SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: December 31, 2026 Certificate Number: 6032.01

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]:

I. Acoustics

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
Sound Level Meters – Class I & Class II Acoustic Calibration: (94, 114) dB Electric Calibration: (10 to 150) dB	 1000 Hz (20 to 20 000) Hz	 0.33 dB 0.27 dB	 INACAL PC-023 procedure for calibration of sound level meters. 1st ed, January 2017.
Acoustic Calibrators	94 dB 114 dB	0.37 dB 0.37 dB	MVAL-LAB-53, 2024 Procedure for calibration of acoustic calibrators
Acoustic Dosimeters	94 dB 114 dB	0.33 dB 0.33 dB	MVAL-LAB-55, 2024 Procedure for calibration of acoustic dosimeters

II. Chemical

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Gas Analyzers[3] – (Concentration)			
CO in N_2	(0.10 x 10^{-6} to 60 x 10^{-6}) mol/mol	0.024 x 10^{-6} mol/mol	ALAB MVAL-LAB-1: calibration of gas analyzer in air quality. By Dynamic Dilution.
NO in N_2	(0.050 x 10^{-6} to 53 x 10^{-6}) mol/mol	0.74 x 10^{-9} mol/mol	
SO_2 in N_2	(50 x 10-9 to 54 x 10^{-6}) mol/mol	0.77 x 10^{-9} mol/mol	
NO_2 in Air/N_2	(20 x 10-9 to 2.4 x 10^{-6}) mol/mol	1.7 x 10^{-9} mol/mol	
H_2S in N_2	(10 x 10-9 to 0.5 x 10^{-6}) mol/mol	1.7 x 10^{-9} mol/mol	
O_3	(10 x 10^{-9} to 5.0 x 10^{-6}) mol/mol	2.0 x 10^{-9} mol/mol	ALAB MVAL-LAB-59: calibration of gas analyzer in air quality. By direct comparison
Combustion Gas Analyzers[3] – (Concentrations)			
CH_4 in N_2	1.052 x 10^{-2} mol/mol 493 x 10^{-6} mol/mol	0.016 x 10^{-2} mol/mol 11 x 10^{-6} mol/mol	ALAB MVAL-LAB-4: calibration procedure of emission gas analyzer. By direct comparison.
CO in Air/N_2	1015 x 10^{-6} mol/mol 48.6 x 10^{-6} mol/mol 203.7 x 10^{-6} mol/mol 504 x 10^{-6} mol/mol 511 x 10^{-6} mol/mol 967 x 10^{-6} mol/mol	7.4 x 10^{-6} mol/mol 0.52 x 10^{-6} mol/mol 1.5 x 10^{-6} mol/mol 5.2 x 10^{-6} mol/mol 5.2 x 10^{-6} mol/mol 9.9 x 10^{-6} mol/mol	
CO_2 in Air/N_2	13.72 x 10^{-2} mol/mol 985 x 10^{-6} mol/mol	0.14 x 10^{-2} mol/mol 9.1 x 10^{-6} mol/mol	
NO in Air/N_2	9.62 x 10^{-6} mol/mol 20.4 x 10^{-6} mol/mol 46.2 x 10^{-6} mol/mol 971 x 10^{-6} mol/mol 984 x 10^{-6} mol/mol	0.10 x 10^{-6} mol/mol 0.21 x 10^{-6} mol/mol 0.49 x 10^{-6} mol/mol 9.8 x 10^{-6} mol/mol 7.0 x 10^{-6} mol/mol	

Parameter/Equipment	Range	CMC[2, 5, 9] (±)	Comments
Combustion Gas Analyzers[3] – (Concentrations)(cont)			
SO_2 in Air/N_2	10.23 x 10^{-6} mol/mol 20 x 10^{-6} mol/mol 978 x 10^{-6} mol/mol 1006 x 10^{-6} mol/mol	0.28 x 10^{-6} mol/mol 0.26 x 10^{-6} mol/mol 9.9 x 10^{-6} mol/mol 11 x 10^{-6} mol/mol	ALAB MVAL-LAB-4: calibration procedure of emission gas analyzer. By direct comparison.
NO_2 in Air/N_2	418 x 10^{-6} mol/mol	5.1 x 10^{-6} mol/mol	
O_2 in Air/N_2	2.995 x 10^{-2} mol/mol 10.002 x 10^{-2} mol/mol 17.47 x 10^{-2} mol/mol 19.93 x 10^{-2} mol/mol	0.032 x 10^{-2} mol/mol 0.21 x 10^{-2} mol/mol 0.18 x 10^{-2} mol/mol 0.21 x 10^{-2} mol/mol	
H_2S in Air/N_2	9.1 x 10^{-6} mol/mol 152 x 10^{-6} mol/mol	0.49 x 10^{-6} mol/mol 1.6 x 10^{-6} mol/mol	
Conductivity Meters[3]	1 µS/cm 5 µS/cm 10 µS/cm 100 µS/cm 1000 µS/cm 1413 µS/cm 10 000 µS/cm	0.62 µS/cm 0.62 µS/cm 0.62 µS/cm 2.1 µS/cm 4.8 µS/cm 6.2 µS/cm 40 µS/cm	INDECOPI PC-022 procedure for the calibration of conductometers. 1st ed, 2014.
pH Meters[3]	4 pH 7 pH 10 pH	0.012 pH 0.012 pH 0.012 pH	INACAL PC-020 procedure for the calibration of pH meters. 2nd ed, 2017.
TDS (Total Dissolved Solid)[3] – Measuring Equipment	0.66 mg/L 3.27 mg/L 6.66 mg/L 66.3 mg/L 666 mg/L 943 mg/L 6600 mg/L 1000 mg/L 1500 mg/L	0.37 mg/L 0.20 mg/L 0.20 mg/L 0.53 mg/L 2.0 mg/L 2.0 mg/L 21 mg/L 8 mg/L 17 mg/L	ALAB MVAL-LAB-26 procedure for the calibration of dissolved solids (TDS) meters. Certified reference materials

Parameter/Equipment	Range	CMC[2, 5, 9] (±)	Comments
TSS (Total Suspended Solid)[3] – Measuring Equipment	10 mg/L 100 mg/L	0.23 mg/L 1.6 mg/L	ALAB MVAL-LAB-12: procedure for the calibration of turbidimeters & total suspended solids meter. Certified reference materials.
Turbidimeters[3]	1 NTU 5 NTU 20 NTU 100 NTU 1000 NTU 4000 NTU	0.061 NTU 0.071 NTU 0.40 NTU 2.0 NTU 6.1 NTU 90 NTU	ALAB MVAL-LAB-12: procedure for the calibration of turbidimeters & total suspended solids meter. Turbidity certified reference materials
Chlorine Meters	0.745 mg/L 2.06 mg/L	0.018 mg/L 0.080 mg/L	ALAB MVAL-LAB-14 procedure for calibration of colorimeters.
Breathalyzers	Up to 2 mg/L	0.14 mg/L BAC	ALAB MVAL-LAB-13 procedure for calibration of breathalyzers.

III. Dimensional

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Rulers	Up to 1000 mm	0.20 mm	ALAB MVAL-LAB-9 procedure with OIML R35 Class I ruler.
Reticulated Meshes	(20 to 1000) µm	0.23 mm	ALAB, 2024 MVAL-LAB-54 procedure for calibration of reticulated meshes.

Parameter/Equipment	Range	CMC[2, 5, 8] (±)	Comments
Global Positioning Equipment (GPS)	10 m	5.8 mm	ALAB, 2024 MVAL-LAB-29 Procedure for GPS calibration.
Tape Measures (OIML R35 Class II & III Tape Measures)	Up to 1 m Up to 2 m Up to 3 m Up to 5 m Up to 10 m Up to 15 m Up to 20 m Up to 30 m Up to 50 m	0.24 mm 0.24 mm 0.24 mm 0.24 mm 0.25 mm 0.27 mm 0.29 mm 0.34 mm 0.83 mm	ALAB MVAL-LAB-10 calibration procedure with OIML R35 Class I ruler & OIML R35 Class I tape measure.
Outside Micrometers	Up to 10 mm Up to 25 mm Up to 150 mm (150 to 300) mm (300 to 400) mm	1.3 µm 1.3 µm 1.7 µm 1.7 µm 1.7 µm	ALAB MVAL-LAB-11 outside micrometer calibration procedure
Vernier Caliper	Up to 150 mm Up to 200 mm Up to 300 mm Up to 450 mm Up to 500 mm Up to 600 mm Up to 800 mm	$\sqrt{5.8^2 + 0.0015^2 L^2}$ µm $\sqrt{5.8^2 + 0.0016^2 \mathrm{L}^2}$ µm $\sqrt{5.8^2 + 0.0061^2 L^2}$ µm $\sqrt{5.8^2 + 0.0010^2 L^2}$ µm $\sqrt{5.8^2 + 0.0010^2 L^2}$ µm $\sqrt{5.8^2 + 0.0068^2 L^2}$ µm $\sqrt{5.8^2 + 0.0068^2 L^2}$ µm	INDECOPI SNM PC-012 procedure of calibration for calipers. 5th Ed, 2012.
Test Sieves	Up to 4 mm (4 to 25) mm (25 to 50) mm (50 to 75) mm (75 to 106) mm (106 to 125) mm	3.2 µm 8.8 µm 8.9 µm 11 µm 12 µm 18 µm	ALAB MVAL-LAB-34 with optical comparator/ measuring projector

IV. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC[2, 5, 7] (±)	Comments
DC Voltage – Generate	(2000 to 4000) mV (4 to 950) V	2.3 mV 0.59 V	INACAL PC-021 procedure for the calibration of digital multimeters. 2nd Ed, 2016.
DC Current – Generate	(20 to 40) µA (40 to 200) µA (200 to 400) µA (400 to 2000) µA (2 to 4) mA (4 to 20) mA (20 to 40) mA (0.18 to 0.9) A (0.9 to 2.25) A (2.5 to 4.5) A (4.5 to 9) A (9 to 18) A	0.046 µA 0.23 µA 0.46 µA 2.3 µA 0.52 mA 0.75 mA 0.047 mA 0.057 A 0.058 A 0.058 A 0.059 A 0.062 A	INACAL PC-021 procedure for the calibration of digital multimeters. 2nd Ed, 2016.
Resistance – Generate	(20.0 to 180) Ω (0.2 to 1.8) kΩ (2 to 18) kΩ	1.0 Ω 0.14 kΩ 0.17 kΩ	INACAL PC-021 procedure for the calibration of digital multimeters. 2nd ed, 2016.
Insulation Resistance Generate –			
Megohmmeter	(1 to 10) kΩ (10 to 100) kΩ (100 to 1000) kΩ (1 to 10) MΩ (10 to 100) MΩ (100 to 1000) MΩ (1 to 10) GΩ (10 to 100) GΩ (100 to 1000) GΩ	0.044 kΩ 0.12 kΩ 1.2 kΩ 0.35 MΩ 1.2 MΩ 12 GΩ 0.64 GΩ 5.8 GΩ 58 GΩ	CEM EL-004 megohmmeter calibration procedure
Tellurometer	(20.0 to 180) Ω (0.2 to 1.8) kΩ (2 to 18) kΩ (20 to 180) kΩ (100 to 1000) kΩ	0.89 Ω 0.14 kΩ 0.16 kΩ 0.89 kΩ 1.2 kΩ	ALAB MVAL-LAB-17 calibration procedure for tellurometer, rev. 00: 2021.

Parameter/Range	Frequency	CMC[2, 5, 7] (±)	Comments
AC Voltage – Generate (20 to 100) V (100 to 200) V (200 to 500) V (500 to 950) V	60 Hz	0.3 V 0.31 V 0.40 V 0.62 V	INACAL PC-021 procedure for the calibration of digital multimeters. 2nd Ed, 2016.
AC Current – Generate (2 to 4) mA (4 to 20) mA (20 to 40) mA (40 to 200) mA	60 Hz	0.024 mA 0.11 mA 0.23 mA 1.1 mA	INACAL PC-021 procedure for the calibration of digital multimeters. 2nd Ed, 2016

V. Fluid Quantities

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Volume –			
Burette	Up to 1 mL Up to 2 mL Up to 5 mL Up to 10 mL (d= 0.02 mL) Up to 10 mL (d= 0.05 mL) Up to 25 mL Up to 50 mL	0.0013 mL 0.0019 mL 0.0020 mL 0.0023 mL 0.0028 mL 0.0048 mL 0.0070 mL	INACAL PC-015 calibration procedure for volumetric glass & plastic material. 5th Ed, 2017. Note: intermediate volumes will take the immediate higher uncertainty.
One & Two Stroke Pipettes	1 mL 2 mL 5 mL 10 mL 20 mL 25 mL 50 mL 100 mL	0.0011 mL 0.0018 mL 0.0028 mL 0.0022 mL 0.0027 mL 0.0031 mL 0.0058 mL 0.0098 mL	
One-Mark Flasks	1 mL 2 mL 5 mL	0.0039 mL 0.0044 mL 0.0050 mL	

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Volume – (cont)			
One-Mark Flasks	10 mL 20 mL 25 mL 50 mL 100 mL 200 mL 250 mL 500 mL 1000 mL 2000 mL	0.0049 mL 0.0052 mL 0.0053 mL 0.0076 mL 0.0097 mL 0.020 mL 0.020 mL 0.034 mL 0.060 mL 0.13 mL	INACAL PC-015 calibration procedure for volumetric glass & plastic material. 5th Ed, 2017. Note: intermediate volumes will take the immediate higher uncertainty.
Graduated Pipette	Up to 0.1 mL Up to 2 mL Up to 5 mL Up to 10 mL Up to 20 mL Up to 25 mL	0.0012 mL 0.0021 mL 0.0031 mL 0.0046 mL 0.011 mL 0.016 mL	X = nominal volume (mL)
Pycnometers	10 mL 25 mL 50 mL 100 mL	0.0009 mL 0.0020 mL 0.0030 mL 0.0058 mL	
Graduated Measuring Cylinders	Up to 5 mL Up to 10 mL Up to 25 mL Up to 50 mL Up to 100 mL Up to 250 mL Up to 500 mL Up to 1000 mL Up to 2000 mL	0.020 mL 0.021 mL 0.023 mL 0.098 mL 0.090 mL 0.016 mL 0.30 mL 0.74 mL 0.82 mL	
Imhoff Cone	Up to 100 mL (100 to 1000) mL	(0.0093X + 0.17) mL (0.0014X + 0.94) mL	
Piston Micropipettes	1 µL Up to 2.5 µL Up to 10 µL Up to 20 µL Up to 100 µL Up to 200 µL Up to 1000 µL Up to 5000 µL Up to 10 000 µL	0.052 µL 0.073 µL 0.085 µL 0.046 µL 0.34 µL 0.29 µL 1.6 µL 6.6 µL 15 µL	INACAL PC-027 procedure for the calibration of piston pipettes. 1st ed, 2019. Note: intermediate volumes will take the immediate higher uncertainty

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Volume – (cont)			
Piston Apparatus (Piston Burettes & Dispensers)	Up to 1 mL (> 1 to 2) mL (> 2 to 5) mL (> 5 to 10) mL (> 10 to 25) mL (> 25 to 50) mL	0.000 22 mL 0.000 44 mL 0.0011 mL 0.0058 mL 0.0059 mL 0.011 mL	ALAB MVAL-LAB-19 procedure for the calibration of piston-actuated volumetric instruments, Rev. 00:2021.
Metallic Volumetric Meters	5 gal	0.03 % of the nominal value	ALAB MVAL-LAB-3 calibration procedure for metallic volumetric meters (volumetric method) Rev. 00: 2020 (based on the Peruvian metrological standard NMP 009: 1999 "measurement systems for liquids other than water: standard volumetric meters")
Metallic Volumetric Meters (Measurement Standards)	5 gal (18 925.7 L)	3.3 mL	ALAB MVAL-LAB-60 calibration for metallic volumetric meters standards
Rain Gauges –			
Analog	Up to 136 L/m^2	1.2 L/m^2	ALAB MVAL-LAB-39: Procedure for calibration of rain gauges with analytical balance
Digital	Up to 136) L/m^2	0.74 L/m^2	
Flow Rate[3] – Air Flowmeters	(0.05 to 1) L/min (1 to 10) L/min (10 to 30) L/min	0.012 L/min 0.016 L/min 0.14 L/min	CEM ME-009 procedure for the calibration of gas flow meters. 1st ed, digital. Reference flow conditions: 1 atm (101325 Pa) & temperature of 298.15 K.

Parameter/Equipment	Range	CMC[2, 5, 6] (±)	Comments
High Volume Air Flow Sampler[3]	(220 to 1200) L/min	3.4 %	ALAB MVAL-LAB-36 "Procedure for calibration of high-volume particle samplers" High volume air flow calibrator Reference flow conditions: 1 atm (101325 Pa) & temperature of 293.15 K (20 °C)
High Volume Variable Flow (Vari Flow)[3] – Measuring Equipment	(50 to 100) m^3/h	3.2 %	ALAB MVAL-LAB-31 "Procedure for calibrating high volume variable flow calibrators" Rotary type air flow meter & timer Reference flow conditions: 1 atm (101325 Pa) & temperature of 293.15 K (20 °C)
Dry Gas Meter	(11 to 31) L/min	0.15 L/min	ALAB MVAL-LAB-57 "Procedure for calibration of dry gas meters in isokinetic samplers"

VI. Mechanical

Parameter/Equipment	Range	CMC[2, 4, 5] (±)	Comments
Balances[3] –			
Balance Class I	Up to 2.1 g Up to 22 g Up to 51 g Up to 120 g Up to 220 g Up to 500 g	0.016 mg 0.13 mg 0.31 mg 0.84 mg 1.3 mg 3.1 mg	INDECOPI PC-011 calibration procedure for non-automatic Class I & II balances. Fourth edition 2010 with OIML class E2, F1 reference weights

Parameter/Equipment	Range	CMC[2, 4, 5] (±)	Comments
Balances[3] – (cont)			
Balance Class II	Up to 300 g Up to 2000 g Up to 3100 g Up to 5200 g Up to 6200 g Up to 20 000 g Up to 30 000 g	3.7 mg 31 mg 39 mg 61 mg 93 mg 0.13 g 0.28 g	INDECOPI PC-011 calibration procedure for non-automatic Class I & II balances. Fourth edition 2010 with OIML class E2, F1 reference weights
Balance Class III & IV	Up to 15 kg Up to 40 kg Up to 500 kg Up to 1500 kg	7.5 g 9.7 g 53 g 200 g	INACAL PC-001 calibration procedure for non-automatic Class III & IIII balances. First Edition 2019 with OIML class M1, M2 reference weights
Mass –			
OIML Classs E2 (Weights of accuracy class E2)	1 mg 2 mg 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg	0.0017 mg 0.0017 mg 0.0017 mg 0.0017 mg 0.0017 mg 0.0022 mg 0.0027 mg 0.0032 mg 0.0042 mg 0.0098 mg 0.010 mg 0.012 mg 0.013 mg 0.015 mg 0.020 mg 0.030 mg 0.056 mg 0.16 mg 0.30 mg 0.56 mg	PC-016 procedure for calibrating precision weights. INDECOPI SNM, 2nd Edition, 2015
OIML Class F1 & F2 (Accuracy class F1 & F2 weights)	1 mg 2 mg 5 mg	0.0032 mg 0.0032 mg 0.0032 mg	PC-016 procedure for calibrating precision weights. INDECOPI SNM, 2nd Edition, 2015

Parameter/Equipment	Range	CMC[2, 4, 5] (±)	Comments
Mass – (cont)			
OIML Class F1 & F2 (Accuracy class F1 & F2 weights)	10 mg 20 mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg	0.0032 mg 0.0047 mg 0.0062 mg 0.0077 mg 0.0092 mg 0.012 mg 0.017 mg 0.032 mg 0.026 mg 0.032 mg 0.039 mg 0.047 mg 0.11 mg 0.17 mg 0.39 mg 0.78 mg 1.5 mg	PC-016 procedure for calibrating precision weights. INDECOPI SNM, 2nd Edition, 2015
OIML Class M1	1 mg 2 mg 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 k g	0.0032 mg 0.0032 mg 0.0032 mg 0.0032 mg 0.0047 mg 0.0062 mg 0.0077 mg 0.0092 mg 0.012 mg 0.017 mg 0.032 mg 0.026 mg 0.032 mg 0.039 mg 0.047 mg 0.11 mg 0.17 mg 0.39 mg 0.78 mg 1.5 mg 0.012 mg 0.017 mg 0.032 mg	

Parameter/Equipment	Range	CMC[2, 4, 5](±)	Comments
Mass – (cont)			
OIML Classes M2	100 mg 200 mg 500 mg	0.095 mg 0.15 mg 0.15 mg	INACAL PC-008 procedure for the calibration of weights of accuracy class OIML M1-2, M2, M2-3 & M3 (NMP 004:2007). 1st Ed, April 2021.
OIML Class M2 & M3	1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg	0.29 mg 0.78 mg 0.78 mg 0.80 mg 0.80 mg 0.80 mg 0.83 mg 1.1 mg 3.3 mg 68 mg 50 mg 50 mg 0.43 g 0.55 g	
Pressure –			
Barometers, & Meteorological Stations	(500 to 800) mbar (800 to 1100) mbar	0.70 mbar 0.52 mbar	INACAL PC-024 calibration of measurement instruments, absolute pressure. 1st ed., 2018.
Liquid Column Manometer	Up to 55 inH_2O	0.33 inH_2O	CEM-Spain ME-021 procedure for the calibration of liquid column (manometric & barometric). 2nd ed, digital, 2020.
Pressure Gauges (Low Volume, Automatic)	(500 to 800) mbar (800 to 1100) mbar	0.7 mbar 0.1 mbar	INACAL PC-024 calibration of measurement instruments, absolute pressure. 1st ed., 2018 (Validated - Applied out of scope)
Differential Pressure Gauge	Up to 1 bar	0.014 bar	ALAB, 2024. MVAL-LAB-44 procedure for differential manometer calibration

Parameter/Equipment	Range	CMC[2, 4, 5, 6] (±)	Comments
Hydraulic Pressure Gauges, Vacuum Gauges & Pressure/ Vacuum Gauges	(-1 to 0) bar (0 to 1) bar (0 to 30) bar (0 to 700) bar	0.091 bar 0.091 bar 0.11 bar 0.18 bar	CEM-Spain ME-003 procedure for the calibration of pressure gauges, vacuum gauges & pressure/vacuum gauges, 3rd ed.
Pneumatic Pressure Gauges/Manometers	(-0.73 to 1) bar (0 to 30) bar (0 to 60) bar	0.0090 bar 0.0092 bar 0.16 bar	CEM-Spain ME-003 procedure for the calibration of pressure gauges, vacuum gauges & pressure/vacuum gauges, 3rd ed.
Air Velocity – Anemometers	(0.5 to 5) m/s (5 to 10) m/s 10 to 15) m/s (15 to 20) m/s (20 to 25) m/s	0.46 m/s 0.68 m/s 0.9 m/s 1.1 m/s 1.3 m/s	ALAB MVAL-LAB-6 procedure for anemometer calibration.
Torque Wrenches	(30 to 811) N·m	2 %	CEM- Spain: procedure for calibration of torque tools (consistent to ISO 6789:2003)

VII. Optical Quantities

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Spectrophotometers[3] –			
Wavelength	279.28 nm 360.82 nm 453.54 nm 536.37 nm 637.60 nm 334.42 nm 345.32 nm 360.80 nm 374.48 nm	0.24 nm 0.14 nm 0.15 nm 0.15 nm 0.15 nm 0.15 nm 0.13 nm 0.13 nm 0.13 nm	ALAB, 2024 MVAL-LAB-18 procedure for the calibration of spectrophotometer UV-Vis.

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Spectrophotometers[3] – (cont)			
Wavelength	386.15 nm 402.56 nm 417.80 nm 485.48 nm 537.62 nm 583.3 nm 642.41 nm 747.71 nm 803.64 nm 975.8 nm 1075.4 nm	0.13 nm 0.13 nm 0.13 nm 0.13 nm 0.13 nm 0.13 nm 0.13 nm 0.13 nm 0.13 nm 0.31 nm 0.21 nm	ALAB, 2024 MVAL-LAB-18 procedure for the calibration of spectrophotometer UV-Vis.
Absorbance	440 nm: 0.2665 A 0.5279 A 1.0802 A 465 nm: 0.2413 A 0.4854 A 1.0006 A 546.1 nm: 0.2521 A 0.4994 A 1.0128 A 590 nm: 0.2874 A 0.5566 A 1.0839 A 635 nm: 0.2909 A 0.5533 A 1.0494 A	 0.0010 A 0.0011 A 0.0018 A 0.0010 A 0.0011 A 0.0014 A 0.0010 A 0.0011 A 0.0015 A 0.0010 A 0.0012 A 0.0018 A 0.0010 A 0.0012 A 0.0017 A	

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Illuminance Meters	Up to 1100 lux	0.045 x *I* + 0.15	ALAB, 2024 MVAL-LAB-20 procedure for calibration of illuminance meters & radiation. *I*: lux
Refractometer	0 °Brix 10 °Brix 20 °Brix 30 °Brix 50 °Brix 60 °Brix	0.12 °Brix 0.14 °Brix 0.14 °Brix 0.14 °Brix 0.14 °Brix 0.14 °Brix	ALAB, 2024 MVAL-LAB-22 procedure for refractometer calibration.

VIII. Thermodynamics

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Thermostatic Baths (Alcohol, Water or Oil as Thermostatic Medium)[3]	(-60 to 200) °C	0.051 °C	INDECOPI/SNM PC-019 procedure for the calibration of thermostatic baths. 1st ed, 2019.
Temperature[3] – Incubators, Stoves, Ovens, Environmental Chambers, Refrigerators, Freezers & Similar Equipment	(-60 to 250) °C (200 to 1000) °C	0.037 °C 0.17 °C	INDECOPI/SNM PC-018 procedure for the calibration or characterization of isothermal media with air as a thermostatic medium. 2nd ed, 2009.
Temperature[3] – Heating Plate	(150 to 200) °C (200 to 300) °C (300 to 400) °C	0.23 °C 1.2 °C 6.7 °C	ALAB MVAL-LAB-15 procedure for the calibration temperature plate.

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Temperature[3] – Digester	(0 to 100) °C (100 to 250) °C	0.19 °C 0.22 °C	ALAB MVAL-LAB-16 digester calibration procedure.
Temperature[3] – Autoclave	(100 to 180) °C	0.2 °C	INDECOPI PC-006 procedure for the calibration of autoclaves. 2nd ed, 2008.
Thermometers – Analog	(-60 to 250) °C	0.12 °C	MVAL-LAB-5 procedure for the calibration of analog thermometer
IR Thermometers	(-20 to 50) °C (50 to 100) °C (100 to 200) °C (200 to 320) °C	3.3 °C 3.1 °C 3.8 °C 5.2 °C	CEM-Spain procedure TH-002 for the calibration of infrared radiation thermometers. 1st ed, digital.
Hygrometers & Environmental Thermometers – Temperature Function Sensor In Humidity Function	(-20 to 40) °C (20 to 90) % RH	0.48 °C 2.2 % RH	INACAL PC-026 procedure for the calibration of hygrometers & environmental thermometers. 1st ed, 2019.
Liquid-In-Glass Thermometers (Partial, Total & Complete Immersion)	(-60 to 20) °C (20 to 90) °C (80 to 250) °C	0.06 °C 0.07 °C 0.08 °C	CEM-Spain: TH-004 procedure for calibration by comparison of liquid column thermometers
Environment Controlled Chambers – Temperature	(-60 to 150) °C	0.42 °C	Calibration procedure consistent with DKD-R 5-7 calibration guideline of climatic chambers Thermo-hygrometer data loggers

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Environment Controlled Chambers – (cont) Humidity	 (30 to 35) % RH (35 to 50) % RH (50 to 82) % RH	 4 % RH 3.6 % RH 6 % RH	Calibration procedure consistent with DKD-R 5-7 calibration guideline of climatic chambers Thermo-hygrometer data loggers
Storage & Transportation Unit Thermal Conditions – Spatial Survey/ Mapping Temperature Humidity	 (0 to 50) °C (30 to 82) % RH	 0.94 °C 4.2 % RH	ALAB MVAL-LAB-37 procedure for environment calibration (temperature-humidity mapping) based on Peru's Ministerial resolution RM 132-215, & Argentina Guia # GO-SAFYBI-005v1 with thermo-hygrometer data loggers.
Temperature – Dry Well	(-40 to 150) °C (150 to 250) °C	0.19 °C 0.25 °C	Procedure consistent with Euramet cg-13 with Fluke 1560 digital thermometers
Temperature – Digital Thermometers	(-60 to 250) °C (250 to 1000) °C (-80 to -65) °C (-65 to -30) °C (-30 to 50) °C (50 to 150) °C (150 to 250) °C	0.058 °C 3.9 °C 0.058 °C 0.049 °C 0.038 °C 0.036 °C 0.047 °C	INDECOPI PC-017 procedure for calibration of digital thermometers. 2nd ed, 2012. CEM-Spain: TH-001 procedure for the calibration of digital thermometers by direct comparison.

IX. Time & Frequency

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Chronometers	1 s to 10 min > 10 min to 3 h (> 3 to 9) h	0.06 s 0.08 s 0.08 s	MVAL-LAB-7 procedure for calibrating time counters

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Non-Contact Tachometers	(10 to 50) rpm (50 to 100) rpm (100 to 500) rpm (500 to 1000) rpm (1000 to 5000) rpm (5000 to 10 000) rpm (10 000 to 50 000) rpm (50 000 to 99 000) rpm	0.013 rpm 0.061 rpm 0.13 rpm 0.61 rpm 1.1 rpm 1.9 rpm 6.3 rpm 12 rpm	MVAL-LAB-8 calibration procedure for tachometer witch optical sensor
Centrifuges	(100 to 50 000) rpm	5 rpm	ALAB, MVAL-LAB-35 procedure for the calibration of centrifuges.
Vibration Meters	1 m/s^2 10 m/s^2	0.038 m/s^2 0.069 m/s^2	ALAB, 2024 MVAL-LAB-30 procedure for calibration of vibrometers

[1] This laboratory offers commercial calibration service and field calibration services.

[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 Generate. 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] CMCs for intermediate values are calculated using linear interpolation.

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

[6] In the statement of CMC, percentages are percentages of reading, unless otherwise indicated.

[7] 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.

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

[9] 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.

Accredited Laboratory

A2LA has accredited

ANALYTICAL LABORATORY EIRL

Lima, PERU

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 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 13th day of December 2024.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 6032.01
Valid to December 31, 2026

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