



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

QUALITY CONTROL SERVICES, INC.
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CALIBRATION

Valid To: September 30, 2025

Certificate Number: 1550.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1,9}:

I. Chemical

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
pH Meter ³ – pH Electrical Simulation of pH Indicator	4 pH 7 pH 10 pH (414 to -414) mV	0.051 pH 0.029 pH 0.053 pH 0.32 mV	Standard pH solutions DMM
Conductivity Meters ³	10 µS/cm 100 µS/cm 1000 µS/cm 10 000 µS/cm	0.68 µS/cm 4.3 µS/cm 15 µS/cm 140 µS/cm	Standard conductivity solutions
Dissolved Oxygen Meters ³ – Fixed Points	0 % DO 100 % DO	0.32 % DO 0.67 % DO	Saturated solution at 25 °C
Turbidimeters ³	(< 0.1 to 1) NTU (1 to 20) NTU (21 to 200) NTU (201 to 1000) NTU (1001 to 4000) NTU	0.083 NTU 0.87 NTU 2.2 NTU 5.0 NTU 21 NTU	Formazin nephelometric turbidity unit standards

Parameter/Equipment	Range	CMC ² (±)	Comments
Refractometers ³	1.3330 ⁿ _D 1.399 86 ⁿ _D 1.468 39 ⁿ _D 0 % Brix 40 % Brix 70 % Brix	0.000 45 ⁿ _D 0.000 43 ⁿ _D 0.000 41 ⁿ _D 0.33 % Brix 0.23 % Brix 0.17 % Brix	ⁿ _D is a unit for refractive index % Brix is unit for refractive index specific to sugar solutions Accredited refractive index standards
Spectrophotometers ³			
Transmittance at (440 to 635) nm	10 % <i>T</i> 50 % <i>T</i>	0.11 % <i>T</i> 0.32 % <i>T</i>	Spectronic glass filter standards
Wavelength	400 nm peak 525 nm peak 780 nm peak	0.63 nm 0.57 nm 0.63 nm	<i>T</i> = transmittance

II. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of Thermocouple Indicators –			
Type J	(-200 to 800) °C	0.46 °C	Fluke 702/ 726 process calibrator
Type K	(-200 to 1300) °C	0.25 °C	
Type S	(0 to 1500) °C	0.56 °C	
Type T	(-200 to 400) °C	0.35 °C	

III. Fluid Quantities

Parameter/Equipment	Range	CMC ² (±)	Comments
Fume Hoods – Air Velocity Only ³	(60 to 120) ft/min	17 ft/min	Extech 407119A anemometer

IV. Mechanical

Parameter/Equipment	Range	CMC ^{2, 5} (±)	Comments
Balances and Scales ³	(1 to 2) mg	0.000 57 mg	ASTM Class 1 weights
	(> 2 to 3) mg	0.000 61 mg	
	(> 3 to 50) mg	0.000 75 mg	
	(> 50 to 100) mg	0.0012 mg	
	(> 100 to 500) mg	0.0030 mg	
	> 500 mg to 3 g	0.0057 mg	
	(> 3 to 5) g	0.0074 mg	
	(> 5 to 10) g	0.0099 mg	
	(> 10 to 30) g	0.017 mg	
	(> 30 to 50) g	0.031 mg	
	(> 50 to 100) g	0.063 mg	
	(> 100 to 200) g	0.072 mg	
	(> 200 to 400) g	0.15 mg	
	(> 400 to 500) g	0.59 mg	
	> 500 g to 1 kg	0.75 mg	
	(> 1 to 2) kg	1.3 mg	
	(> 2 to 3) kg	1.8 mg	
(> 3 to 5) kg	2.4 mg		
(> 5 to 10) kg	9.2 mg		
(> 10 to 50) kg	83 mg		
	(> 50 to 100) kg	89 mg	ASTM Class 6 weights
	(> 100 to 300) kg	820 mg	
Moisture Analyzers ³	1 mg to 10 g	0.082 mg	ASTM Class 1 weights plus temperature measurement of heating element (refer to parameter temperature – measure)
	(> 10 to 20) g	0.084 mg	
	(> 20 to 50) g	0.093 mg	
	(> 50 to 100) g	0.10 mg	
	(> 100 to 200) g	0.11 mg	
	(> 200 to 400) g	0.83 mg	
	(> 400 to 500) g	1.0 mg	
Scales (Class III) ³	(0.001 to 2500) lb	0.82R	NIST Class F weights
	(> 2500 to 5000) lb	1.0R	NIST Class F weights w/ substitution weights

Parameter/Equipment	Range	CMC ² (±)	Comments
Pipettes ³ –	(0.1 to 0.5) µL (0.5 to 2.5) µL (2.5 to 5) µL (5 to 10) µL (10 to 100) µL (100 to 500) µL (500 to 1000) µL (1000 to 2500) µL (2500 to 5000) µL	0.061 µL 0.050 µL 0.065 µL 0.054 µL 0.16 µL 0.34 µL 0.66 µL 1.4 µL 3.3 µL	Gravimetric method using: analytical balances
Volumetric Dispensers ³	(5 to 10) mL (10 to 25) mL (25 to 50) mL	9.4 µL 9.6 µL 12 µL	Gravimetric method using: analytical balances/ precision balances
Titration ³ –			
pH	4 pH 7 pH 10 pH	0.051 pH 0.029 pH 0.053 pH	Standard pH solutions
Electrical Simulation of pH Indicator	(414 to -414) mV	0.31 mV	DMM
Burette Volume	Up to 10 mL	0.017 mL	Gravimetric method
Rotational Speed ³ –			
Tachometers	(50.0 to 100.0) rpm (100.1 to 999.9) rpm (1000.0 to 2000.0) rpm (2000.1 to 5000.0) rpm (5000.1 to 9999.9) rpm 10 000 rpm (10 001 to 20 000) rpm (20 001 to 30 000) rpm (30 001 to 50 000) rpm (50 001 to 100 000) rpm	0.082 rpm 0.15 rpm 0.59 rpm 1.2 rpm 1.5 rpm 1.7 rpm 2.6 rpm 3.0 rpm 4.8 rpm 9.5 rpm	Hoto ESL-200A strobe/ tachometer
Rotational Devices, Including Centrifuges, Shakers, Stirrers, Etc.	(50 to 5000) rpm (5000 to 10 000) rpm (10 001 to 20 000) rpm (20 001 to 30 000) rpm	6.0 rpm 6.2 rpm 6.6 rpm 6.8 rpm	Strobe/ tachometer

Parameter/Equipment	Range	CMC ² (±)	Comments
Mass ⁶	1 mg	0.000 49 mg	OIML E2 mass standards and Sartorius SC2 as comparator
	(> 1 to 2) mg	0.000 41 mg	
	(> 2 to 3) mg	0.000 39 mg	
	(> 3 to 5) mg	0.000 41 mg	
	(> 5 to 10) mg	0.000 24 mg	
	(> 10 to 20) mg	0.000 18 mg	
	(> 20 to 30) mg	0.000 22 mg	
	(> 30 to 50) mg	0.000 22 mg	
	(> 50 to 100) mg	0.000 34 mg	
	(> 100 to 200) mg	0.000 49 mg	
	(> 200 to 300) mg	0.000 71 mg	
	(> 300 to 500) mg	0.0011 mg	
	> 500 mg to 1 g	0.0022 mg	
	(> 1 to 2) g	0.0018 mg	
	(> 2 to 3) g	0.0021 mg	OIML E2 mass standards and Mettler AT 106 as comparator
	(> 3 to 5) g	0.0022 mg	
	(> 5 to 10) g	0.0034 mg	
	(> 10 to 20) g	0.0046 mg	
	(> 20 to 30) g	0.0066 mg	
	(> 30 to 50) g	0.010 mg	
	(> 50 to 100) g	0.021 mg	
(> 100 to 200) g	0.042 mg	OIML E2/ ASTM Class 0 mass standards and Mettler AT 201 as comparator	
(> 200 to 300) g	0.092 mg	ASTM Class 0 mass standards and Mettler BC51000 as comparator	
(> 300 to 500) g	0.10 mg		
> 500 g to 1 kg	0.15 mg		
(> 1 to 2) kg	0.46 mg	ASTM Class 0 mass standards and Sartorius S10000 as comparator	
(> 2 to 3) kg	0.51 mg		
(> 3 to 5) kg	0.79 mg		
(> 5 to 10) kg	1.5 mg		
(> 10 to 20) kg	10 mg	ASTM Class 0 mass standards and Sartorius CC 30002 as comparator	
(> 20 to 30) kg	10 mg		

V. Thermodynamics

Parameter/Equipment	Range	CMC ^{2, 8} (±)	Comments
Thermometers and Temperature Sensors –			Temperature baths or furnace and:
Liquid-In-Glass Thermometers ⁷	(-80 to -1) °C (0 to 150) °C (151 to 400) °C	0.081 °C 0.034 °C 0.35 °C	Fluke 1523 indicator w/ 5628 PRT probe for (-80 to 0) °C;
RTD and Thermistor Sensors	(-80 to -1) °C (0 to 150) °C (151 to 400) °C (401 to 600) °C	0.047 °C 0.015 °C 0.34 °C 1.2 °C	Fluke/ Hart Scientific 1502A indicator w/ Burns 5615-12 PRT probe for (0 to 150) °C;
Thermocouple Thermometers	(-80 to -1) °C (0 to 150) °C (151 to 400) °C (401 to 600) °C (601 to 1000) °C	0.10 °C 0.070 °C 0.36 °C 1.5 °C 2.6 °C	Fluke 1523 indicator w/ 5628 PRT probe for (151 to 600) °C; Fluke 702/726 indicator w/ Omega type S thermocouple for (601 to 1000) °C
Infrared (IR) Thermometers	(-15 to < 0) °C (0 to < 50) °C (50 to < 100) °C (100 to 120) °C (> 120 to 200) °C (> 200 to 350) °C (> 350 to 500) °C	0.92 °C 0.73 °C 0.44 °C 0.80 °C 1.6 °C 2.7 °C 4.0 °C	Fluke 4180 IR calibrator Fluke 4181 IR calibrator
Temperature ³ – Measure, Freezers, Refrigerators, Cold Boxes, Incubators, Environmental Chambers, Water Baths, Autoclaves, Hot Plates, Furnaces, Ovens	(-80 to -1) °C (0 to 150) °C (151 to 400) °C (401 to 600) °C (601 to 1000) °C	0.31 °C 0.29 °C 0.79 °C 3.7 °C 8.0 °C	Fluke 51/54 digital thermometer
Relative Humidity ³ – Measure	(40 to 60) % RH	1.0 % RH	Fluke 1620A meter with 2626H sensor

- ¹ This laboratory offers commercial calibration service 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 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 For the parameter Dissolved Oxygen, DO represents "Dissolved Oxygen" and for the parameter Turbidity, NTU represents Nephelometric Turbidity Units.
- ⁵ For the parameters Analytical and Precision Balances, Scales and Moisture Analyzers and Moisture Balances, R represents the numerical value of the resolution of the device.
- ⁶ English/Avoirdupois Mass values will be determined using accepted international conversion factors.
- ⁷ CMC uncertainties based on total immersion thermometers.
- ⁸ 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.
- ⁹ This scope meets A2LA's *P112 Flexible Scope Policy*.



Accredited Laboratory

A2LA has accredited

QUALITY CONTROL SERVICES, INC.

Portland, OR

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/NCCL 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 11th day of October 2023.

A blue ink signature of Trace McInturff, written in a cursive style.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1550.01
Valid to September 30, 2025

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