Accredited Laboratory

A2LA has accredited

VERTEX CALIBRATION

Doha, QATAR

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 14th day of February 2025.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 7399.01
Valid to February 28, 2027

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

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

VERTEX CALIBRATION
Office No. 1, Building 317, Street 250, Zone 43, D-Ring Road, Nuaija,
Doha, QATAR
Ronaldo Acosta Phone: 31299833

CALIBRATION

Valid To: February 28, 2027 Certificate Number: 7399.01

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, 4]:

I. Acoustics

Parameter/Equipment	Range	CMC[2] (±)	Comments
Sound Level Meter	94 dB @ 1kHz 114 dB @ 1kHz	0.43 dB 0.43 dB	Sound level calibrator
Sound Level Calibrator	94 dB @ 1kHz 114 dB @ 1kHz	0.92 dB 0.92 dB	Sound level meter

II. Chemical Quantities

Parameter/Equipment	Range	CMC[2] (±)	Comments
pH – Measuring Equipment[3]	4.015 pH 7.003 pH 10.015 pH	0.02 pH 0.02 pH 0.02 pH	Traceable buffer solutions
Conductivity – Measuring Equipment[3]	84 µS/cm 1413 µS/cm 12 880 µS/cm	1 µS/cm 5.2 µS/cm 50 µS/cm	Traceable conductivity solutions

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
Turbidity – Measuring Equipment[3]	1.0 NTU 20 NTU 100 NTU 200 NTU 1000 NTU 4000 NTU	0.04 NTU 0.55 NTU 1.2 NTU 2.2 NTU 7.2 NTU 38 NTU	Traceable turbidity solutions
Gas Detector Analyzer			
CO	100 ppm	2.0 %	Certified gas concentrations
H25	25 ppm	2.0 %	
O_2	18 %	2.0 %	
CH_4 (Methane)	2.5% (50% LEL)	2.0 %	
Single Gas Detector			
O_2	25%	2.0 %	Certified gas concentration

III. Dimensional

Parameter/Equipment	Range	CMC[2] (±)	Comments
Micrometers Digital & Mechanical	(0 to 25) mm (25 to 50) mm (75 to 100) mm (100 to 125) mm (125 to 150) mm (150 to 175) mm (175 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	0.0008 mm 0.006 mm 0.006 mm 0.006 mm 0.006 mm 0.006 mm 0.006 mm 0.006 mm 0.006 mm 0.006 mm 0.006 mm 0.007 mm 0.007 mm 0.007 mm 0.007 mm	Optical flats, optical parallel & gauge blocks, grade 0, 1 & Grade K

Parameter/Equipment	Range	CMC[2] (±)	Comments
Setting Standard for Micrometer	(0 to 25) mm	3.6 µm	Micrometer
Caliper – Vernier, Dial, Digital, Spring type Outside Measurement Inside Measurement Depth Measurement	Up to 600 mm Up to 1000 mm	0.009 mm 0.010 mm	Gauge blocks K, grade 0 & 1, caliper checker
Laser Distance Meter	Up to 1000 mm	0.0027 m	Comparison to laser distance meter & gauge blocks.
Measuring Ruler/Scale	Up to 100 mm (100 to 1000) mm	0.29 mm 0.58 mm	Gauge block Set
Dial Gauge & Indicators	Up to 5 mm (5 to 10) mm (10 to 25) mm (25 to 50) mm (50 to 100) mm	0.003 mm 0.003 mm 0.003 mm 0.007 mm 0.007 mm	Dial gauge calibrator, gauge block
Feeler Gauge Width Gauge	Up to 25 mm	0.004 mm	Digital micrometer, gauge block set
Thickness Gauge	Up to 5 mm (5 to 10) mm (10 to 20) mm (20 to 30) mm (30 to 40) mm (40 to 50) mm (50 to 60) mm (60 to 70) mm (70 to 80) mm (80 to 90) mm (90 to 100) mm	0.001 mm 0.001 mm 0.001 mm 0.001 mm 0.006 mm 0.006 mm 0.006 mm 0.006 mm 0.006 mm 0.006 mm 0.006 mm	Gauge block
Standard Shims	Up to 750 µm (0.75 to 1.2) mm (1.2 to 5) mm	1.4 µm 8.1 µm 2.5 µm	Digital micrometer, DFT gauge

Parameter/Equipment	Range	CMC[2] (±)	Comments
Test Sieves	(38 to 850) µm (1 to 125) mm	4.5 µm 5.4 µm	Video measuring machine
Fixture Gauges X-Axis Y-Axis	 Up to 250 mm Up to 200 mm	 5.3 µm 5.1 µm	 Video measuring machine
Video Measuring Machine[3]	(0 to 150 mm)	17 µm	Glass scale
Surface Plate (Local Area Flatness Only)	Up to 1000 mm Up to 37 in	1.5 µm 60 µin	Repeat-o-meter
Coating Thickness Gauge	79.5 µm 258.7 µm 1486.7 µm	1.6 µm 1.8 µm 1.8 µm	Foil set scale

IV. Electrical -- DC/Low Frequency

Parameter/Equipment	Range	CMC[2, 6] (±)	Comments
DC Voltage – Generate	(0.1 to 330) mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (330 to 1000) V	0.0083 mV 0.045 mV 0.52 mV 7.1 mV 0.02 V	Multi-product calibrator
DC Voltage – Measure	Up to 100 mV (0.1to 1) V (1 to 10) V (10 to 100) V 100 V to 1 kV	0.15 mV 0.000 92 V 0.0092 V 0.023 V 0.23 V	6 ½ Multimeter

Parameter/Equipment	Range	CMC[2, 6] (±)	Comments
DC High Voltage – Measure	Up to 5 kV (5 to 10) kV (10 to 15) kV (15 to20) kV (20 to 30) kV (30 to 40) kV	0.12 kV 0.31 kV 0.53 kV 0.61 kV 0.88 kV 1.2 kV	High voltage probe & meter
DC Current – Generate	(0.1to 330) µA 330 µA to 3.3 mA (3.3 to 33.3) mA (33.3 to 330) mA (0.33 to 1) A (1 to 3) A (3 to 10) A (10 to 20) A (20 to 400) A (400 to 1000) A	0.90 µA 0.0006 mA 0.004 mA 0.15 mA 0.72 mA 4.6 mA 24 mA 89 mA 0.66 % of rdg 1.2 % rdg	Multi-product calibrator, current coil.
DC Current – Measure	(1 to 100) µA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A (1 to 10) A	0.10 µA 0.0007 mA 0.012 mA 0.067 mA 0.0088 A 0.021 A	6 ½ Multimeter
Resistance – Generate	(1 to 10) Ω (10 to 100) Ω 100 Ω to 1 kΩ (1 to 10) kΩ (10 to 100) kΩ (100 to 1000) kΩ (1 to 10) MΩ (10 to 100) MΩ (100 to 1000) MΩ	0.43 mΩ 0.0034 Ω 0.03 Ω 0.31 Ω 3.4 Ω 0.036 kΩ 1.4 kΩ 0.058 MΩ 17 MΩ	Multiproduct calibrator
DC Resistance – Measure	(0 to10) 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	0.022 Ω 0.031 Ω 0.15 Ω 1.2 Ω 0.015 kΩ 0.15 kΩ 8.5 kΩ 0.12 MΩ 29 MΩ	6 ½ Multimeter

Parameter/Equipment	Range	CMC[2, 6] (±)	Comments
Temperature Simulation – RTD [3]			
(Pt–100, Pt–200, Pt–500, Pt–1000)	(–200 to 600) °C	0.27 °C	Multiproduct calibrator & multifunction calibrator
Temperature Simulation – Thermocouples[3]			
Type B	(600 to 1820) °C	0.7 °C	Multiproduct calibrator, multifunction calibrator
Type C	(0 to 2316) °C	1.2 °C	
Type E	(- 250 to 0) °C (0 to 1000) °C	0.59 °C 0.26 °C	
Type J	(- 210 to 1200) °C	0.28 °C	
Type K	(- 200 to 800) °C (800 to 1372) °C	0.39 °C 0.47 °C	
Type L	(- 200 to 1300) °C	0.44 °C	
Type N	(- 200 to 0) °C (0 to 1300) °C	0.47 °C 0.32 °C	
Type R	(0 to 1767) °C	0.66 °C	
Type S	(0 to 1767) °C	0.55 °C	
Type T	(- 250 to 0) °C (0 to 400) °C	0.74 °C 0.28 °C	
Type U	(- 200 to 0) °C (0 to 600) °C	0.65 °C 0.32 °C	
Capacitance – Generate	(0.5 to 330) nF (0.33 to 330 µF (0.33 to 110) mF	2.9 % 0.65 % 3.9 %	Decade capacitance box,
Capacitance – Measure	(100 to 500) pF (0.5 to 500) nF (0.5 to 500) µF (0.5 to 2) mF	1.5 % 1.2 % 0.5 % 0.85 %	LCR Meter

Parameter/Equipment	Range	CMC[2, 6] (±)	Comments
Inductance – Generate @1 kHz	100 µH to 10 H	1.2 %	Decade inductance box
Inductance – Measure @1 kHz	100 µH to 10 H	1.2 %	LCR Meter

Parameter/Equipment	Frequency	CMC[2, 6] (±)	Comments
AC Current – Measure			
(10 to 100) µA	50 Hz to 1 kHz	0.51 µA	6 ½ Multimeter
(0.1 to 11) mA		0.0019 mA	
(1 to 10) mA		0.038 mA	
(10 to 100) mA		0.16 mA	Electrical safety tester
100 mA to 1 A		0.0017 A	
(1 to 10) A		0.030 A	
AC Current – Generate			
(30 to 330) µA	50 Hz to 1 kHz	2.1 µA	Multi-product calibrator
330 µA to 3.3 mA		4.2 µA	
(3.3 to 33.3) mA		0.026 mA	
(33.3 to 330) mA		0.43 mA	
(0.33 to 1.1) A		1.1 mA	
(1.1 to 3) A		2 mA	
(3 to 11) A		0.018 A	Current coil
(11 to 20) A		0.044 A	
(20 to 100) A		0.92 % of rdg	
(100 to 400) A		0.39 % of rdg	
(400 to 1000) A		0.38 % of rdg	

Parameter/Equipment	Frequency	CMC[2, 6] (±)	Comments
AC Voltage – Generate (3 to 33) mV (33 to 330) mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (330 to 1000) V	50 Hz to 1 kHz	0.013 mV 0.092 mV 0.000 77 V 0.0086 V 0.093 V 0.36 V	Multi-product calibrator
AC Voltage – Measure (10 to 500) mV 500 mV to 1 V (1to 10) V (10 to 100) V (100 to 1000) V	50 Hz to 1 kHz	0.15 mV 0.0012 V 0.012 V 0.12 V 0.63 V	6 ½ Multimeter
AC High Voltage – Measure Up to 2 kV (2 to 5) kV (5 to 10) kV (10 to 15) kV (15 to 20) kV (20 to 28) kV	50 Hz	0.11 kV 0.29 kV 0.61 kV 0.96 kV 1.2 kV 1.7 kV	High voltage Probe & meter

V. Fluid Quantities

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Air Velocity	(0.2 to 30) m/s	0.08 m/s	Vane probe anemometer
Air Flow[3]	(0 to 20) L/min	0.50 L/min	Air flow calibrator

VI. Mechanical

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Pressure – Hydraulics & Pneumatics[3]	(0 to 20) bar (0 to 40) bar (40 to 60) bar (60 to 70) bar (0 to 100) bar (100 to 200) bar (0 to 300) bar (300 to 400) bar (400 to 500) bar (500 to 600) bar (600 to 700) bar (700 to 800) bar (800 to 1000) bar	0.007 bar 0.06 bar 0.06 bar 0.06 bar 0.13 bar 0.13 bar 0.62 bar 0.62 bar 0.62 bar 0.62 bar 0.62 bar 1.1 bar 1.3 bar	Deadweight tester, master gauge with comparator, hand held pressure calibrator
Vacuum Gauge[3]	(0 to -1) bar	0.007 bar	Pressure calibrator
Force & Load Cell[3] Compression Tension	(0 to 200) kN (200 to 900) kN (900 to 1800) KN (1800 to 3000) KN (0 to 10) kN (10 to 50) kN (50 to 100) kN (100 to 200) kN	0.40 kN 0.09 kN 0.52 KN 0.90 KN 0.36 kN 0.36 kN 0.36 kN 0.39 kN	Master load cell,
Scales & Balances[3] Micro-Balance, Analytical, Precision & Electronic	(0 to 20) g (20 to 50) g (50 to 100) g (100 to 200) g (200 to 300) g (300 to 400) g (400 to 500) g (500 to 600) g	0.05 mg 0.21 mg 0.17 mg 0.26 mg 8.8 mg 8.8 mg 13 mg 13 mg	Standard test weight E1, E2, F1, M1

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Scales & Balances[3] (cont)			
Platforms, Spring, Batching	(600 to 800) g (800 to 1000) g (1 to 2) kg (2 to 5) kg (5 to 10) kg (10 to 15) kg (15 to 20) kg	13 mg 13 mg 13 mg 14 mg 17 mg 60 mg 62 mg	Standard test weight E1, E2, F1
	(20 to 40) kg (40 to 60) kg (60 to 80) kg (80 to 100) kg (100 to 120) kg (120 to 140) kg (140 to 160) kg (160 to 180) kg (180 to 200) kg (200 to 220) kg (220 to 240) kg (240 to 280) kg (280 to 300) kg	9.0 g 9.2 g 9.2 g 13 g 13 g 13 g 13 g 13 g 14 g 14 g 14 g 14 g 14 g	Standard test weight F1, M1
Mass (Weights/Bullion)	(1 to 5) mg 10 mg 20 mg 50 mg 100 mg 200 mg 300 mg 400 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1000 g 2000 g 5000 g 10 000 g 20 000 g	0.0016 mg 0.0016 mg 0.0016 mg 0.0021 mg 0.0025 mg 0.0031 mg 0.0031 mg 0.0031 mg 0.0041 mg 0.005 mg 0.007mg 0.010 mg 0.015 mg 0.026 mg 0.083 mg 0.13 mg 0.24 mg 5.8 mg 7.7 mg 8.1 mg 8.3 mg 14 mg 25 mg	Micro-balance, analytical balance precision balance, electronic balance, platform scale

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Torque Testers/Tools	(0 to 400) N·m (400 to 1500) N·m	0.44 % 0.29 %	Torque tester, torque transducer, torque display
Volume Pipettes, Micropipettes, & Burettes Volumetric Flasks, Dispensers, & Measuring Cylinders	(0 to 10) µL (10 to 20) µL (20 to 50) µL (50 to 100) µL (100 to 200) µL (200 to 500) µL (500 to 1000) µL (1 to 5) mL (5 to 10) mL (10 to 20) mL (20 to 50) mL (50 to 100) mL (100 to 200) mL (200 to 500) mL (500 to 1000) mL (1000 to 2000) mL	0.16 µL 0.16 µL 0.16 µL 0.16 µL 0.16 µL 0.99 µL 1.6 µL 0.008 ml 0.007 ml 0.007 ml 0.05 ml 0.05 ml 0.10 ml 0.10 ml 0.10 ml 0.10 ml	Micro-balance, analytical balance, electronic balance & standard weights

VII. Optical

Parameter/Equipment	Range	CMC[2] (±)	Comments
OTDR Distance Loss Centroidal Wavelength Single mode Multimode	(Single/multi mode) 1km (Single/multi mode) 2km (1310/1550 nm) 1 km (1310/1550 nm) 2 km (850 ~ 1650) nm	1.4 m 2.5 m 0.02 dB 0.02 dB 1.2 nm	Power meter Spectrum analyzer

Parameter/Equipment	Range	CMC[2] (±)	Comments
Power Meter			
Power Accuracy	(1310 nm) 10 µW (1550 nm) 10 µW	0.1 µW 0.1 µW	Power meter Laser source
Linearity/Non-Linearity	(1550 nm) 0 ~ -50dB	0.01 dB	Attenuator
Laser Source			
Output Power	(-50 to 3) dBm	0.02 dB	Power meter
CW Stability	0 dBm	0.007 dB	Lightwave multimeter
Wavelength	1310 nm/1550 nm	0.06 nm	
Spectrum Analyzer			
Absolute Wavelength	(1310/1550) nm	0.06 nm	Laser source
Resolution Bandwidth	(0.5 ~ 10) nm (1310/1550) nm	0.007 nm	Power meter
Linearity/Non-Linearity	(1550 nm) 0 ~ -50dB	0.01 dB	Laser source attenuator

VIII. Thermodynamics

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Hygrometer	(10 to 95) % RH (5 to 60) ˚C	1.1 % RH 0.44 ˚C	Humidity chamber, reference meter
Temperature Chambers, Ovens, Incubators, Furnaces, Chillers, Freezers, Fridges[3]	(-100 to 0) ˚C (0 to 50) ˚C (50 to 200) ˚C (200 to 400) ˚C (400 to 700) ˚C (700 to 1200) ˚C	0.22 ˚C 0.21 ˚C 0.27 ˚C 0.38 ˚C 0.56 ˚C 1.7 ˚C	Datalogger, multifunction calibrator, SPRT, 6½ DMM, reference thermometer

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Temperature[3] – Measuring Equipment, Transmitters, Temperature Bath, Liquid in Glass Thermometers, Thermocouple Sensors, RTD	(-35 to 0) ˚C (0 to 25) ˚C (25 to 50) ˚C (50 to 100) ˚C (100 to 150) ˚C (150 to 200) ˚C (200 to 300) ˚C (300 to 400) ˚C (400 to 500) ˚C (500 to 650) ˚C	0.22 ˚C 0.22 ˚C 0.22 ˚C 0.27 ˚C 0.27 ˚C 0.27 ˚C 0.27 ˚C 0.27 ˚C 0.27 ˚C 0.27 ˚C	Dry block calibrator, oil bath, reference thermometer
Temperature Mapping incubator, chiller, freezer, furnace, oven, fridges, (9 Points)[3]	(0 to 1000) ˚C (-25 to 1200) ˚C	0.6 ˚C	Multichannel data logger with RTD/TC sensor
Infrared Thermometer & Pyrometer	Up to 500 ˚C	4.1 ˚C	Black body calibrator

IX. Time & Frequency

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Frequency – Measure	1 Hz to 1 MHz 1 MHz to 225 MH	0.02 % 0.000 03 %	6½ Multimeter Frequency counter
Frequency – Generate	5 Hz to 10 kHz 10 kHz to 1 MHz	0.07 % 0.59 %	6½ Multimeter Frequency counter
Timers, Stopwatches, Chronometers[3]	Up to 1200 s (1200 to 3600) s	0.016 s 0.58 s	Stopwatch
Timers, Stopwatches, Chronometers	Up to 1200 s (1200 to 3600) s	0.03 s 0.06 s	Frequency counter

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Photo-Tachometer	Up to 1000 rpm (1000 to 2000) rpm (2000 to 10 000) rpm (10 000 to 99 999) rpm	0.1 rpm 0.41 rpm 1.3 rpm 2.9 rpm	Function generator, LED system
Rotational Speed[3] - Centrifuge	Up to 1000 rpm (1000 to 10 000) rpm (10 000 to 50 000) rpm (50 000 to 90 000) rpm	3 rpm 13 rpm 65 rpm 120 rpm	Reference noncontact tachometer

[1] This laboratory offers commercial 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] This scope meets *A2LA's P112 Flexible Scope Policy.*

[5] 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.

[6] 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.