measurand) JTM K09, JTM K07, IEC 60068-3-6, IEC 60068-3-5, T/C's
Humidity Controlled Chamber[3, 5]	(10 to 98) % RH	1.6 % RH	Dew point hygrometer & Reference PRT JTM K09,JTM K07, IEC 60068-3-6, IEC 60068-3-5
Hygrometer	30 % RH (>30 to 40) % RH (>40 to 60) % RH (>60 to 70) % RH (>70 to 80) % RH (>80 to 95) % RH	1.1 % RH 1.4 % RH 1.9 % RH 2.2 % RH 2.5 % RH 2.9 % RH	Optical dew point meter

VII. Time & Frequency

Parameter/Equipment	Range	CMC[2, 6] (±)	Comments
Frequency – Measure[3]	1 mHz to 1300 MHz	1.5 parts in 10^7 Hz/Hz	Frequency counter 53220A, Reference clock OCXO-MV89A
Frequency – Measuring Equipment[3]	1 mHz to 600 MHz	1.5 parts in 10^7 Hz/Hz	Frequency counter 53220A, Reference clock OCXO-MV89A
Stopwatch[3]	(0 to 388.8) s/day	0.02 s/day	Watch tester, Reference clock OCXO-MV89A

[1] This laboratory offers commercial 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. CMC for the on-site calibrations assume that the environmental conditions are maintained as in the primary laboratory.

[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. 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.

[5] The contributions from the "best existing device" are not included in the CMC claim.

[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*.

[8] In the statement of CMC, L is the numerical value of the nominal length of the device measured in millimeters.

Accredited Laboratory

A2LA has accredited

JAPAN QUALITY ASSURANCE ORGANIZATION
KYUSHU TESTING LABORATORY

Fukuoka-ken, JAPAN

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 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 1st day of May 2026.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1400.05
Valid to March 31, 2028
Revised June 30, 2026

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