SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: September 30, 2024 Certificate Number: 4968.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations[1, 8:]

I. Chemical

Parameter/Equipment	Range	CMC[2, 9] (±)	Comments[4]
pH[3] – Measuring Equipment	(2, 4, 7, 10, 12) pH	0.04 pH	Standard solution
Conductivity[3] – Measuring Equipment	2 µS/cm 10 µS/cm 100 µS/cm 1000 µS/cm 10 000 µS/cm 100 000 µS/cm	0.15 µS/cm 0.27 µS/cm 1.5 µS/cm 13 µS/cm 0.21 mS/cm 1.3 mS/cm	Standard solution
Conductivity[3] – Measure	$(0.1 < C \leq 10\ 000)$ µS/cm	0.12 % + 0.0094 µS/cm	Conductivity meter
CO_2[3] – Measure	$(0 < CO_2 \leq 2.5)$ % CO_2 $(2.5 < CO_2 \leq 5)$ % CO_2 $(5 < CO_2 \leq 10)$ % CO_2	0.29 % CO_2 0.26 % CO_2 0.27 % CO_2	Gas analyzer
O_2[3] – Measure	$(0 < O_2 \leq 99)$ % O_2	0.4 % O_2	Gas analyzer

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Parameter/Equipment	Range	CMC[2] (±)	Comments[4]
Gas Analyzers, Data Loggers, Transmitters & Detection Equipment[3]	1 % CO_2 2.5 % CO_2 5 % CO_2 10 % CO_2 20 % CO_2 5 % O_2 10 % O_2 20.8 % O_2 50 % O_2 99 % O_2	0.17 % CO_2 0.11 % CO_2 0.11 % CO_2 0.11 % CO_2 0.12 % CO_2 0.16 % O_2 0.21 % O_2 0.22 % O_2 0.39 % O_2 0.22 % O_2	Reference gases

II. Dimensional

Parameter/Equipment	Range[7]	CMC[2] (±)	Comments[4]
Calipers[3]	$L \leq 150$ mm $150 < L \leq 300$ mm	8 µm (320 µin) 13 µm (510 µin)	Caliper checker gage blocks: DIN 862
Thickness Gages (Mechanical, Electronical, Voil, Ultrasonic)[3]	$L \leq 50$ mm	2.3 µm (91 µin)	Gage blocks
Micrometers[3]	$L \leq 50$ mm $50 < L \leq 100$ mm $100 < L \leq 200$ mm $200 < L \leq 275$ mm	1.7 µm (67 µin) 2.4 µm (95 µin) 4.3 µm (170 µin) 5.8 µm (230 µin)	Gage blocks: DIN 863

III. Fluid Quantities

Parameter/Equipment	Range	CMC[2] (±)	Comments[4]
Volume – Fixed Points (Volumetric Apparatus, Pipettes)	1 µl 2 µl 5 µl 10 µl 20 µl 50 µl 100 µl 200 µl 500 µl 1 ml 2 ml 5 ml 10 ml 20 ml 50 ml 100 ml	0.04 µl 0.04 µl 0.04 µl 0.06 µl 0.11 µl 0.20 µl 0.21 µl 0.23 µl 0.44 µl 0.67 µl 1.7 µl 2.7 µl 5.1 µl 8.0 µl 15 µl 17 µl	Gravimetric method with analytical balance: ISO 8655-1; ISO 8655-2; ISO 8655-3; ISO 8655-4; ISO 8655-5; ISO 8655-6

IV. Industry Specific Calibrations

Parameter/Equipment	Range[7]	CMC[2] (±)	Comments[4]
Sieves – 2D	$L \leq$ (150 x 50) mm	7.6 µm	Profile projector; ASTM E11; ISO 3310; ISO 9044; ISO 4782; ISO 4783

V. Mechanical

Parameter/Equipment	Range[7]	CMC[2, 5] (±)	Comments[4]
Pressure Gages, Pressure Transducers, Pressure Indicators, & Pressure Transmitters[3]			
Absolute:	(1 ≤ *P* ≤ 50) Pa (0.5 < *P* ≤ 2) kPa (3.5 ≤ *P* ≤ 200) kPa (0.2 < *P* ≤ 0.4) MPa (0.4 < *P* ≤ 1.2) MPa (1.2 < *P* ≤ 2) MPa (2 < P ≤ 20) MPa (20 < P ≤ 40) MPa	1.3 % + 0.01 Pa 1 % + 0.15 Pa 31 Pa 0.15 kPa 0.20 kPa 0.25 kPa 25 kPa 28 kPa	Pressure transducer OIML/R101; EA-10/17 Israeli standard 697
Pneumatic:			
Gage & Differential	(-2400 < *P* ≤ 2400) Pa	0.24 % + 0.15 Pa	
Vacuum	(-90 ≤ *P* ≤ 0) kPa	0.16 kPa	
Hydraulic & Pneumatic:	(0 ≤ *P* ≤ 0.1) MPa (0.1 < *P* ≤ 0.4) MPa (0.4 < *P* ≤ 1.2) MPa (1.2 < *P* ≤ 2) MPa (2 < *P* ≤ 5) MPa (5 < *P* ≤ 7) MPa (7 < *P* ≤ 14) MPa (14 < *P* ≤ 28) MPa (28 < *P* ≤ 35) MPa (35 < *P* ≤ 50) MPa (50 < *P* ≤ 70) MPa	0.13 kPa 0.15 kPa 0.20 kPa 0.25 kPa 1.2 kPa 1.6 kPa 5.0 kPa 7.4 kPa 9.9 kPa 16 kPa 20 kPa	
Balances[3, 6] (Includes Analytical Balances)	1 mg < *m* ≤ 500 g 500 g < *m* ≤ 50 kg (50 < *m* ≤ 200) kg (200 < *m* ≤ 600) kg[10] (600 < *m* ≤ 800) kg[10] (800 < *m* ≤ 1000) kg[10]	2 LSVD 1 LSVD 2 LSVD 2 LSVD 3 LSVD 4 LSVD	Mass standards: Class E2, F1, M1, OIML R76-1, EURAMET/cg 18/v.02, USP 41
Torque – Torque Wrenches & Torque Drivers	TRQ ≤ 2.5 N·m 2.5 < TRQ ≤ 50 N·m 50 < TRQ ≤ 150 N·m 150 < TRQ ≤ 500 N·m 500 < TRQ ≤ 1000 N·m	0.012 N·m 0.13 N·m 0.24 N·m 1.4 N·m 3.8 N·m	Torque transducers

VI. Thermodynamics

Parameter/Equipment	Range[7]	CMC[2, 8, 9] (±)	Comments[4]
Thermocouple Calibration –			
Type K, T, N, J	(-100 ≤ T ≤ 400) °C (400 < T ≤ 600) °C (600 < T ≤ 800) °C (800 < T ≤ 1200) °C	0.16 °C 0.92 °C 1.1 °C 3.1 °C	ASTM E220
RTD (PRT) Probes	-196 °C	0.04 °C	ASTM E644;
Calibration	(-100 ≤ T < 0) °C (0 ≤ T ≤ 165) °C (165 < T ≤ 400) °C	0.04 °C 0.02 °C 0.04 °C	ASTM E 1137
Temperature – Measuring Equipment			
Instruments – Liquid in Glass Thermometers	(-35 ≤ T ≤ 165) °C (165 < T ≤ 400) °C	0.09 °C 0.17 °C	ASTM E1;
Mechanical & Electrical Indicators[3]	-196 °C (-100 ≤ T ≤ 400) °C (400 < T ≤ 600) °C (600 < T ≤ 800) °C (800 < T ≤ 1200) °C	0.13 °C 0.13 °C 0.92 °C 1.1 °C 3.1 °C	ASTM E77; ISO 1770; ISO 1771
Temperature – Measure[3]			
Liquid Baths, Heaters	(-196 ≤ T < -100) °C (-100 ≤ T ≤ 165) °C (165 < T ≤ 400) °C (400 < T ≤ 600) °C (600 < T ≤ 800) °C (800 < T ≤ 1200) °C	0.04 °C 0.02 °C 0.04 °C 0.92 °C 1.1 °C 3.0 °C	RTD probes, thermocouples
Furnaces, Ovens, Freezers, Autoclaves (Uniformity Surveys)[3]	(-196 ≤ T < -80) °C (-80 ≤ T ≤ 180) °C (180 < T ≤ 400) °C (400 < T ≤ 600) °C (600 < T ≤ 800) °C (800 < T ≤ 1200) °C	0.28 °C 0.23 °C 0.28 °C 2.9 °C 3.9 °C 5.8 °C	AMS 2750; ISO 17665-1; ISO 17665-2 DKD-R 5-7

Parameter/Equipment	Range[7]	CMC[2, 9] (±)	Comments[4]
Electrical Simulation of RTDs & Thermocouples[3]			
RTD	(-200 ≤ T ≤ 800) °C	0.10°C	EURAMET/cg-11
Thermocouples:			
Type K	(-180 ≤ T ≤ 1230) °C	0.12 °C	
Type N	(-180 ≤ T ≤ 900) °C	0.19 °C	
Type J	(-180 ≤ T ≤ 1000) °C	0.20 °C	
Type R	(100 ≤ T ≤ 1580) °C	0.23 °C	
Type S	(100 ≤ T ≤ 1580) °C	0.22 °C	
Type T	(-180 ≤ T ≤ 360) °C	0.15 °C	
Relative Humidity – Measure[3] & Measuring Equipment	(10 ≤ H ≤ 95) % RH	1.2 % RH	Humidity chamber and indicator
Relative Humidity – Probe, Measuring Equipment	10 % RH 35 % RH 50 % RH 80 % RH 95 % RH	0.59 % RH 0.54 % RH 0.69 % RH 0.78 % RH 0.86 % RH	Humidity standards
Radiation Thermometry	(-35 ≤ T < 0) °C (0 ≤ T ≤ 50) °C (50 < T ≤ 160) °C (160 < T ≤ 200) °C (200 < T ≤ 400) °C (400 < T ≤ 600) °C (600 < T ≤ 800) °C (800 < T ≤ 1000) °C	1.1 °C 0.37 °C 1.4 °C 1.8 °C 3.4 °C 5.5 °C 7.5 °C 10 °C	Blackbody target Ɛ = 0.9 to 1.0 λ = (8 to 14) µm ASTM E2847
Dew Point Temperature – Measuring Equipment	(-70 ≤ DP < -40) °C DP (-40 ≤ DP ≤ 20) °C DP	0.38 °C DP 0.31 °C DP	Chilled mirror, DP: dew point

VII. Time & Frequency

Parameter/Equipment	Range[7]	CMC[2, 9] (±)	Comments[4]
Timers	2 sec ≤ t ≤ 9:45 hrs	0.27 sec	Timers
Speed[3] Rotational (RPM) Oscillation (OPM)	 (20 < ω ≤ 90 RPM (90 < ω ≤ 900) RPM (900 < ω ≤ 2000) RPM (2000 < ω ≤ 6000) RPM (6000 < ω ≤ 20 000) RPM (20 000 < ω ≤ 80 000) RPM	 0.16 RPM 0.77 RPM 3.4 RPM 3.7 RPM 6.6 RPM 21 RPM	Optical tachometer OPM is oscillation per minute.

[1] This laboratory offers commercial calibration 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 measuring equipment. CMCsrepresent 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] Calibration can be also performed to manufacturer or specific customer requirements

[5] LSVD represents the least significant valid displayed division of the device subject to calibration

[6] Analytical balance is a balance with one LSVD less of 0.001 gram.

[7] In the statement of the range, P is pressure, m is mass, T is temperature, H is humidity, t is time, ω is rotation, L is length.

[8] This scope meets A2LA's *P112 Flexible Scope Policy.*

[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.

[10] Calibration by means of substitution method.

Accredited Laboratory

A2LA has accredited

SCALAR LABORATORIES LTD

Azor, ISRAEL

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 16th day of September 2022.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 4968.01
Valid to September 30, 2024

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