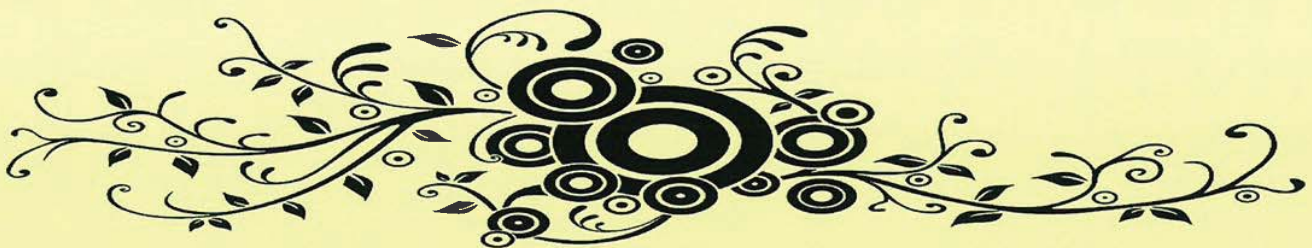


ภาคผนวกที่ 52

เอกสารรับรองการสอบเทียบของเครื่องมือตรวจวัด





Certificate of Calibration

Method 5 Pre-Test Calibration - Liters (L)

UUT Meter Console Information

Model #: XC-572-V
Serial #: 1108048
DGM Model #: GB/T6968-2011
DGM Serial #: L1500033220

Calibration Conditions

Bar. Pressure (mm Hg): 759.8
Ambient Temperature (°C): 25.3
Relative Humidity (%): 52
Altitude (m): 1.83
Bar. Pressure Corr. (mm Hg): 759.7

Factors/Conversions

Std. Temp. (K): 293.15
Std. Press. (mm Hg): 760
K_i (K/mm Hg): 0.3657

Reference Equipment

Calibration Meter Model: DGM-200H
Cal. Date: 25 Jun 23
Serial No.: 0000026
Gamma: 1.0000

UUT Meter (DGM)

Run Time seconds	Office, ΔH (mm H ₂ O)	Volume			Meter Temperature (°C)		Meter Pressure (mm H ₂ O)	Reference Meter (WTM)			Outlet Temperature (°C)	
		Initial (L)	Final (L)	Total (L)	Initial	Final		Initial	Final	Total	Initial	Final
Θ	P _{m(g)}	V _m	V _{mf}	V _m	I _m	t _{mf}	P _w	V _{mf}	V _{mf}	V _w	t _{mf}	t _{mf}
840.00	13.00	295908.5	296063.5	155.0	25.0	25.0	0.3	0.00	156.39	156.39	25.0	25.0
630.00	25.00	296063.5	296227.0	163.5	26.0	27.0	0.5	0.00	164.53	164.53	25.0	25.0
450.00	50.00	296227.0	296391.0	164.0	27.0	28.0	0.6	0.00	164.36	164.36	25.0	25.0
360.00	80.00	296391.0	296559.8	168.8	28.0	29.0	2.0	0.00	169.18	169.18	25.0	25.0
300.00	120.00	296559.8	296733.7	173.9	29.0	30.0	2.4	0.00	176.25	176.25	25.0	25.0

Standardized Data

Reference Meter (L)		UUT Meter (L)		Correction Factor		ΔH @ (mm H ₂ O)	
Std. Vol.	Std. Flow	Std. Vol.	Std. Flow	Value	Variance	ΔH @	Variance
V _{w(Std)}	Q _{w(Std)}	V _{m(Std)}	V _{w(Std)}	Y	ΔY	ΔH @	ΔΔH @
53.81	10.99	152.52	11.0	1.0084	-0.0036	47.9	1.421
61.90	15.42	160.27	15.4	1.0102	-0.0018	46.6	0.155
61.77	21.57	160.61	21.6	1.0072	-0.0048	47.6	1.161
67.09	27.85	165.24	27.8	1.0112	-0.0008	46.0	-0.455
74.24	34.85	170.32	34.8	1.0230	0.0110	44.2	-2.282
				1.0120	= Y Avg.	46.5	= ΔH @ Avg.

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ±0.02.

Note: For ΔH_g, office pressure differential that equates to 0.0212m³/min at standard temperature and pressure, acceptable tolerance of individual values from the average is ±0.2 inches (5.1mm) H₂O.

Pass/Fail Judgment : **Pass**

Calibrate By : *Tatungayen P.*

Approved By:

Date: 9 Jan 24

The instrument listed and described on this certificate have been calibrated against standards traceable to the National Institute of Standards and Technology (N.I.S.T.) and in reference to EPA Method 5, Section 10.3.1.



Neediss Supply Instrument Co., Ltd.



Certificate of Calibration - Supplemental

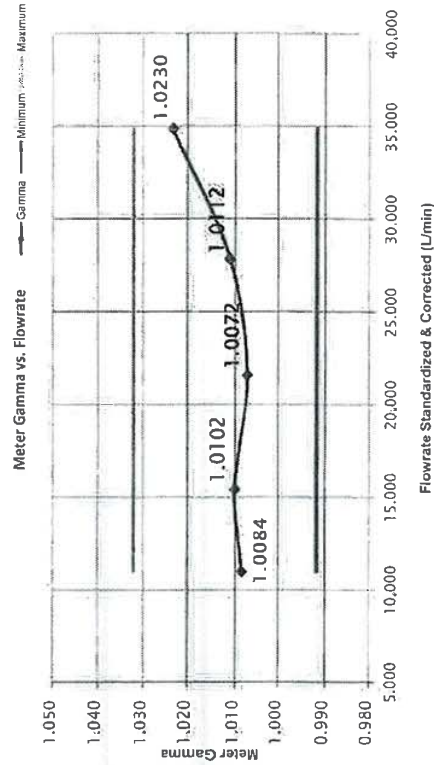
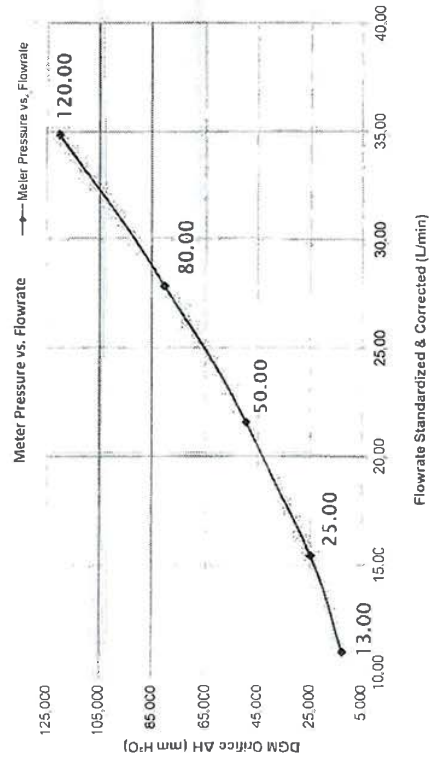
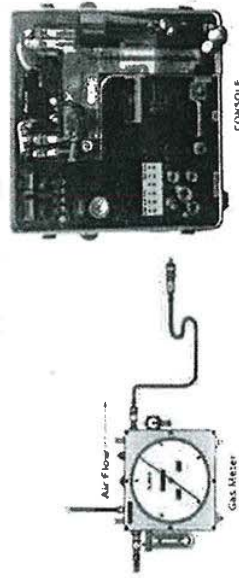
Nomenclature

- P_b - Barometric Pressure
DCM - Dry Gas Meter
 K_1 - Constant based on standard temp and press
() - Run time, in minutes
 P_m - V.H (Meter Pressure, gauge)
 V_n - Volume collected by test meter, corrected for STP
 Q_{std} - Calculated flow rate of test meter
 K' - Critical orifice coefficient
 P_m - Measured pressure of reference meter
 T_m - Temperature measured in reference meter

Equations

$$V_{w(std)} = Y * K_1 * \frac{V_w * (P_{bar} + \frac{P_{std}}{13.6})}{T_{std}}$$
$$K' = \frac{V_w * (P_{bar} + \frac{\Delta H}{13.6})}{T_m}$$
$$K_1 = \frac{V_{std}}{P_{std}}$$
$$Y = \frac{V_{ext(std)}}{V_{int(std)}}$$
$$Q_{w(std)} = \frac{V_{w(std)}}{\Theta}$$
$$Metric \Delta H_s = \frac{P_{std} * 0.001096 * (P_{bar} + \frac{P_{std}}{13.6})}{T_m} * \left(\frac{T_w * \Theta}{V_w * P_{bar}} \right)^2$$

Calibration Train





Certificate of Calibration

Method 5 Console Sensor Calibration - Metric Units

Console Information

Model #: XC-572-V
Serial #: 1108048
Units: Metric

Calibration Conditions

Pbar (mm. Hg): 759.8
Humidity (%): 52
Tamb (°C): 25.3
Elevation (m): 1.8
Corr. Pbar (mm. Hg): 759.7

Reference Devices

TC Calibrator Model: CC-VTR-SH
Reference #: 091109269
Barometer Model: 736930
Reference #: EBARODIALSPE01
Pressure Model: 718 30G
Reference #: 9543013

Temperature Sensors Calibration Data

Reference Point ¹	Reference Temp.	Test Thermocouple Calibrations						Reference Point Status ²
		Aux	Stack	Probe	Oven	Filter	Exit	
#	°C	°C	°C	°C	°C	°C	°C	Pass/Fail
1	-18	-17	-16	-17	-18	-17	-17	PASS
2	38	37	38	38	38	38	37	PASS
3	93	93	93	94	93	93	93	PASS
4	149	149	150	149	148	148	149	PASS
5	260	259	259	260	259	259	259	PASS
6	371	372	372	372	372	371	372	PASS
7	482	482	483	483	483	483	483	PASS
8	593	594	594	594	594	593	594	PASS
9	816	816	816	816	816	816	816	PASS
10	1038	1039	1039	1039	1039	1039	1039	PASS

Overall Audit Status

NIST Reference Thermocouple ID: 12702001

Ref Point	Theoretical Temp	DGM Thermocouple Sensor Reading	ΔT_{abs} ⁴
#	°C	°C	°C
Ice Water	1	1	0.15%
Ambient ³	2	25	0.06%

Maximum² 0.15%

Status PASS

Internal temperature thermocouple is not audited to EPA standards, and should not be used as an official reference for ambient temperature.

Calibrate By:

Approved By:

Date:

9 Jan 24

Notes

¹ Suggested, minimum reference points are 10 (0, 100, 200, 300, 500, 700, 900, 1100, 1500, 1900 °F), can test for more

² For valid test results, the maximum difference between temperature and reference readings should be less than ± 5.4 °F (± 3 °C), for all thermocouples except for the stack thermocouple which should be less than $\pm 1.5\%$ absolute temperature from the reference reading and the exit thermocouple which should be less than ± 2 °F (± 1 °C) from the reference reading (EPA Method 2, Section 6.3 and EPA Method 5, Sections 6.1.1, 7.6.1.1.8)

³ Do not change this cell value, it is instead based on input from Cell H8 at the top of this sheet under "Calibration Conditions"

⁴ Absolute temperature difference and other formulas are calculated based on unit input from cell C8 at the top of this sheet under "Meter Console Information"

⁵ For valid test results, the maximum difference between console and reference barometric pressure readings should be less than ± 0.1 in. Hg (± 2.5 mm Hg), (EPA Method 5, Section 6.1.2)

⁶ For valid test results, the maximum difference between console and reference vacuum readings should be less than ± 0.5 in. Hg (± 12.5 mm Hg)

⁷ For valid test results, the maximum difference between console and reference vacuum readings should be less than ± 0.5 in. Hg (± 12.5 mm Hg)



Neediss Supply Instrument Co., Ltd.



neediss Console Sensor Calibration Data Sheet

Console Information

Model #: XC-572-V
Serial #: 1108048
Units: Metric
Type: "English"

Calibration Conditions

Pbar (mm. Hg): 759.8
Humidity (%): 52.0
Tamb (°C): 25.3
Corr. Pbar (mm. Hg): 759.7

Reference Devices

TC Simulator Model: CC-VTR-SH
Reference #: 091109269
Barometer Model: 736930
Reference #: EBARODIALSPE01
Digital Pressure Calibrator Model: 718 30G
Reference #: 3891001

Pressure Gauge / Manometer Calibration Data

Console Vacuum Calibration			
Reference Point	Reference Vacuum	Console Vacuum	Reference Point Status ⁶
#	in. Hg	in. Hg	Pass/Fail
1	-5.0	-5.1	PASS
2	-15.0	-15.0	PASS
3	-20.0	-20.0	PASS

Reference Point ¹	ΔH Manometer Calibration			Reference Point Status ²
	Reference mm H2O	Positive (+) Pitot mm H2O	Negative (-) Pitot mm H2O	
#				Pass/Fail
1	-200.000	0.0	-200.0	PASS
2	-150.000	0.0	-150.0	PASS
3	-100.000	0.0	-100.0	PASS
4	-80.000	0.0	-80.0	PASS
5	-50.000	0.0	-50.0	PASS
6	0.000	0.0	0.0	PASS
7	50.000	50.0	0.0	PASS
8	80.000	80.0	0.0	PASS
9	100.000	100.0	0.0	PASS
10	150.000	150.0	0.0	PASS
11	200.000	200.0	0.0	PASS
ΔH Overall Audit Status				PASS

Reference Point ¹	ΔP Manometer Calibration			Reference Point Status ²
	Reference mm H2O	Positive (+) Pitot mm H2O	Negative (-) Pitot mm H2O	
#				Pass/Fail
1	-200.000	0.0	-200.0	PASS
2	-150.000	0.0	-150.0	PASS
3	-100.000	0.0	-100.0	PASS
4	-80.000	0.0	-80.0	PASS
5	-50.000	0.0	-50.0	PASS
6	0.000	0.0	0.0	PASS
7	50.000	50.0	0.0	PASS
8	80.000	80.0	0.0	PASS
9	100.000	100.0	0.0	PASS
10	150.000	150.0	0.0	PASS
11	200.000	200.0	0.0	PASS
ΔP Overall Audit Status				PASS

Calibrate By:

Patterson P.

Approved By:

[Signature]

Notes

¹ Suggested, minimum reference points are 10 (0, 100, 200, 300, 500, 700, 900, 1100, 1500, 1900 °F), can test for more.

² For valid test results, the maximum difference between temperature and reference readings should be less than ±5.4 °F (±3 °C), for all thermocouples except for the stack thermocouple which should be less than ±1.5% absolute temperature from the reference reading and the stack thermocouple which should be less than ±2°F (±1 °C) from the reference reading (EPA Method 5, Section 6.1.2)

³ Do not change the cell value. It is instead based on input from Cell Host. The top of this sheet under "Calibration Conditions"

⁴ Absolute temperature difference and other formulas are calculated based on data input from Cell Host. The top of this sheet under "Meter Console Information"

⁵ For valid test results, the maximum difference between console and reference barometric pressure readings should be less than ±0.1 in. Hg (±2.5 mm Hg), (EPA Method 5, Section 6.1.2)

⁶ For valid test results, the maximum difference between console and reference vacuum readings should be less than ±0.5 in. Hg (±12.5 mm Hg)

⁷ For valid test results, the maximum difference between console and reference vacuum readings should be less than ±0.05 in. H2O (±1.25 mm H2O), or 5% of full scale
I certify that the above Thermocouple Sensors were calibrated in accordance with US EPA Methods 2 and 5, CFR 40 Part 60



neediss

Console Sensor Audit QA Sheet

Meter Console Information (UUT)

Model #: XC-572-V
 Serial #: 1108048
 Units: Metric

Calibration Conditions

Pbar (mm. Hg): 759.8
 Humidity (%): 70%
 Amb. Temp. (°C): 24.7
 Altitude (m): 1.8
 Corrected Pbar (mm. Hg): 759.7

Reference Devices

TC Simulator Model: CC-VTR-SH
 Reference #: 91109269
 Barometer Model: 369307
 Reference #: EBARODIALSPE01
 Digital Pressure Calibrator Model: 718 30G
 Reference #: 9543013

Audit Data

Reference Point	Reference Temp.	Thermocouple Probe Audit						Reference Point Status ¹
		Aux	Stack	Probe	Oven	Filter	Exit	
	°C	°C	°C	°C	°C	°C	°C	Pass/Fail
Room	24.7	24	25	25	25	25	24	PASS
Ice Water	1	0	1	1	1	0	0	PASS

Console Vacuum Audit

Reference Point	Reference Vacuum	Console Vacuum	Reference Point Status ³
#	in. Hg	in. Hg	Pass/Fail
1	17.0	17.0	PASS

Calibrate By:

Pattaraporn P.

Approved By:

[Signature]

Date:

9 Jan 24

Notes

¹For valid test results, the maximum difference between test and reference readings should be less than 5.4 °F (3 °C); for all thermocouples except for the stack thermocouple which should be less than 1.5% absolute temperature from the reference reading and the exit thermocouple which should be less than 2°F (1 °C) from the reference reading (EPA Method 2, Section 6.3 and EPA Method 5, Sections 6.1.1.7-6.1.1.8)

²For valid test results, the maximum difference between console and reference barometric pressure readings should be less than 0.1 in. Hg (2.5 mm Hg), (EPA Method 5, Section 6.1.2)

³For valid test results, the maximum difference between console and reference vacuum readings should be less than 0.5 in. Hg (12.5 mm Hg)

I certify that the above Thermocouple, Barometric, and Vacuum Sensors were calibrated and audited in accordance with US EPA Methods, CFR 40 Part 60



Neediss Supply Instrument Co., Ltd

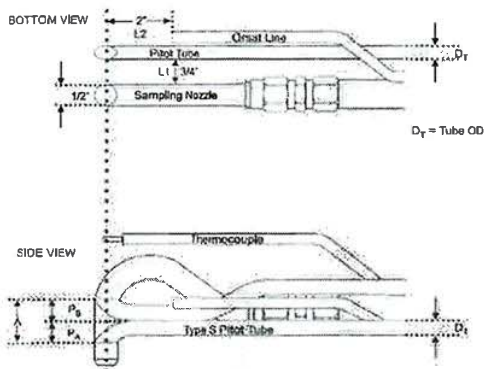
neediss Sampling Probe and Pitot Validation

Sampling System Equipment Information

Probe Sheat	Apex 1 in. , 3 ft.
Probe Number	W1906153
Pitot tube Number	-
Pitot tube Type	S Type 3/8 Inc.
Validation method	Standard Probe 1 in. and 1/2 in. Sampling Nozzle

Validation Conditions and Equipment

Digital Calipers	CD-15APX
Reference No.	A22070181
Digital Inclinator	BASELINE
Reference No.	FEI 12-1057
Temperatute	25.3 °C±3
Barometric Pressure	759.8 mm Hg



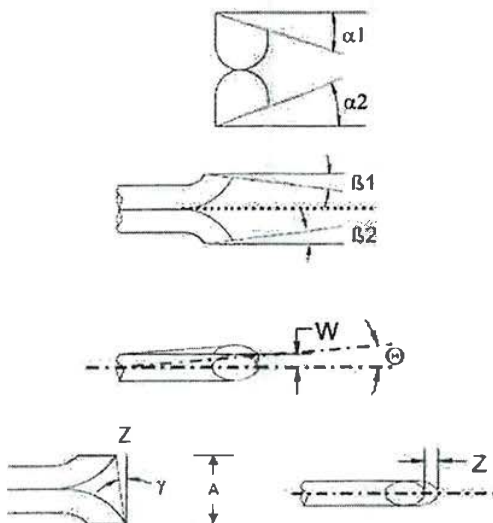
Sampling Probe Validation with Tune up

☒ Measure and Alinment with 1/2" Sampling Nozzle(12.7 mm)

Measured	Standard Range
$L_1 =$	1.94 cm. (1.905 cm. or 3/4 in.)
$L_2 =$	5.08 cm. (5.08 cm. or 2.0 in.)
$D_T =$	0.948 cm. (3/8 in.)
$A =$	2.44 cm. ($2.1 D_T \leq A \leq 3 D_T$)
$A/2D_T =$	1.289 cm. ($1.05 P_A / D_T \leq A \leq 1.5$)

Pitot Tube Validations and Engles measurement Result

☒ : Measure Result after Maintenance and Adjustable



P_B Size

$\alpha_1 =$	-2.70 °	$\leq 10^\circ$
$\beta_1 =$	1.80 °	$\leq 5^\circ$

P_A Size

$\alpha_2 =$	2.80 °	$\leq 10^\circ$
$\beta_2 =$	-1.90 °	$\leq 5^\circ$

Engles measurement

$W =$ 0.20 ° 0.009 cm. $W < 0.08 \text{ cm (} 1/32 \text{ in.)}$

$Z =$ 0.59 ° 0.025 cm $Z < 0.032 \text{ cm (} 1/8 \text{ in.)}$

Can be use 0.84 for Cp(s) if the type of face-opening misafgnment show above with not affect the base line value of Cp(s) Solong as standard range

Validation By:

William P.

Approved By:

[Signature]

Date:

9 Jan 24



Nozzle Validation

Sampling System Equipment Information

Console Model XC-572-V
Console Number 1108048
DGM Model GB/T6968-2011
DGM Number L1500033220

Validation Conditions

Digital Calipers CD-15APX
Reference No A22070181
Temperature 25.2 °C±3
Barometric Pressure 759.8 mm Hg

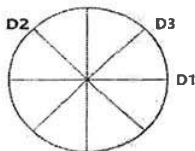
Validation Data					Results	
Nozzle ID	Nozzle Diameter				Different	$(D_1 + D_2 + D_3) / 3$
Sizes		D ₁	D ₂	D ₃	ΔD	D _{avg}
	mm	mm	mm	mm	mm	mm
4	3.17	3.17	3.17	3.17	0.000	3.170
6	4.77	4.77	4.77	4.77	0.000	4.770
8	6.35	6.34	6.35	6.36	0.010	6.350
10	7.92	7.92	7.92	7.92	0.000	7.920
12	9.52	9.52	9.51	9.51	0.006	9.513
14	11.09	11.05	11.05	11.06	0.006	11.053
16	12.70	12.70	12.71	12.71	0.006	12.707

Where :

D₁, D₂, D₃ = There difference nozzle diameters , mm ; diameter must be within 0.025 mm

Δ D = Maximum difference between any two diameters, must be ≤ 0.100 mm

D avg = $(D_1 + D_2 + D_3) / 3$



Validation By:

Pattanan P.

Approved By:

[Signature]

Date:

9 Jan 24



Neediss Supply Instrument Co., Ltd





Verification Test Report

Instruments Information

Page:1/2

Analyzer Type: Flue Gas Analyser
Model: Optima7

Manufacturer: MRU
Serial No.: 320779

Calibration Gas information

Standard Gas Mid Range

O2 Conc 2.1 %vol.
Cd/Ex: 343014/Jul 24,2025
CO Conc 100.2 ppm
NO Conc 101.9 ppm
NOX Conc 101.9 ppm
SO2 Conc 100.7 ppm
CO2 Conc 7.597 %
Cd/Ex: GN0029548/Mar 08,2032

Standard Gas High Range

O2 Conc 10.00 %vol.
Cd/Ex: 343018/Nov 9,2025
CO Conc 600.0 ppm
NO Conc 198.9 ppm
NOX Conc 198.9 ppm
SO2 Conc 200.0 ppm
CO2 Conc 16.00 %
Cd/Ex: GN0032954/Apr 30,2032

Environment: Temperature 26.4 °C Humidity: 77 %RH

SO2 calibration test

Set point	Std.gas (ppm)	Before Adj Reading(ppm)	After Adj Reading(ppm)	Difference	% error
Low/Zero	0.0	0	0	0.0	0.0
Mid	100.7	96	100	-0.7	-0.7
Hight	200.0	197	200	0.0	0.0

NO calibration test

Set point	Std.gas (ppm)	Before Adj Reading(ppm)	After Adj Reading(ppm)	Difference	% error
Low/Zero	0.0	0	0	0.0	0.0
Mid	101.9	92	101	-0.9	-0.9
Hight	198.9	190	199	0.1	0.1

NOX calibration test

Set point	Std.gas (ppm)	Before Adj Reading(ppm)	After Adj Reading(ppm)	Difference	% error
Low/Zero	0.0	0	0	0.0	0.0
Mid	101.9	92	100	-1.9	-1.9
Hight	198.9	190	199	0.1	0.1

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Verification Test Report

Instruments Information

Page:2/2

Analyzer Type: Flue Gas Analyser
Model: Optima7

Manufacturer: MRU
Serial No.: 320779

Calibration Gas information

Standard Gas Mid Range

O2 Conc 2.1 %vol.
Cd/Ex: 343014/Jul 24,2025
CO Conc 100.2 ppm
NO Conc 101.9 ppm
NOX Conc 101.9 ppm
SO2 Conc 100.7 ppm
CO2 Conc 7.597 %
Cd/Ex: GN0029548/Mar 08,2032

Standard Gas High Range

O2 Conc 10.00 %vol.
Cd/Ex: 343018/Nov 9,2025
CO Conc 600.0 ppm
NO Conc 198.9 ppm
NOX Conc 198.9 ppm
SO2 Conc 200.0 ppm
CO2 Conc 16.00 %
Cd/Ex: GN0032954/Apr 30,2032

Environment: Temperature 26.4 °C Humidity: 77 %RH

CO calibration test

Set point	Std.gas (ppm)	Before Adj Reading(ppm)	After Adj Reading(ppm)	Difference	% error
Low/Zero	0.0	0	0	0.0	0.0
Mid	100.2	101	99	-1.2	-1.2
Hight	600.0	607	601	1.0	0.2

O2 calibration test

Set point	Std.gas (ppm)	Before Adj Reading(ppm)	After Adj Reading(ppm)	Difference	% error
Low/Zero	0.0	0	0	0.0	0.0
Mid	2.1	2.2	2.1	0.0	0.0
Hight	10.00	10.21	10.2	0.2	2.0

Note

Technical Data Calibration results.:Calibration reading response discrepancy

O2 parameter ± 0.2 Vol-% at Range 0-21 Vol-%
CO2 parameter ± 0.3 Vol-% at Range 0-CO2 Max
CO parameter ± 5 % at Range 0-500
NO parameter ± 5 % at Range 0-100
NO2 parameter ± 5 % at Range 0-100
SO2 parameter ± 5 % at Range 0-200

Calibrate By:

Pattanasan P.

Approve By:

tan

Date:

7 Sep 24



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Certificate of Calibration

Certificate No. : 68-200066-2

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

540, 540/1 Soi Bangkhae7, Bangkhae, Bangkok 10160

Equipment : Electronic Balance

Manufacturer : METTLER TOLEDO **Model :** XSR205DU

Serial No. : B911363567 **ID No. :** ELABBALANCEN06

Capacity : 220 g **Resolution :** 0.00001g/81g, 0.0001g/220g

Environment : On site calibration was carried out at the B304 Balance Room, Envilab Co., Ltd.

Ambient Temperature : (21.2 to 21.5) °C

Relative Humidity : (51.4 to 56.2) %

Air Pressure : 1011.0 mbar

Date of Received : 17 February 2025

Date of Calibration : 17 February 2025

Date of Issue : 19 February 2025

Calibrated by : Satja Sangkhum

Calibration Method : In-house method CAL-M2001 based on UKAS Publication ref : LAB 14

Edition 7 - November 2022

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E261-E2624	C02242009	07 Nov 2025	National Institute of Metrology (Thailand), (NIMT)

Approved by :

(Surachai Promthong)

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written

Certificate of Calibration

Certificate No. : 68-200066-2

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

Nominal Value (g)	Correction (g)	Uncertainty \pm (g)
0.1	0.00000	0.000016
0.5	0.00000	0.000022
1	0.00000	0.000026
2	-0.00001	0.000034
5	-0.00001	0.000043
10	0.00000	0.000053
50	-0.00002	0.00011
100	0.0000	0.00020
150	0.0000	0.00038
200	0.0000	0.00038

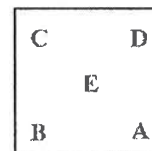
This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

Eccentric error

Load test : 50 g

A	B	C	D	E	
-0.00001	-0.00001	0.00003	0.00003	0.00000	g



Repeatability

Load test : 200 g
Stdev. : 0.000032 g

- o o -



CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com



Certificate of Calibration

Certificate No. : 68-410088-1

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkok 10160

Equipment : Digital Thermo-Hygrometer

Manufacturer : ebro

Model : EBI 20

Range Temperature : -30 °C to 70 °C **Resolution :** 0.1 °C

Range Humidity : 0 %R.H. to 100 %R.H. **Resolution :** 0.1 %R.H.

Serial No. : 62324021

ID No. : ELABTMEB120TH1

Environment : Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Date of Received : 18 June 2025

Date of Calibration : 24 June 2025

Date of Issue : 24 June 2025

Calibrated by : Chortip Samchusri

Calibration Method : This instrument was calibrated by In-house method comparison technique CAL-M4013 by compared with standard probe sensor humidity/temperature into humidity/temperature chamber.

Reference Standard Instruments : This certification is traceable to the International System of Units

Digital Indicator with Standard Probe Temp&Hum

ID No.

Cert. No.

Due Date

Traceability

400034 & 400036

SG-H-00001/68

04 Jul 2025

Success Gateway Co., Ltd., Accredited by TISI Calibration No.0268

Approved by :

(Pempon Chanpu)

The Uncertainties are for a confidence probability of approximately 95%

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CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

Certificate of Calibration

Certificate No. : 68-410088-1

Page : 2 of 2

UUC Condition As-Received : Good

Result of Calibration : Without Adjustment

Function : Temperature measurement

Reference Humidity @ 50 %R.H.

Standard Temperature ($^{\circ}\text{C}$)	UUC Reading ($^{\circ}\text{C}$)	Correction ($^{\circ}\text{C}$)	Uncertainty ($\pm^{\circ}\text{C}$)
24.99	24.9	0.1	0.46

Result of Calibration : Without Adjustment

Function : Humidity measurement

Reference Temperature @ 25 $^{\circ}\text{C}$

Standard Humidity (%R.H.)	UUC Reading (%R.H.)	Correction (%R.H.)	Uncertainty (\pm %R.H.)
50.00	3.6	-3.6	2.2

Remark

UUC : Unit Under Calibration

This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%

- 000 -



บริษัท เอ็นไวแล็บ จำกัด 540,540/1 ซอยบางแค 7 เขตบางแค กรุงเทพมหานคร 10160
EnviLab Co., Ltd. 540,540/1 Soi Bangkhæ 7 Bangkhæ Bangkok 10160 Thailand
Tel : 02-802-3577-8 Fax: 02-802-3773 E-mail : info@evitestng.com



Needless EnviLab

TSP High Volume Sampler Calibration

Verification Report No.

SO2500006-E009 -TSP 01

<input type="checkbox"/> PM	<input checked="" type="checkbox"/> Onsite
Site: วัดเขาคันทรง	
UTM : 47P 736059 m E 1450918 m N	
Sampler: ETSP#37	
Recorder: ECRAN000031072	
Date: 5 Nov 25	
Technical: Thanabudee A.	
Approval: Wisan R.	

CONDITIONS

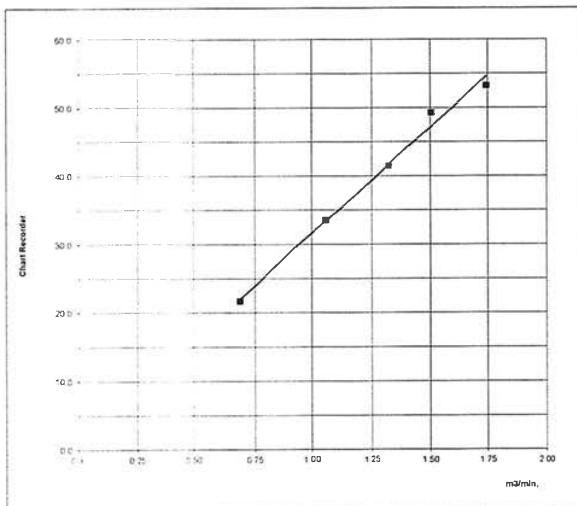
Barometric Press. (hPa): 1007.0	Corrected Pressure (mm Hg): 755.3
Temperature (deg C): 32.0	Temperature (deg K): 305.0
Average Press. (hPa): 1013.0	Corrected Avg. Press. (mm Hg): 759.8
Average Temp. (deg C): 30.0	Average Temp. (deg K): 303.0


CALIBRATION ORIFICE


Brand: Tisch Environmental, Inc	Qstd Slope: 2.06933
Model: TE-5025A	Qstd Intercept: -0.02815
Serial#: 2067	Date Certified: 4 Mar 25
	Due Date : 03-Mar-26

CALIBRATIONS

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION Slope = 30.8115 Intercept = 0.8748 Corr. coeff.= 0.9950 # of Observations: 5 Range of Chart at 1.1 - 1.7 m3/min. 36 54
1	13.20	1.744	54.0	53.21	
2	9.80	1.504	50.0	49.27	
3	7.60	1.326	42.0	41.39	
4	4.80	1.057	34.0	33.50	
5	2.00	0.687	22.0	21.68	



Calibrated by : 
(Thanabudee Anusasananan)
5 November 2025

Approved by : 
(Wisan Ritthikamon)
5 November 2025

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บริษัท เอ็นไวแล็บ จำกัด
EnviLab Co., Ltd.
Tel : 02-802-3577-8

540,540/1 ซอยบางแค 7 เขตบางแค แขวงบางแค กรุงเทพฯ 10160
540.540/1 Soi Bangkhae 7 Bangkhae Bangkok 10160 Thailand
Fax 02-802-3773 E-mail : info@evltesting.com



Needless EnviLab

TSP High Volume Sampler Calibration

Verification Report No.

SO2500006-E009 -TSP 02

☐ PM ☒ Onsite

Site: บ้านนาบึง

UTM : 47P 731798 m E 1448651 m N

Sampler: ETSP#29

Recorder: ECRDS016339504

Date: 5 Nov 25

Technical: Thanabudee A.

Approval: Wisan R.

CONDITIONS

Barometric Press. (hPa): 1007.3

Temperature (deg C): 32.0

Average Press. (hPa): 1013.0

Average Temp. (deg C): 30.0

Corrected Pressure (mm Hg): 755.5

Temperature (deg K): 305.0

Corrected Avg.Press. (mm Hg): 759.8

Average Temp. (deg K): 303.0

CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc

Model: TE-5025A

Serial#: 2067

Qstd Slope: 2.06933

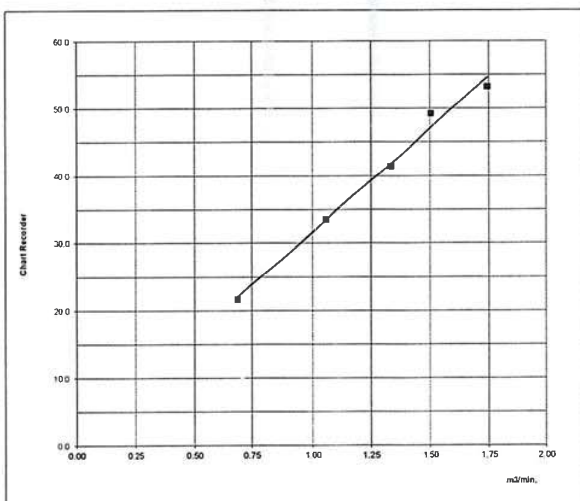
Qstd Intercept: -0.02815

Date Certified: 4 Mar 25

Due Date : 03-Mar-26

CALIBRATIONS

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION Slope = 24.6370 Intercept = 8.8956 Corr. coeff= 0.9952 # of Observations: 5 Range of Chart at 1.1 - 1.7 m3/min. 37 51
1	13.30	1.751	52.0	51.25	
2	9.70	1.497	48.0	47.31	
3	7.90	1.352	42.0	41.39	
4	3.40	0.892	32.0	31.54	
5	2.10	0.704	26.0	25.62	



Calibrated by :

(Thanabudee Anusasananan)
5 November 2025

Approved by :

(Wisan Ritthikamon)
5 November 2025

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Envilab Co., Ltd. 540.540/1 Soi Bangkhae 7 Bangkhae Bangkok 10160 Thailand
Tel : 02-802-3577-8 Fax: 02-802-3773 E-mail : info@evltesting.com



Needless Envilab

PM10 High Volume Sampler Calibration

Verification Report No.

SO2500006-E009 -PM 01

<input type="checkbox"/> PM	<input checked="" type="checkbox"/> Onsite
Site: วัดเขาคันทรง	
UTM : 47P 736059 m E 1450918 m N	
Sampler: EPM10#29	
Recorder: ECRDS016449812	
Date: 5 Nov 25	
Technical: Thanabudee A.	
Approval: Wisan R.	

CONDITIONS

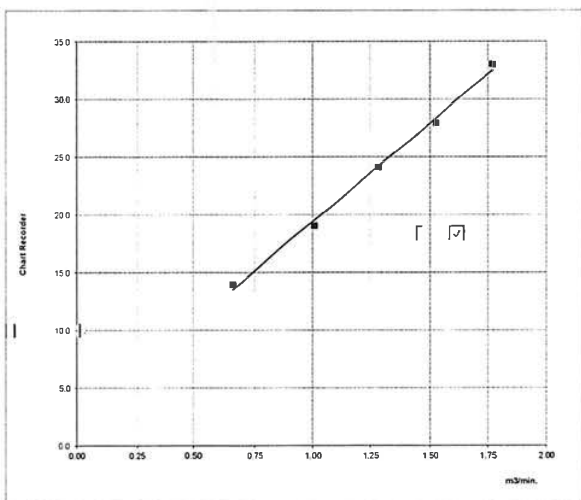
Barometric Press. (hPa): 1007.0	Corrected Pressure (mm Hg): 755.3
Temperature (deg C): 32.0	Temperature (deg K): 305.0
Average Press. (hPa): 1013.0	Corrected Avg. Press. (mm Hg): 759.8
Average Temp. (deg C): 30.0	Average Temp. (deg K): 303.0

CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc	Slope: 1.29578
Model: TE-5025A	Intercept: -0.01772
Serial#: 2067	Date Certified: 4 Mar 25
	Due Date : 3 Mar 26

CALIBRATIONS

CALIBRATIONS					
Plate or Test #	H2O (in)	Qa (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
1	12.80	1.768	52.0	33.04	Slope = 17.0317
2	9.50	1.525	44.0	27.96	Intercept = 2.3963
3	6.70	1.283	38.0	24.15	Corr. coeff.= 0.9980
4	4.10	1.007	30.0	19.06	SFR = 1.000
5	1.70	0.653	22.0	13.98	SSP = 30.57
					# of Observations: 5
					Range of Chart 28
					at SFR ±10% 33



Calibrated by :
(Thanabudee Anusasananan)
5 November 2025

Approved by :
(Wisan Ritthikamon)
5 November 2025



บริษัท เอ็นไวแล็บ จำกัด 540,540/1 ซอยบางแค 7 เขตบางแค แขวงบางแค กรุงเทพมหานคร 10160
Envilab Co., Ltd. 540,540/1 Soi Bangkhae 7 Bangkhae Bangkok 10160 Thailand
Tel : 02-802-3577-8 Fax: 02-802-3773 E-mail : info@evltesting.com



Needless Envilab

PM10 High Volume Sampler Calibration

Verification Report No.

SO2500006-E009 -PM 02

<input type="checkbox"/> PM	<input checked="" type="checkbox"/> Onsite
Site: บ้านนาเลียง	
UTM : 47P 731798 m E 1448651 m N	
Sampler: EPM10#32	
Recorder: ECRDS016431061	
Date: 5 Nov 25	
Technical: Thanabudee A.	
Approval: Wisan R.	

CONDITIONS

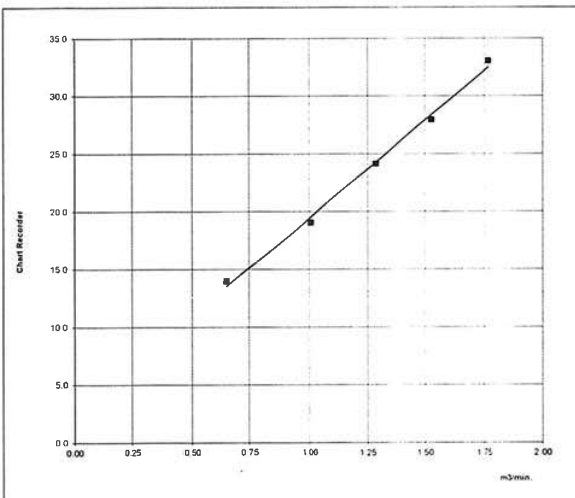
Barometric Press. (hPa): 1007.3	Corrected Pressure (mm Hg): 755.5
Temperature (deg C): 32.0	Temperature (deg K): 305.0
Average Press. (hPa): 1013.0	Corrected Avg. Press. (mm Hg): 759.8
Average Temp. (deg C): 30.0	Average Temp. (deg K): 303.0

CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc	Slope: 1.29578
Model: TE-5025A	Intercept: -0.01772
Serial#: 2067	Date Certified: 4 Mar 25
	Due Date : 3 Mar 26

CALIBRATIONS

Plate or Test #	H2O (in)	Qa (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
1	12.50	1.747	52.0	33.04	Slope = 17.0333
2	9.80	1.549	46.0	29.23	Intercept = 3.1107
3	6.90	1.302	40.0	25.41	Corr. coeff. = 0.9997
4	3.60	0.944	30.0	19.06	SFR = 1.000
5	2.00	0.707	24.0	15.25	SSP = 31.70
					# of Observations: 5
					Range of Chart at SFR $\pm 10\%$
					30
					34



Calibrated by :

(Thanabudee Anusananan)
5 November 2025

Approved by :

(Wisan Ritthikamon)
5 November 2025

Certificate of Calibration

Calibration Certification Information
Cal. Date: March 4, 2025

Rootsmeter S/N: 438320

Ta: 294 °K

Operator: Jim Tisch

Pa: 746.0 mm Hg

Calibration Model #: TE-5025A

Calibrator S/N: 2067

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4220	3.2	2.00
2	3	4	1	1.0090	6.4	4.00
3	5	6	1	0.9030	8.0	5.00
4	7	8	1	0.8610	8.8	5.50
5	9	10	1	0.7090	12.8	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
0.9907	0.6967	1.4106	0.9957	0.7002	0.8878
0.9864	0.9776	1.9949	0.9914	0.9826	1.2556
0.9843	1.0900	2.2304	0.9893	1.0955	1.4038
0.9832	1.1419	2.3393	0.9882	1.1477	1.4723
0.9779	1.3792	2.8212	0.9828	1.3862	1.7756
QSTD	m=	2.06933	QA	m=	1.29578
	b=	-0.02815		b=	-0.01772
	r=	0.99997		r=	0.99997

Calculations

Vstd=	$\Delta Vol((Pa-\Delta P)/Pstd)(Tstd/Ta)$	Va=	$\Delta Vol((Pa-\Delta P)/Pa)$
Qstd=	Vstd/ΔTime	Qa=	Va/ΔTime
For subsequent flow rate calculations:			
$Qstd = 1/m \left(\left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} \right) - b \right)$		$Qa = 1/m \left(\left(\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)} \right) - b \right)$	

Standard Conditions

Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH:	calibrator manometer reading (in H2O)
ΔP:	rootsmeter manometer reading (mm Hg)
Ta:	actual absolute temperature (°K)
Pa:	actual barometric pressure (mm Hg)
b:	intercept
m:	slope

RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

Certificate of Calibration

Certificate No. : 68-200034-1

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkok 10160

Equipment : Electronic Balance

Manufacturer : Sartorius

Model : SECURA224-1S

Serial No. : 0034803270

ID No. : ELABBALANCEN04

Capacity : 220 g

Resolution : 0.0001 g

Environment : On site calibration was carried out at the Balance Room, Envilab Co., Ltd.

Ambient Temperature : (20.4 to 21.0) °C

Relative Humidity : (41.9 to 42.9) %

Air Pressure : 1014.0 mbar

Date of Received : 28 January 2025

Date of Calibration : 28 January 2025

Date of Issue : 30 January 2025

Calibrated by : Akaradath Thippichai

Calibration Method : In-house method: CAL-M2001 based on UKAS Publication ref : LAB 14

Edition 7 - November 2022

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Weights

ID No.

Cert. No.

Due Date

Traceability

E261-E2624

C02242009

07 Nov 2025

National Institute of Metrology (Thailand), (NIMT)

Approved by :

(Satia Sangkhum)

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 68-200034-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

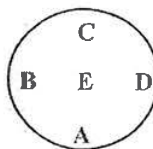
Nominal Value (g)	Correction (g)	Uncertainty \pm (g)
0.01	0.0000	0.00012
0.1	0.0001	0.00012
1	0.0000	0.00013
2	0.0001	0.00013
5	0.0000	0.00013
10	0.0000	0.00013
20	-0.0001	0.00014
50	-0.0001	0.00015
100	-0.0001	0.00020
200	-0.0001	0.00038

This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.06$, providing a level of confidence of approximately 95%

Eccentric error

Load test : 50 g
 A B C D E
 0.0004 0.0004 0.0005 0.0004 0.0000 g



Repeatability

Load test : 200 g
 Stdev. : 0.00005 g

- oOo -





SO2 Analyzer Verification Test Report

Page:1/2

Calibration Report No.: API-6809003

Calibrated Date: 1-Sep-68

☐ PM ☐ Onsite

Instruments Information

Analyzer Type: SO2 Analyzer Model: T100	Manufacturer API S/N: 2034
--	-------------------------------

Calibration System

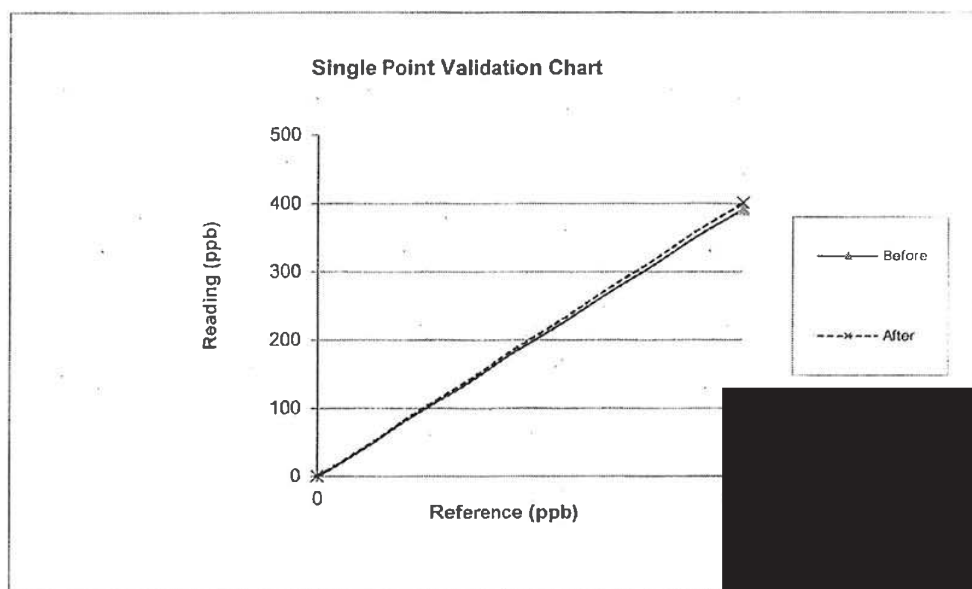
Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792 ZERO AIR Generator ZAG7001 S/N: 644	NOx Conc 45.30 PPM NO Conc 45.30 PPM SO2 Conc 45.05 PPM CO Conc 4528 PPM Expire Date: OCT 23,2027 EB0170003

Environment: Temperature 25.1 °C

Humidity: 59 %RH

Validation Report

Status	Zero			Span		
	Reference (ppb)	Reading (ppb)	Drift (ppb)	Reference (ppb)	Reading (ppb)	Drift%
Before	0.0	-0.6	-0.6	400.0	392.3	-1.0
After	0.0	0.4	0.4	400.0	401.4	0.2





บริษัท นีดีส ซัพพลาย อินสตรูमेंท์ จำกัด

536 ซ.บางแค7 แขวงบางแค เขตบางแค กรุงเทพฯ 10160 โทร : 02-802-3980-2

www.neediss.com E-mail : info@neediss.com



Page:2/2

Calibration Report No.: API-6809003

Calibrated Date: 1-Sep-68

☒ PM ☐ Onsite

Test Function Value	Normal range	Unit	Before	After	Note
Date	1-Sep-68				
Time	8:30				
Range	50 - 20000	PPB	500	500	
Stability (Zero Gas)	< 0.2	PPB	0.4	0.2	
Sample Flow	650 (+/- 50)	cc/min	666	662	
PMT Detector	0 - 5000	mV	24.3	28.2	
Norm PMT Detector	0 - 5000	mV	31.4	34.3	
HVPS	400-900 constant	V	725	725	
DCPS	2500 (+/- 200)	mV	-	-	
ROCELL TEMP	50 (+/- 1)	Dreegee C	50	50	
BOX TEMP	20-40	Dreegee C	32.6	35.1	
PMT TEMP	7 (+/-1)	Dreegee C	8.3	8.3	
UV lamp	1000-4900	mV	3251	3251	
Lamp Ratio	30-120	%	87.4	87.4	
STR. Light (Zero Gas)	<100	PPB	38.5	38.5	
Dark PMT	(-50) - (+200)	mV	27.6	27.6	
Dark lamp	(-50) - (+200)	mV	3.6	3.6	
SAMP PRES	20-30 contant	IN-Hg-A	26.9	27.3	
Electric Test/Optic Test					
PMT Volts	2000 (+/- 500)	mV	2010	2006	
SO2 Conc	1000 (+/- 250)	PPB	1005	1003	
SO2 Slope	1 (+/- 0.3)	-	1.054	1.053	
SO2 Offset	< 250	mV	94.7	90.4	
Stability at Zero	< 0.2	PPB	0.1	0.1	
Stability at Span	< 2 ppb @ 400 ppb	PPB	0.4	0.2	
Gas Test Response					
Zero Gas (0.00 PPB)	0	ppb	-0.6	0.4	
Span Gas (400 PPB)	400	ppb	392.3	401.4	± 5% of Range

Calibrate By :

Supachai

Supachai Anankijyingyong

Date:

1-Sep-68

Approve By :

[Signature]

Date:

1-Sep-68



Neediss Supply Instrument Co



บริษัท นีดีส ซัพพลาย อินสตรูमेंท์ จำกัด

536 ซ.บางแค7 แขวงบางแค เขตบางแค กรุงเทพฯ 10160 โทร : 02-802-3980-2

www.neediss.com E-mail : info@neediss.com



SO2 Analyzer Verification Test Report

Calibration Report No.: ESA-6809005

Calibrated Date: 1-Sep-68

☒ PM ☐ Onsite

Instruments Information

Page:1/2

Analyzer Type: SO2 Analyzer Model: AF22e	Manufacturer Environnement SA., France S/N: 2506
---	---

Calibration System

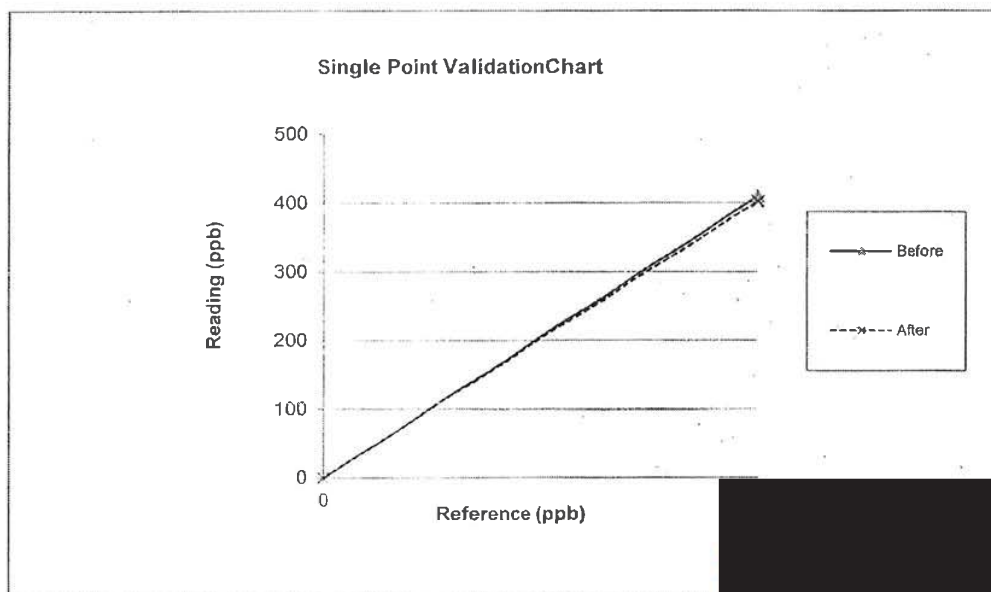
Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792 ZERO AIR Generator ZAG7001 S/N: 644	NOx Conc 45.30 PPM NO Conc 45.30 PPM SO2 Conc 45.05 PPM CO Conc 4528 PPM Expire Date: OCT 23,2027 EB0170003

Environment: Temperature 25.9 °C

Humidity: 60 %RH

Validation Report

Status	Zero			Span		
	Reference (ppb)	Reading (ppb)	Drift (ppb)	Reference (ppb)	Reading (ppb)	Drift%
Before	0.0	-0.5	-0.5	400.0	409.3	1.1
After	0.0	0.5	0.5	400.0	402.1	0.3





Calibration Report No.: ESA-6809005

Calibrated Date: 1-Sep-68

☒ PM ☐ Onsite

Analyzer Signal Values					
Date	1-Sep-68	Time	13:11:00		
Power Supplies					
Option	0.00	mV	+5 V Sensor	5	V
+4 V	4068	mV	+3.3 V	3.3	V
+24 V	24.1	V	+12 V	11.9	V
+5 V	5	V	I UV lamp	44.3	mA
I+24 V	1.2	A			
Optical Bench					
Dark UV sig.	0	mV	Dark PM sig.	88	mV
UV ref.	0	mV	PM ref.	0	mV
UV sig.	24.1	mV	PM sig.	138.6	mV
Ref.ratio	0		Meas ratio	0.34	
Mean sig.	0.7		Raw trend	11	
Raw sig.	24.4	ppb	inst.meas.	22.8	ppb
I UV Lamp	44.7	mA	HV PM	2626.80	mV
Sample					
Internal Temp.	31.9	deg.C	Chamber T.	50	deg.C
Gas Pr.	970	hPa	Pump Pr.	355.5	hPa
Flow	18.7	l/h			

Validation By : Supachai
Supachai Anankijyingyong

Date: 1-Sep-68

Approve By : [Signature]

Date: 1-Sep-68



NOx Analyzer Verification Test Report

Page:1/2

Validation Report No.: API-6809003

Validation Date: 1-Sep-25

☒ PM ☐ Onsite

Instruments Information

Analyzer Type: NO/NO2/NOx Analyzer Model: T200	Manufacturer API S/N: 2469
---	-------------------------------

Calibration System

Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792 ZERO AIR Generator ZAG7001 S/N: 644	NOx Conc 45.30 PPM NO Conc 45.30 PPM SO2 Conc 45.05 PPM CO Conc 4528 PPM Expire Date: OCT 23,2027 EB0170003

Environment: Temperature 24.9 °C

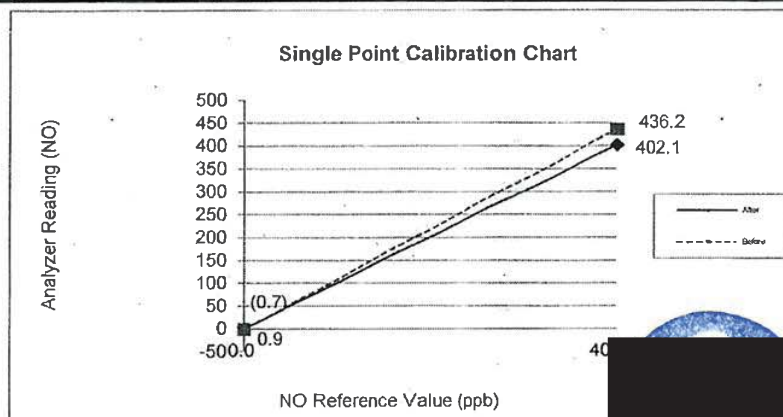
Humidity: 60 %RH

Validation Check (Before adjust)

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	-0.95	0.0	-1.0	436.1	400.0	4.3
NO ₂	-0.22	0.0	-0.2	0.1	0.0	0.0
NOx	-0.73	0.0	-0.7	436.2	400.0	4.3

Validation Check (After adjust)

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	0.42	0.0	0.4	400.0	400.0	0.0
NO ₂	0.49	0.0	0.5	2.1	0.0	0.3
NOx	0.91	0.0	0.9	402.1	400.0	0.3





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536 ซ.บางแค7 แขวงบางแค เขตบางแค กรุงเทพฯ 10160 โทร : 02-802-3980-2

www.neediss.com E-mail : info@neediss.com



Page:2/2

Validation Report No.: API-6809003

Validation Date: 1-Sep-25

☐ PM ☐ Onsite

Analyzer Signal Values					
Date	1-Sep-25	Time	14:14		
Power Supplies					
Option	-13.52	mV	+5 V Sensor	4.99	V
+3.3 V	3.3	V	+24 V	23.96	V
+12 V	11.88	V	+5 V	4.99	V
+4 V	3974.3	mV	I+ 24V	2.4	A
I O3	82.74	mA			
Optical Bench					
Dark PM sig.	0.0	mV	PM NO sig.	84.28	mV
PM Nox sig.	107.0	mV	PM Ny sig.	86.71	mV
Sample					
Chamber T	60	deg.C	Internal Temp.	33.33	deg.C
Chamber P	1720.8	hPa	PM T.	1.46	deg.C
Flow	47.21	NI/h	Sample Pr.	993.2	hPa

Validation By :

Supachai Anankijyingyong

Date:

1-Sep-25

Approve By :

Date:

1-Sep-25





NOx Analyzer Verification Test Report

Page:1/2

Validation Report No.: API-6809004

Validation Date: 1-Sep-25

☒ PM ☐ Onsite

Instruments Information

Analyzer Type: NO/NO2/NOx Analyzer Model: T200	Manufacturer API S/N: 2572
---	-------------------------------

Calibration System

Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792 ZERO AIR Generator ZAG7001 S/N: 644	NOx Conc 45.30 PPM NO Conc 45.30 PPM SO2 Conc 45.05 PPM CO Conc 45.28 PPM Expire Date: OCT 23,2027 EB0170003

Environment: Temperature 24.9 °C

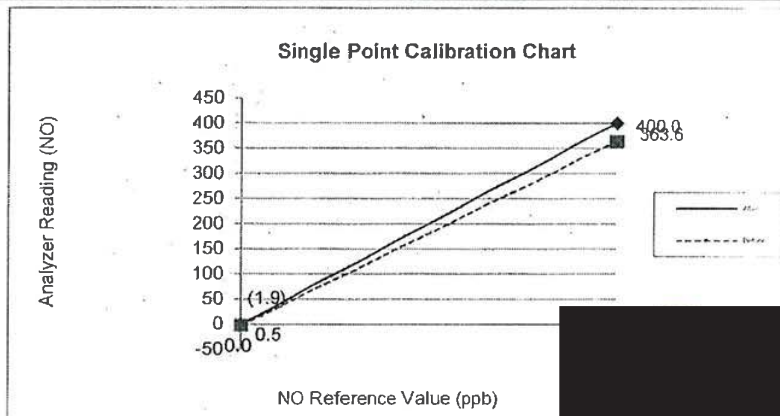
Humidity: 60 %RH

Validation Check (Before adjust)

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	-1.7	0.0	-1.7	354.4	400.0	-6.0
NO ₂	2	0.0	2.0	9.2	0.0	1.3
NOx	-1.9	0.0	-1.9	363.6	400.0	-4.8

Validation Check (After adjust)

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	0.7	0.0	0.7	401	400.0	0.1
NO ₂	0.2	0.0	0.2	1	0.0	-0.1
NOx	0.5	0.0	0.5	400	400.0	0.0





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Page:2/2

Validation Report No.: API-6809004

Validation Date: 1-Sep-25

☐ PM ☐ Onsite

Analyzer Signal Values					
Date	1-Sep-25	Time	14:14		
Power Supplies					
Option	-13.52	mV	+5 V Sensor	4.99	V
+3.3 V	3.3	V	+24 V	23.96	V
+12 V	11.88	V	+5 V	4.99	V
+4 V	3974.3	mV	I+ 24V	2.4	A
I O3	82.74	mA			
Optical Bench					
Dark PM sig.	0.0	mV	PM NO sig.	84.28	mV
PM Nox sig.	107.0	mV	PM Ny sig.	86.71	mV
Sample					
Chamber T	60	deg.C	Internal Temp.	33.33	deg.C
Chamber P	1720.8	hPa	PM T.	1.46	deg.C
Flow	47.21	NI/h	Sample Pr.	993.2	hPa

Validation By :

Supachai
Supachai Anankijyingyong
Date: 1-Sep-25

Approve By :

[Signature]
Date: 1-Sep-25

Neediss Supply Instrument Co.,Ltd

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer:	AIR LIQUIDE (THAILAND) LTD	Reference Number:	160-403162930-1
Part Number:	E04NI99E15A00V3	Cylinder Volume:	144.0 CF
Cylinder Number:	EB0170003	Cylinder Pressure:	2015 PSIG
Laboratory:	124 - Plumsteadville - PA	Valve Outlet:	660
PGVP Number:	A12024	Certification Date:	Oct 23, 2024
Gas Code:	CO,NO,NOX,SO2,BALN		

Expiration Date: Oct 23, 2027

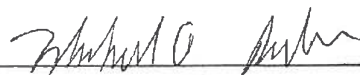
Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted. The results relate only to the items tested. The report shall not be reproduced except in full without approval of the laboratory. Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	45.00 PPM	45.30 PPM	G1	+/- 1.0% NIST Traceable	10/16/2024, 10/23/2024
NITRIC OXIDE	45.00 PPM	45.30 PPM	G1	+/- 0.9% NIST Traceable	10/16/2024, 10/23/2024
SULFUR DIOXIDE	45.00 PPM	45.05 PPM	G1	+/- 0.7% NIST Traceable	10/16/2024, 10/23/2024
CARBON MONOXIDE	4500 PPM	4528 PPM	G1	+/- 0.6% NIST Traceable	10/15/2024
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	OCK1201202235	CC750377	49.05 PPM NITRIC OXIDE/NITROGEN	+/- 0.5%	May 03, 2026
PRM	12404	APEX 1324257	50.04 PPM NITRIC OXIDE/NITROGEN	+/- 0.4%	Dec 22, 2023
GMIS	124206899128	CC323207	4.239 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Jan 04, 2027
PRM	C2392001.1	D153445	9.87 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 22, 2024
GMIS	0712202310	CC494279	49.92 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.7%	Jun 18, 2027
SRM	1693a	FF25467	50.33 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.7%	Jun 27, 2023
CARBON MONOXIDE	080123	KAL004712	4857 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Feb 20, 2030

The SRM, NTRM, PRM, or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS ULTRAMAT 6 N1M9050	NDIR	Oct 09, 2024
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Oct 17, 2024
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Oct 03, 2024
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Sep 26, 2024



Approved for Release

Triad Data Available Upon Request.

NOTES: Gross Weight: 27.8 Kg

Net Weight: 4.8 Kg




Approved for Release





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 23 May, 2025

Certification No. 260/25

Page : 1 of 6

Object : เครื่องมือตรวจวัดอุณหภูมินิยมวิทยา

Manufacturer : DYACON

Type : Data Logger MS-100

Serial No. : 130148 ID No. : EWSDCMS1200148

Customer : Envilab Co.,Ltd.(Head Office)
540.540/1 Soi Bangkhae 7, Bangkhae, Bangkhae
Bangkok 10160,Thailand.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1008.2 hPa

NATIONAL STANDARD WIND TUNNEL : Vane Angel Bench Stand Model 18112

: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425

N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec

: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: Thermoschneider No.9188 : testo, testo 645 Serial No. 02848057

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No. Y1220015

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer

Signed :

Mr. Pisood Promsut

(Authorised Signatory)





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Sensor Wind Speed & Wind Direction Model WSD-1 F

Certification No. 260/25

23 May, 2025

Serial No. 1222

Page : 2 of 6

Standard Ultrasonic Anemometer	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure	Vacumm	Velocity	Velocity	Correction
	m/sec	inches H2O	inches H2O	m/sec	m/sec
1.00	-	-	-	1.0	0.00
3.02	-	-	-	3.0	0.02
5.00	-	-	-	5.0	0.00
7.04	-	-	-	7.0	0.04
9.02	-	-	-	9.0	0.02
11.01	-	-	-	11.0	0.01
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.1	-0.09
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.1	-0.08

Vane Angel Bench Stand Model 18112	
Young Meteorological Instruments	
WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	90
180	182
270	

Calibrated by :

Watchapol

Mr. Watcharapol Subwat

Mechanical Engineer



M



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Sensor Presure Model TPH-1 C

Serial No. 6273

Certification No. 260/25

23 May, 2025

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
1006.72	1006.1	0.62
1007.36	1006.8	0.56
1007.32	1006.8	0.52
1007.17	1006.6	0.57
1005.40	1004.9	0.50
1006.09	1005.4	0.69
1006.51	1006.0	0.51
1003.03	1002.6	0.43
1003.56	1003.1	0.46
1004.09	1003.5	0.59
1004.61	1004.1	0.51
1005.22	1004.8	0.42
1005.33	1004.9	0.43
1005.79	1005.2	0.59
1005.55	1005.0	0.55
1004.53	1003.9	0.63
1005.32	1004.9	0.42
1004.09	1003.6	0.49
1004.51	1003.9	0.61
1005.08	1004.6	0.48

Average

Calibrated by :

Watcharapol

Mr. Watcharapol Subwat

Mechanical Engineer





THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Sensor Temperature Model TPH-1 C

Certification No. 260/25

23 May, 2025

Serial No. 6273

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.7	45.8	-0.1
30.3	30.4	-0.1
15.6	15.6	0.0

Calibrated by :

Watchapol

Mr. Watchapol Subwat

Mechanical Engineer



Calibration Test Section

Meteorological Instruments Bureau



THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804, 0-2399-0469

The Result of Calibration

Sensor Humidity Model TPH-1 C

Certification No. 260/25

23 May, 2025

Serial No. 6273

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
86.3	88.3	-2.0
65.1	66.3	-1.2
42.3	42.6	-0.3

Calibrated by :

Natchapol

Mr. Watchapol Subwat

Mechanical Engineer





Date of Issue 23 May, 2025

Certification No. 260/25

Page: 6 of 6

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ซีห้อ Davis Instruments แบบ TIPPING BUCKET Product No. #7852 Mfg. Code. EWSDCMS1200148 ทำการสอบเทียบกับแก้ววัดฝน แบบแก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm./TIP)



ลงชื่อ... วัชรพล ทรัพย์วัฒน์ ...

(นายวัชรพล ทรัพย์วัฒน์)

วิศวกรชำนาญการ





บริษัท เอ็นไวแล็บ จำกัด
Envilab Co., Ltd.
Tel : 02-802-3577-8

540,540/ 1 ซอยบางแค 7 เขตบางแค แขวงบางแค กรุงเทพฯ 10160
540,540/ 1 Soi Bangkhae 7 Bangkhae Bangkok 10160 Thailand
Fax. 02-802-3773 E-mail : info@evltesting.com



Needless Envilab

Verification Test Report

Report No.: SO2500006-E009 / 001

Verification Date : 05 November 2025

Operate Information ☐ PM ☒ Onsite

Site : บ้านมาบแสนสุข (จุดใกล้เคียง คือ บ้านมาบเอียง)

GPS coordinates : 47P N 1448758 E 731867

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 45

Serial No : 0016

Scale Rang : 20dB-140dB

Class : 1

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.20 °C Relative humidity 54.20 %

Atmospheric pressure 1007.1 hpa

Measurement Data

Refferance Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	94	93.8	-0.2	±0.5

* UUR = Unit Under Reference Unit

Acceptant Criteria : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By :

Thanabudee Anusasananan

Date : 05 November 2025

Approve By :

(Wisan Ritthikamon)

Date : 05 November 2025

The Results shown in this verification report refer only to the equipment

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Fax. 02-802-3773 E-mail : info@evltesting.com



Neediss Envilab

Verification Test Report

Report No.: SO2500006-E009 / 001

Verification Date : 05 November 2025

Operate Information ☐ PM ☒ Onsite

Site : ริมรั้วโครงการทิตเหนือ

GPS coordinates : 47P N 1449126 E 733913

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial No : 1970

Scale Rang : 20dB-140dB

Class : 2

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.20 °C Relative humidity 54.20 %
Atmospheric pressure 1007.1 hpa

Measurement Data

Refferance Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	94	93.7	-0.3	±1.0

* UUR = Unit Under Reference Unit

Acceptant value : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By :

Thanabudee Anusasananan

Date : 05 November 2025

Approve By :

(Wisan Ritthikamon)

Date : 05 November 2025

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540,540/1 Soi Bangkhae 7 Bangkhae Bangkok 10160 Thailand
Fax. 02-802-3773 E-mail : info@evltesting.com



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Verification Test Report

Report No.: SO2500006-E009 / 001

Verification Date : 05 November 2025

Operate Information ☐ PM ☒ Onsite

Site : ริมรั้วโครงการทิสได้

GPS coordinates : 47P N 1448430 E 733987

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 45

Serial No : 0022

Scale Rang : 20dB-140dB

Class : 1

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.20 °C Relative humidity 54.20 %

Atmospheric pressure 1007.1 hpa

Measurement Data

Refferance Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	93.93	94.2	0.27	±0.5

* UUR = Unit Under Reference Unit

Acceptant value : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By :

Thanabudee Anusasananan

Date : 05 November 2025

Approve By :

(Wisan Ritthikamon)

Date : 05 November 2025

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Neediss Envilab

Verification Test Report

Report No.: SO2500006-E009 / 001

Verification Date : 05 November 2025

Operate Information ☐ PM ☒ Onsite

Site : ริมรั้วโครงการทีศตะวันออก

GPS coordinates : 47P N 1448872 E 733993

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 45

Serial No : 0027

Scale Rang : 20dB-140dB

Class : 1

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.20 °C Relative humidity 54.20 %
Atmospheric pressure 1007.1 hpa

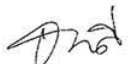
Measurement Data


Refferance Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	94	93.6	-0.4	±0.5

* UUR = Unit Under Reference Unit

Acceptant value : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By : 
Thanabudee Anusasananan

Approve By : 
(Wisan Ritthikamon)

Date : 05 November 2025

Date : 05 November 2025

The Results shown in this verification report refer only to the equipment verification unless otherwise stated

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540,540/1 Soi Bangkhae 7 Bangkhae Bangkok 10160 Thailand
Fax. 02-802-3773 E-mail : info@evltesting.com



Neediss Envilab

Verification Test Report

Report No.: SO2500006-E009 / 001

Verification Date : 05 November 2025

Operate Information ☐ PM ☒ Onsite

Site : ริมรั้วโครงการทีศตวันตก

GPS coordinates : 47P N 1448839 E 733739

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 45

Serial No : 0034

Scale Rang : 20dB-140dB

Class : 1

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.20 °C Relative humidity 54.20 %
Atmospheric pressure 1007.1 hpa

Measurement Data

Refferance Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	94.1	94.2	0.1	±0.5

* UUR = Unit Under Reference Unit

Acceptant value : Sound Level Meter Class 1 ±0.5 dB
Sound Level Meter Class 2 ±1.0 dB

Calibrated By :

Thanabudee Anusasananan

Date : 05 November 2025

Approve By :

(Wisan Ritthikamon)

Date : 05 November 2025

The Results shown in this verification report refer only to the equipment verification unless otherwise stated.

This Calibration Certificate cannot be reproduced.



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0152

MTC No. EEL. BP. 65/0168

CALIBRATION CERTIFICATE

Submitted by : Envilab Co.,Ltd.

Address : 540, 540/1 Soi Bangkhac 7, Bangkhac, Bangkhac, Bangkok 10160 Thailand.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Acoustic Calibrator

Manufacturer : Pulsar

Model : 103

Serial No. : 98971

Ambient Environment

Temperature : $(23 \pm 3) ^\circ\text{C}$

Relative Humidity : $(50 \pm 15) \%$

Ambient Pressure : $(101.325 \pm 1.500) \text{ kPa}$

Standards used : 1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.

2. Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.

3. Programmable Attenuator Tamagawa TPA-303A S/N OF 2214.

4. Digital Multimeter Agilent 34401A S/N MY44005560.

5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.

6. Audio Analyzer Panasonic VP-7722A S/N 041477D122.

7. Condenser Microphone B&K 4180 S/N 2889871.

Calibration Procedure: CP-102-04 based on IEC 60942-2003. The sound pressure level of instrument was measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 10 Jan. 2025

Date of Calibration : 17 Jan. 2025

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FM.BL.MTC.002 Rev.5

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Office/Laboratory

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(66) 08 3219 9440
E-mail : mtc@tistr.or.th Website : www.tistr.or.th

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Request No. 21-68/0152

MTC No. EEL. BP. 65/0168

The reported expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

Nominal Output of Unit Under Test = 94 dB re 20 μ Pa at 1000 HzAcoustic Output in dB re 20 μ Pa, Corrected to Reference Conditions : 101.325 kPa, 23.0°C and 50 %RH

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	93.93	-0.07	± 0.10	± 0.40 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1000.4	0.4	± 1.5	$\pm 1.0\%$

3. Total distortion

Standard Microphone Type	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1.40	± 0.50	$\pm 3.0\%$

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Date of Calibration : 17 Jan. 2025

2 / 3



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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0152

MTC No. EEL. BP. 65/0168

Nominal Output of Unit Under Test = 114 dB re 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa , Corrected to Reference Conditions : 101.325 kPa , 23.0 °C and 50 %RH

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	114.01	0.01	± 0.10	± 0.40 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1000.3	0.3	± 1.5	$\pm 3.0\%$

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	2.05	± 0.50	$\pm 3.0\%$

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by :

(Mr. Weerachai Deechaiyae)

Approved by :

(Mr. Prawate Kluaypa)
Director

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 17 Jan. 2025

Date of Issue : 20 Jan. 2025

End of Certificate

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FM.BL.MTC.002 Rev.5

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Fax. 02-802-3773 E-mail : info@evltesting.com



Needless Envilab

Verification Test Report

Instrument Information

Equipment : Air Sampling Pump

Manufacturer : AP Buck

Model : LP5

Serial No : 5568

Scale Rang : 5-5000 ml/min

Report No.: SO2500006-E009 / 001

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578

Certificate No. : L202507108-0002

Date due : 14 July 2026

Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %

Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point

☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	1000	1000.9	1001.5	1000.6	1000.4	999.6	1000.6	0.6	0.1

* UUR = Unit Under Reference flow

Calibrated By:

ธัญญลักษณ์

Thanyaluk Saengpetdimakan

Date : 05 November 2025

Approve By :

Wisana Ritthikamon

(Wisan Ritthikamon)

Date : 05 November 2025

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540,540/1 Soi Bangkhae 7 Bangkhae Bangkok 10160 Thailand
Fax. 02-802-3773 E-mail : info@evltesting.com



Neediss Envilab

Verification Test Report

Instrument Information

Equipment : Air Sampling Pump

Manufacturer : AP Buck

Model : LP5

Serial No : 5576

Scale Rang : 5-5000 ml/min

Report No.:

SO2500006-E009 / 002

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578

Certificate No. : L202507108-0002

Date due : 14 July 2026

Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %

Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point

☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	500	500.0	500.2	500.8	499.3	499.6	500.0	0.0	0.0

* UUR = Unit Under Reference flow

Calibrated By: ธัญญลักษณ์ แสนเกษม
Thanyaluk Saengpetdimakan

Date : 05 November 2025

Approve By: วิสัน ฤทธิกามอน
(Wisan Ritthikamon)

Date : 05 November 2025

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Fax. 02-802-3773 E-mail : info@evltesting.com



Neediss Envilab

Verification Test Report

Instrument Information

Equipment : Air Sampling Pump
Manufacturer : AP Buck
Model : LP5
Serial No : 5612
Scale Rang : 5-5000 ml/min

Report No.: SO2500006-E009 / 003

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578
Certificate No. : L202507108-0002
Date due : 14 July 2026
Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	500	500.3	500.5	499.2	500.9	500.2	500.2	0.2	0.0

* UUR = Unit Under Reference flow

Calibrated By: ธัญญลักษณ์
Thanyaluk Saengpetdimakan

Date : 05 November 2025

Approve By : (Signature)
(Wisan Ritthikamon)

Date : 05 November 2025

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Neediss Envilab

Verification Test Report

Instrument Information

Equipment : Air Sampling Pump
Manufacturer : AP Buck
Model : LP5
Serial No : 5611
Scale Rang : 5-5000 ml/min

Report No.: SO2500006-E009 / 004

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578
Certificate No. : L202507108-0002
Date due : 14 July 2026
Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	200	200.3	200.8	200.6	199.5	199.4	200.1	0.1	0.1

* UUR = Unit Under Reference flow

Calibrated By:

ชัญญลักษณ์

Thanyaluk Saengpetdimakan

Date : 05 November 2025

Approve By :

Wisan Ritthikamon

(Wisan Ritthikamon)

Date : 05 November 2025

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Needless Envilab

Verification Test Report

Instrument Information

Equipment : Air Sampling Pump

Manufacturer : AP Buck

Model : LP5

Serial No : 5821

Scale Rang : 5-5000 ml/min

Report No.: SO2500006-E009 / 005

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578

Certificate No. : L202507108-0002

Date due : 14 July 2026

Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %

Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point

☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	1000	1000.5	1000.4	1001.3	999.2	1000.6	1000.4	0.4	0.0

* UUR = Unit Under Reference flow

Calibrated By: ธัญญ์ลักขณ์
Thanyaluk Saengpetdimakan

Date : 05 November 2025

Approve By : Wisana Ritthikamon
(Wisan Ritthikamon)

Date : 05 November 2025

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Verification Test Report

Instrument Information

Equipment : Air Sampling Pump
Manufacturer : AP Buck
Model : LP4
Serial No : 4829
Scale Rang : 5-4000 ml/min

Report No.: SO2500006-E009 / 006

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578
Certificate No. : L202507108-0002
Date due : 14 July 2026
Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	2000	2000.7	2000.3	1999.4	1999.6	2000.8	2000.2	0.2	0.0

* UUR = Unit Under Reference flow

Calibrated By: ธัญลักษณ์
(Thanyaluk Saengpetdimakan)
Date : 05 November 2025

Approve By : Wisana Ritthikamon
(Wisana Ritthikamon)
Date : 05 November 2025

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Neediss Envilab

Verification Test Report

Instrument Information

Equipment : Air Sampling Pump

Manufacturer : AP Buck

Model : LP4

Serial No : 4830

Scale Rang : 5-4000 ml/min

Report No.: SO2500006-E009 / 007

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578

Certificate No. : L202507108-0002

Date due : 14 July 2026

Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %

Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point

☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	1000	1000.3	1001.8	1000.4	1000.6	1001.2	1000.9	0.9	0.1

* UUR = Unit Under Reference flow

Calibrated By :

ธัญลักษณ์

Thanyaluk Saengpetdimakan

Date : 05 November 2025

Approve By :

Wisana

(Wisan Ritthikamon)

Date : 05 November 2025

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Neediss Envilab

Verification Test Report

Instrument Information

Equipment : Air Sampling Pump
Manufacturer : AP Buck
Model : LP4
Serial No : 4831
Scale Rang : 5-4000 ml/min

Report No.: SO2500006-E009 / 008

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578
Certificate No. : L202507108-0002
Date due : 14 July 2026
Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	1700	1700.8	1700.5	1701.5	1700.3	1699.9	1700.6	0.6	0.0

* UUR = Unit Under Reference flow

Calibrated By: ธัญญลักษณ์
(Thanyaluk Saengpetdimakan)
Date : 05 November 2025

Approve By: Wisana Ritthikamon
(Wisan Ritthikamon)
Date : 05 November 2025

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Fax. 02-802-3773 E-mail : info@evltesting.com



Verification Test Report

Instrument Information

Equipment : Air Sampling Pump
Manufacturer : AP Buck
Model : LP4
Serial No : 4832
Scale Rang : 5-4000 ml/min

Report No.: SO2500006-E009 / 009

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578
Certificate No. : L202507108-0002
Date due : 14 July 2026
Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	500	500.4	500.8	500.3	501.4	499.7	500.5	0.5	0.1

* UUR = Unit Under Reference flow

Calibrated By: ธัญลักษณ์
Thanyaluk Saengpetdimakan
Date : 05 November 2025

Approve By: Wisarn Ritthikamon
(Wisarn Ritthikamon)
Date : 05 November 2025

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Fax. 02-802-3773 E-mail : info@evitest.com



Verification Test Report

Instrument Information

Report No.: SO2500006-E009 / 010

Equipment : Air Sampling Pump

Verification Date : 05 November 2025

Manufacturer : AP Buck

Model : LP4

Serial No : 4834

Scale Rang : 5-4000 ml/min

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578

Certificate No. : L202507108-0002

Date due : 14 July 2026

Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point

☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	2000	2000.1	2000.9	1999.5	2000.6	2000.4	2000.3	0.3	0.0

* UUR = Unit Under Reference flow

Calibrated By:

ธัญญลักษณ์

Thanyalak Saengpetdimakan

Date : 05 November 2025

Approve By :

วิสัน ฤทธิกามอน

(Wisan Ritthikamon)

Date : 05 November 2025

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Neediss Envilab

Verification Test Report

Instrument Information

Equipment : Air Sampling Pump
Manufacturer : SKC
Model : AirCheck-52
Serial No : 215608
Scale Rang : 5-3000 ml/min

Report No.: SO2500006-E009 / 001

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578
Certificate No. : L202507108-0002
Date due : 14 July 2026
Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	1000	1000.7	1001.4	1000.9	1000.2	999.8	1000.6	0.6	0.1

* UUR = Unit Under Reference flow

Calibrated By: ธัญญลักษณ์
Thanyaluk Saengpetdimakan

Date : 05 November 2025

Approve By : (Signature)
(Wisan Ritthikamon)

Date : 05 November 2025

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Verification Test Report

Instrument Information

Equipment : Air Sampling Pump

Manufacturer : SKC

Model : AirCheck-52

Serial No : 208267

Scale Rang : 5-3000 ml/min

Report No.: SO2500006-E009 / 002

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578

Certificate No. : L202507108-0002

Date due : 14 July 2026

Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %

Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point

☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	200	200.0	200.5	199.9	201.8	200.4	200.5	0.5	0.3

* UUR = Unit Under Reference flow

Calibrated By:

ธัญลักษ์

Thanyaluk Saengpetdimakan

Date : 05 November 2025

Approve By :

Wisarn

(Wisan Ritthikamon)

Date : 05 November 2025

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Neediss Envilab

Verification Test Report

Instrument Information

Equipment : Air Sampling Pump
Manufacturer : SKC
Model : AirCheck-52
Serial No : 208201
Scale Rang : 5-3000 ml/min

Report No.: SO2500006-E009 / 003

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578
Certificate No. : L202507108-0002
Date due : 14 July 2026
Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	200	200.9	200.8	200.6	201.3	201.5	201.0	1.0	0.5

* UUR = Unit Under Reference flow

Calibrated By: ธัญลักษณ์
(Thanyaluk Saengpetdimakan)
Date : 05 November 2025

Approve By : Wisana
(Wisan Ritthikamon)
Date : 05 November 2025

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Needless Envilab

Verification Test Report

Instrument Information

Equipment : Air Sampling Pump
Manufacturer : SKC
Model : PCXR8
Serial No : 309938
Scale Rang : 5-5000 ml/min

Report No.: SO2500006-E009 / 004

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578
Certificate No. : L202507108-0002
Date due : 14 July 2026
Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	1700	1701.3	1700.8	1700.6	1700.5	1699.7	1700.6	0.6	0.0

* UUR = Unit Under Reference flow

Calibrated By:

ธัญลักษณ์

Thanyaluk Saengpetdimakan

Date : 05 November 2025

Approve By :

วิสัน

(Wisan Ritthikamon)

Date : 05 November 2025

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Verification Test Report

Instrument Information

Equipment : Air Sampling Pump

Manufacturer : SKC

Model : PCXR4

Serial No : 701832

Scale Rang : 5-5000 ml/min

Report No.: SO2500006-E009 / 005

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578

Certificate No. : L202507108-0002

Date due : 14 July 2026

Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point

☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	500	500.6	500.9	500.3	500.4	500.8	500.6	0.6	0.1

* UUR = Unit Under Reference flow

Calibrated By:

ธัญลักษณ์

Thanyalak Saengpetdimakan

Date : 05 November 2025

Approve By :

Wisana

(Wisan Ritthikamon)

Date : 05 November 2025

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Verification Test Report

Instrument Information

Report No.: SO2500006-E009 / 006

Equipment : Air Sampling Pump

Verification Date : 05 November 2025

Manufacturer : Gilian

Model : GILAir-5RC

Serial No : 504925

Scale Rang : 5-5000 ml/min

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578

Certificate No. : L202507108-0002

Date due : 14 July 2026

Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %

Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point

☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	200	200.4	200.9	201.8	199.6	201.2	200.8	0.8	0.4

* UUR = Unit Under Reference flow

Calibrated By :

ชัยฤกษ์

Thanyaluk Saengpetdimakan

Date : 05 November 2025

Approve By :

Wis

(Wisan Ritthikamon)

Date : 05 November 2025

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Verification Test Report

Instrument Information

Equipment : Air Sampling Pump

Manufacturer : Gilian

Model : GILAir-5RC

Serial No : 504929

Scale Rang : 5-5000 ml/min

Report No.: SO2500006-E009 / 008

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578

Certificate No. : L202507108-0002

Date due : 14 July 2026

Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	500	500.4	501.2	501.5	499.6	500.3	500.6	0.6	0.1

* UUR = Unit Under Reference flow

Calibrated By:

ธัญญลักษณ์

Thanyaluk Saengpetdimakan

Date : 05 November 2025

Approve By :

วิสัน ฤทธิกามอน

(Wisan Ritthikamon)

Date : 05 November 2025

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Verification Test Report

Instrument Information

Equipment : Air Sampling Pump

Manufacturer : Gilian

Model : GILAir-5RC

Serial No : 504931

Scale Rang : 5-5000 ml/min

Report No.: SO2500006-E009 / 009

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578

Certificate No. : L202507108-0002

Date due : 14 July 2026

Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	500	500.7	501.8	499.7	500.3	500.6	500.6	0.6	0.1

* UUR = Unit Under Reference flow

Calibrated By: ธัญญ์ลักขณ์
(Thanyaluk Saengpetdimakan)

Date : 05 November 2025

Approve By : Wisana Ritthikamon
(Wisan Ritthikamon)

Date : 05 November 2025

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Neediss Envilab

Verification Test Report

Instrument Information

Report No.: SO2500006-E009 / 010

Equipment : Air Sampling Pump

Verification Date : 05 November 2025

Manufacturer : Gilian

Model : GILAir3

Serial No : 19001

Scale Rang : 20-3000 ml/min

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578

Certificate No. : L202507108-0002

Date due : 14 July 2026

Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	200	200.9	200.4	201.7	199.7	200.5	200.6	0.6	0.3

* UUR = Unit Under Reference flow

Calibrated By: ธัญญ์ลักขณ์
Thanyaluk Saengpetdimakan
Date : 05 November 2025

Approve By : (Signature)
(Wisan Ritthikamon)
Date : 05 November 2025

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Verification Test Report

Instrument Information

Equipment : Air Sampling Pump
Manufacturer : Gilian
Model : GILAir3
Serial No : 19002
Scale Rang : 20-3000 ml/min

Report No.: SO2500006-E009 / 001

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578
Certificate No. : L202507108-0002
Date due : 14 July 2026
Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	200	200.8	200.5	201.7	200.2	199.8	200.6	0.6	0.3

* UUR = Unit Under Reference flow

Calibrated By: ธัญญ์ลักษณ์
Thanyaluk Saengpetdimakan

Date : 05 November 2025

Approve By : (Signature)
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Date : 05 November 2025

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Verification Test Report

Instrument Information

Equipment : Air Sampling Pump
Manufacturer : Gilian
Model : GILAir3
Serial No : 15078
Scale Rang : 20-3000 ml/min

Report No.: SO2500006-E009 / 002

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578
Certificate No. : L202507108-0002
Date due : 14 July 2026
Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	2000	2000.0	2001.4	2000.3	2000.6	2000.9	2000.6	0.6	0.0

* UUR = Unit Under Reference flow

Calibrated By: ธัญญลักษณ์
(Thanyaluk Saengpetdimakan)
Date : 05 November 2025

Approve By : Wisarn
(Wisan Ritthikamon)
Date : 05 November 2025

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Needless Envilab

Verification Test Report

Instrument Information

Equipment : Air Sampling Pump
Manufacturer : Gilian
Model : GILAir3
Serial No : 15079
Scale Rang : 20-3000 ml/min

Report No.: SO2500006-E009 / 003

Verification Date : 05 November 2025

Reference Standard

Standard : Bios Flow Calibrator Manufacturer : Mesalabs Model : Defender 520H S/N : 164578
Certificate No. : L202507108-0002
Date due : 14 July 2026
Traceability : MIT

Ambient Condition : Temperature 25.00 °C Relative humidity 58.00 %
Atmospheric pressure 1013.3 hpa

Verification Point : ☒ Single Point
☐ Multi Point

Measurement Data

UUR Point	UUR Reading (ml/min)	Reference flow response						Error (ml/min)	Accuracy (± 5% of the flow set point)
		Test 1 (ml/min)	Test 2 (ml/min)	Test 3 (ml/min)	Test 4 (ml/min)	Test 5 (ml/min)	Average (ml/min)		
1	1700	1700.8	1701.5	1700.5	1700.6	1700.9	1700.9	0.9	0.1

* UUR = Unit Under Reference flow

Calibrated By: ธัญญ์ลักษณ์
Thanyaluk Saengpetdimakan
Date : 05 November 2025

Approve By : (Signature)
(Wisan Ritthikamon)
Date : 05 November 2025

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214 Bangwaek Rd. Bangpai Bangkok 10160
Tel.: 0-2865-4647-8 Fax: 0-2865-4649 <http://www.mit.in.th>



CALIBRATION CERTIFICATE

Page 1 of 3

Certificate No. : L202507108-0002

Date Issued : 15-Jul-25

Customer : Envilab Co., Ltd.
540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkok, Thailand
10160

Equipment : Bios Flow Calibrator

Manufacturer : MESALABS

Model : Defender 520 H

Serial No. : 164578

ID No./Tag No. : -

Date Received : 09-Jul-25

Date Calibrated : 14-Jul-25

Calibrated by : Saruth Srichutikul

Calibration Method or Calibration Procedure Used

In-house method : CP-26 by comparison against Bell Prover.

In-house method : CP-44 by comparison against Piston Prover.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

Result of Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level confidence approximately 95 percent.

This certificate may not be reproduced other than in full except with the prior written approval of the Miracle International Technology Company Limited.

Approved by:

K. Nathong
(Nathapong Krudaum)



Certificate No. : L202507108-0002

Environment : Ambient temperature : $(25 \pm 2)^{\circ}\text{C}$
 Relative humidity : $(50 \pm 15)\%\text{RH}$

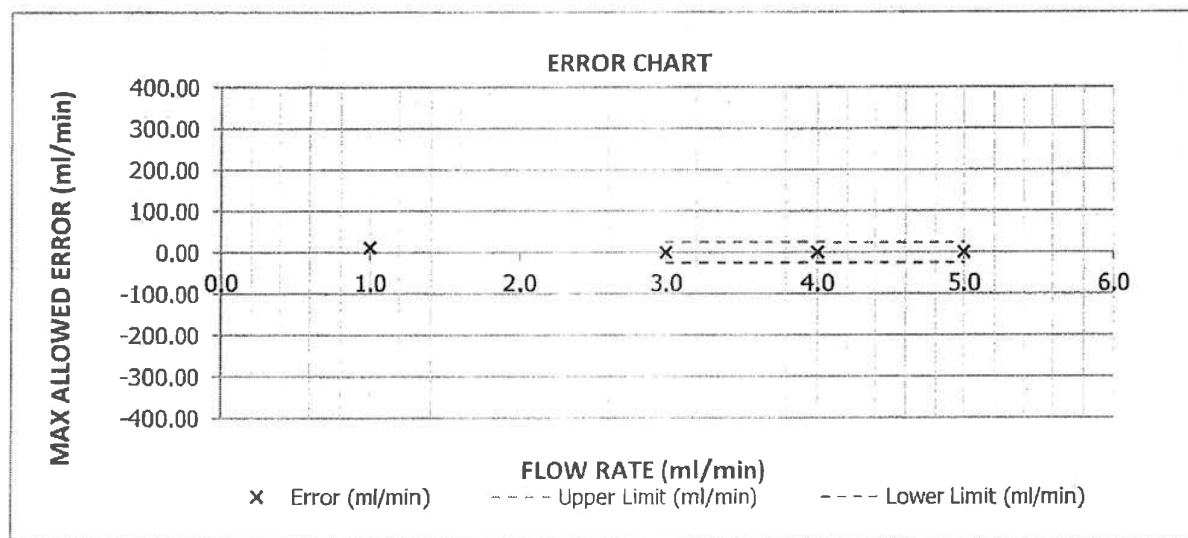
Capacity Range : 30000 ml/min

Calibration Media : Air

UUC Reference Condition : Pressure 101.325 kPa @ 25 $^{\circ}\text{C}$, Air

Temperature ($^{\circ}\text{C}$)	Pressure (kPa)	Flow Rate Reading (ml/min)		Error (ml/min)	Uncertainty $\pm(\text{ml/min})$
		UUC Reading	STD Reading		
23.737	100.70	50.06	38.908	11.15	0.43
24.82	101.18	500.09	488.1	11.99	2.5
24.69	101.02	1500.00	1472.9	27.10	5.2
24.09	101.24	3000.2	2944.2	56.0	8.1
24.73	101.61	4999.9	4900	99.9	14

Error = Unit Under Calibration - Standard



Note : The actual flow rate is determined by the equation :

$$Q_{Meas} = Q_{Ref} \times \frac{P_{Ref}}{P_{Meas}} \times \frac{T_{Meas}}{T_{Ref}}$$

; Q = Flow rate

; P = Absolute pressure

; T = Absolute temperature

; Subscript "Meas" = Measurement condition

; Subscript "Ref" = Reference condition

Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used :

MIT Calibration Certificate No. L202405039-0005 for Piston Prover Volume Serial No. 85, Due 30-May-26

MIT Calibration Certificate No. L202403007-0026 for Piston Prover Timer Serial No. 122199, Due 05-Mar-26

MIT Calibration Certificate No. L202409011-0001 for Absolute Pressure (Piston Prover) Serial No. 220368, Due 02-Dec-27

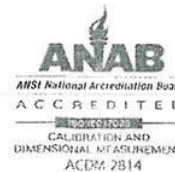
End of Certificate



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Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : HEAT STRESS MONITOR
MANUFACTURER : METROSONICS
MODEL / TYPE : hs-32
SERIAL NO. : MCE010015[EHEMTHS3210015]
CLID. NO. : 232400805
JOB CONTROL NO. : 250203012904
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : ENVILAB CO., LTD.
540, 540/1 SOI BANGKHAE 7, BANGKHAE,
BANGKHAE, BANGKOK 10160 THAILAND

DATE OF RECEIVED : 03 February 2025

DATE OF ISSUED : 06 February 2025

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Wenick Inchaistri
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory
06 February 2025



This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q25012904

F3-011-05/12-23



@ckcalibration



CALIBRATION LABORATORY CO., LTD.

2/10-11, 14, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



REPORT OF CALIBRATION

FOR

NOMENCLATURE : HEAT STRESS MONITOR
MANUFACTURER : METROSONICS
MODEL / TYPE : hs-32
SERIAL NO. : MCE010015[EHEMTHS3210015]
DATE OF CALIBRATION : 05 February 2025

ENVIRONMENT CONDITIONS :

Temperature : $(23 \pm 2) ^\circ\text{C}$

Relative Humidity : $(55 \pm 10) \% \text{RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPTH-11. The calibration was performed by using Chilled Mirror Hygrometer which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Chilled Mirror Hygrometer, Edgetech Model Dew Master S/N. 36151.

Temperature & Humidity Chamber, PGC Model 9141-5114 S/N.0802282.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Thunder Scientific Corporation.

Certificate No. 22212, Due Date 23 February 2025.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2.00$ which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

Certificate No. Q25012904

F3-011-05/12-23

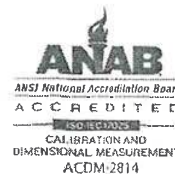


#clccalibration



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Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties of the measuring heat stress monitor.

CALIBRATION DATA

1. CORRECTION OF TEMPERATURE : WET

Test point (° C)	Actual Temperature (° C)	DUC Reading (° C)	Correction (° C)	Uncertainty ± (° C)
20.0	20.00	20.2	-0.20	0.27
30.0	30.00	29.8	+0.20	
40.0	40.01	39.5	+0.51	

2. CORRECTION OF TEMPERATURE : DRY

Test point (° C)	Actual Temperature (° C)	DUC Reading (° C)	Correction (° C)	Uncertainty ± (° C)
20.0	20.00	20.2	-0.20	0.27
30.0	30.00	29.8	+0.20	
40.0	40.01	39.6	+0.41	

3. CORRECTION OF TEMPERATURE : GLOBE

Test point (° C)	Actual Temperature (° C)	DUC Reading (° C)	Correction (° C)	Uncertainty ± (° C)
20.0	20.00	20.3	-0.30	0.27
30.0	30.00	29.7	+0.30	
40.0	40.01	39.1	+0.91	

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 014 Page 60 of 68

This report is valid for the above stated instrument/s only.

End of Certificate

Certificate No. Q25012904

F3-011-05/12-23

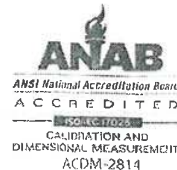


@clccalibration



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CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : HEAT STRESS MONITOR
MANUFACTURER : QUEST TECHNOLOGIES
MODEL / TYPE : QUESTemp^o32
SERIAL NO. : MCH110027[EHEMTHS3211027]
CLID. NO. : 232400069
JOB CONTROL. NO. : 251021124937
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : ENVILAB CO., LTD.
540, 540/1 SOI BANGKHAE 7, BANGKHAE,
BANGKHAE, BANGKOK 10160 THAILAND

DATE OF RECEIVED : 21 October 2025

DATE OF ISSUED : 24 October 2025

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Oranut Kamchatphai
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory
24 October 2025



This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q25124937

F3-011-05/12-23





CALIBRATION LABORATORY CO., LTD.

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REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	HEAT STRESS MONITOR
MANUFACTURER	:	QUEST TECHNOLOGIES
MODEL / TYPE	:	QUESTemp ^o 32
SERIAL NO.	:	MCH110027[EHEMTHS3211027]
DATE OF CALIBRATION	:	22 October 2025

ENVIRONMENT CONDITIONS :

Temperature : $(23 \pm 2) ^\circ\text{C}$

Relative Humidity : $(55 \pm 10) \% \text{RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPTH-11. The calibration was performed by using Chilled Mirror Hygrometer which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Chilled Mirror Hygrometer, Edgetech Model Dew Master S/N. 36151.

Temperature & Humidity Chamber, PGC Model 9141-5116 S/N. 1304261.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through Thunder Scientific Corporation.

Certificate No. 23247, Due Date 23 April 2026.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$ which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

Certificate No. Q25124937

F3-011-05/12-23



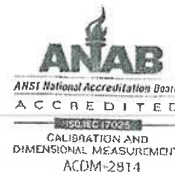
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Accredited
ISO/IEC 17025

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Tel: 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties of the measuring heat stress monitor.

CALIBRATION DATA

1. CORRECTION OF TEMPERATURE : WET

Test point (° C)	Actual Temperature (° C)	DUC Reading (° C)	Correction (° C)	Uncertainty ± (° C)
20.0	20.00	19.9	+0.10	0.27
30.0	30.00	29.9	+0.10	
40.0	40.00	39.9	+0.10	

2. CORRECTION OF TEMPERATURE : DRY

Test point (° C)	Actual Temperature (° C)	DUC Reading (° C)	Correction (° C)	Uncertainty ± (° C)
20.0	20.00	20.1	-0.10	0.27
30.0	30.00	30.1	-0.10	
40.0	40.00	40.0	0.00	

3. CORRECTION OF TEMPERATURE : GLOBE

Test point (° C)	Actual Temperature (° C)	DUC Reading (° C)	Correction (° C)	Uncertainty ± (° C)
20.0	20.00	20.1	-0.10	0.27
30.0	30.00	30.1	-0.10	
40.0	40.00	40.0	0.00	

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 016 Page 63 of 73

This report is valid for the above stated instrument/s only.

End of Certificate

Certificate No. Q25124937

F3-011-05/12-23



calibration



ID LINE : IEC17025



Certificate of Calibration

Certificate Number : SPR25050052-1

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkhae Bangkok 10160

Equipment Name : Light Meter

Manufacturer : Tenmars

Model : TM-720

Serial Number : 190600385

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Relative Humidity : $50\% \pm 15\%$

Location of Calibration : In-Lab

Calibration Procedure : SP-CPE-04-32

Received Date : 06 May 2025

Calibration Date : 10 May 2025

Recommend Due Date : 10 May 2026

Date of Issue : 11 May 2025

Method of Calibration


This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Nanthawat Wanasit

Calibration Officer

Approved by :


(Mr. Prayoon Topart)



ID LINE: IEC17025



Calibration Report

Certificate Number : SPR25050052-1

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Digital Light Meter	LX-73	Q842777	24PH432	21 Aug 2025

Traceability

This certification is traceable to the International System of Unit maintained at :

TPA - Technology Promotion Association (Thailand-Japan)



Result of Calibration

Certificate Number : SPR25050052-1

Page : 3 of 3

Function: Illumination Measurement

Unit : Lux

Calibration Point	Standard Reading	UUC Reading	Error	Uncertainty (±)
0	0.0	0.0	0.0	0.47
100	100.0	101.2	1.2	1.3
500	500	502.4	2.4	6.6
1000	1000	1019	19	13
1500	1500	1501	1	20
2000	2000	2012	12	26

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95 %

- End of Certificate -



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Envilab Co., Ltd.
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Fax. 02-802-3773 E-mail : info@evitest.com



Neediss Envilab

Verification Test Report

Report No.: SO2500006-E009 / 001

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial No : 1881

Scale Rang : 20dB-140dB

Class : 2

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 27.80 °C Relative humidity 54.20 %

Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	93.61	94	0.39	±1.0

* UUR = Unit Under Reference flow

Acceptant Criteria : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By :

(Phraewa Iamlamai)

Date : 04 November 2025

Approve By :

(Wisan Ritthikamon)

Date : 04 November 2025

The Results shown in this verification report refer only to the

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Neediss Envilab

Verification Test Report

Report No.: SO2500006-E009 / 002

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial No : 1842

Scale Rang : 20dB-140dB

Class : 2

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 27.80 °C Relative humidity 54.20 %
Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	93.47	93.5	0.03	±1.0

* UUR = Unit Under Reference flow

Acceptant value : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By:

(Phraewa Iamlamai)

Date : 04 November 2025

Approve By :

(Wisan Ritthikamon)

Date : 04 November 2025

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Neediss Envilab

Verification Test Report

Report No.: SO2500006-E009 / 003

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial No : 1877

Scale Rang : 20dB-140dB

Class : 2

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 27.80 °C Relative humidity 54.20 %
Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	93.76	94	0.24	±1.0

* UUR = Unit Under Reference flow

Acceptant value : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By:

(Phraewa Iamlamai)

Date : 04 November 2025

Approve By :

(Wisan Ritthikamon)

Date : 04 November 2025

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Verification Test Report

Report No.: SO2500006-E009 / 004

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial No : 1810

Scale Rang : 20dB-140dB

Class : 2

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 27.80 °C Relative humidity 54.20 %
Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	93.19	93	-0.19	±1.0

* UUR = Unit Under Reference flow

Acceptant value : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By :

(Phraewa Iamlamai)

Approve By :

(Wisan Ritthikamon)

Date : 04 November 2025

Date : 04 November 2025

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Verification Test Report

Report No.: SO2500006-E009 / 005

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial No : 1777

Scale Rang : 20dB-140dB

Class : 2

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 27.80 °C Relative humidity 54.20 %

Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	94.11	93.74	-0.37	±1.0

* UUR = Unit Under Reference flow

Acceptant value : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By:

(Phraewa Iamlamai)

Approve By :

(Wisan Ritthikamon)

Date : 04 November 2025

Date : 04 November 2025

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Needless Envilab

Verification Test Report

Report No.: SO2500006-E009 / 007

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial No : 1805

Scale Rang : 20dB-140dB

Class : 2

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 27.80 °C Relative humidity 54.20 %
Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	93.8	94.07	0.27	±1.0

* UUR = Unit Under Reference flow

Acceptant value : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By:

(Phraewa Iamlamai)

Date : 04 November 2025

Approved

(Wisan Ritthikamon)

Date : 04 November 2025

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Neediss Envilab

Verification Test Report

Report No.: SO2500006-E009 / 008

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial No : 1796

Scale Rang : 20dB-140dB

Class : 2

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 27.80 °C Relative humidity 54.20 %

Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	93.43	93.4	-0.03	±1.0

* UUR = Unit Under Reference flow

Acceptant value : Sound Level Meter Class 1 ± 0.5 dB

Sound Level Meter Class 2 ± 1.0 dB

Calibrated By:

(Phraewa Iamlamai)

Date : 04 November 2025

Approve By :

(Wisan Ritthikamon)

Date : 04 November 2025

The Results shown in this verification report refer only to the equipment used.

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Verification Test Report

Report No.: SO2500006-E009 / 009

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial No : 1575

Scale Rang : 20dB-140dB

Class : 2

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 27.80 °C Relative humidity 54.20 %

Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	Correction Value (dB)	Adjustment (dB)	UUR Reading		Error (dB)	Acceptant Criteria (dB)
			Initial	Final		
93.93	-0.3	93.63	93.42	93.3	-0.12	±1.0

* UUR = Unit Under Reference flow

Acceptant value : Sound Level Meter Class 1 ±0.5 dB

Sound Level Meter Class 2 ±1.0 dB

Calibrated By :

(Phraewa Iamlamai)

Date : 04 November 2025

Approve By :

(Wisan Ritthikamon)

Date : 04 November 2025

The Results shown in this verification report refer only to the equipment used.

This Calibration Certificate cannot be reproduced, except in full.



ID LINE : IEC17025

Certificate of Calibration

Certificate Number : SPR25050328-1

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkhae Bangkok 10160

Equipment Name : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial Number : PN1575

ID. Number : NSMPUMD44N1575

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Received Date : 20 May 2025

Relative Humidity : $50\% \pm 15\%$

Calibration Date : 24 May 2025

Location of Calibration : In-Lab

Recommend Due Date : 24 May 2026

Calibration Procedure : SP-CPE-04-01

Date of Issue : 25 May 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Nanthawat Wanasit

Approved by :

Calibration Officer

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-04-15 rev.0



Calibration Report

Certificate Number : SPR25050328-1

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research



ID LINE : IEC17025

Result of Calibration

Certificate Number : SPR25050328-1

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	93.9	93.9	-0.1	-0.1	0.15
114	113.8	113.8	-0.2	-0.2	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	93.9	93.9	-0.1	-0.1	0.15
114	113.8	113.8	-0.2	-0.2	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence of 95%.

— End of Certificate



Certificate of Calibration

Certificate Number : SPR25080284-1

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkhae Bangkok 10160

Equipment Name : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial Number : PN1777

ID. Number : NSMPUMD44N1777

Environmental Conditions

Ambient Temperature : 23 °C \pm 3 °C

Received Date : 18 Aug 2025

Relative Humidity : 50 % \pm 15 %

Calibration Date : 22 Aug 2025

Location of Calibration : In-Lab

Recommend Due Date : 22 Aug 2026

Calibration Procedure : SP-CPE-04-01

Date of Issue : 23 Aug 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the res

The calibration certificate shall not be reproduced except in full, with

System (Thailand).

Calibrated by : Mr.Chumpon Dokpikul

Approved by

Calibration Officer



(Mr.Pootthipong A.)

Authorized Signatory

SP-FM-04-15 rev.0



Calibration Report

Certificate Number : SPR25080284-1

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research





ID LINE: IEC17025

Result of Calibration

Certificate Number : SPR25080284-1

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	93.9	93.9	-0.1	-0.1	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	93.9	93.9	-0.1	-0.1	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	93.9	93.9	-0.1	-0.1	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Note :

The result of calibration was found accurate as show on
This Certificate is not certified for any commercial transaction

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR25080284-2

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkhae Bangkok 10160

Equipment Name : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial Number : PN1796

ID. Number : NSMPUMD44N1796

Environmental Conditions

Ambient Temperature : $23\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$

Received Date : 18 Aug 2025

Relative Humidity : $50\% \pm 15\%$

Calibration Date : 22 Aug 2025

Location of Calibration : In-Lab

Recommend Due Date : 22 Aug 2026

Calibration Procedure : SP-CPE-04-01

Date of Issue : 23 Aug 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meet the requirements.

The calibration certificate shall not be reproduced except in full, without written permission from the Metrology System (Thailand).

Calibrated by : Mr.Chumpon Dokpikul

Approved by

Calibration Officer



(Mr.Pootthipong A.)

Authorized Signatory

SP-FM-04-15 rev.0



Calibration Report

Certificate Number : SPR25080284-2

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research



ID LINE: IEC17025

Result of Calibration

Certificate Number : SPR25080284-2

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Note :

The result of calibration was found accurate as shown.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



Service Report

Instrument Manufacturer: Pulsar Instruments Plc

Job Reference Number: 98106

Instrument Type: Model 44

Serial Number: PN1805

Customer Name: Envilab Co., Ltd.

Customer Address: 540,540/1 Soi Bangkhae 7

Bangkhae

Thailand

10160

Issue	Action	Result	Engineer
USB port severely damaged	Repair to USB port carried out.	Functional checks carried out.	Andrew Windrass
Keypad not working.	New keypad fitted.	Functional checks carried out.	Andrew Windrass

Engineer:

Date: 22 May 2025

We hope that you are satisfied with the service you have received from Pulsar Instruments plc.
If you have any concerns, would like further information or have any feedback do not hesitate to contact us.

Pulsar Instrument Plc, Acoustic House, Bridlington Road, Hunmanby, YO14 0PH

Telephone: +44 (0) 1723 518011 Fax: +44 (0) 1723 518043

Email: sales@pulsarinstruments.com



CERTIFICATE OF CALIBRATION

ISSUED BY Pulsar Instruments Plc

DATE OF ISSUE 22 May 2025

CERTIFICATE NUMBER 241105



Pulsar Instruments Plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory

A. Windrass

Electronically signed:

A handwritten signature in black ink, appearing to read 'A. Windrass', written over a horizontal line.

Sound Level Meter : IEC 61672-3:2013

Instrument information

Manufacturer:	Pulsar Instruments Plc	Notes:
Model:	Model 44	
Serial number:	PN1805	
Class:	2	
Firmware version:	2.7.0.333	

Test summary

Date of calibration: 14 May 2025

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.

The sound level meter submitted for testing successfully completed the class 2 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 2 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

CERTIFICATE OF CALIBRATION

Certificate Number:

241105

Page 2 of 2

Environmental conditions

The following conditions were recorded at the time of the test:

Before Pressure: 101.76 kPa Temperature: 21.7 °C Humidity: 51.8 %

After Pressure: 101.77 kPa Temperature: 21.8 °C Humidity: 51.6 %

Test equipment

Equipment	Manufacturer	Model	Serial number
Signal Generator	SIGLENT	SDG1032X	SDG1XDDC7R0237
Attenuator	Cirrus Research	ZE:952	93891
Environmental Monitor	Comet	T7510	16966334

Additional instrument information

Instruction manual:

Reference level range: Single range

Pattern approval: No

Source of pattern approval: -

Preamplifier

Model: PA40

Serial number: 1759

Microphone

Model: PM2

Serial number: 021400B

Test results summary

Test	Result
Toneburst response	Complies
Electrical noise-floor	Complies
Linearity	Complies
Electrical Frequency weightings	Complies
Frequency and time weightings at 1 kHz	Complies
G-weighted peak	Complies
Overload indication	Complies
High level stability	Complies
Long-term stability	Complies
Acoustic Frequency weightings	Complies

Acoustic Calibrator

Manufacturer: Bruel and Kjaer

Model: 4231

Serial number: 2579252

Note: This sound calibrator is not of a model that is specified in the instruction manual.

Calibration

Calibration check frequency: 1000 Hz

Calibrator's certificate ref: 239540

Level before adjustment: 93.70 dB(A)

Level after adjustment: 93.70 dB(A)

CERTIFICATE OF CALIBRATION

ISSUED BY Pulsar Instruments Plc
DATE OF ISSUE 22 May 2025 CERTIFICATE NUMBER 241106



Pulsar Instruments Plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Test engineer:
D. Swalwell
Electronically signed:

A handwritten signature in black ink, appearing to be 'D. Swalwell', written over a horizontal line.

Microphone

Microphone capsule

Manufacturer: Pulsar Instruments Plc
Model: PM2
Serial Number: 021400B

Calibration procedure

Open circuit: 31.0 mV/Pa
Sensitivity at 1 kHz: -30.2 dB rel 1 V/Pa

The microphone capsule detailed above has been calibrated to the published data as described in the operating manual of the associated sound level meter (where applicable).

The frequency response was measured using an electrostatic actuator in accordance with BS EN 61094-6:2005 with the free-field response derived via standard correction data traceable to a National Measurement Institute.

The absolute sensitivity at 1 kHz was measured using an acoustic calibrator conforming to IEC 60942:2003 Class 1.

Environmental conditions

Pressure: 102.00 kPa
Temperature: 22.0 °C
Humidity: 47.0 %



CERTIFICATE OF CALIBRATION

Certificate Number:

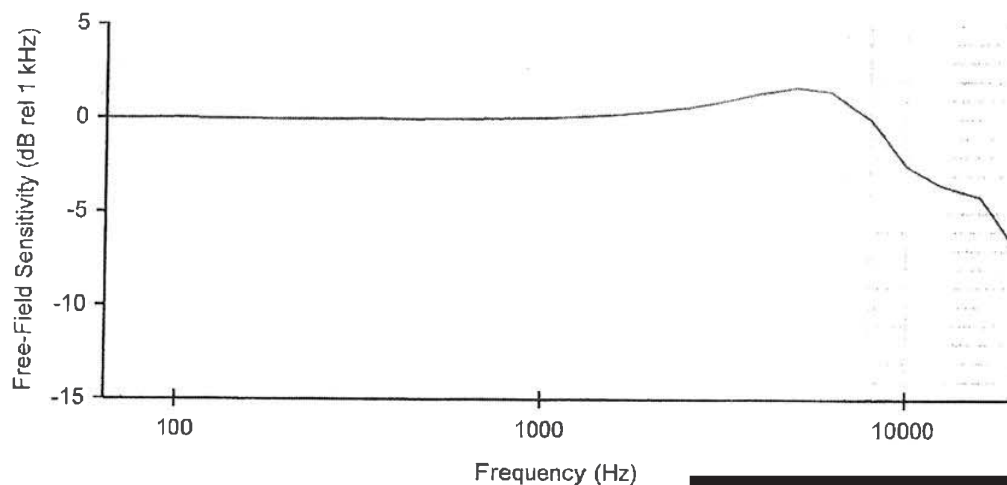
241106

Page 2 of 2

Free-Field Frequency Response : Tabular

Frequency (Hz)	Free-Field Sensitivity (dB rel 1 kHz)	Actuator Response (dB)
63	-0.03	-0.28
80	-0.03	-0.17
100	0.00	-0.08
125	-0.05	-0.09
160	-0.06	-0.08
200	-0.08	-0.07
250	-0.08	-0.07
315	-0.05	-0.06
400	-0.07	-0.06
500	-0.06	-0.06
630	-0.05	-0.05
800	-0.03	-0.04
1 000	0.00	-0.02
1 250	0.06	0.02
1 600	0.18	0.08
2 000	0.35	0.16
2 500	0.58	0.28
3 150	0.91	0.41
4 000	1.35	0.53
5 000	1.64	0.40
6 300	1.44	-0.51
8 000	-0.04	-3.11
10 000	-2.53	-7.22
12 500	-3.51	-10.01
16 000	-4.17	-12.12
20 000	-6.89	-15.94

Free-Field Frequency Response : Graphical





ID LINE : IEC17025

Certificate of Calibration

Certificate Number : SPR25050328-2

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae Bangkok 10160

Equipment Name : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial Number : PN1810

ID. Number : NSMPUMD44N1810

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Received Date : 20 May 2025

Relative Humidity : $50\% \pm 15\%$

Calibration Date : 24 May 2025

Location of Calibration : In-Lab

Recommend Due Date : 24 May 2026

Calibration Procedure : SP-CPE-04-01

Date of Issue : 25 May 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Nanthawat Wanasit

Approved by :

Calibration Officer

(Mr. Nanthawat Wanasit)





ID LINE : IEC17025

Calibration Report

Certificate Number : SPR25050328-2

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research



ID LINE : IEC17025

Result of Calibration

Certificate Number : SPR25050328-2

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded standard uncertainty with the coverage factor $k = 2.00$, provided

- End of Certificate



ID LINE: IEC17025



Certificate of Calibration

Certificate Number : SPR25050328-3

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhæ 7, Bangkhæ, Bangkhæ Bangkok 10160

Equipment Name : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial Number : PN1842

ID. Number : NSMPUMD44N1842

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Relative Humidity : $50\% \pm 15\%$

Location of Calibration : In-Lab

Calibration Procedure : SP-CPE-04-01

Received Date : 20 May 2025

Calibration Date : 24 May 2025

Recommend Due Date : 24 May 2026

Date of Issue : 25 May 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Nanthawat Wanasit

Calibration Officer

Approved by :

(Mr Prayoon Topart)

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Calibration Report

Certificate Number : SPR25050328-3

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research





Result of Calibration

Certificate Number : SPR25050328-3

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	93.9	93.9	-0.1	-0.1	0.15
114	113.8	113.8	-0.2	-0.2	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	93.9	93.9	-0.1	-0.1	0.15
114	113.8	113.8	-0.2	-0.2	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	93.9	93.9	-0.1	-0.1	0.15
114	113.8	113.8	-0.2	-0.2	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded standard uncertainty with the coverage factor $k = 2.00$, provided

- End of Certificate



Certificate of Calibration

Certificate Number : SPR25070275-6

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkhae Bangkok 10160

Equipment Name : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial Number : PN1877

ID. Number : NSMPUMD44N1877

Environmental Conditions

Ambient Temperature : 23 °C ± 3 °C

Received Date : 15 Jul 2025

Relative Humidity : 50 % ± 15 %

Calibration Date : 17 Jul 2025

Location of Calibration : In-Lab

Recommend Due Date : 17 Jul 2026

Calibration Procedure : SP-CPE-04-01

Date of Issue : 18 Jul 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without the permission of SP Metrology System (Thailand).

Calibrated by : Mr.Chumpon Dokpikul

Approved

Calibration Officer



(Mr.Pootthipong A.)

Authorized Signatory

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Calibration Report

Certificate Number : SPR25070275-6

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research



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Result of Calibration

Certificate Number : SPR25070275-6

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.3	94.3	0.3	0.3	0.15
114	114.4	114.4	0.4	0.4	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.3	94.3	0.3	0.3	0.15
114	114.4	114.4	0.4	0.4	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.3	94.3	0.3	0.3	0.15
114	114.4	114.4	0.4	0.4	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty
standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



ID LINE : JEC17025



Certificate of Calibration

Certificate Number : SPR25070275-1

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae Bangkok 10160

Equipment Name : Sound Level Meter

Manufacturer : Pulsar

Model : 44

Serial Number : PN1881

ID. Number : NSMPUMD44N1881

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Received Date : 15 Jul 2025

Relative Humidity : 50 % \pm 15 %

Calibration Date : 17 Jul 2025

Location of Calibration : In-Lab

Recommend Due Date : 17 Jul 2026

Calibration Procedure : SP-CPE-04-01

Date of Issue : 18 Jul 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without WSP System (Thailand).

Calibrated by : Mr.Chumpon Dokpikul

Approved by _____

Calibration Officer

(Mr.Pootthipong A.)

Authorized Signatory

SP-FM-04-15 rev.0





ID LINE : IEC17025

Calibration Report

Certificate Number : SPR25070275-1

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research





Result of Calibration

Certificate Number : SPR25070275-1

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.4	94.4	0.4	0.4	0.15
114	114.2	114.2	0.2	0.2	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.4	94.4	0.4	0.4	0.15
114	114.2	114.2	0.2	0.2	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.4	94.4	0.4	0.4	0.15
114	114.2	114.2	0.2	0.2	0.15

Note :

The result of calibration was found accurate as show on
This Certificate is not certified for any commercial transaction

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



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Needless Envilab

Verification Test Report

Report No.: SO2500006-E009 / 001

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Evilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Noise Dosimeter

Manufacturer : Quest Technologies

Model : NoisePro DLX

Serial No : 120053

Scale Rang : 40dB-140dB

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.60 °C Relative humidity 54.20 %
Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	1 st Calibration			2 nd Calibration		
	UUR Reading (dB)	Offset (dB)	Acceptant (dB)	UUR Reading (dB)	Drift (dB)	Acceptant (dB)
93.93	93.88	-0.05	±0.5	94.07	0.14	±0.5

* UUR = Unit Under Reference Unit

Acceptant value : In most applications, drifts of between +/-0.5dB are acceptable; that is that the second calibration check differs from the first calibration results by up to +/-0.5dB.

Calibrated By: ธัญลักษณ์
Thanyaluk Saengpetdimakan

Date : 04 November 2025

Approved By: [Signature]

Date : 04 November 2025

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Neediss Envilab

Verification Test Report

Report No.: SO2500006-E009 / 002

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Evilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Noise Dosimeter

Manufacturer : Quest Technologies

Model : NoisePro DLX

Serial No : 120107

Scale Rang : 40dB-140dB

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.60 °C Relative humidity 54.20 %
Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	1 st Calibration			2 nd Calibration		
	UUR Reading (dB)	Offset (dB)	Acceptant (dB)	UUR Reading (dB)	Drift (dB)	Acceptant (dB)
93.93	93.98	0.05	±0.5	94.21	0.28	±0.5

* UUR = Unit Under Reference Unit

Acceptant value : In most applications, drifts of between +/-0.5dB are acceptable; that is that the second calibration check differs from the first calibration results by up to +/-0.5dB.

Calibrated By:

ธัญลักษณ์

Thanyaluk Saengpetdimakan

Approve



(Wisan Rattikamon)

Date : 04 November 2025

Date : 04 November 2025

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Tel : 02-802-3577-8 Fax. 02-802-3773 E-mail : info@evltesting.com



Neediss Envilab

Verification Test Report

Report No.: SO2500006-E009 / 003

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Noise Dosimeter

Manufacturer : Quest Technologies

Model : NoisePro DLX

Serial No : 120105

Scale Rang : 40dB-140dB

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.60 °C Relative humidity 54.20 %
Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	1 st Calibration			2 nd Calibration		
	UUR Reading (dB)	Offset (dB)	Acceptant (dB)	UUR Reading (dB)	Drift (dB)	Acceptant (dB)
93.93	93.47	-0.46	±0.5	94.29	0.36	±0.5

* UUR = Unit Under Reference Unit

Acceptant value : In most applications, drifts of between +/-0.5dB are acceptable; that is that the second calibration check differs from the first calibration results by up to +/-0.5dB.

Calibrated By: ชญญ์ลักษณ์
Thanyaluk Saengpetdimakan

Date : 04 November 2025

Approve By: Wisarn Ritthikamon
(Wisarn Ritthikamon)

Date : 04 November 2025

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Verification Test Report

Report No.: SO2500006-E009 / 004

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Evilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Noise Dosimeter

Manufacturer : Quest Technologies

Model : NoisePro DLX

Serial No : 120104

Scale Rang : 40dB-140dB

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.60 °C Relative humidity 54.20 %
Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	1 st Calibration			2 nd Calibration		
	UUR Reading (dB)	Offset (dB)	Acceptant (dB)	UUR Reading (dB)	Drift (dB)	Acceptant (dB)
93.93	93.75	-0.18	±0.5	94.02	0.09	±0.5

* UUR = Unit Under Reference Unit

Acceptant value : In most applications, drifts of between +/-0.5dB are acceptable; that is that the second calibration check differs from the first calibration results by up to +/-0.5dB.

Calibrated By: ธัญญลักษณ์
Thanyaluk Saengpetdimakan

Approve By : Wisarn Ritthikamon
(Wisarn Ritthikamon)

Date : 04 November 2025

Date : 04 November 2025

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Verification Test Report

Report No.: SO2500006-E009 / 005

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Noise Dosimeter

Manufacturer : Quest Technologies

Model : NoisePro DLX

Serial No : 120106

Scale Rang : 40dB-140dB

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.60 °C Relative humidity 54.20 %
Atmospheric pressure 1013.3 hpa

Measurement Data

Reference Value (dB)	1 st Calibration			2 nd Calibration		
	UUR Reading (dB)	Offset (dB)	Acceptant (dB)	UUR Reading (dB)	Drift (dB)	Acceptant (dB)
93.93	93.69	-0.24	±0.5	94.13	0.2	±0.5

* UUR = Unit Under Reference Unit

Acceptant value : In most applications, drifts of between +/-0.5dB are acceptable; that is that the second calibration check differs from the first calibration results by up to +/-0.5dB.

Calibrated By: ธัญญลักษณ์

Thanyaluk Saengpetdimakan

Date : 04 November 2025

Approve By: (Signature)

(Wisan Ritthikamon)

Date : 04 November 2025

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Verification Test Report

Report No.: SO2500006-E009 / 006

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Noise Dosimeter

Manufacturer : Quest Technologies

Model : NoisePro DLX

Serial No : ENDQTDLX030030

Scale Rang : 40dB-140dB

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.60 °C Relative humidity 54.20 %
Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	1 st Calibration			2 nd Calibration		
	UUR Reading (dB)	Offset (dB)	Acceptant (dB)	UUR Reading (dB)	Drift (dB)	Acceptant (dB)
93.93	93.56	-0.37	±0.5	94.32	0.39	±0.5

* UUR = Unit Under Reference Unit

Acceptant value : In most applications, drifts of between +/-0.5dB are acceptable; that is that the second calibration check differs from the first calibration results by up to +/-0.5dB.

Calibrated By:

ชัญญลักษณ์

Thanyaluk Saengpetdimakan

Date : 04 November 2025

App

Date : 04 November 2025

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Verification Test Report

Report No.: SO2500006-E009 / 007

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Noise Dosimeter

Manufacturer : Quest Technologies

Model : NoisePro DLX

Serial No : ENDQTDLX030080

Scale Rang : 40dB-140dB

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.60 °C Relative humidity 54.20 %
Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	1 st Calibration			2 nd Calibration		
	UUR Reading (dB)	Offset (dB)	Acceptant (dB)	UUR Reading (dB)	Drift (dB)	Acceptant (dB)
93.93	93.52	-0.41	±0.5	94.14	0.21	±0.5

* UUR = Unit Under Reference Unit

Acceptant value : In most applications, drifts of between +/-0.5dB are acceptable; that is that the second calibration check differs from the first calibration results by up to +/-0.5dB.

Calibrated By: ธัญลักษณ์
Thanyaluk Saengpetdimakan

Date : 04 November 2025

Ap [Redacted]
ภาพ
Date : 04 November 2025

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Needless Envilab

Verification Test Report

Report No.: SO2500006-E009 / 008

Verification Date : 04 November 2025

Operate Information ☒ PM ☐ Onsite

Site : Envilab Co.,Ltd.

GPS coordinates : 47Q N 1506368 E 257777

Instrument Information

Equipment : Noise Dosimeter

Manufacturer : Quest Technologies

Model : NoisePro DLX

Serial No : ENDQTDLX030036

Scale Rang : 40dB-140dB

Reference Standard

Standard : Acoustic Calibrator Manufacturer : Pulsar Model : 103 S/N : 98971

Certificate No. : EEL.BP.65/0168

Date due : 17 January 2026

Traceability : TISTR

Ambient Condition : Temperature 32.60 °C Relative humidity 54.20 %

Atmospheric pressure 1013.3 hpa

Measurement Data

Refferance Value (dB)	1 st Calibration			2 nd Calibration		
	UUR Reading (dB)	Offset (dB)	Acceptant (dB)	UUR Reading (dB)	Drift (dB)	Acceptant (dB)
93.93	93.65	-0.28	±0.5	94.26	0.33	±0.5

* UUR = Unit Under Reference Unit

Acceptant value : In most applications, drifts of between +/-0.5dB are acceptable; that is that the second calibration check differs from the first calibration results by up to +/-0.5dB.

Calibrated By:

ธัญญลักษณ์

Thanyaluk Saengpetdimakan

Date : 04 November 2025

App

(Wisan Ritthikamon)

Date : 04 November 2025

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ID LINE: IEC17025

Certificate of Calibration

Certificate Number : SPR25080220-7

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae Bangkok 10160

Equipment Name : Noise Dosimeter

Manufacturer : Quest Technologies

Model : NoisePro DLX Dosimeter

Serial Number : NXC120053

ID. Number : ENDQTDLX120053

Environmental Conditions

Ambient Temperature : 23 °C ± 3 °C

Received Date : 11 Aug 2025

Relative Humidity : 50 % ± 15 %

Calibration Date : 14 Aug 2025

Location of Calibration : In-Lab

Recommend Due Date : 14 Aug 2026

Calibration Procedure : SP-CPE-04-01

Date of Issue : 15 Aug 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the result

The calibration certificate shall not be reproduced except in full, without the permission of SPM Metrology System (Thailand).

Calibrated by : Mr.Nanthawat Wanasit

Approved

Calibration Officer



(Mr.Pootthipong A.)

Authorized Signatory

SP-FM-04-15 rev.0



ID LINE : IEC17025

Calibration Report

Certificate Number : SPR25080220-7

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research



ID LINE: IEC17025

Result of Calibration

Certificate Number : SPR25080220-7

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence of 95%.

– End of Certificate



ID LINE : IEC17025

Certificate of Calibration

Certificate Number : SPR25080220-8

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae Bangkok 10160

Equipment Name : Noise Dosimeter
 Manufacturer : Quest Technologies
 Model : NoisePro DLX Dosimeter
 Serial Number : NXC120104
 ID. Number : ENDQTDLX120104

Environmental Conditions

Ambient Temperature	: 23 °C ± 3 °C	Received Date	: 11 Aug 2025
Relative Humidity	: 50 % ± 15 %	Calibration Date	: 14 Aug 2025
Location of Calibration	: In-Lab	Recommend Due Date	: 14 Aug 2026
Calibration Procedure	: SP-CPE-04-01	Date of Issue	: 15 Aug 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, with the calibration system (Thailand).

Calibrated by : Mr.Nanthawat Wanasit

Approved

Calibration Officer



(Mr.Pootthipong A.)

Authorized Signatory

SP-FM-04-15 rev.0



Calibration Report

Certificate Number : SPR25080220-8

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research



ID LINE : IEC17025

Result of Calibration

Certificate Number : SPR25080220-8

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the standard uncertainty with the coverage factor $k = 2.0$ which provides a level of confidence of approximately 95%.

- End of C





ID LINE : IEC17025

Certificate of Calibration

Certificate Number : SPR25080220-9

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae Bangkok 10160

Equipment Name : Noise Dosimeter

Manufacturer : Quest Technologies

Model : NoisePro DLX Dosimeter

Serial Number : NXC120105

ID. Number : ENDQTDLX120105

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Received Date : 11 Aug 2025

Relative Humidity : $50\% \pm 15\%$

Calibration Date : 14 Aug 2025

Location of Calibration : In-Lab

Recommend Due Date : 14 Aug 2026

Calibration Procedure : SP-CPE-04-01

Date of Issue : 15 Aug 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the result is acceptable. The calibration certificate shall not be reproduced except in full, without the permission of SPM Metrology System (Thailand).

Calibrated by : Mr.Nanthawat Wanasit

Approved

Calibration Officer



(Mr.Poothipong A.)

Authorized Signatory

SP-FM-04-15 rev.0



ID LINE : IEC17025

Calibration Report

Certificate Number : SPR25080220-9

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research



ID LINE : IEC17025

Result of Calibration

Certificate Number : SPR25080220-9

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded standard uncertainty with the coverage factor $k = 2.00$, provided

— End of Certificate



ID LINE: IEC17025

Certificate of Calibration

Certificate Number : SPR25080220-10

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae Bangkok 10160

Equipment Name : Noise Dosimeter

Manufacturer : Quest Technologies

Model : NoisePro DLX Dosimeter

Serial Number : NXC120106

ID. Number : ENDQTDLX120106

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Received Date : 11 Aug 2025

Relative Humidity : 50 % \pm 15 %

Calibration Date : 14 Aug 2025

Location of Calibration : In-Lab

Recommend Due Date : 14 Aug 2026

Calibration Procedure : SP-CPE-04-01

Date of Issue : 15 Aug 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without the permission of the Calibration Laboratory of the Bureau of Standards, Bangkok, Thailand.

Calibrated by : Mr.Nanthawat Wanasit

Approve

Calibration Officer



(Mr.Pootthipong A.)

Authorized Signatory

SP-FM-04-15 rev.0



Calibration Report

Certificate Number : SPR25080220-10

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research



ID LINE: IEC17025

Result of Calibration

Certificate Number : SPR25080220-10

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	113.9	113.9	-0.1	-0.1	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence of approximately 95%.

— End of Certificate



Certificate of Calibration

Certificate Number : SPR25080220-11

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkhae Bangkok 10160

Equipment Name : Noise Dosimeter
Manufacturer : Quest Technologies
Model : NoisePro DLX Dosimeter
Serial Number : NXC120107
ID. Number : ENDQTDLX120107

Environmental Conditions

Ambient Temperature	: 23 °C ± 3 °C	Received Date	: 11 Aug 2025
Relative Humidity	: 50 % ± 15 %	Calibration Date	: 14 Aug 2025
Location of Calibration	: In-Lab	Recommend Due Date	: 14 Aug 2026
Calibration Procedure	: SP-CPE-04-01	Date of Issue	: 15 Aug 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without the approval of SPM Metrology System (Thailand).

Calibrated by : Mr.Nanthawat Wanasit

Approved

Calibration Officer



(Mr.Pootthipong A.)

Authorized Signatory

SP-FM-04-15 rev.0



Calibration Report

Certificate Number : SPR25080220-11

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research



ID LINE : IEC17025

Result of Calibration

Certificate Number : SPR25080220-11

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence of 95%.

- End of Certificate



ID LINE : IEC17025

Certificate of Calibration

Certificate Number : SPR25080220-12

Page : 1 of 3

Customer : Envilab Co., Ltd.

540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae Bangkok 10160

Equipment Name : Noise Dosimeter

Manufacturer : Soundtek

Model : ST-130

Serial Number : 190500030

ID. Number : NNDTMST1300030

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Received Date : 11 Aug 2025

Relative Humidity : $50\% \pm 15\%$

Calibration Date : 14 Aug 2025

Location of Calibration : In-Lab

Recommend Due Date : 14 Aug 2026

Calibration Procedure : SP-CPE-04-01

Date of Issue : 15 Aug 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without v
System (Thailand).

Calibrated by : Mr.Nanthawat Wanasit

Approved by

Calibration Officer



(Mr.Poothipong A.)

Authorized Signatory

SP-FM-04-15 rev.0



ID LINE : IEC17025

Calibration Report

Certificate Number : SPR25080220-12

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research





Result of Calibration

Certificate Number : SPR25080220-12

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence of approximately 95%.

– End of Certificate



Certificate of Calibration

Certificate Number : SPR25080220-13
Customer : Envilab Co., Ltd.
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae Bangkok 10160

Page : 1 of 3

Equipment Name : Noise Dosimeter
Manufacturer : Soundtek
Model : ST-130
Serial Number : 190500036
ID. Number : NNDTMST1300036
Environmental Conditions
Ambient Temperature : 23 °C ± 3 °C
Relative Humidity : 50 % ± 15 %
Location of Calibration : In-Lab
Calibration Procedure : SP-CPE-04-01
Received Date : 11 Aug 2025
Calibration Date : 14 Aug 2025
Recommend Due Date : 14 Aug 2026
Date of Issue : 15 Aug 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without
System (Thailand).

Calibrated by : Mr.Nanthawat Wanasit

Approved

Calibration Officer



(Mr.Pootthipong A.)

Authorized Signatory

SP-FM-04-15 rev.0



ID LINE: IEC17025



Calibration Report

Certificate Number : SPR25080220-13

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research



ID LINE: IEC17025

Result of Calibration

Certificate Number : SPR25080220-13

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.2	94.2	0.2	0.2	0.15
114	114.2	114.2	0.2	0.2	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.1	114.1	0.1	0.1	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, by 95%.

– End of Certificate



ID LINE: IEC17025

Certificate of Calibration

Certificate Number : SPR25080220-15 Page : 1 of 3

Customer : Envilab Co., Ltd.
540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkhae Bangkok 10160

Equipment Name : Noise Dosimeter
Manufacturer : Soundtek
Model : ST-130
Serial Number : 190500080
ID. Number : NNDTMST1300080

Environmental Conditions

Ambient Temperature	: 23 °C ± 3 °C	Received Date	: 11 Aug 2025
Relative Humidity	: 50 % ± 15 %	Calibration Date	: 14 Aug 2025
Location of Calibration	: In-Lab	Recommend Due Date	: 14 Aug 2026
Calibration Procedure	: SP-CPE-04-01	Date of Issue	: 15 Aug 2025

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

The calibration certificate shall not be reproduced except in full, without the approval of the Metrology System (Thailand).

Calibrated by : Mr.Nanthawat Wanasit

Approved

Calibration Officer



(Mr.Pootthipong A.)

Authorized Signatory

SP-FM-04-15 rev.0



Calibration Report

Certificate Number : SPR25080220-15

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EEL.BP.22/0268	20 Feb 2026

Traceability

This certification is traceable to the International System of Unit maintained at :

TISTR - Thailand Institute of Scientific and Technological Research



ID LINE: IEC17025

Result of Calibration

Certificate Number : SPR25080220-15

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select C

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Select Z

Unit : dB

Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.0	94.0	0.0	0.0	0.15
114	114.0	114.0	0.0	0.0	0.15

Note :

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence of approximately 95%.

- End of Certificate



SCIMET Co., Ltd.
818/124 Udomsuk Rd., Bangna-Nuea,
Bangna, Bangkok 10260 Thailand
Email:scimet2022@gmail.com, Tel: 02 460 9239
https://www.scimet.co.th



Certificate No. C08250053

Calibration Certificate

Equipment:	pH METER	Job No.:	KSMT2501044
Model:	F-74BW	Received Date:	19 March 2025
Serial No.(or ID):	B41J0001 (ELABPHHB74BW01)	Issued Date:	19 March 2025
Manufacturer:	HORIBA	Page:	1 of 3
Condition:	In Condition		

Customer

Envilab Co., Ltd.
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae, Bangkok 10160

Calibration Place

Envilab Co., Ltd. (B300 CH1 ROOM)
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae, Bangkok 10160

Calibration Date

19 March 2025

Environment Condition

Temperature: 26.1 °C \pm 0.3 °C
Humidity: 50.2 %RH \pm 1.1 %RH

The Method used

In-house method, WI08, based on ASTM E 70-07

Traceability

This certificate is traceable to SI Units, Sample Test is assured through primary measurement method Harned cell, through CPAchem Ltd. (ISO17034) Certificate No. 1066714, 1066714, 1066716, pH Scale and Temperature test are traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through Industrial Foundation Electrical and Electronics Institute Certificate No. CA20250010EA, through SCIMET Co., Ltd. Certificate No.C23240075

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.

(Mr. Dumrong Boonsopon)

Person in charge



ngngam)

ory

08-04: 27 JAN 2025

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Condition of reference standards Instruments / CRM:

<u>Instruments</u>		<u>Model or S/N.</u>	<u>Certificate No.</u>	<u>Due date</u>
Standard Buffer solution	4.007 pH	PH216.L5	1066714	18-Jan-27
Standard Buffer solution	6.965 pH	PH107.L5	1066714	18-Jan-26
Standard Buffer solution	10.010 pH	PH220.L5	1066716	18-Jan-26
DC Voltage and Current Calibrator / XITRON		2000MN	CA20250010EA	19-Jan-26
Digital Thermometer		376	C23240075	30-Jul-25

Calibration Results:

pH Scale

Input (mV)	pH Meter Reading			Uncertainty of Measurement (mV)	Coverage Factor (<i>k</i>)
	(mV)	Error (mV)	(pH)		
414.12	414.2	0.08	0.000	0.065	2.00
354.96	355.0	0.04	1.000	0.065	2.00
295.80	295.8	0.00	2.000	0.065	2.00
236.64	236.7	0.06	3.000	0.065	2.00
177.48	177.5	0.02	4.000	0.065	2.00
118.32	118.4	0.08	5.000	0.065	2.00
59.16	59.2	0.04	6.000	0.065	2.00
0.00	0.0	0.00	7.000	0.065	2.00
-59.16	-59.1	0.06	8.000	0.065	2.00
-118.32	-118.2	0.12	9.000	0.065	2.00
-177.48	-177.4	0.08	10.000	0.065	2.00
-236.64	-236.6	0.04	11.000	0.065	2.00
-295.80	-295.7	0.10	12.000	0.065	2.00
-354.96	-354.9	0.06	13.000	0.065	2.00
-414.12	-414.0	0.12	14.000	0.065	2.00

**Electrode Test Results***

The three-point calibration using three standard buffer solutions; pH 4.007 , pH 6.965 and pH 10.010

The practical slope of the pH electrode; 58.31 (mV/pH), 98.57%

The zero point of the pH electrode; 6.58 (pH)

Sample Test Results

Electrode Serial No.: 9X1K0003

Model: 9615S

Manufacturer: HORIBA

Standard Buffer Solution (pH)	Unit Under Calibration (pH)	Difference (pH)	Uncertainty of Measurement (pH)	Coverage Factor (<i>k</i>)
4.007	3.995	-0.012	0.011	2.43
6.965	6.970	0.005	0.011	2.07
10.010	10.019	0.009	0.0089	2.06

Temperature Electrode**Dimension of Probe;**

Length : 100 mm
Diameter : 12 mm
Immersion Depth : 80 mm

STD. Reading (°C)	UUC. Reading (°C)	Correction of UUC (°C)	Uncertainty of Measurement (±°C)	Coverage Factor (<i>k</i>)
25.03	25.0	0.03	0.20	2.00

* Calibration Marked for Electrode Test" Not TISI Accredited " in this Certificate have been included for completeness.

The End of Certificate

บริษัท ชายันเมท จำกัด (SCIMET CO., LTD.)

818/124 Udomsuk rd., Bangna-Nuea, Bangna, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

27 JAN 2025



ใบตรวจสอบสภาพเครื่อง pH Meter

เลขที่ใบงาน: KSMT2501044

ชนิดเครื่องมือ: pH METER

รุ่น: F-74BW

หมายเลขเครื่อง: B41J0001

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
19 Mar 2025			19 Mar 2025		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิทช์ ปิด – เปิด เครื่อง (On-Off Swicth)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. อิเล็กโทรด (Electrode and Connection Cable)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. สายอิเล็กโทรด	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	8. ระดับสารละลายใน Electrode (Level KCl)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. ขาจับอิเล็กโทรด (Stand)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

เพิ่มเติม/ข้อแนะนำ :

Mr. Dumrong Boonsopon
Service Engineer

บริษัท ซายน์เมค จำกัด (SCIMET CO., LTD.)

818/124 Udomsuk rd., Bangna-Nuea, Bangna, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

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27 JAN 2025



SCIMET Co., Ltd.
1194 Soi Wachirathamsathit 57, Bangchak,
Phrakhanong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239
https://www.scimet.co.th



Certificate No. C17240307

Calibration Certificate

Equipment:	Cooled Incubator	Job No.:	KSMT2402653
Model:	BIC-140	Received Date:	27 September 2024
Serial No.(or ID):	100613-1 (ELABBODC140NO1)	Issued Date:	30 September 2024
Manufacturer:	M-LAB	Page:	1 of 3
Condition:	In Condition		
Ventilation Valve:	None	Shelves(pc.):	5

Customer

Envilab Co., Ltd.
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae, Bangkok 10160

Calibration Place

Envilab Co., Ltd. (B300 CH1 ROOM)
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae, Bangkok 10160

Calibration Date

27 September 2024

Environment Condition

Temperature: 20.8 °C \pm 1.0 °C
Humidity: 54.8 %RH \pm 2.6 %RH

The Method used

In-house method, WI17, based on TLAS-G20

Traceability

This certificate is traceable to the SI Units maintained by
National Institute of Metrology (NIMT), Thailand through
SCIMET Co.,Ltd.Certificate No. C23240083

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

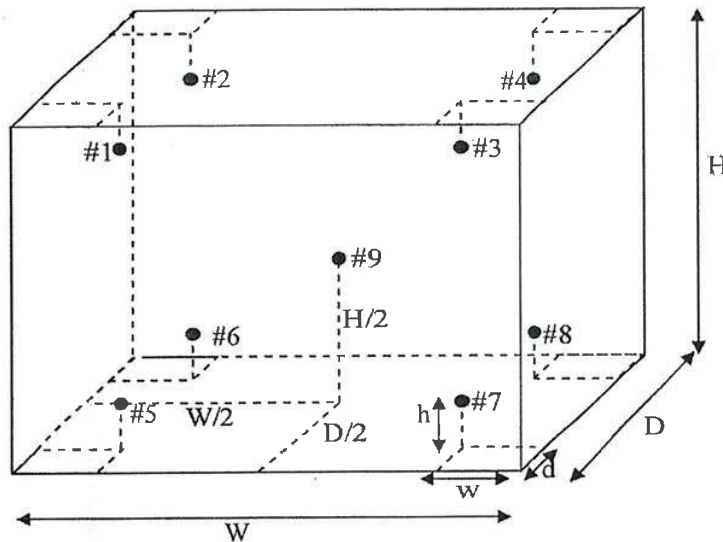
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.

(Mongkolwat Hasanon)

Person in charge



(Mr. Thalemokeat Pongngam)



Standard Installation Locations

Volume (Calibration Zone)= 58 (Liters)

Inside chamber: $W = 38 \text{ (cm)}$ $D = 32 \text{ (cm)}$ $H = 114 \text{ (cm)}$

Standard Locations (#1, #2, #3, #4): $w = 5 \text{ (cm)}$ $d = 5 \text{ (cm)}$ $h = 10 \text{ (cm)}$

Standard Locations (#5, #6, #7, #8): $w = 5 \text{ (cm)}$ $d = 5 \text{ (cm)}$ $h = 10 \text{ (cm)}$

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	201	202	203	204	205	206	207	208	209

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the enclosure.

Measured Temperature: The average reading of standards at any positions or location.

Measured Uniformity: The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.

Measured Stability: The one-half of greatest maximum difference of measured temperatures at any one probe.

Overall Variation: The difference of maximum and minimum measured

**Calibration Results:****Without adjustment**

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 20.0 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	19.54	-0.46	0.38
#2	19.49	-0.51	0.39
#3	19.87	-0.13	0.39
#4	20.04	0.04	0.37
#5	20.36	0.36	0.36
#6	20.21	0.21	0.37
#7	20.10	0.10	0.36
#8	20.19	0.19	0.37
#9	20.48	0.48	0.35

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
20.0	20.0	20.0	19.54	19.49	19.87	20.04	20.36	20.21	20.10	20.19	20.48	0.39

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
20.0	1.07	0.18	1.26

Note: * Maximum uncertainty of the each position

The End of Certificate**บริษัท ชายนันเมท จำกัด (SCIMET CO., LTD.)**1194 Soi Wachirathamsathit 57, Bangchak, Phrakhanong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 923930 MAY 2023
177

Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, TLAS-G20. Therefore, those parameters have not

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule :** ☐ Choice A Binary Statement for Simple Acceptance Rule ($w = 0$), Specific Risk $< 50\%$ PFA.
- ☒ Choice B Non-binary statement with guard band ($w = 1$ U), Pass or Fail Specific Risk $< 2.5\%$ PFA and Condition Pass or Condition Fail Specific Risk $< 50\%$ PFA.
- ☐ Choice C Customer defined, Customers may define arbitrary multiple of r to have applied as guard band ($w = r$ U) .
- ; PFA: Probability of False Accept




(Mr. Thalerngkeat Pongngam)
Authorized signatory

Without adjustment

Desired Temperature : 20.0°C

Tolerances : 1.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 20.0 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	19.54	-0.46	0.38	1.0	Pass
#2	19.49	-0.51	0.39	1.0	Pass
#3	19.87	-0.13	0.39	1.0	Pass
#4	20.04	0.04	0.37	1.0	Pass
#5	20.36	0.36	0.36	1.0	Pass
#6	20.21	0.21	0.37	1.0	Pass
#7	20.10	0.10	0.36	1.0	Pass
#8	20.19	0.19	0.37	1.0	Pass
#9	20.48	0.48	0.35	1.0	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements of Conformity

บริษัท ชัยนิเทศ จำกัด (SCIMET CO., LTD.)

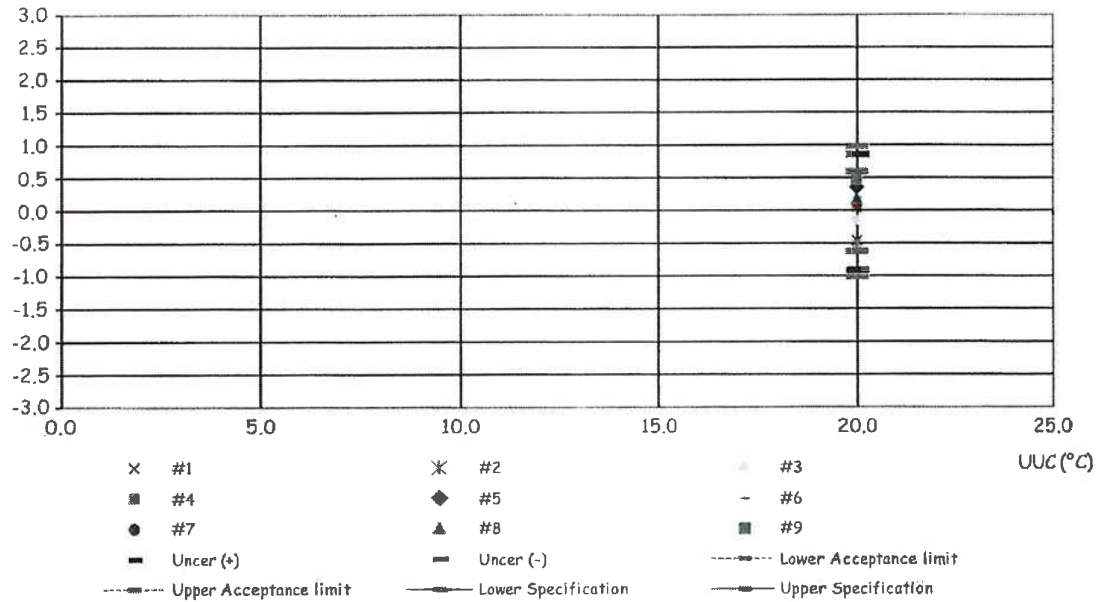
1194 Soi Wachirathamthit 57, Bangchak, Phrakhanong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

Corr_Distribution & Max_Measurement Uncertainty

Job_No. KSMT2402653

Without adjustment

Correction (°C)

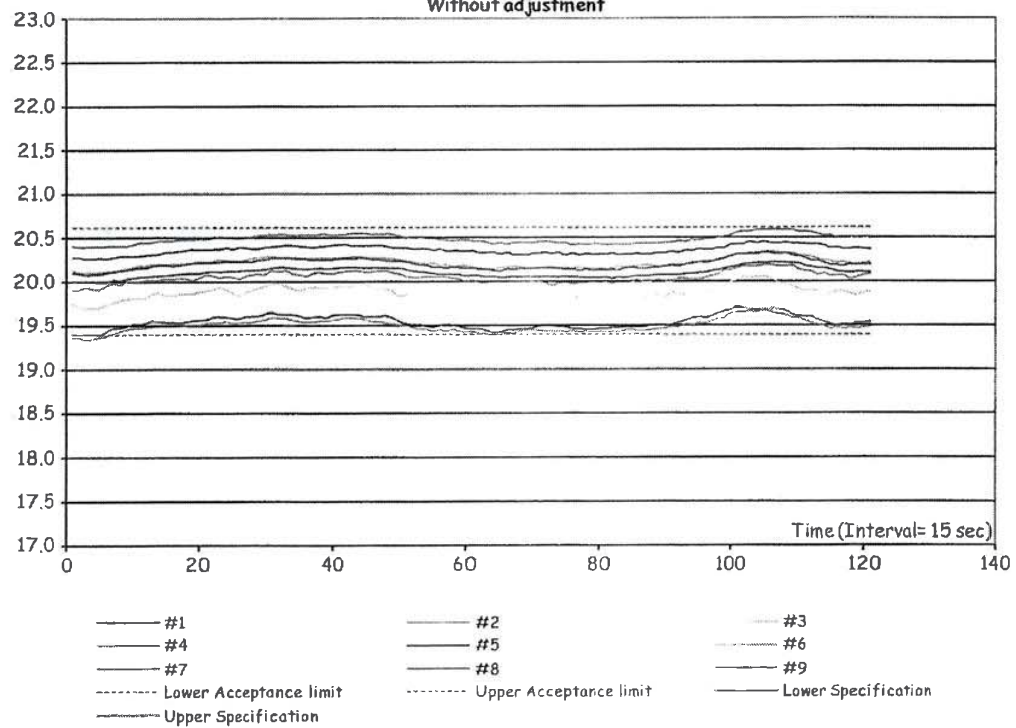


Temperature Distribution @ 20.0°C

Job_No. KSMT2402653

Without adjustment

Std(°C)





ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSMT2402653

ชนิดเครื่องมือ: Cooled Incubator

รุ่น: BIC-140

หมายเลขเครื่อง: 100613-1 (ELABBODC140NO1)

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
27 Sep 2024			27 Sep 2024		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. การทำงาน พัดลม	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	6. สภาพ Lever of Ventilation valve	<input type="checkbox"/>	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. สภาพ Lever door open / close	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. สภาพ Door seal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. การทำงานของระบบ Safety	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. การทำงานของระบบทำความเย็น	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	11. การทำงานของระบบทำความชื้น	<input type="checkbox"/>	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	<input type="checkbox"/>	12. สภาพตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. สภาพแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อแนะนำ :

Mr. Mongkolwat Hasanon
Service Engineer

บริษัท ชายนันเท จำกัด (SCIMET CO., LTD.)

1194 Soi Wachirathamsathit 57, Bangchak Phrakhanong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

2023



SCIMET Co., Ltd.
818/124 Udomsuk Rd., Bangna-Nuea,
Bangna, Bangkok 10260 Thailand
Email:scimet2022@gmail.com, Tel: 02 460 9239
https://www.scimet.co.th



Certificate No. C17250552

Calibration Certificate

Equipment:	Cooled Incubator	Job No.:	KSMT2503905
Model:	BIC-140	Received Date:	06 October 2025
Serial No.(or ID):	100613-1 (ELABBODC140N01)	Issued Date:	09 October 2025
Manufacturer:	M-LAB	Page:	1 of 3
Ventilation Valve:	None		
Shelves(pc.):	5		

Customer

Envilab Co., Ltd.
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae, Bangkok 10160

Calibration Place

Envilab Co., Ltd. (B300 CH1 ROOM)
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae, Bangkok 10160

Calibration Date

06 October 2025

Environment Condition

Temperature: 21.0 °C \pm 1.3 °C
Humidity: 53.6 %RH \pm 3.8 %RH

The Method used

In-house method, WI17, based on G-20-1/02-08 (E)

Traceability

This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through SCIMET Co.,Ltd. Certificate No. C23250017

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.

(Mr. Mongkolwat Hasanon)

Person in charge

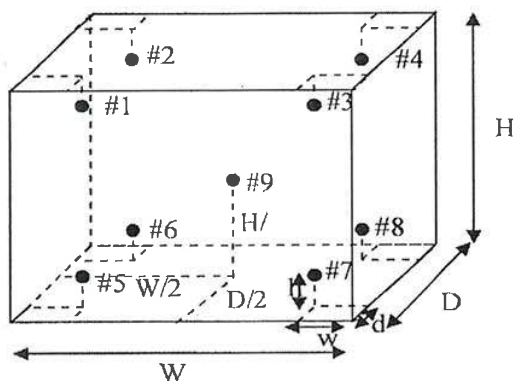


(Mr. Theeraporn)

Condition of reference standards instruments:

<u>Instruments</u>	<u>Model</u>	<u>S/N or ID.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Datalogger 3	34970A	MY44075238	C23250017	28-Jan-2026

Condition of Calibration item : In Condition



Standard Installation Locations

Volume (Calibration Zone)= 57 (Liters)

Inside chamber: W = 38 (cm) D = 32 (cm) H = 114 (cm)

Standard Locations (#1, #2, #3, #4): w = 5 (cm) d = 5 (cm) h = 11 (cm)

Standard Locations (#5, #6, #7, #8): w = 5 (cm) d = 5 (cm) h = 11 (cm)

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	201	202	203	204	205	206	207	208	209

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the enclosure.

Measured Temperature: The average reading of standards at any positions or location.

Measured Uniformity: The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.

Measured Stability: The one-half of greatest maximum difference of measured temperatures at any one probe.

Overall Variation: The difference of maximum and minimum measured

**Calibration Results:****Without adjustment**

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 20.1 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	20.30	0.30	0.58
#2	20.40	0.40	0.59
#3	20.53	0.53	0.58
#4	19.55	-0.45	0.57
#5	20.09	0.09	0.66
#6	20.11	0.11	0.77
#7	20.12	0.12	0.64
#8	20.03	0.03	0.72
#9	20.11	0.11	0.63

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
20.0	20.0	20.1	20.30	20.40	20.53	19.55	20.09	20.11	20.12	20.03	20.11	0.77

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
20.1	0.70	0.50	1.57

Note: * Maximum uncertainty of the each position

The End of Certificate



Refer to Certificate No.: C17250552

Page: 1 of 1

Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, G20-1/02-08(E). Therefore, those parameters have not

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

Decision rule : ☐ Choice A Binary Statement for Simple Acceptance Rule ($w = 0$), Specific Risk $< 50\%$ PFA.

☒ Choice B Non-binary statement with guard band ($w = 1 U$), Pass or Fail Specific Risk $< 2.5\%$ PFA and Condition Pass or Condition Fail Specific Risk $< 50\%$ PFA.

☐ Choice C Customer defined, Customers may define arbitrary multiple of r to have applied as guard band ($w = r U$).

; PFA: Probability of False Accept



(Mr. Thalerngkeat Pongngam)

Authorized signatory

Without adjustment**Desired Temperature : 20.0°C****Tolerances : 1.0 °C**

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 20.1 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	20.30	0.30	0.58	1.0	Pass
#2	20.40	0.40	0.59	1.0	Pass
#3	20.53	0.53	0.58	1.0	Condition Pass
#4	19.55	-0.45	0.57	1.0	Condition Pass
#5	20.09	0.09	0.66	1.0	Pass
#6	20.11	0.11	0.77	1.0	Pass
#7	20.12	0.12	0.64	1.0	Pass
#8	20.03	0.03	0.72	1.0	Pass
#9	20.11	0.11	0.63	1.0	Pass

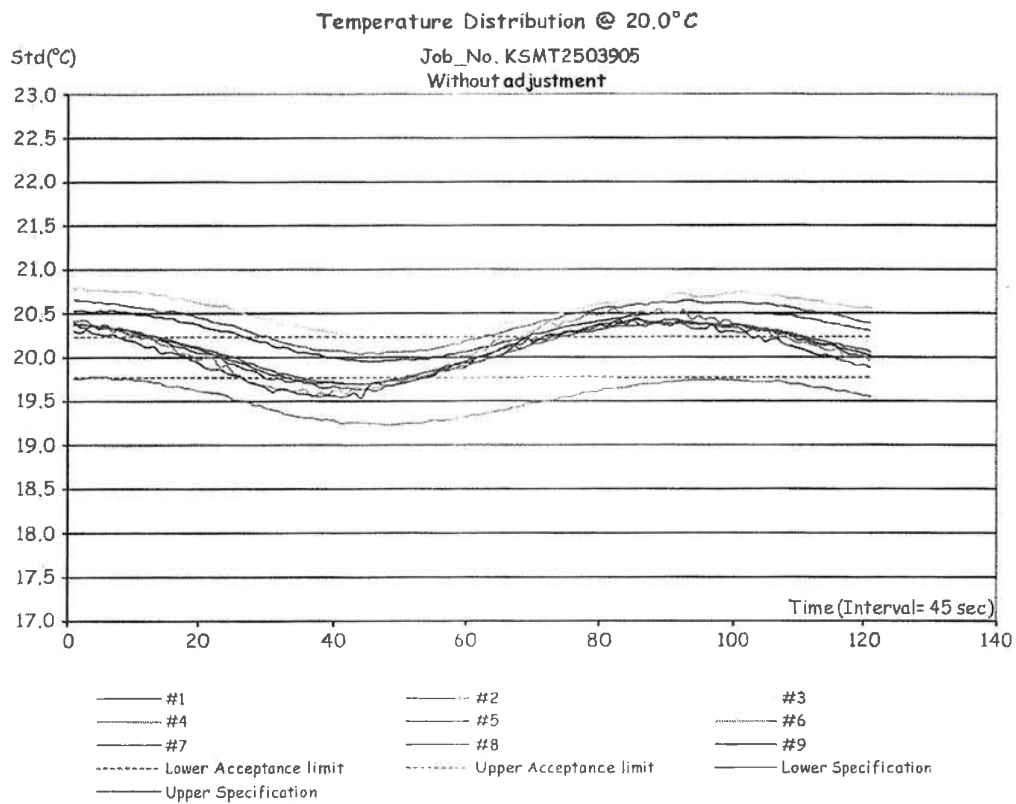
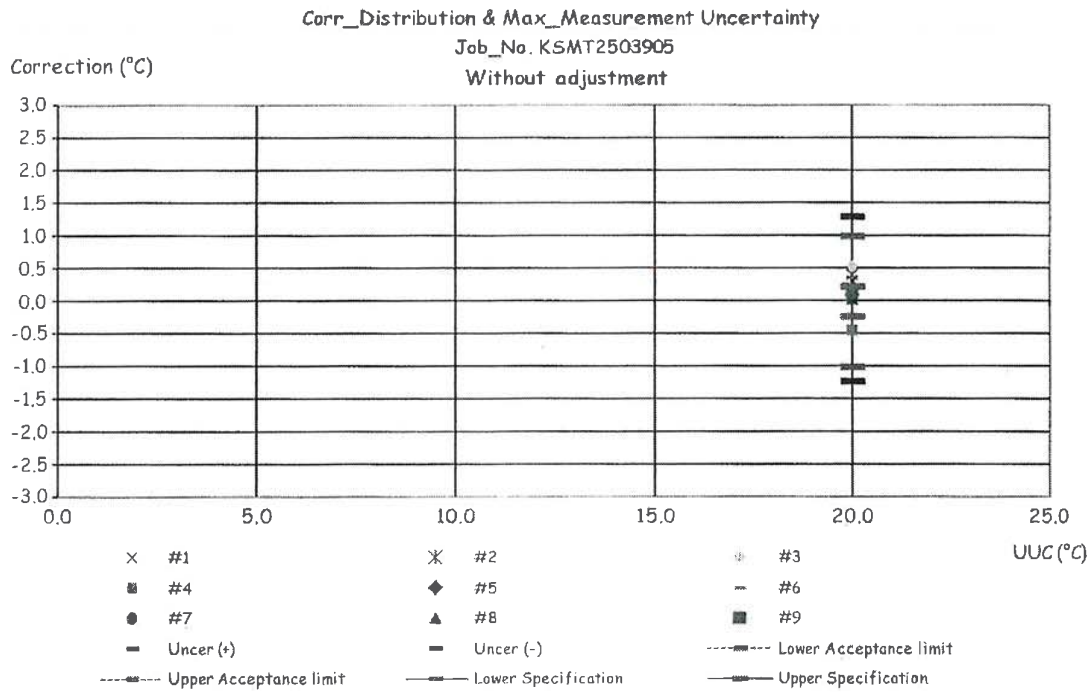
Correction of UUC.* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements of C

บริษัท ชายน์เมท จำกัด (SCIMET CO., LTD.)818/124 Udomsuk rd., Bangna-Nuea, Bangna, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

2025





ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSMT2503905

ชนิดเครื่องมือ: Cooled Incubator

รุ่น: BIC-140

หมายเลขเครื่อง: 100613-1 (ELABBODC140N01)

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
06 Oct 2025			06 Oct 2025		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. การทำงาน พัดลม	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	6. สภาพ Lever of Ventilation valve	<input type="checkbox"/>	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. สภาพ Lever door open / close	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. สภาพ Door seal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. การทำงานของระบบ Safety	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. การทำงานของระบบทำความเย็น	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	11. การทำงานของระบบทำความชื้น	<input type="checkbox"/>	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	<input type="checkbox"/>	12. สภาพตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. สภาพแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อแนะนำ :

Mr. Mongkolwat Hasanon

Service Engineer

บริษัท ชายนันเมก จำกัด (SCIMET CO., LTD.)

818/124 Udomsuk rd., Bangna-Neua, Bangna, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel 02 460 9239



SCIMET Co., Ltd.
1194 Soi Wachirathamsathit 57, Bangchak,
Phrakhanong, Bangkok 10260 Thailand
Email:scimet2022@gmail.com, Tel:095-552-4939

Certificate No. C27250001

Calibration Certificate

Equipment:	DO METER	Job No.:	KSMT2501049
Model:	HI9146	Received Date:	17 March 2025
Serial No.(or ID):	G0007931 (ELABDOHI914601)	Issued Date:	18 March 2025
Manufacturer:	HANNA	Page:	1 of 2
Condition:	In Condition		

Customer

Envilab Co., Ltd.
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae, Bangkok 10160

Calibration Place

Environment Laboratory, SCIMET Co., Ltd.
1194 Soi Wachirathamsathit 57, Bangchak, Prakhnong, Bangkok 10260 Thailand

Calibration Date

17 March 2025

Environment Condition

Temperature: 23 °C \pm 2 °C
Humidity: 50 %RH \pm 15 %RH

The Method used

In-house method, WI27 , By comparison with certified dissolved oxygen solution standard

Traceability

This is certificate is traceable to SI Units , Sample test and temperature test are assured through HANNA instruments company certificate No. 26142, through Quality Reborn Co.,LTD certificate No.C23240075

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.

Mr.Dumrong Boonsopon
Person in charge



**Calibration Results:**

Electrode Serial No. -
Model : -
Brand : HANNA

Electrode Test

Atmospheric pressure measured while calibrating. 756.36 mmHg
Temperature measured while calibrating. (± 0.2 °C) 24.7 °C
The Oxygen Solubility was calculated from the ambient conditions. 8.27 \pm 0.03 mg/L
The Oxygen Solubility reading from the DO METER - mg/L

Sample Test

Standard Oxygen Solution	Unit Under Calibration Reading	Correction	Coverage Factor (<i>k</i>)	Uncertainty of Measurement (\pm)
0.0 %	0.0 %	0.0 %	2.00	0.20 %

Temperature Electrode**Dimension of Probe;**

Length : 85 mn.
Diameter : 18 mn.
Immersion Depth 80 mn.

STD. Reading (°C)	UUC. Reading (°C)	Correction of UUC (°C)	Coverage Factor (<i>k</i>)	Uncertainty of Measurement (\pm °C)
25.01	25.6	-0.59	2.00	0.15

The End of Certificate



ใบตรวจสอบสภาพเครื่อง Do Meter

เลขที่ใบงาน: KSMT2501049

ชนิดเครื่องมือ: DO METER

รุ่น: HI9146

หมายเลขเครื่อง: G0007931

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
17 Mar 2025			17 Mar 2025		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิตช์ ปิด – เปิด เครื่อง (On-Off Swicth)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. อิเล็กโทรด (Electrode and Connection Cable)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. สายอิเล็กโทรด	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. เชื้อนเซอร์อิเล็กโทรด	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. ขาจับอิเล็กโทรด (Stand)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อเสนอแนะ :

Mr.Dumrong Boonsopon

Service Engineer

บริษัท ชายนัมเมท จำกัด (SCIMET CO., LTD.)

1194 Soi Wachirathamsathit 57, Bangchak, Phrakhanong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 095 552 4939

ภาพ

Certificate of Calibration

Certificate No. : 68-400323-1

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

540,540/1 Soi Bangkhac7, Bangkhac, Bangkok 10160

Equipment : COD Reactor

Manufacturer : Hanna

Model : HI839800

Range : N/A °C

Resolution : 0.1 °C

Serial No. : 06480040101

ID No. : ELABHI83980001

Environment : Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Date of Received : 28 May 2025

Date of Calibration : 31 May 2025

Date of Issue : 31 May 2025

Calibrated by : Sarawut Sangiamging

Calibration Method : This instrument was calibrated by In-house method direct measurement with

Standard Digital Thermometer with TC Type T probe

The temperature scale used was based on ITS-90

Reference Standard Instruments :

Standard Digital Thermometer with TC Probe

ID No.	Cert. No.	Due Date	Traceability
400046 & 400023	68-400148-1	02 Oct 2025	National Institute of Metrology Thailand (NIMT)
400046 & 400028	68-400148-3	01 Oct 2025	National Institute of Metrology Thailand (NIMT)

Approved by : 

(Permpon Chanpu)

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written

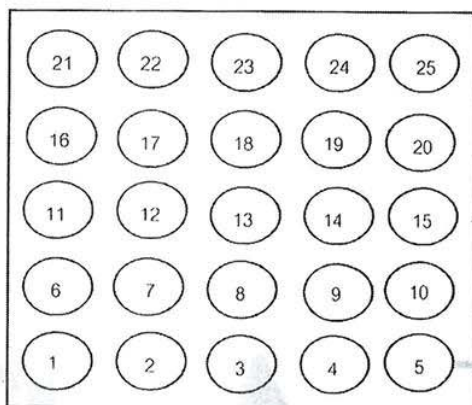
Certificate of Calibration

Certificate No. : 68-400323-1

Page : 2 of 2

Result of Calibration : Without Adjustment

Function : Temperature measurement



Controller

Test Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Standard Reading at Position (°C)									
			1	2	3	4	5	6	7	8	9	10
150.0	150.0	150.0	149.0	149.2	149.4	149.6	148.6	149.0	150.3	149.7	149.6	149.8

Test Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Standard Reading at Position (°C)									
			11	12	13	14	15	16	17	18	19	20
150.0	150.0	150.0	149.4	149.5	150.2	150.0	149.1	149.1	150.0	150.1	150.1	148.7

Test Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Standard Reading at Position (°C)					Uncertainty (± °C)
			21	22	23	24	25	
150.0	150.0	150.0	148.6	148.7	149.6	148.9	148.6	0.79

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%

- o0o -





SCIMET Co., Ltd.
818/124 Udomsuk Rd., Bangna-Nuea,
Bangna, Bangkok 10260 Thailand
Email:scimet2022@gmail.com, Tel: 02 460 9239
<https://www.scimet.co.th>



Certificate No. C18250038

Calibration Certificate

Equipment:	Liquid Bath	Job No.:	KSMT2501047
Model:	WNB14	Received Date:	19 March 2025
Serial No.(or ID):	L412.2222 (ELABWBWNB14N01)	Issued Date:	24 March 2025
Manufacturer:	Memmert	Page:	1 of 3
Circulation:	None		

Customer

Envilab Co., Ltd.
540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkhae, Bangkok 10160

Calibration Place

Envilab Co., Ltd. (B300 CH1 ROOM)
540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkhae, Bangkok 10160

Calibration Date

19 March 2025

Environment Condition

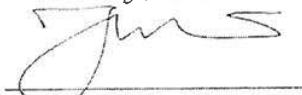
Temperature: 28.1 °C \pm 0.5 °C
Humidity: 49.2 %RH \pm 3 %RH

The Method used

In-house method, WI18, based on ASTM E715-1980
(reapproved 2022)

Traceability

This certificate is traceable to the SI Units maintained by
National Institute of Metrology (NIMT), Thailand through
SCIMET Co.,Ltd. Certificate No. C23250016


(Mr. Hattapong Pumnil)

Person in charge



This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

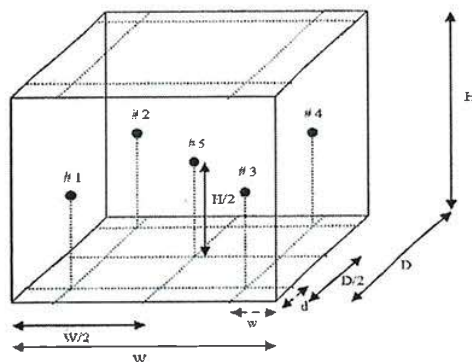
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.



Condition of reference standards instruments:

<u>Instruments</u>	<u>Model</u>	<u>S/N or ID.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Datalogger 1	34972A	MY59003249	C23250016	30-Jan-2026

Condition of Calibration item : In Condition



Standard Installation Locations

Midway between the diffuser plate and the water surface

Inside bath: W = 37 (cm) D = 33 (cm) H = 16 (cm) Volume = 20 (Liters)

Standard Locations #1: w = 5 (cm) d = 5 (cm)

Standard Locations #2: w = 5 (cm) d = 5 (cm)

Standard Locations #3: w = 5 (cm) d = 5 (cm)

Standard Locations #4: w = 5 (cm) d = 5 (cm)

Standard Locations #5: Center of any probes. (#1 - #4)

Position of Std	#1	#2	#3	#4	#5
Channel of Logger	101	102	103	104	105

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the bath.

Measured Temperature: The average reading of standards at any positions or location.

Measured Uniformity: The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the bath at steady-state. The reference probe is preferably located in the geometric center of the bath.

Measured Stability: The one-half of greatest maximum difference

Overall Variation: The difference of maximum and minimum measured

**Calibration Results:****Without adjustment**

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 94.5 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	95.08	0.08	0.20
#2	95.12	0.12	0.20
#3	95.03	0.03	0.20
#4	95.07	0.07	0.20
#5	95.08	0.08	0.20

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)					Uncertainty (± °C)*
			#1	#2	#3	#4	#5	
95.0	94.5	94.5	95.08	95.12	95.03	95.07	95.08	0.20

Bath Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
94.5	0.12	0.09	0.28

Note: * Maximum uncertainty of the each position

The End of Certificate

**Statements of conformity:**

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, ASTM E715-1980 (reapproved 2022). Therefore, those parameters have not been assessed separately.

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule :** ☐ Choice A Binary Statement for Simple Acceptance Rule ($w = 0$), Specific Risk $< 50\%$ PFA.
- ☒ Choice B Non-binary statement with guard band ($w = 1$ U), Pass or Fail Specific Risk $< 2.5\%$ PFA and Condition Pass or Condition Fail Specific Risk $< 50\%$ PFA.
- ☐ Choice C Customer defined, Customers may define arbitrary multiple of r to have applied as guard band ($w = r$ U) .
- ; PFA – Probability of False Accept



(Mr. Thalerngkeat Pongngam)

Authorized signatory

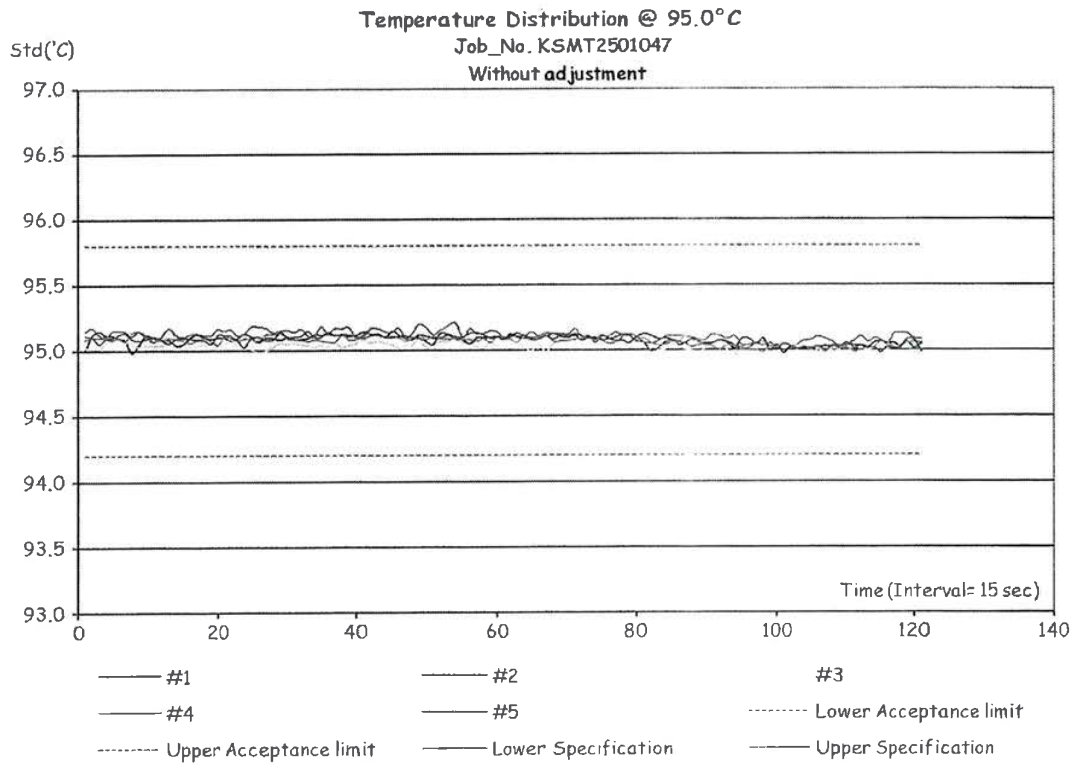
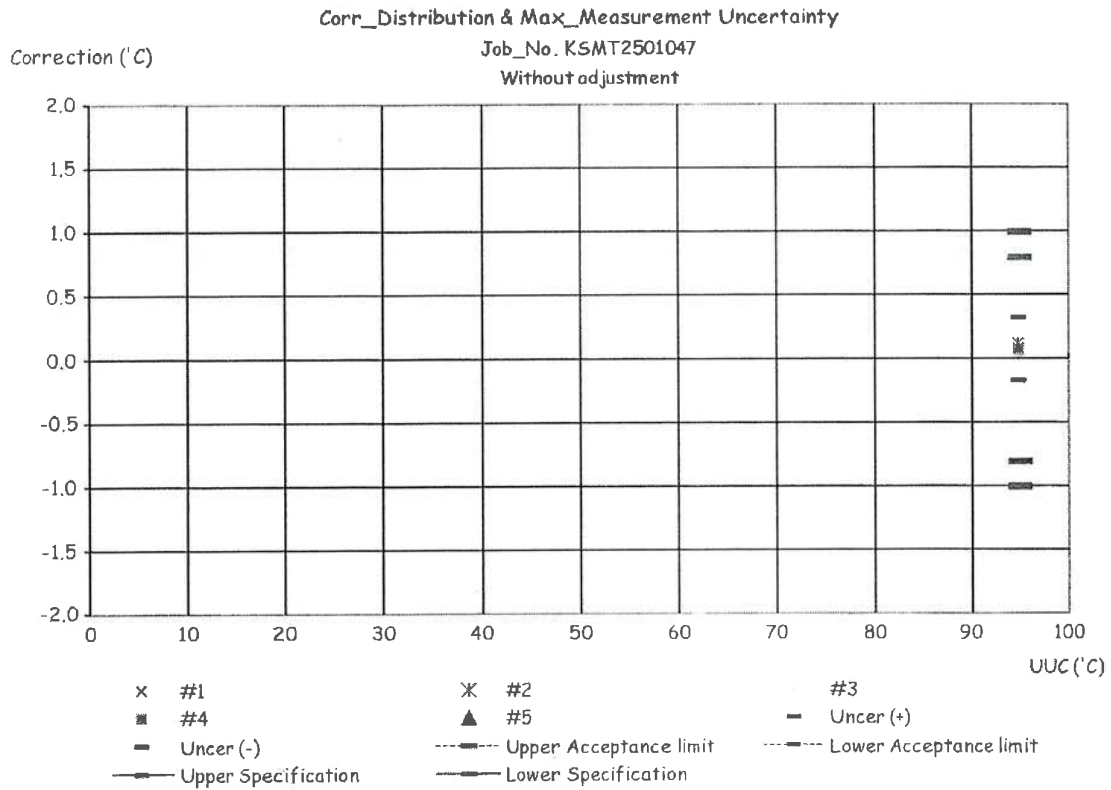
Without adjustment**Desired Temperature : 95.0°C Tolerances : 1.0 °C****Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 94.5 °C**

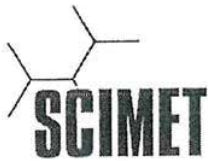
Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	95.08	0.08	0.20	1.0	Pass
#2	95.12	0.12	0.20	1.0	Pass
#3	95.03	0.03	0.20	1.0	Pass
#4	95.07	0.07	0.20	1.0	Pass
#5	95.08	0.08	0.20	1.0	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements of Conformity





ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSMT2501047

ชนิดเครื่องมือ: Liquid Bath

รุ่น: WNB14

หมายเลขเครื่อง: L412.2222

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
19 Mar 2025			19 Mar 2025		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	5. การทำงาน Circulator	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. สภาพ Lever door open / close	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. ท่อระบายน้ำทิ้ง (DRAIN)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	8. การทำงานของระบบทำความเย็น	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. สภาพตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. สภาพแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ขอแนะนำ :

Mr. Hattapong Pumnil

Service Engineer

บริษัท ซายน์เมท จำกัด (SCIMET CO., LTD.)

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FI18-01: 27 JAN 2025



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https://www.scimet.co.th



Certificate No. C17250137

Calibration Certificate

Equipment:	Hot Air Oven	Job No.:	KSMT2501050
Model:	UF75	Received Date:	19 March 2025
Serial No.(or ID):	B319.0600 (ELABHAOVEN0600)	Issued Date:	24 March 2025
Manufacturer:	Memmert	Page:	1 of 5
Ventilation Valve:	Closed		
Shelves(pc.):	3		

Customer

Envilab Co., Ltd.
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae, Bangkok 10160

Calibration Place

Envilab Co., Ltd. (B306 CH2 ROOM)
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae, Bangkok 10160

Calibration Date

19 March 2025

Environment Condition

Temperature: 29.4 °C \pm 1.2 °C
Humidity: 48 %RH \pm 3 %RH

The Method used

In-house method, W117, based on G-20-1/02-08 (E)

Traceability

This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through SCIMET Co.,Ltd. Certificate No. C23250016

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.


(Mr. Hattapong Pumnil)

Person in charge

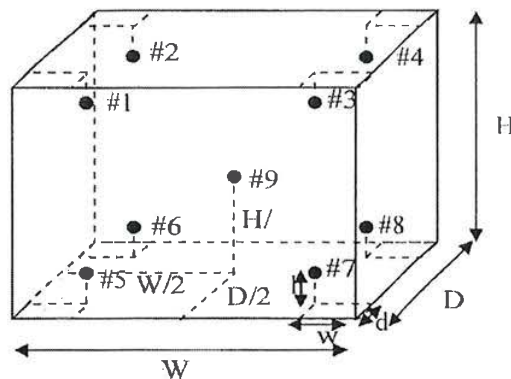



(Mr. Thalerngkeat Pongngam)

Condition of reference standards instruments:

<u>Instruments</u>	<u>Model</u>	<u>S/N or ID.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Datalogger 1	34972A	MY59003249	C23250016	30-Jan-2026

Condition of Calibration item : In Condition



Standard Installation Locations

Volume (Calibration Zone)= 30 (Liters)

Inside chamber:	W = 40 (cm)	D = 33 (cm)	H = 56 (cm)
Standard Locations (#1, #2, #3, #4):	w = 5 (cm)	d = 5 (cm)	h = 6 (cm)
Standard Locations (#5, #6, #7, #8):	w = 5 (cm)	d = 5 (cm)	h = 6 (cm)

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	301	302	303	304	305	306	307	308	309

Definitions

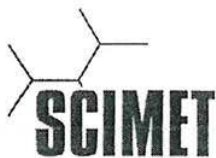
Indicating Temperature: The average reading of indicating device which forms the integral part of the enclosure.

Measured Temperature: The average reading of standards at any positions or location.

Measured Uniformity: The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.

Measured Stability: The one-half of greatest maximum difference of measured temperatures at any one probe.

Overall Variation: The difference of maximum and minimum measured temperatures throughout observation time.

**Calibration Results:****Before adjustment**

Desired (°C)	Setting (°C)	Indicating (°C)	#1 (°C)	#2 (°C)	#3 (°C)	#4 (°C)	#5 (°C)	#6 (°C)	#7 (°C)	#8 (°C)	#9 (°C)
104.0	104.0	104.0	104.44	104.95	105.08	104.82	104.94	104.72	104.13	104.70	105.02

After adjustment

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 104.0 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	103.85	-0.15	0.39
#2	104.35	0.35	0.39
#3	104.40	0.40	0.39
#4	104.17	0.17	0.39
#5	104.33	0.33	0.39
#6	104.12	0.12	0.39
#7	103.73	-0.27	0.39
#8	104.10	0.10	0.39
#9	104.31	0.31	0.39

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
104.0	104.0	104.0	103.85	104.35	104.40	104.17	104.33	104.12	103.73	104.10	104.31	0.39

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
104.0	0.65	0.09	0.80

Note: * Maximum uncertainty of the each position

After adjustment (Cont.)

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 110.0 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	109.74	-0.26	0.39
#2	110.28	0.28	0.39
#3	110.40	0.40	0.39
#4	110.15	0.15	0.39
#5	110.24	0.24	0.39
#6	110.01	0.01	0.39
#7	109.59	-0.41	0.39
#8	110.02	0.02	0.39
#9	110.33	0.33	0.39

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
110.0	110.0	110.0	109.74	110.28	110.40	110.15	110.24	110.01	109.59	110.02	110.33	0.39

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
110.0	0.84	0.12	0.98

Note: * Maximum uncertainty of the each position



After adjustment (Cont.)

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 179.0 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	179.37	-0.63	0.49
#2	180.52	0.52	0.48
#3	180.61	0.61	0.47
#4	180.55	0.55	0.47
#5	180.51	0.51	0.48
#6	180.03	0.03	0.50
#7	179.26	-0.74	0.49
#8	180.23	0.23	0.49
#9	180.67	0.67	0.47

Temperature Distribution

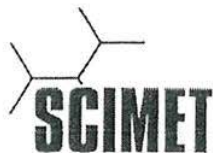
Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
180.0	179.0	179.0	179.37	180.52	180.61	180.55	180.51	180.03	179.26	180.23	180.67	0.50

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
179.0	1.54	0.17	1.68

Note: * Maximum uncertainty of the each position

The End of Certificate



Refer to Certificate No.: C17250137

Page: 1 of 2

Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:


The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, G20-1/02-08(E). Therefore, those parameters have not

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule :** ☐ Choice A Binary Statement for Simple Acceptance Rule ($w = 0$), Specific Risk $< 50\%$ PFA,
- ☒ Choice B Non-binary statement with guard band ($w = 1 U$), Pass or Fail Specific Risk $< 2.5\%$ PFA and Condition Pass or Condition Fail Specific Risk $< 50\%$ PFA.
- ☐ Choice C Customer defined, Customers may define arbitrary multiple of r to have applied as guard band ($w = r U$).
- ; PFA: Probability of False Accept




(Mr. Thalerngkeat POUNGNGAM)
Authorized signatory

After adjustment

Desired Temperature : 104.0°C

Tolerances : 1.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 104.0 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	103.85	-0.15	0.39	1.0	Pass
#2	104.35	0.35	0.39	1.0	Pass
#3	104.40	0.40	0.39	1.0	Pass
#4	104.17	0.17	0.39	1.0	Pass
#5	104.33	0.33	0.39	1.0	Pass
#6	104.12	0.12	0.39	1.0	Pass
#7	103.73	-0.27	0.39	1.0	Pass
#8	104.10	0.10	0.39	1.0	Pass
#9	104.31	0.31	0.39	1.0	Pass

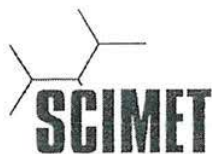
Correction of UUC.* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

บริษัท ชายันเทค จำกัด (SCIMET CO., LTD.)

818/124 Udomsuk rd., Bangna-Neua, Bangna, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

31 JAN 2025



Refer to Certificate No.: C17250137

Page: 2 of 2

Statements of conformity:(Cont.)**After adjustment (Cont.)**

Desired Temperature : 110.0°C

Tolerances : 1.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 110.0 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	109.74	-0.26	0.39	1.0	Pass
#2	110.28	0.28	0.39	1.0	Pass
#3	110.40	0.40	0.39	1.0	Pass
#4	110.15	0.15	0.39	1.0	Pass
#5	110.24	0.24	0.39	1.0	Pass
#6	110.01	0.01	0.39	1.0	Pass
#7	109.59	-0.41	0.39	1.0	Pass
#8	110.02	0.02	0.39	1.0	Pass
#9	110.33	0.33	0.39	1.0	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

After adjustment (Cont.)

Desired Temperature : 180.0°C

Tolerances : 2.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 179.0 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	179.37	-0.63	0.49	2.0	Pass
#2	180.52	0.52	0.48	2.0	Pass
#3	180.61	0.61	0.47	2.0	Pass
#4	180.55	0.55	0.47	2.0	Pass
#5	180.51	0.51	0.48	2.0	Pass
#6	180.03	0.03	0.5	2.0	Pass
#7	179.26	-0.74	0.49	2.0	Pass
#8	180.23	0.23	0.49	2.0	Pass
#9	180.67	0.67	0.47	2.0	Pass

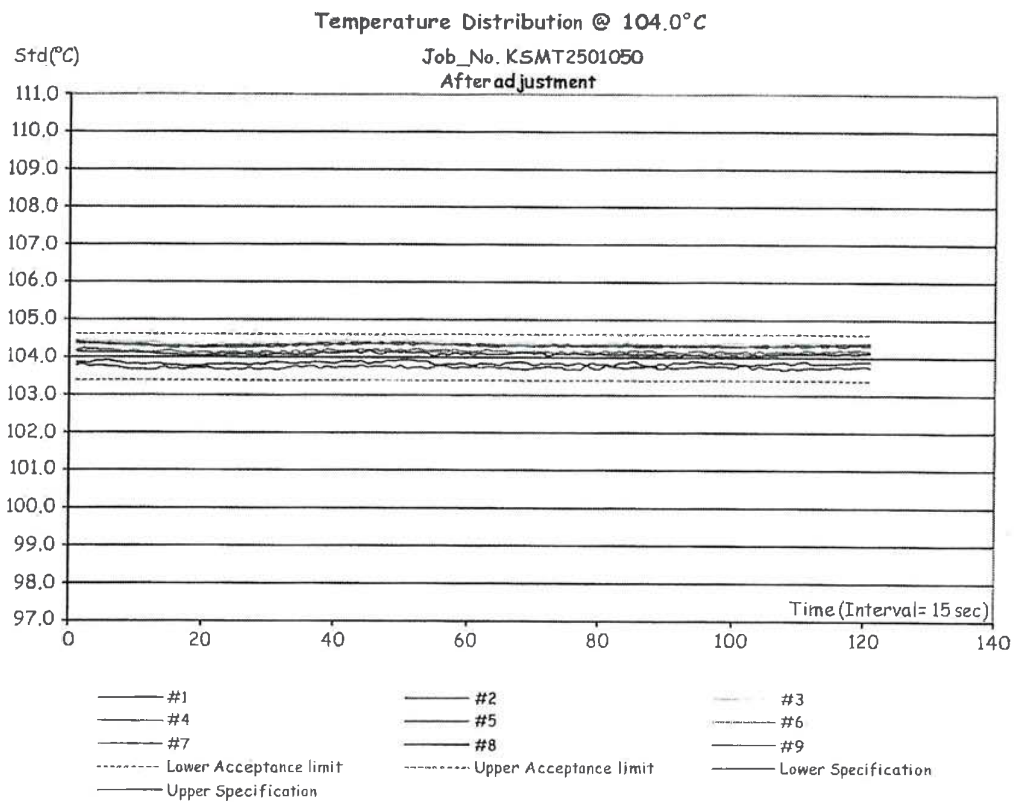
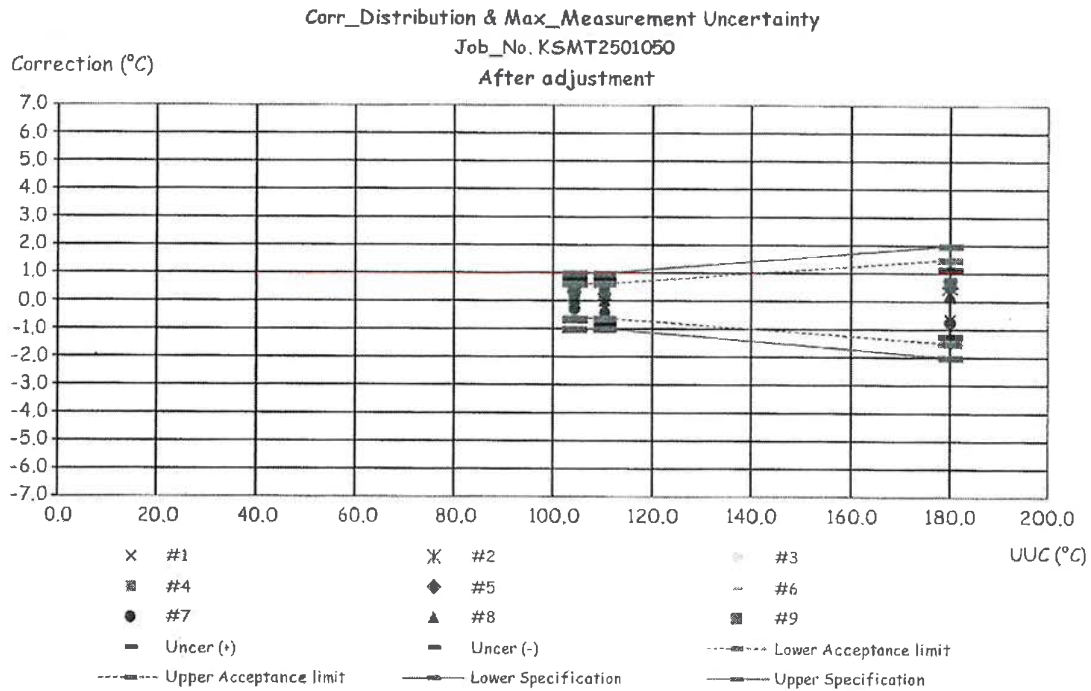
Correction of UUC.* = Measured Temperature - Desired Temperature

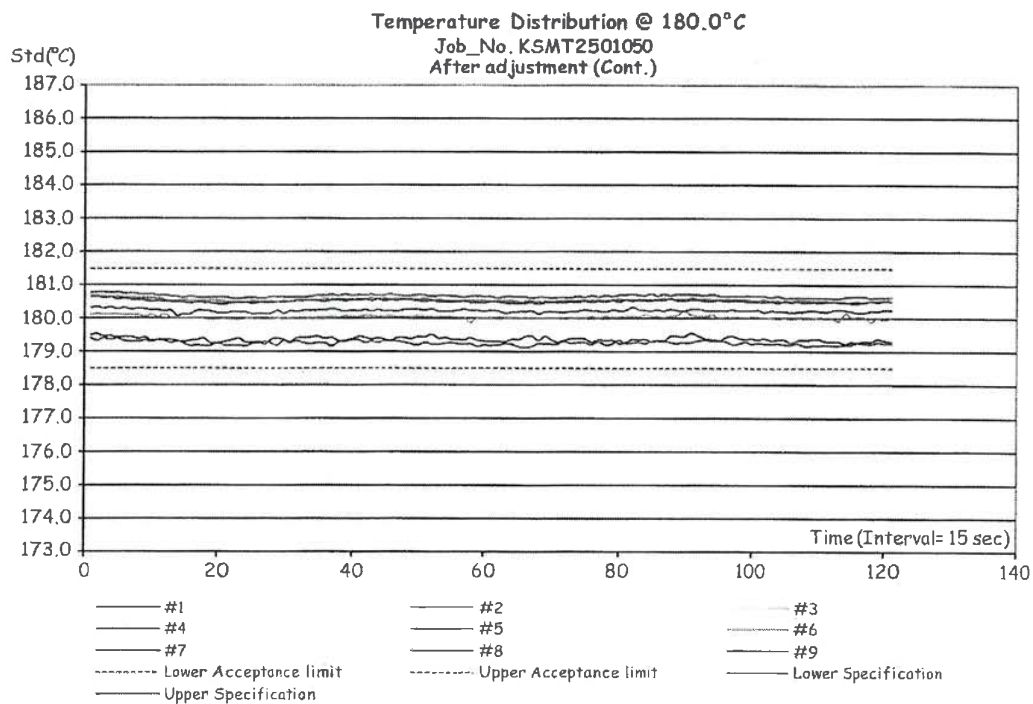
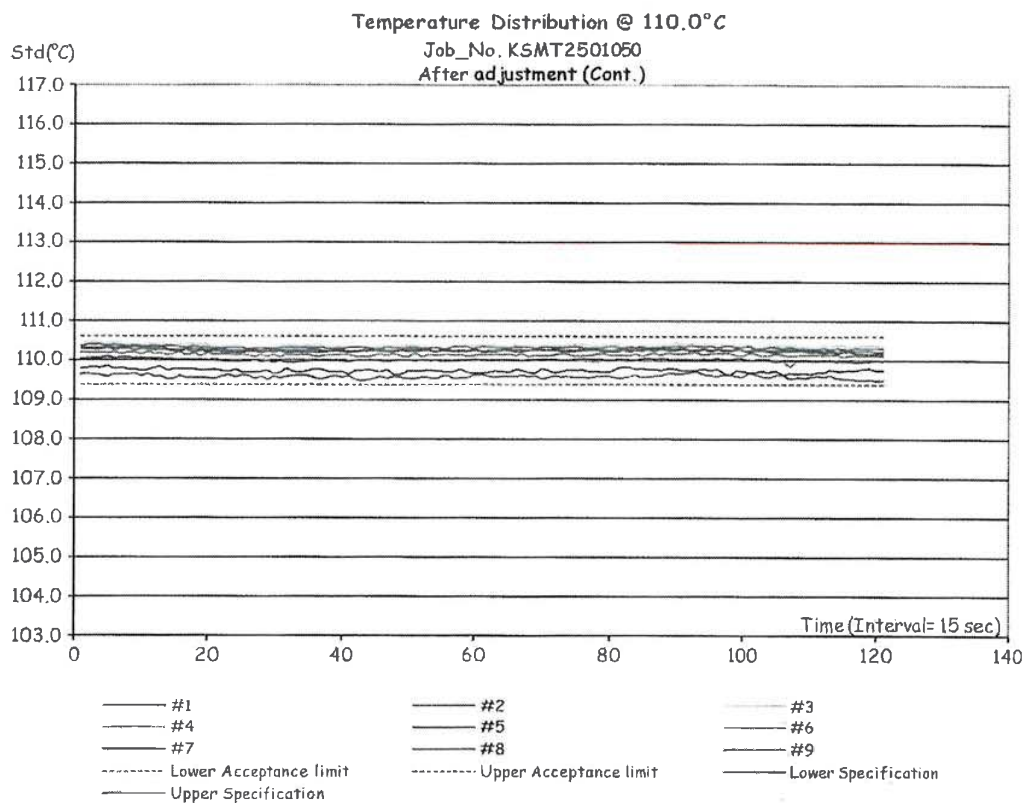
The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements of Conformity**บริษัท ชายนิเมท จำกัด (SCIMET CO., LTD.)**818/124 Udomsuk rd., Bangna-Nua, Bangna, Bangkok 10260 Thailand
Email : scimet2022@gmail.com, Tel: 02-460-9239

N 2025

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ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSMT2501050

ชนิดเครื่องมือ: Hot Air Oven

รุ่น: UF75

หมายเลขเครื่อง: B319.0600 (ELABHAOVEN0600)

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
19 Mar 2025			19 Mar 2025		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. การทำงาน พัดลม	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. สภาพ Lever of Ventilation valve	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. สภาพ Lever door open / close	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. สภาพ Door seal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. การทำงานของระบบ Safety	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	10. การทำงานของระบบทำความเย็น	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input type="checkbox"/>	<input type="checkbox"/>	11. การทำงานของระบบทำความชื้น	<input type="checkbox"/>	<input type="checkbox"/>	ไม่มี
<input checked="" type="checkbox"/>	<input type="checkbox"/>	12. สภาพตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. สภาพแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อแนะนำ :

Mr. Hattapong Pumnil

Service Engineer

บริษัท ซายน์เมท จำกัด (SCIMET CO., LTD.)

818/124 Udomsuk rd., Bangna-Nuea, Bangna, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

Certificate of Calibration

Certificate No. : 68-200034-1

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

540, 540/1 Soi Bangkhao 7, Bangkhao, Bangkok 10160

Equipment : Electronic Balance

Manufacturer : Sartorius

Model : SECURA224-1S

Serial No. : 0034803270

ID No. : ELABBALANCEN04

Capacity : 220 g

Resolution : 0.0001 g

Environment : On site calibration was carried out at the Balance Room, Envilab Co., Ltd.

Ambient Temperature : (20.4 to 21.0) °C

Relative Humidity : (41.9 to 42.9) %

Air Pressure : 1014.0 mbar

Date of Received : 28 January 2025

Date of Calibration : 28 January 2025

Date of Issue : 30 January 2025

Calibrated by : Akaradath Thippichai

Calibration Method : In-house method CAL-M2001 based on UKAS Publication ref : LAB 14

Edition 7 - November 2022

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Weights

<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceability</u>
E261-E2624	C02242009	07 Nov 2025	National Institute of Metrology (Thailand), (NIMT)

App

The Uncertainties are for a confidence probability of approximately 95%

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7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

Certificate of Calibration

Certificate No. : 68-200034-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

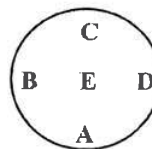
Nominal Value (g)	Correction (g)	Uncertainty \pm (g)
0.01	0.0000	0.00012
0.1	0.0001	0.00012
1	0.0000	0.00013
2	0.0001	0.00013
5	0.0000	0.00013
10	0.0000	0.00013
20	-0.0001	0.00014
50	-0.0001	0.00015
100	-0.0001	0.00020
200	-0.0001	0.00038

This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.06$, providing a level of confidence of approximately 95%

Eccentric error

Load test : 50 g
A B C D E
0.0004 0.0004 0.0005 0.0004 0.0000 g



Repeatability

Load test : 200 g
Stdev. : 0.00005 g

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NSC-TISI-TIS 17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 68-300049-2

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

540, 540/1 Soi Bangkhac 7, Bangkhac, Bangkok 10160

Equipment : Piston Pipette

Manufacturer : sartorius

Model : N/A

Serial No. : 4538900217

ID No. : ELABMICROPP006

Capacity : 100 μ l to 1000 μ l **Resolution** : 5 μ l

Environment : Ambient Temperature : (20 ± 3) $^{\circ}$ C

Relative Humidity : (55 ± 10) %

Air Pressure : (1010.5 to 1010.6) mbar.

Date of Received : 15 January 2025

Date of Calibration : 17 January 2025

Date of Issue : 17 January 2025

Calibrated by : Wipa Tovadee

Calibration Method : In-house method CAL-M3002 base on ISO 8655-6 : 2022-04

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241003	67-200410-2	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 68-300049-2

Page : 2 of 2

Result of Calibration : Without Adjustment

based on the gravimetric determination of the quantity of water which is converted to true volume at the standard temperature of 20 °C

Setting Volume (μl)	Measuring Volume (μl)	e_s (μl)	η_s (%)	S_r (μl)	C_v (%)	Uncertainty ($\pm \mu\text{l}$)	Coverage Factor (k)
100	106.96	6.96	6.96	0.15	0.14	3.1	2.00
500	502.27	2.27	0.45	0.12	0.02	3.2	2.00
1000	999.28	-0.72	0.07	0.08	0.01	3.3	2.00

Note : e_s : Systematic error (μl) , η_s : Relative systematic error (%)

S_r : Standard deviation (μl) , C_v : Coefficient of variation (%)

The formula used to convert weighing values into volume is

$$V_{20} = M \times Z$$

V_{20} = is the water volume at standard temperature of 20 °C

M = is the balance reading of delivered water

Z = is the combined factor for buoyancy correction and conversion from mass to volume

UUC Condition As-Received : Good

UUC Calibrated to delivery (Ex) by using : White Tip

This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor (k)

providing a level of confidence of approximately 95%

- o0o -



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NSC-TISI-TIS 17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 68-300237-2

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkok 10160

Equipment : Cylinder

Manufacturer : BOROSIL

Class : A

Capacity : 50 ml

Graduation : 1 ml

ID No. : C-WW-004/24

Environment : Ambient Temperature : (20 ± 3) °C

Relative Humidity : (50 ± 10) %

Air Pressure : 1015.8 mbar.

Date of Received : 14 March 2025

Date of Calibration : 18 March 2025

Date of Issue : 18 March 2025

Calibrated by : Areerat Sombun

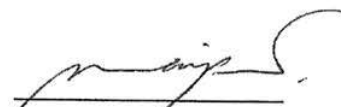
Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceability</u>
241002	67-200410-1	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :


(Wipa Tovadce)

The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-03



Certificate of Calibration

Certificate No. : 68-300237-2

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
30	30.07
50	50.08

Uncertainty of measurement with in \pm 0.054 ml

This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

- oOo -



Certificate of Calibration

Certificate No. : 68-300237-6

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkok 10160

Equipment : Cylinder

Manufacturer : PYREX

Class : A

Capacity : 1000 ml

Graduation : 10 ml

ID No. : C-WW-001/24

Environment : Ambient Temperature : (20 ± 3) °C

Relative Humidity : (50 ± 10) %

Air Pressure : 1015.9 mbar.

Date of Received : 14 March 2025

Date of Calibration : 18 March 2025

Date of Issue : 18 March 2025

Calibrated by : Areerat Sombun

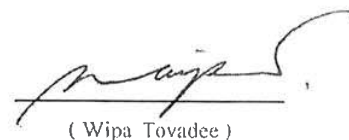
Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241002	67-200410-1	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :



(Wipa Tovadee)

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 68-300237-6

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
500	501.34
1000	1001.27

Uncertainty of measurement with in \pm 0.17 ml

This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$,
providing a level of confidence of approximately 95%

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NSC-TISI-TIS17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-300662-2

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

540, 540/1 Soi Bangkhac 7, Bangkhac, Bangkok 10160

Equipment : Measuring Pipette

Manufacturer : KIMAX

Capacity : 25 ml

Graduation : 0.1 ml

ID No. : B-WW-001/15

Environment : Ambient Temperature : (20 ± 3) °C

Relative Humidity : (50 ± 10) %

Air Pressure : 1010.6 mbar.

Date of Received : 07 November 2024

Date of Calibration : 09 November 2024

Date of Issue : 09 November 2024

Calibrated by : Arcerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	67-200210-4	02 Dec 2024	National Institute of Metrology (Thailand) (NIMT)

Approved by :

(Wipa Tovadec)

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 67-300662-2

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Delivery Time : 2.24 sec.


Nominal Volume (ml)	Measuring Volume (ml)
10	10.0133
25	24.9316

Uncertainty of measurement with in \pm 0.0067 ml

This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$,
providing a level of confidence of approximately 95%

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NSC-TISI-TIS17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 68-300822-2

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

540, 540/1 Soi Bangkhac 7, Bangkhac, Bangkok 10160

Equipment : Measuring Pipette

Manufacturer : Witcg

Class : B

Capacity : 25 ml

Graduation : 0.1 ml

ID No. : G-WW-013/25

Environment : Ambient Temperature : (20 ± 3) °C

Relative Humidity : (50 ± 10) %

Air Pressure : 1005.2 mbar.

Date of Received : 05 November 2025

Date of Calibration : 08 November 2025

Date of Issue : 08 November 2025

Calibrated by : Wipa Tovadec

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceability</u>
241003	68-200298-2	02 Dec 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

(Wipa Tovadec)

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 68-300822-2

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Delivery Time : 13.06 sec.

Nominal Volume (ml)	Measuring Volume (ml)
10	9.9729
25	24.9327

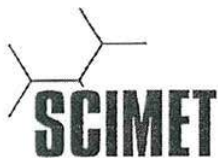
Uncertainty of measurement with in \pm 0.0067 ml

This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

- o0o -





SCIMET Co., Ltd.
818/124 Udomsuk Rd., Bangna-Nuea,
Bangna, Bangkok 10260 Thailand
Email:scimet2022@gmail.com, Tel: 02 460 9239
https://www.scimet.co.th



Certificate No. C07250028

Calibration Certificate

Equipment:	SPECTROPHOTOMETER	Job No.:	KSMT2500779
Model:	CARY 60UV-VIS	Received Date:	03 March 2025
Serial No.(or ID):	MY17490026 (ELABSPECTRO0002)	Issued Date:	03 March 2025
Manufacturer:	Agilent	Page:	1 of 3
Condition:	In Condition		

Customer

Envilab Co., Ltd.
540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkok 10160

Calibration Place

Envilab Co., Ltd. (B301 CO-THC ROOM)
540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkok 10160

Calibration Date

03 March 2025

Environment Condition

Temperature: 22.3 °C ± 0.1 °C
Humidity: 66.0 %RH ± 2.2 %RH

The Method used

In-house method, WI07, based on ASTM E 275-08 and
ASTM E 387-04

Traceability

This certificate is traceable to the CRM maintained by National Institute
of Standards and Technology (NIST) through Starna Scientific Limited.

The standard for Wavelength Certificate No. 125472 and 125471

The standard for Photometric Certificate No. 125567 and 125517

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.

(Mr. Dumrong Boonsopon)

Person in charge



(Mr. Thalerakorn Boonngam)

ry

4: 27 JAN 2025



Condition of reference standards Instruments / CRM:

<u>Instruments</u>	<u>Set No.</u>	<u>Certificate No.</u>	<u>Due date</u>
Didymium Oxide Glass Reference	131033	125472	16-Sep-26
Holmium Oxide Glass Reference	136650	125471	16-Sep-26
Neutral Density Filter Reference	45329	125567	17-Sep-26
Potassium Dichromate Solution References	45328	125517	17-Sep-26

Calibration Results:

Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 1.5 nm and UUC at 1.5 nm

Standard Wavelength (nm)	Unit Under Calibration (nm)	Correction (nm)	Uncertainty of Measurement (± nm)
219.39	220.0	-0.61	0.14
241.27	241.5	-0.23	0.14
287.39	287.5	-0.11	0.14
333.65	333.4	0.25	0.14
360.32	360.0	0.32	0.14
417.64	417.0	0.64	0.14
472.50	472.5	0.00	0.14
513.47	513.4	0.07	0.14
528.88	528.9	-0.02	0.14
537.13	537.1	0.03	0.14
640.92	641.7	-0.78	0.14
740.72	741.4	-0.68	0.14
748.55	749.3	-0.75	0.14
807.03	807.5	-0.47	0.14
879.28	879.3	-0.02	0.14

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance (Abs)	Unit Under Calibration (Abs)	Correction (Abs)	Uncertainty of Measurement (± Abs)
235 nm	0.0000	0.0002	-0.0002	0.0080
	0.7328	0.7345	-0.0017	0.0080
257 nm	0.0000	-0.0003	0.0003	0.0080
	0.8537	0.8545	-0.0008	0.0080
313 nm	0.0000	-0.0001	0.0001	0.0080
	0.2855	0.2862	-0.0007	0.0080
350 nm	0.0000	0.0000	0.0000	0.0080
	0.6338	0.6349		

บริษัท ชายน์เมท จำกัด (SCIMET CO., LTD.)

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Email: scimet2022@gmail.com, Tel 02 460 9239

N 2025

**Calibration Results:**

Without Adjustment

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance (Abs)	Unit Under Calibration (Abs)	Correction (Abs)	Uncertainty of Measurement(\pm Abs)
420 nm	0.0000	0.0000	0.0000	0.0045
	0.2352	0.2382	-0.0030	0.0045
	0.5716	0.5740	-0.0024	0.0045
	0.7146	0.7167	-0.0021	0.0045
	1.0179	1.0190	-0.0011	0.0045
440 nm	0.0000	0.0000	0.0000	0.0045
	0.2314	0.2350	-0.0036	0.0045
	0.5566	0.5596	-0.0030	0.0045
	0.7028	0.7060	-0.0032	0.0045
	1.0016	1.0039	-0.0023	0.0045
465 nm	0.0000	0.0000	0.0000	0.0045
	0.2107	0.2137	-0.0030	0.0045
	0.5192	0.5219	-0.0027	0.0045
	0.6638	0.6668	-0.0030	0.0045
	0.9447	0.9471	-0.0024	0.0045
546.1 nm	0.0000	0.0000	0.0000	0.0045
	0.2187	0.2208	-0.0021	0.0045
	0.5207	0.5230	-0.0023	0.0045
	0.7002	0.7025	-0.0023	0.0045
	1.0001	1.0020	-0.0019	0.0045
590 nm	0.0000	0.0000	0.0000	0.0045
	0.2430	0.2449	-0.0019	0.0045
	0.5546	0.5567	-0.0021	0.0045
	0.7756	0.7774	-0.0018	0.0045
	1.1117	1.1123	-0.0006	0.0045
635 nm	0.0000	0.0000	0.0000	0.0045
	0.2635	0.2651	-0.0016	0.0045
	0.5622	0.5639	-0.0017	0.0045
	0.7651	0.7673	-0.0022	0.0045
	1.0974	1.0982	-0.0008	0.0045

The End of Cer



Refer to Certificate No.: C07250028

Page: 1 of 3

Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The error of temperature determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, ASTM E 275-08 and ASTM E 387-04. Therefore, those parameters have not been assessed separately.

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule :** ☐ Choice A Binary Statement for Simple Acceptance Rule ($w = 0$), Specific Risk $< 50\%$ PFA.
- ☒ Choice B Non-binary statement with guard band ($w = 1 U$), Pass or Fail Specific Risk $< 2.5\%$ PFA and Condition Pass or Condition Fail Specific Risk $< 50\%$ PFA.
- ☐ Choice C Customer defined, Customers may define arbitrary multiple of r to have applied as guard band ($w = r U$).
- ; PFA – Probability of False Accept



(Mr. Thalemgkeat Pongngam)

Authorized signatory



Refer to Certificate No.: C07250028

Page: 2 of 3

Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 1.5 nm and UUC at 1.5 nm

Unit Under Calibration	Correction	Guard Band (w)	Tolerance (\pm)	Conformity
220.0	-0.61	0.14	1.0	Pass
241.5	-0.23	0.14	1.0	Pass
287.5	-0.11	0.14	1.0	Pass
333.4	0.25	0.14	1.0	Pass
360.0	0.32	0.14	1.0	Pass
417.0	0.64	0.14	1.0	Pass
472.5	0.00	0.14	1.0	Pass
513.4	0.07	0.14	1.0	Pass
528.9	-0.02	0.14	1.0	Pass
537.1	0.03	0.14	1.0	Pass
641.7	-0.78	0.14	1.0	Pass
741.4	-0.68	0.14	1.0	Pass
749.3	-0.75	0.14	1.0	Pass
807.5	-0.47	0.14	1.0	Pass
879.3	-0.02	0.14	1.0	Pass

Photometric Accuracy (Absorbance)

Wavelength	Unit Under Calibration	Correction	Guard Band (w)	Tolerance (\pm)	Conformity
235 nm	0.0002	-0.0002	0.0080	0.020	Pass
	0.7345	-0.0017	0.0080	0.020	Pass
257 nm	-0.0003	0.0003	0.0080	0.020	Pass
	0.8545	-0.0008	0.0080	0.020	Pass
313 nm	-0.0001	0.0001	0.0080	0.020	Pass
	0.2862	-0.0007	0.0080	0.020	Pass
350 nm	0.0000	0.0000	0.0080	0.020	Pass
	0.6349	-0.0011	0.0080	0.020	Pass

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Refer to Certificate No.: C07250028

Page: 3 of 3

Without Adjustment

Photometric Accuracy (Absorbance)

Wavelength	Unit Under Calibration	Correction	Guard Band (w)	Tolerance (\pm)	Conformity
420 nm	0.0000	0.0000	0.0045	0.015	Pass
	0.2382	-0.0030	0.0045	0.015	Pass
	0.5740	-0.0024	0.0045	0.015	Pass
	0.7167	-0.0021	0.0045	0.015	Pass
	1.0190	-0.0011	0.0045	0.015	Pass
440 nm	0.0000	0.0000	0.0045	0.015	Pass
	0.2350	-0.0036	0.0045	0.015	Pass
	0.5596	-0.0030	0.0045	0.015	Pass
	0.7060	-0.0032	0.0045	0.015	Pass
	1.0039	-0.0023	0.0045	0.015	Pass
465 nm	0.0000	0.0000	0.0045	0.015	Pass
	0.2137	-0.0030	0.0045	0.015	Pass
	0.5219	-0.0027	0.0045	0.015	Pass
	0.6668	-0.0030	0.0045	0.015	Pass
	0.9471	-0.0024	0.0045	0.015	Pass
546.1 nm	0.0000	0.0000	0.0045	0.015	Pass
	0.2208	-0.0021	0.0045	0.015	Pass
	0.5230	-0.0023	0.0045	0.015	Pass
	0.7025	-0.0023	0.0045	0.015	Pass
	1.0020	-0.0019	0.0045	0.015	Pass
590 nm	0.0000	0.0000	0.0045	0.015	Pass
	0.2449	-0.0019	0.0045	0.015	Pass
	0.5567	-0.0021	0.0045	0.015	Pass
	0.7774	-0.0018	0.0045	0.015	Pass
	1.1123	-0.0006	0.0045	0.015	Pass
635 nm	0.0000	0.0000	0.0045	0.015	Pass
	0.2651	-0.0016	0.0045	0.015	Pass
	0.5639	-0.0017	0.0045	0.015	Pass
	0.7673	-0.0022	0.0045	0.015	Pass
	1.0982	-0.0008	0.0045	0.015	Pass

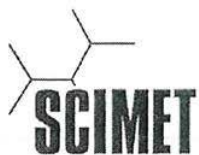
The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statement of Conformity

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JAN 2025



ใบตรวจสอบสภาพเครื่อง Spectrophotometer

เลขที่ใบงาน: KSMT2500779

ชนิดเครื่องมือ: SPECTROPHOTOMETER

รุ่น: CARY 60UV-VIS

หมายเลขเครื่อง: MY17490026

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
03 Mar 2025			03 Mar 2025		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิตช์ ปิด – เปิด เครื่อง (On-Off Swicth)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. ความยาวคลื่น (Wavelength Check)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. แหล่งกำเนิดแสง (UV < 3,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. แหล่งกำเนิดแสง (Visible < 5,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	10. ช่องวัดหลายตัวอย่าง (Carousel Module)	<input type="checkbox"/>	<input type="checkbox"/>	-

เพิ่มเติม/ข้อแนะนำ :

Mr. Dumrong Boonsopon

Service Engineer

บริษัท ชายนีเมก จำกัด (SCIMET CO., LTD.)

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AN 2025



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Phrakhanong, Bangkok 10260 Thailand
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https://www.scimet.co.th



Certificate No. C17240309

Calibration Certificate

Equipment:	Oven	Job No.:	KSMT2402655
Model:	ED53	Received Date:	27 September 2024
Serial No.(or ID):	13-02277 (ELABHAOVEN2277)	Issued Date:	30 September 2024
Manufacturer:	Binder	Page:	1 of 5
Condition:	In Condition		
Ventilation Valve:	Closed	Shelves(pc.):	2

Customer

Envilab Co., Ltd.
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae, Bangkok 10160

Calibration Place

Envilab Co., Ltd. (B306 CH2 ROOM)
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae, Bangkok 10160

Calibration Date

27 September 2024

Environment Condition

Temperature: 30.4 °C \pm 1.0 °C
Humidity: 70.3 %RH \pm 5.0 %RH

The Method used

In-house method, WI17, based on TLAS-G20

Traceability

This certificate is traceable to the SI Units maintained by
National Institute of Metrology (NIMT), Thailand through
SCIMET Co.,Ltd.Certificate No. C23240083

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

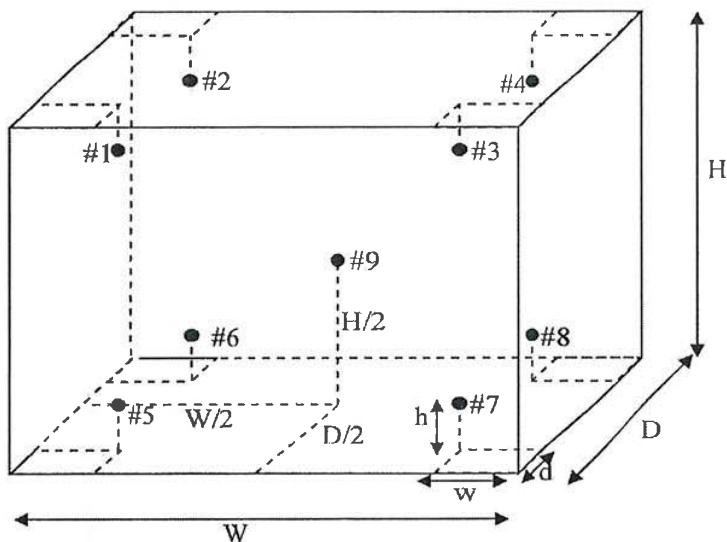
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.

(Mongkolwat Hasanon)

Person in charge



03
MAY 2023
คุณกมล



Standard Installation Locations

Volume (Calibration Zone)= 21 (Liters)

Inside chamber: $W = 40$ (cm) $D = 33$ (cm) $H = 40$ (cm)

Standard Locations (#1, #2, #3, #4): $w = 5$ (cm) $d = 5$ (cm) $h = 5$ (cm)

Standard Locations (#5, #6, #7, #8): $w = 5$ (cm) $d = 5$ (cm) $h = 5$ (cm)

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	101	102	103	104	105	106	107	108	109

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the enclosure.

Measured Temperature: The average reading of standards at any positions or location.

Measured Uniformity: The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.

Measured Stability: The one-half of greatest maximum difference of measured temperatures at any one probe.

Overall Variation: The difference of maximum and minimum measured temperatures throughout observation time

Calibration Results:

Before adjustment

Desired (°C)	Setting (°C)	Indicating (°C)	#1 (°C)	#2 (°C)	#3 (°C)	#4 (°C)	#5 (°C)	#6 (°C)	#7 (°C)	#8 (°C)	#9 (°C)
85.0	85.0	85.0	87.01	88.17	87.35	87.18	85.19	85.80	85.32	85.05	85.84

After adjustment

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 85.0 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	86.28	1.28	0.58
#2	87.39	2.39	0.58
#3	86.58	1.58	0.58
#4	86.54	1.54	0.58
#5	84.67	-0.33	0.58
#6	85.22	0.22	0.57
#7	84.76	-0.24	0.57
#8	84.63	-0.37	0.58
#9	85.14	0.14	0.58

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
85.0	85.0	85.0	86.28	87.39	86.58	86.54	84.67	85.22	84.76	84.63	85.14	0.58

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
85.0	2.29	0.07	2.89

Note: * Maximum uncertainty of the each position

After adjustment (Cont.)

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 104.5 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	104.52	0.52	0.82
#2	106.25	2.25	0.85
#3	105.03	1.03	0.82
#4	105.00	1.00	0.83
#5	103.10	-0.90	0.82
#6	103.32	-0.68	0.82
#7	103.12	-0.88	0.82
#8	102.58	-1.42	0.82
#9	103.17	-0.83	0.82

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
104.0	104.5	104.5	104.52	106.25	105.03	105.00	103.10	103.32	103.12	102.58	103.17	0.85

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
104.5	3.26	0.21	3.96

Note: * Maximum uncertainty of the each position

After adjustment (Cont.)

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 182.5 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	181.12	1.12	1.1
#2	183.67	3.67	1.3
#3	181.80	1.80	1.1
#4	181.92	1.92	1.1
#5	179.84	-0.16	1.2
#6	180.90	0.90	1.1
#7	179.77	-0.23	1.1
#8	179.38	-0.62	1.2
#9	179.75	-0.25	1.1

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
180.0	182.5	182.5	181.12	183.67	181.80	181.92	179.84	180.90	179.77	179.38	179.75	1.3

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
182.5	4.48	0.64	5.29

Note: * Maximum uncertainty of the each position

The End of Certificate

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Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, TLAS-G20. Therefore, those parameters have not

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

Decision rule : ☐ Choice A Binary Statement for Simple Acceptance Rule ($w = 0$), Specific Risk $< 50\%$ PFA.

☒ Choice B Non-binary statement with guard band ($w = 1$ U), Pass or Fail Specific Risk $< 2.5\%$ PFA and Condition Pass or Condition Fail Specific Risk $< 50\%$ PFA.

☐ Choice C Customer defined, Customers may define arbitrary multiple of r to have applied as guard band ($w = r$ U) .

; PFA: Probability of False Accept




(Mr. Thalerngkeat Pongngam)

Authorized signatory

After adjustment

Desired Temperature : 85.0 °C

Tolerances : 1.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 85.0 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	86.28	1.28	0.58	1.0	Condition Fail
#2	87.39	2.39	0.58	1.0	Fail
#3	86.58	1.58	0.58	1.0	Condition Fail
#4	86.54	1.54	0.58	1.0	Condition Fail
#5	84.67	-0.33	0.58	1.0	Pass
#6	85.22	0.22	0.57	1.0	Pass
#7	84.76	-0.24	0.57	1.0	Pass
#8	84.63	-0.37	0.58	1.0	Pass
#9	85.14	0.14	0.58	1.0	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use

บริษัท ชัยนิเทศ จำกัด (SCIMET CO., LTD.)

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Email: scimet2022@gmail.com, Tel: 02 460 9239

Statements of conformity:(Cont.)

After adjustment (Cont.)

Desired Temperature : 104.0°C

Tolerances : 2.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 104.5 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	104.52	0.52	0.82	2.0	Pass
#2	106.25	2.25	0.85	2.0	Condition Fail
#3	105.03	1.03	0.82	2.0	Pass
#4	105.00	1.00	0.83	2.0	Pass
#5	103.10	-0.90	0.82	2.0	Pass
#6	103.32	-0.68	0.82	2.0	Pass
#7	103.12	-0.88	0.82	2.0	Pass
#8	102.58	-1.42	0.82	2.0	Condition Pass
#9	103.17	-0.83	0.82	2.0	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

After adjustment (Cont.)

Desired Temperature : 180.0°C

Tolerances : 2.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 182.5 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	181.12	1.12	1.1	2.0	Condition Pass
#2	183.67	3.67	1.3	2.0	Fail
#3	181.80	1.80	1.1	2.0	Condition Pass
#4	181.92	1.92	1.1	2.0	Condition Pass
#5	179.84	-0.16	1.2	2.0	Pass
#6	180.90	0.90	1.1	2.0	Pass
#7	179.77	-0.23	1.1	2.0	Pass
#8	179.38	-0.62	1.2	2.0	Pass
#9	179.75	-0.25	1.1	2.0	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements

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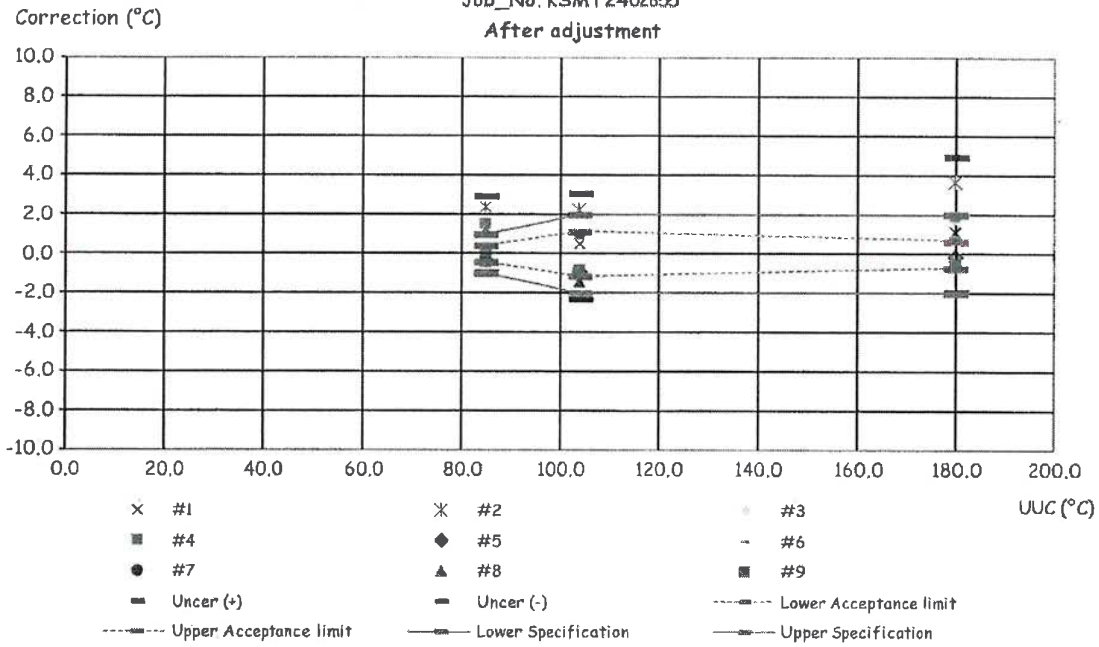
03

MAY 2023

Corr_Distribution & Max_Measurement Uncertainty

Job_No. KSMT2402655

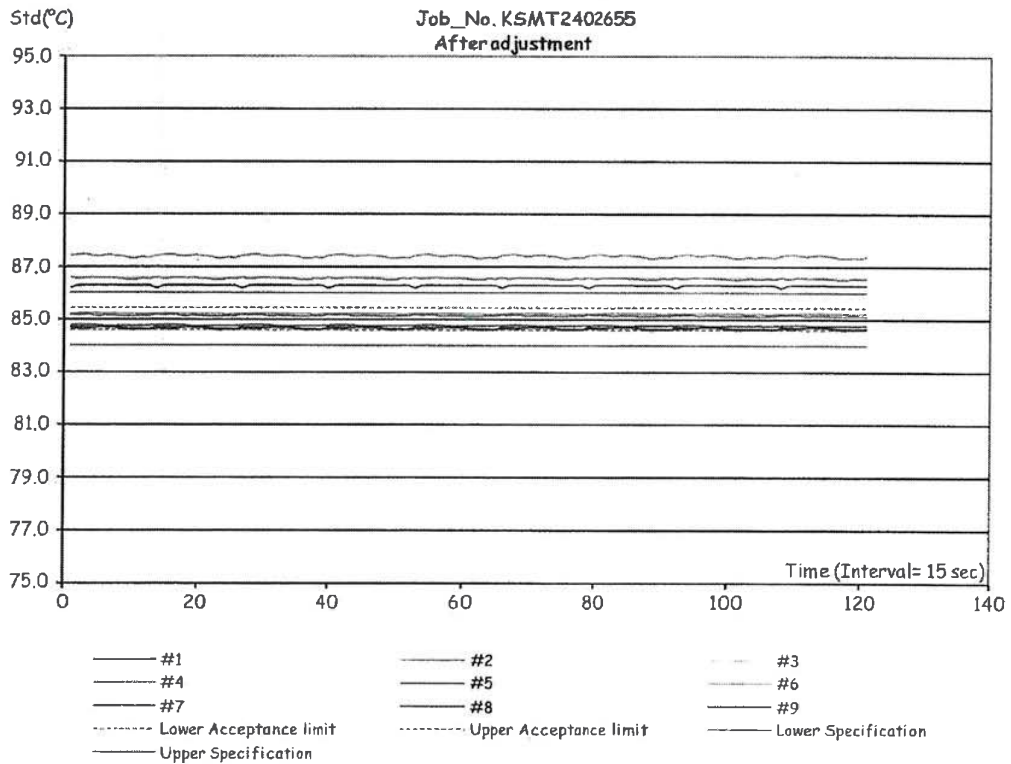
After adjustment

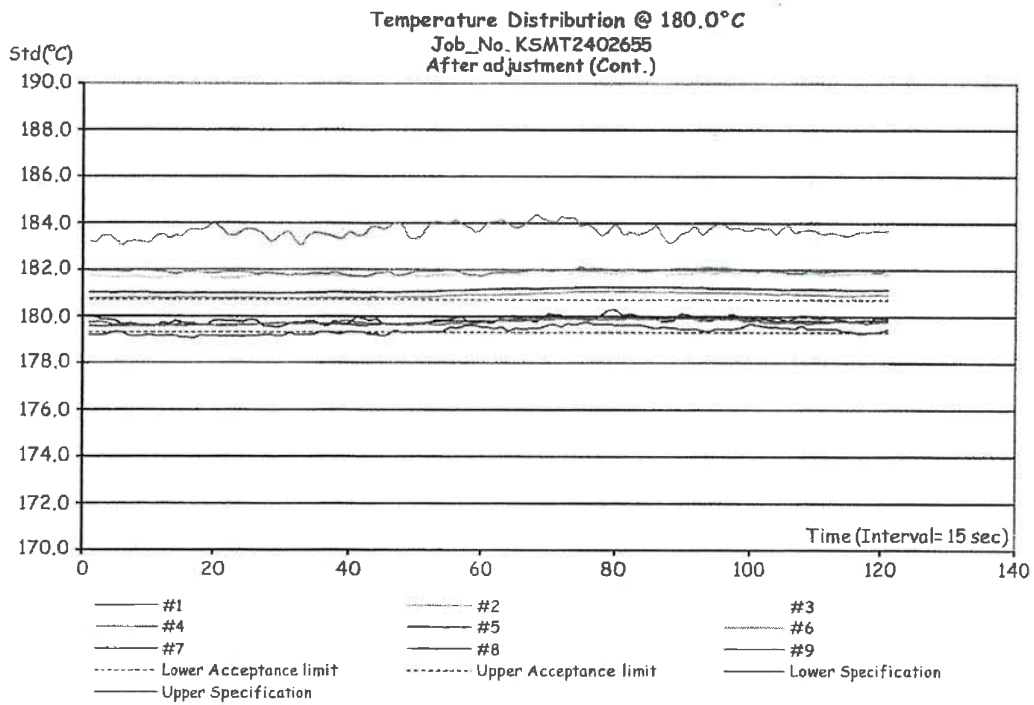
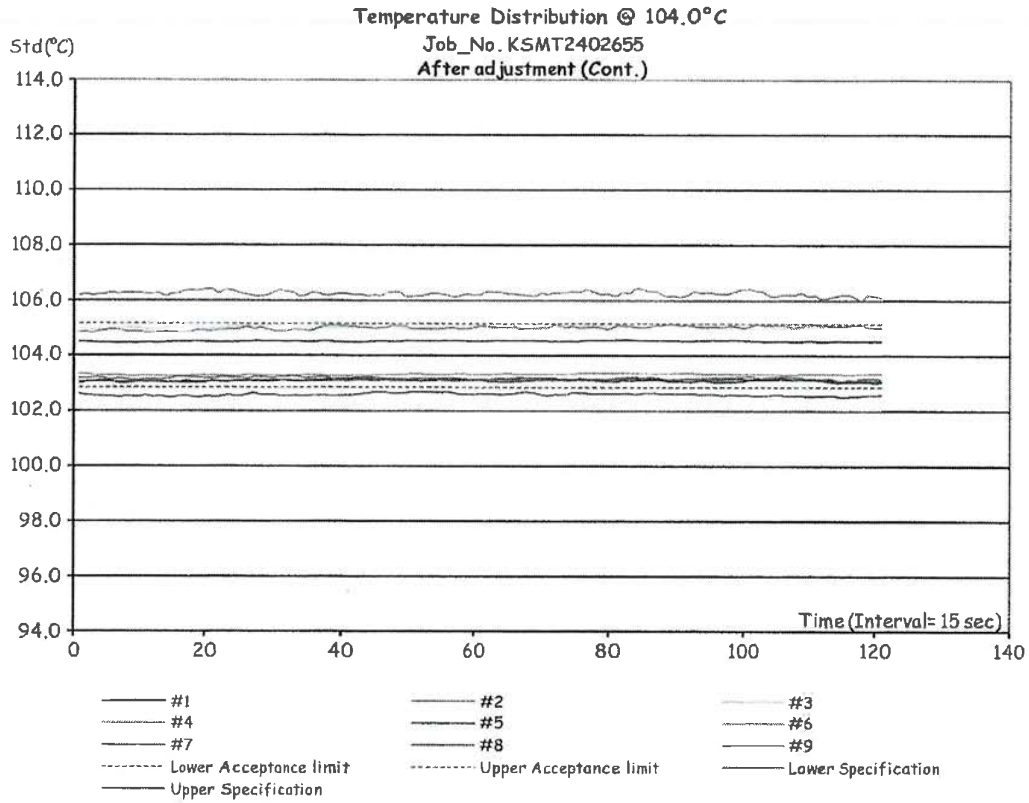


Temperature Distribution @ 85.0°C

Job_No. KSMT2402655

After adjustment







ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSMT2402655

ชนิดเครื่องมือ: Oven

รุ่น: ED53

หมายเลขเครื่อง: 13-02277 (ELABHAOVEN2277)

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
27 Sep 2024			27 Sep 2024		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*
<input type="checkbox"/>	<input type="checkbox"/>	5. การทำงาน พัดลม	<input type="checkbox"/>	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. สภาพ Lever of Ventilation valve	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. สภาพ Lever door open / close	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. สภาพ Door seal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. การทำงานของระบบ Safety	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	10. การทำงานของระบบทำความเย็น	<input type="checkbox"/>	<input type="checkbox"/>	-
<input type="checkbox"/>	<input type="checkbox"/>	11. การทำงานของระบบทำความชื้น	<input type="checkbox"/>	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	<input type="checkbox"/>	12. สภาพตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. สภาพแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อแนะนำ : * Control Modify Brand M-LAB

Mr. Mongkolwat Hasanon

Service Engineer

บริษัท ชายนีเมก จำกัด (SCIMET CO., LTD.)

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https://www.scimet.co.th



Certificate No. C17250533

Calibration Certificate

Equipment:	Oven	Job No.:	KSMT2503907
Model:	ED53	Received Date:	24 September 2025
Serial No.(or ID):	13-02277 (ELABHAOVEN2277)	Issued Date:	28 September 2025
Manufacturer:	BINDER	Page:	1 of 5
Ventilation Valve:	Closed		
Shelves(pc.):	2		

Customer

Envilab Co., Ltd.
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkok 10160

Calibration Place

Envilab Co., Ltd. (B306 CH2 ROOM)
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkok 10160

Calibration Date

24 September 2025

Environment Condition

Temperature: 31.7 °C \pm 1.4 °C
Humidity: 66.4 %RH \pm 5.5 %RH

The Method used

In-house method, WI17, based on G-20-1/02-08 (E)

Traceability

This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through SCIMET Co.,Ltd. Certificate No. C23250017

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.

(Mr. Mongkolwat Hasanon)

Person in charge

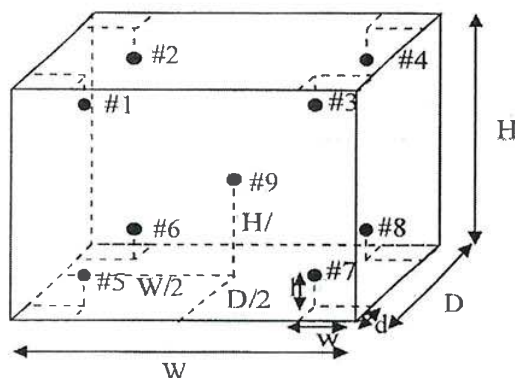


(Mr. Thalerngkeat Pounngam)

Condition of reference standards instruments:

<u>Instruments</u>	<u>Model</u>	<u>S/N or ID.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Datalogger 3	34970A	MY44075238	C23250017	28-Jan-2026

Condition of Calibration item : In Condition



Standard Installation Locations

Volume (Calibration Zone)= 21 (Liters)

Inside chamber: $W = 40 \text{ (cm)}$ $D = 33 \text{ (cm)}$ $H = 40 \text{ (cm)}$

Standard Locations (#1, #2, #3, #4): $w = 5 \text{ (cm)}$ $d = 5 \text{ (cm)}$ $h = 5 \text{ (cm)}$

Standard Locations (#5, #6, #7, #8): $w = 5 \text{ (cm)}$ $d = 5 \text{ (cm)}$ $h = 5 \text{ (cm)}$

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	101	102	103	104	105	106	107	108	109

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the enclosure.

Measured Temperature: The average reading of standards at any positions or location.

Measured Uniformity: The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.

Measured Stability: The one-half of greatest maximum difference of measured temperatures at any one probe.

Overall Variation: The difference of maximum and minimum measured temperature

Calibration Results:

Before adjustment

Desired (°C)	Setting (°C)	Indicating (°C)	#1 (°C)	#2 (°C)	#3 (°C)	#4 (°C)	#5 (°C)	#6 (°C)	#7 (°C)	#8 (°C)	#9 (°C)
85.0	85.0	85.0	88.23	89.43	88.81	87.59	86.56	86.24	86.17	86.11	86.36

After adjustment

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 85.0 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	85.78	0.78	1.1
#2	88.39	3.39	1.1
#3	86.61	1.61	1.1
#4	85.58	0.58	1.1
#5	84.39	-0.61	1.1
#6	84.15	-0.85	1.1
#7	83.99	-1.01	1.1
#8	83.99	-1.01	1.1
#9	84.16	-0.84	1.1

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
85.0	85.0	85.0	85.78	88.39	86.61	85.58	84.39	84.15	83.99	83.99	84.16	1.1

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
85.0	4.50	0.21	4.68

Note: * Maximum uncertainty of the each position

After adjustment (Cont.)

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 104.5 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	104.15	0.15	1.2
#2	107.54	3.54	1.2
#3	105.15	1.15	1.2
#4	104.13	0.13	1.2
#5	103.02	-0.98	1.2
#6	102.63	-1.37	1.2
#7	102.48	-1.52	1.2
#8	102.44	-1.56	1.2
#9	102.69	-1.31	1.2

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
104.0	104.5	104.5	104.15	107.54	105.15	104.13	103.02	102.63	102.48	102.44	102.69	1.2

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
104.5	4.99	0.16	5.27

Note: * Maximum uncertainty of the each position

After adjustment (Cont.)

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 181.5 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	180.06	0.06	1.3
#2	184.16	4.16	1.4
#3	181.54	1.54	1.3
#4	180.09	0.09	1.3
#5	179.50	-0.50	1.3
#6	180.39	0.39	1.5
#7	178.67	-1.33	1.3
#8	178.45	-1.55	1.3
#9	179.20	-0.80	1.3

Temperature Distribution

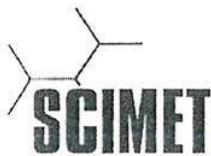
Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
180.0	181.5	181.5	180.06	184.16	181.54	180.09	179.50	180.39	178.67	178.45	179.20	1.5

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
181.5	5.46	0.68	6.45

Note: * Maximum uncertainty of the each position

The End of Certificate



Refer to Certificate No.: C17250533

Page: 1 of 2

Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, G20-1/02-08(E). Therefore, those parameters have not

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

Decision rule : ☐ Choice A Binary Statement for Simple Acceptance Rule ($w = 0$), Specific Risk $< 50\%$ PFA.

☒ Choice B Non-binary statement with guard band ($w = 1$ U), Pass or Fail Specific Risk $< 2.5\%$ PFA and Condition Pass or Condition Fail Specific Risk $< 50\%$ PFA.

☐ Choice C Customer defined, Customers may define arbitrary multiple of r to have applied as guard band ($w = r$ U).

; PFA: Probability of False Accept



(Mr. Thalerngkeat Pongngam)

Authorized signatory

After adjustment**Desired Temperature : 85.0 °C****Tolerances : 3.0 °C**

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 85.0 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	85.78	0.78	1.1	3.0	Pass
#2	88.39	3.39	1.1	3.0	Condition Fail
#3	86.61	1.61	1.1	3.0	Pass
#4	85.58	0.58	1.1	3.0	Pass
#5	84.39	-0.61	1.1	3.0	Pass
#6	84.15	-0.85	1.1	3.0	Pass
#7	83.99	-1.01	1.1	3.0	Pass
#8	83.99	-1.01	1.1	3.0	Pass
#9	84.16	-0.84	1.1	3.0	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different pl

บริษัท ซายน์เมท จำกัด (SCIMET CO., LTD.)818/124 Udomsuk rd., Bangna-Nuea, Bangna, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239



Refer to Certificate No.: C17250533

Page: 2 of 2

Statements of conformity:(Cont.)**After adjustment (Cont.)**

Desired Temperature : 104.0°C

Tolerances : 3.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 104.5 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	104.15	0.15	1.2	3.0	Pass
#2	107.54	3.54	1.2	3.0	Condition Fail
#3	105.15	1.15	1.2	3.0	Pass
#4	104.13	0.13	1.2	3.0	Pass
#5	103.02	-0.98	1.2	3.0	Pass
#6	102.63	-1.37	1.2	3.0	Pass
#7	102.48	-1.52	1.2	3.0	Pass
#8	102.44	-1.56	1.2	3.0	Pass
#9	102.69	-1.31	1.2	3.0	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

After adjustment (Cont.)

Desired Temperature : 180.0°C

Tolerances : 3.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 181.5 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	180.06	0.06	1.3	3.0	Pass
#2	184.16	4.16	1.4	3.0	Condition Fail
#3	181.54	1.54	1.3	3.0	Pass
#4	180.09	0.09	1.3	3.0	Pass
#5	179.50	-0.50	1.3	3.0	Pass
#6	180.39	0.39	1.5	3.0	Pass
#7	178.67	-1.33	1.3	3.0	Pass
#8	178.45	-1.55	1.3	3.0	Pass
#9	179.20	-0.80	1.3	3.0	Pass

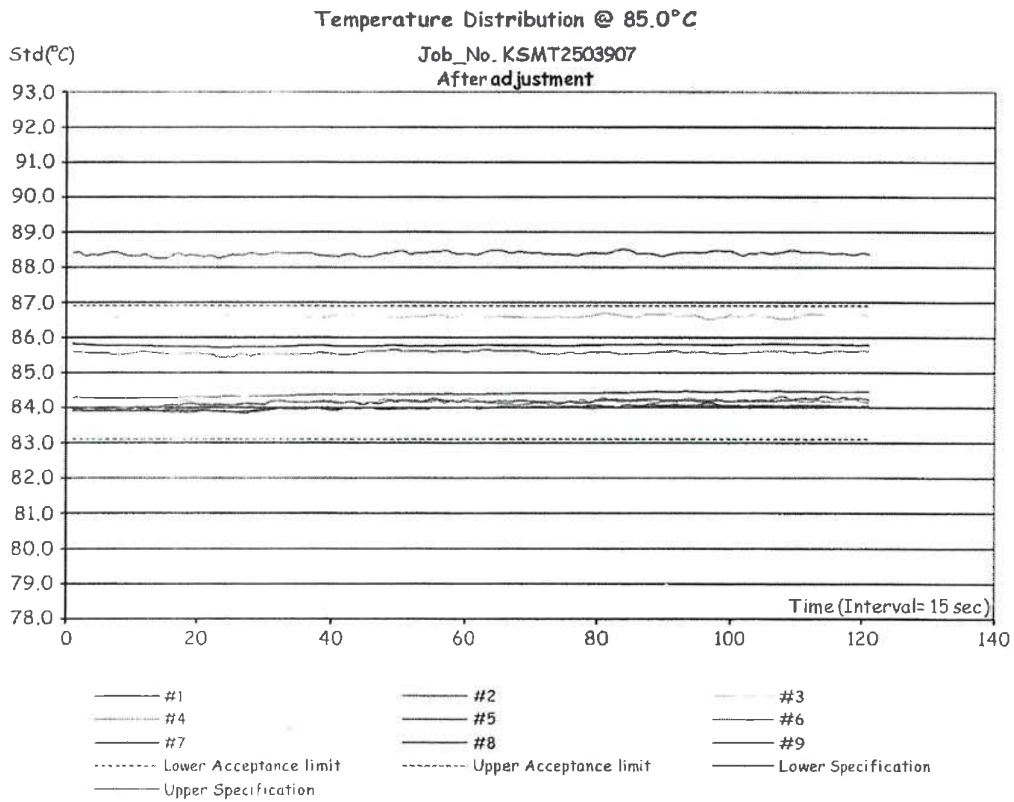
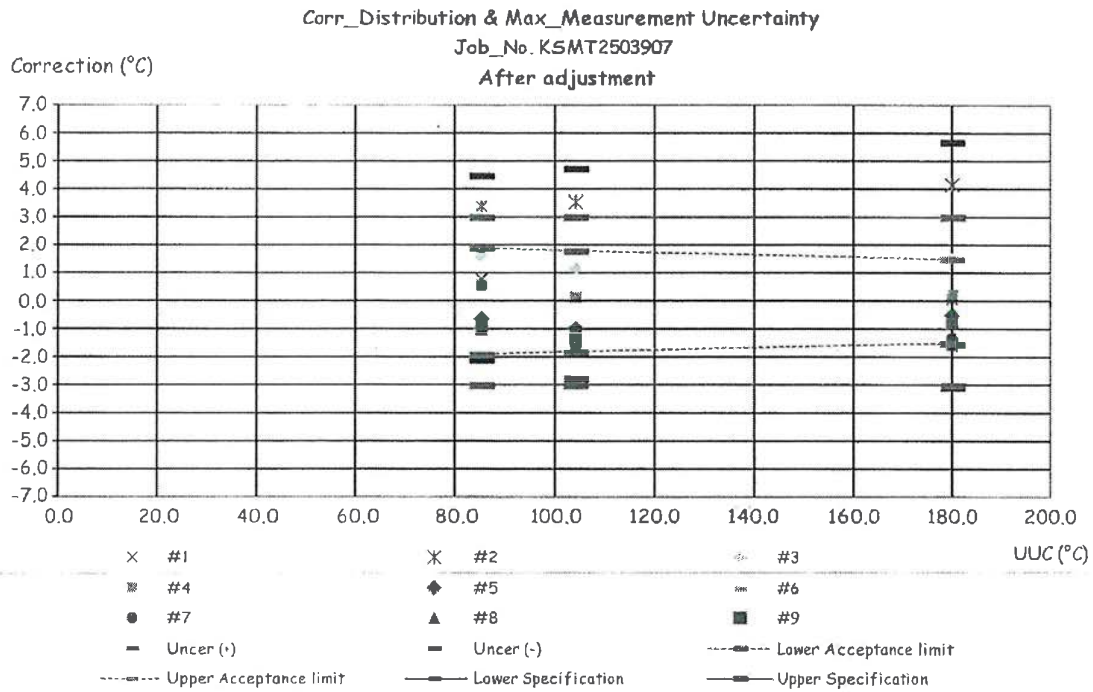
Correction of UUC.* = Measured Temperature - Desired Temperature

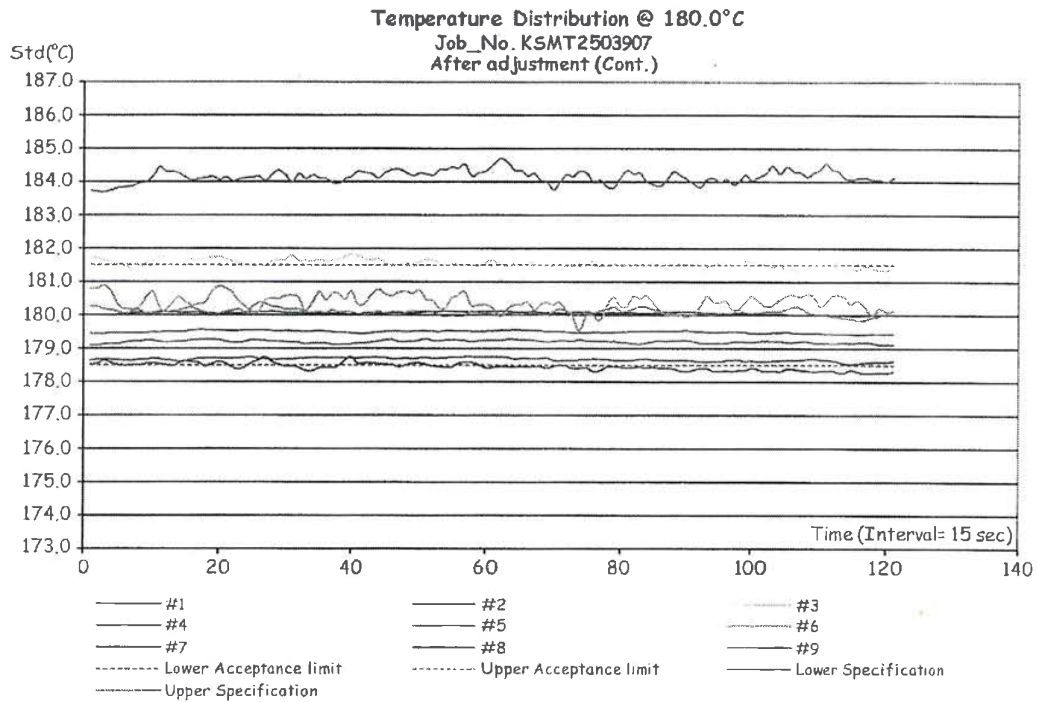
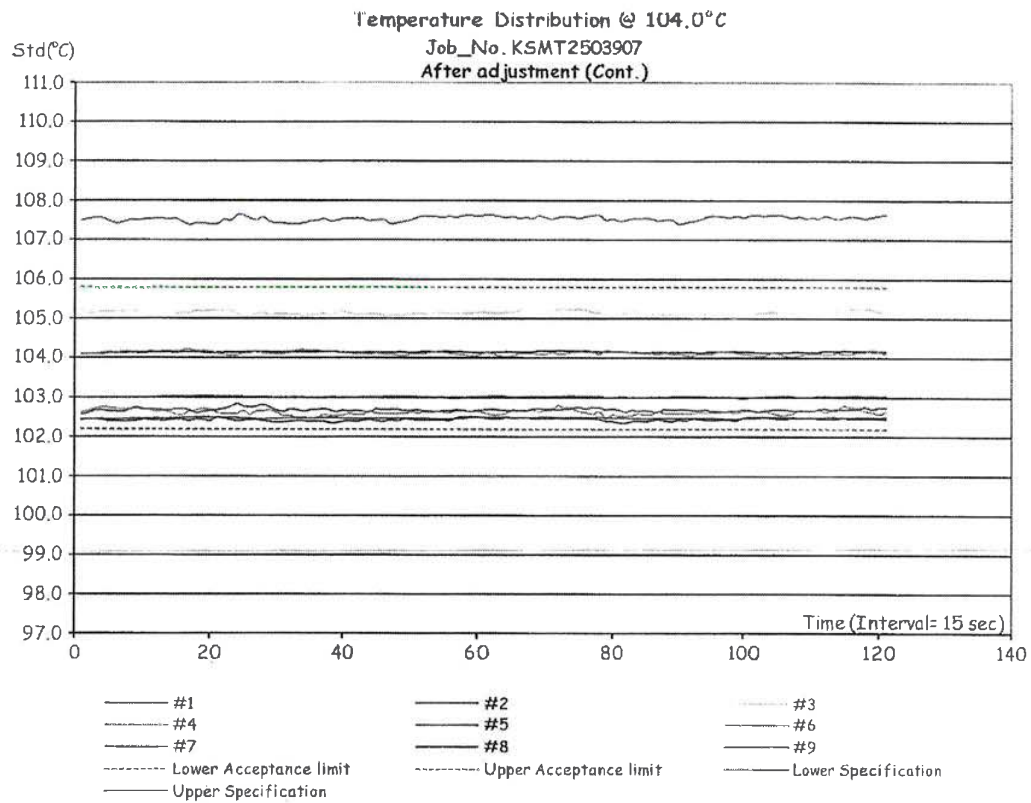
The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements of Conformity

บริษัท ชายนิเทศ จำกัด (SCIMET CO., LTD.)818/121 Udomsuk rd, Bangna-Nuea, Bangna, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

N 2025







ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSMT2503907

ชนิดเครื่องมือ: Oven

รุ่น: ED53

หมายเลขเครื่อง: 13-02277 (ELABHAOVEN2277)

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
24 Sep 2025			24 Sep 2025		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*
<input type="checkbox"/>	<input type="checkbox"/>	5. การทำงาน พัดลม	<input type="checkbox"/>	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. สภาพ Lever of Ventilation valve	<input checked="" type="checkbox"/>	<input type="checkbox"/>	**
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. สภาพ Lever door open / close	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. สภาพ Door seal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. การทำงานของระบบ Safety	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	10. การทำงานของระบบทำความเย็น	<input type="checkbox"/>	<input type="checkbox"/>	-
<input type="checkbox"/>	<input type="checkbox"/>	11. การทำงานของระบบทำความชื้น	<input type="checkbox"/>	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	<input type="checkbox"/>	12. สภาพตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. สภาพแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อแนะนำ : * Control Modify Brand M-LAB

** Lever of Ventilation valve ปิดไม่สนิท

Mr. Mongkolwat Hasanon

Service Engineer

บริษัท ชายนันเมก จำกัด (SCIMET CO., LTD.)

818/124 Udomsuk rd., Bangna-Neua, Bangna, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

F117-01: 27 JAN 2025



AIRFLOW CALIBRATION CO.,LTD.

CERTIFICATION OF TEST REPORT

Equipment : Biological Safety Cabinet (Class II)
Manufacturer : Heal Force
Model : HFsafe-1200LC
Serial Number : EX04201LC5497
Identification Number : ELABMICROBSC01
Report Number : B225332
Issued Date : 7 March 2025
Job Number : B225332
Page : 1 of 7 Pages

Customer : ENVILAB CO.,LTD. (HEAD OFFICE)
540, 540/1 Soi Bangkhac 7, Bangkhac, Bangkhac, Bang 10160

Test Place : ENVILAB CO.,LTD. (HEAD OFFICE) Laboratory Floor 3

Test By : Mr.Chanatphon Tusakat

Test Date : 28 February 2025

Due Date : 28 February 2026

Test Procedure : Service Manual

NSF/ANSI 49 - 2008: Biosafety Cabinetry: Design, Construction, Performance, and Field Certification
EN 12469: 2000 Biotechnology performance criteria for microbiological safety cabinet
AS 1807.23: 2000 Determination of intensity of radiation from germicidal ultraviolet lamp

Traceability : Velocity test is traceable to TECHMASTER Certificate Number :TTH-0-90784
Leak test of HEPA filter is traceable to WK Certificate Number :WK2501-091-1
Ultraviolet radiation test is traceable to EEI Certificate Number :CO20240056EA
Illumination test is traceable to WK Certificate Number :WK2404-302-93
Sound test is traceable to TECHMASTER Certificate Number :TTH-0-91022

This calibration certificate documents the traceability to national standards, which realize the unit of measurement according to the International System of Units (SI).

This certificate may not be reproduced other than in full except with the prior written approval of the Air Flow Calibration Company Limited.

Mr. Watcharin Tavara
Authorized Signatory



AIRFLOW CALIBRATION CO.,LTD.

Continuation of the Certificate of Test Report Number: B225332

Page 2 of 7 Pages

Primary Test Results

1. Downflow Velocity Test

Test equipment used

- Thermo anemometer ● Brand: Testo ● Model: 425
- Serial number: 01844130 ● Calibration due: 2-May-2025

Instruction: Work opening in normal positions. With the anemometer inside the MSC, make air velocity measurements in horizontal plane 50 mm to 100 mm above the top edge of the front aperture. Make measurements over a period of at least 1 min in each position.

Downflow Velocity Unit: m/s

Back

0.36	0.37	0.35	0.38	0.38	0.37	0.39	0.39
0.38	0.37	0.39	0.37	0.40	0.42	0.42	0.39
0.35	0.36	0.36	0.37	0.40	0.41	0.40	0.38

Front

Characteristic of downflow velocities

Specification	Mean	Maximum	Minimum	+20 % of Mean
• Mean downflow velocity to achieve product protection : 0.33 m/s - 0.38 m/s. All measurements should be within ± 20 % of mean values.	0.38	0.42	0.35	0.31 - 0.46

Result Summary : Pass



AIRFLOW CALIBRATION CO.,LTD.

Continuation of the Certificate of Test Report Number : B225332

Page 3 of 7 Pages

2. Inflow Velocity Test

Test equipment used

- Thermo anemometer ● Brand: Testo ● Model: 425
- Serial number: 01844130 ● Calibration due: 2-May-2025

Exhaust Measurement

Instruction: The alternative procedure to determine inflow velocity uses a thermoanemometer in a constricted window access opening of 3 inches (76mm) with the armrest removed. Inflow air velocity is measured in the center of the constricted opening 1-1/2 inches (38mm) below the top of the work access opening on the following specified grid. Use the correction factor table to calculate the inflow velocity.

Inflow Velocity Unit: m/s

1.43	1.42	1.41	1.37	1.39	1.39	1.38	1.41
------	------	------	------	------	------	------	------

Characteristic of air velocities in the work opening

Specification	Mean inflow (m/s)
• Mean inflow velocity to achieve product protection : 0.51 m/s - 0.56 m/s.	0.53

Result Summary : Pass



Page 4 of 7 Pages

Test equipment used

Test equipment used:

Instruction: The aerosol through the "Challenge" valve to the backside of HEPA filter and maximum local penetration: 0.01 % of upstream concentration. (PAO test substitute for DOP test)

Characteristic of PAO test

Concentration on the upstream side of main HEPA filter	14	µg/l
Downstream aerosol and the ratio of concentration in percentage of main HEPA filter	0.002	%
Downstream aerosol and the ratio of concentration in percentage of exhaust HEPA filter	0.002	%

Main HEPA Filter

Leak position

[illegible]

□ : 10 cm. x 10 cm. X : Media leak position G : Gasket leak position M : Maximum leak position



AIRFLOW CALIBRATION CO.,LTD.

Continuation of the Certificate of Test Report Number : B225332

Page 5 of 7 Pages

Exhaust HEPA Filter

Leak position

☐ : 10 cm x 10 cm X : Media leak position G : Gasket leak position M : Maximum leak position

Result Summary : Pass

4. Airflow Patterns

Test equipment used

Smoke Generator

Instruction : The purpose of the test is to verify that no smoke escapes from the working space to the room, and that smoke will be drawn into the working space from the room.

Pass the smoke in an easy movement along the front opening outside the cabinet. The smoke must be drawn into the cabinet without visible turbulence.

Test the laminarity of the downflow and along the side-and back wall. No smoke must come out in the room and only small Turbulence must be observed.

Result Summary :

Downflow Pattern Test	Pass
View Screen Retention Test	Pass
Work Opening Edge Retention Test	Pass
Sash/Window Seal Test	Pass



AIRFLOW CALIBRATION CO.,LTD.

Continuation of the Certificate of Test Report Number : B225332

Page 6 of 7 Pages

5. Site Installation

5.1 Sash Alarm	Pass
5.2 Interlocks	N/A
5.3 Exhaust System Alarm	N/A

6. Soap Solution

Instruction: Comprising 25g/l soft soap in tepid distilled water prepared in grease free vessel.

Result Summary : Absence of soap bubbles. N/A

Secondary Test Results

7. Illumination Test

Instruction: Take readings at approximately 300 mm centres across the full front width of the work floor surface, starting approximately 150 mm in from each side.

Test equipment used

- Lux meter
- Brand: Digicon
- Model: LX-73
- Serial number: T.034913
- Calibration due: 30-Apr-2025

Illumination Unit: Lux

Back

783	895	914	911	821
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Front

The intensity of illumination shall be not less than 750 lux at all work positions.

Result Summary : Pass



8. Ultraviolet Radiation Test

Instruction: Take readings at approximately 300 mm centres across the full front width of the work floor surface, starting approximately 150 mm in from each side.

Test equipment used

- UVC Light Meter
- Brand: Lutron
- Model: UVC-254SD
- Serial number: S.021156
- Calibration due: 7-Jun-2025

Ultraviolet Radiation Unit: mW/m^2

Back

1575	2048	2478	2379	1817
------	------	------	------	------

Front

The intensity of radiation at a wave length of 254 nm shall be not less than 400 mW/m^2 at all work positions.

Result Summary : Pass

9. Sound levels Test

Instruction: Sound levels in a cabinet should be low enough not to distract a worker. When tested in accordance with EN ISO 3744 using a sound level meter situated 1.0 m from the centre of the front aperture of the cabinet 1.0 m from any part of the installation within the laboratory, the A-weighted sound pressure level generated by the cabinet should not exceed 65 dB when the A-weighted sound pressure level of the background is less than 55 dB. If the background noise exceeds 55 dB then the corrected cabinet A-weighted sound pressure level should not exceed 65 dB.

Test equipment used

- Sound Meter
- Brand: Daiichi
- Model: SL332
- Serial number: 130108517
- Calibration due: 7-May-2025

* Sound pressure level of the background: 47.7 dBA

* Sound levels: 63.8 dBA

Result Summary : Pass

End of Certificate of Test Report

Certificate of Calibration

Certificate No. : 68-400025-1

Page : 1 of 2

Submitted by : Envilab Co., Ltd.
540,540/1 Soi Bangkhae7, Bangkhae, Bangkok 10160

Equipment : Autoclave

Manufacturer : Tomy

Model : SX-500

Range : N/A °C

Resolution : 1 °C

Serial No. : 55133094

ID No. : ELABAUTOCLAVE1

Environment : On site calibration was carried out at the Laboratory, Envilab Co., Ltd.

Ambient Temperature : (26.5 to 27.0) °C

Relative Humidity : (40 to 45) %

Line Voltage : (224.0 to 225.0) V

Date of Received : 28 January 2025

Date of Calibration : 28 January 2025

Date of Issue : 31 January 2025

Calibrated by : Permpon Chanpu

Calibration Method : This instrument was calibrated by In-house method CAL-M4007 based on BS 2646 Part 1 : 2021

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Temperature Data Logger with RTD pt 100

<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceability</u>
400039	67-400732-1	25 Jun 2025	National Institute of Metrology Thailand (NIMT)
400040	67-400732-2	25 Jun 2025	National Institute of Metrology Thailand (NIMT)
400041	67-400732-3	25 Jun 2025	National Institute of Metrology Thailand (NIMT)

Approved by :



(Permpon Chanpu)

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written permission of Calibratech Co., Ltd.

Certificate of Calibration

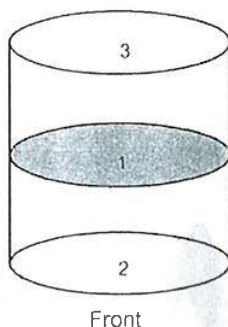
Certificate No. 68-400025-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement



Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.			Uncertainty (± °C)	Measured Uniformity (°C)	Measured Stability (°C)	Sterilizing Time (minute)	Pressure Gauge Reading (kg/cm²)
			1	2	3					
121	121	121	121.6	121.6	121.6	0.71	0.1	0.1	15	0.11

Remark

1. UUC : Unit Under Calibration
2. Pressure Gauge reading are out of accreditation's scope.

This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%

- o0o -



CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com



NSC-TISI-TIS17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 68-400102-1

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

540, 540/1 Soi Bangkhac 7, Bangkhac, Bangkok 10160

Equipment : Temperature controlled enclosure (Incubator)

Manufacturer : Memmert

Model : IF 110

Range : N/A °C

Resolution : 0.1 °C

Serial No. : D419.0525

ID No. : ELABINCUBATOR1

Environment : On site calibration was carried out at the Laboratory, Envilab Co., Ltd.

Ambient Temperature : (26.0 to 26.5) °C

Relative Humidity : (50 to 55) %

Line Voltage : (223.0 to 225.0) V

Date of Received : 17 February 2025

Date of Calibration : 17 February 2025

Date of Issue : 25 February 2025

Calibrated by : Permpon Chanpu

Calibration Method : CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Digital Thermometer with RTD Probe

ID No.

Cert. No.

Due Date

Traceability

400029 & 400043

67-400585-1

26 Apr 2025

National Institute of Metrology Thailand (NIMT)

Approved by : 

(pu)

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written approval of the Calibratech Co.,Ltd.



Certificate of Calibration

Certificate No. : 68-400102-1

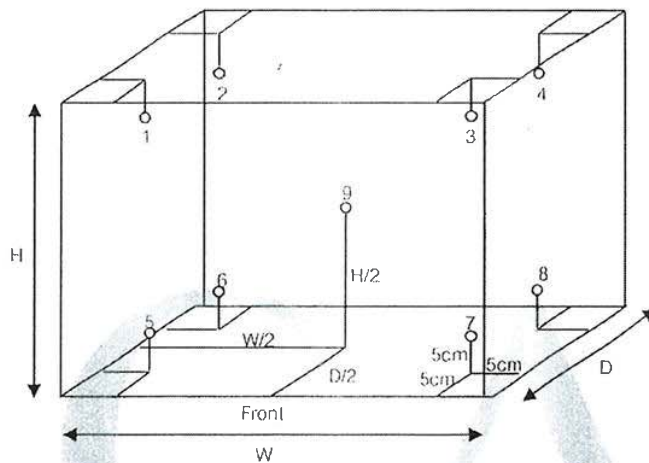
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Inside of Chamber

W = 0.56 m

D = 0.48 m

H = 0.40 m

Capacity = 0.11 m³

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.									Uncertainty (± °C)
			1	2	3	4	5	6	7	8	9	
35.0	35.0	35.0	35.01	35.07	35.07	35.10	35.11	35.07	34.89	35.08	35.06	0.30
37.0	37.0	37.0	37.08	37.12	37.15	37.16	37.18	37.14	36.95	37.15	37.13	0.30

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
35.0	35.0	35.0	0.21	0.02	0.25
37.0	37.0	37.0	0.21	0.02	0.26

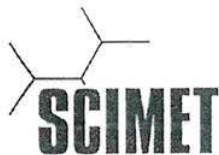
Remark The uncertainty is not combine uniformity of the air chamber

This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%

- 000 -





SCIMET Co., Ltd.
818/124 Udomsuk Rd., Bangna-Nuea,
Bangna, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239
https://www.scimet.co.th



Certificate No. C18250104

Calibration Certificate

Equipment:	Liquid Bath	Job No.:	KSMT2503407
Model:	A 24	Received Date:	22 August 2025
Serial No.(or ID):	CN21001882 (ELABWBALPHA241)	Issued Date:	26 August 2025
Manufacturer:	LAUDA	Page:	1 of 3
Circulation:	Yes		

Customer

Envilab Co., Ltd.
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae, Bangkok 10160

Calibration Place

Envilab Co., Ltd. (B 302 MIRCO ROOM)
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkhuae, Bangkok 10160

Calibration Date

22 August 2025

Environment Condition

Temperature: 23.0 °C \pm 1.4 °C
Humidity: 58.9 %RH \pm 5.6 %RH

The Method used

In-house method, WI18, based on ASTM E715-1980
(reapproved 2022)

Traceability

This certificate is traceable to the SI Units maintained by
National Institute of Metrology (NIMT), Thailand through
Quality Reborn Co.,Ltd. Certificate No. QR25-2313

(Mr. Mongkolwat Hasanon)
Person in charge



ingngam)
tory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

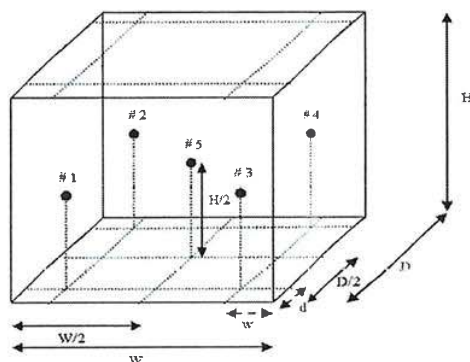
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.

Condition of reference standards instruments:

<u>Instruments</u>	<u>Model</u>	<u>S/N or ID.</u>	<u>Certificate No.</u>	<u>Due Date</u>
Datalogger 2	34972A	MY49009529	QR25-2313	4-Aug-2026

Condition of Calibration item : In Condition



Standard Installation Locations

Midway between the diffuser plate and the water surface

Inside bath: W = 30 (cm) D = 49 (cm) H = 20 (cm) Volume = 29 (Liters)

Standard Locations #1: w = 5 (cm) d = 5 (cm)

Standard Locations #2: w = 5 (cm) d = 20 (cm)

Standard Locations #3: w = 5 (cm) d = 5 (cm)

Standard Locations #4: w = 5 (cm) d = 20 (cm)

Standard Locations #5: Center of any probes. (#1 - #4)

Position of Std	#1	#2	#3	#4	#5
Channel of Logger	301	302	303	304	309

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the bath.

Measured Temperature: The average reading of standards at any positions or location.

Measured Uniformity: The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the bath at steady-state. The reference probe is preferably located in the geometric center of the bath.

Measured Stability: The one-half of greatest maximum difference of

Overall Variation: The difference of maximum and minimum measur

**Calibration Results:****Before adjustment**

Desired (°C)	Setting (°C)	Indicating (°C)	#1 (°C)	#2 (°C)	#3 (°C)	#4 (°C)	#5 (°C)
44.5	44.5	44.5	44.63	44.64	44.64	44.64	44.61

After adjustment

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 44.5 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	44.53	0.03	0.16
#2	44.54	0.04	0.16
#3	44.54	0.04	0.16
#4	44.54	0.04	0.16
#5	44.52	0.02	0.16

Temperature Distribution

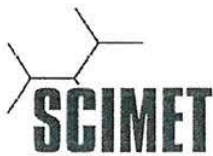
Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)					Uncertainty (± °C)*
			#1	#2	#3	#4	#5	
44.5	44.5	44.5	44.53	44.54	44.54	44.54	44.52	0.16

Bath Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
44.5	0.04	0.02	0.07

Note: * Maximum uncertainty of the each position

The End of Certificate



Refer to Certificate No.: C18250104 Page: 1 of 1

Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, ASTM E715-1980 (reapproved 2022). Therefore, those parameters have not been assessed separately.

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule :** ☐ Choice A Binary Statement for Simple Acceptance Rule ($w = 0$), Specific Risk < 50% PFA.
- ☒ Choice B Non-binary statement with guard band ($w = 1 U$), Pass or Fail Specific Risk < 2.5% PFA and Condition Pass or Condition Fail Specific Risk < 50% PFA.
- ☐ Choice C Customer defined, Customers may define arbitrary multiple of r to have applied as guard band ($w = r U$).
- ; PFA – Probability of False Accept



(Mr. Thalerngkeat Pounngam)

Authorized signatory

After adjustment

Desired Temperature : 44.5°C Tolerances : 0.2 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 44.5 °C

Locations	Measured (°C)	Correction of UUC, (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	44.53	0.03	0.16	0.2	Pass
#2	44.54	0.04	0.16	0.2	Pass
#3	44.54	0.04	0.16	0.2	Pass
#4	44.54	0.04	0.16	0.2	Pass
#5	44.52	0.02	0.16	0.2	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

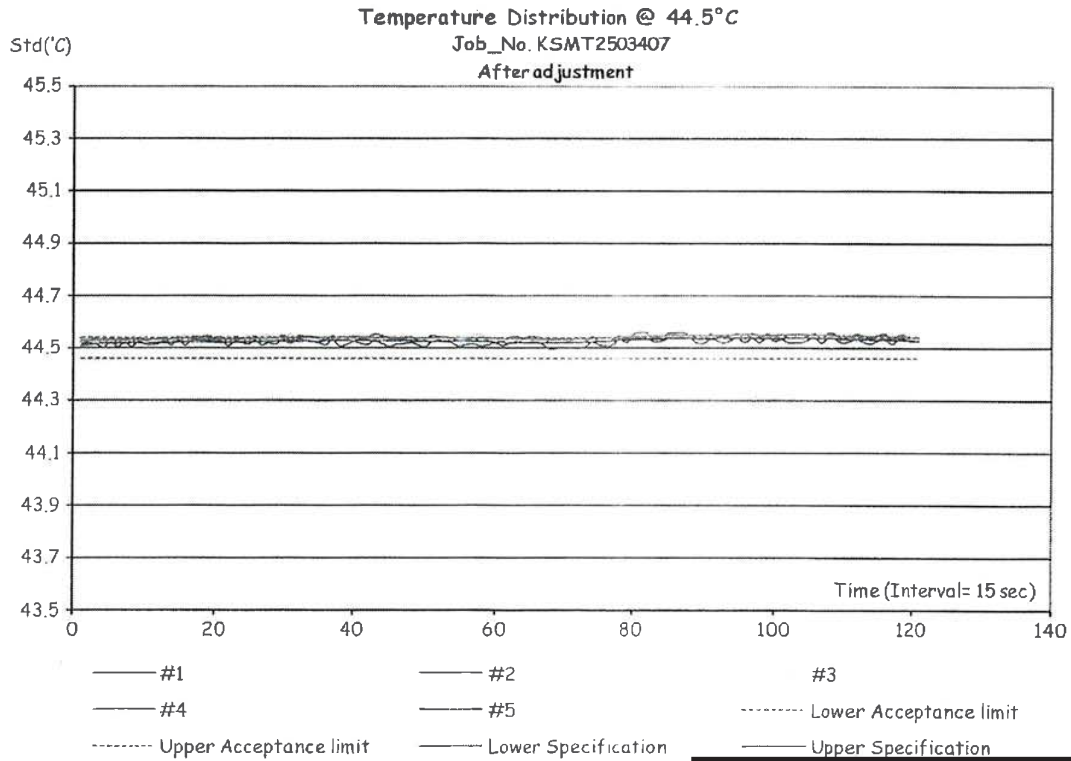
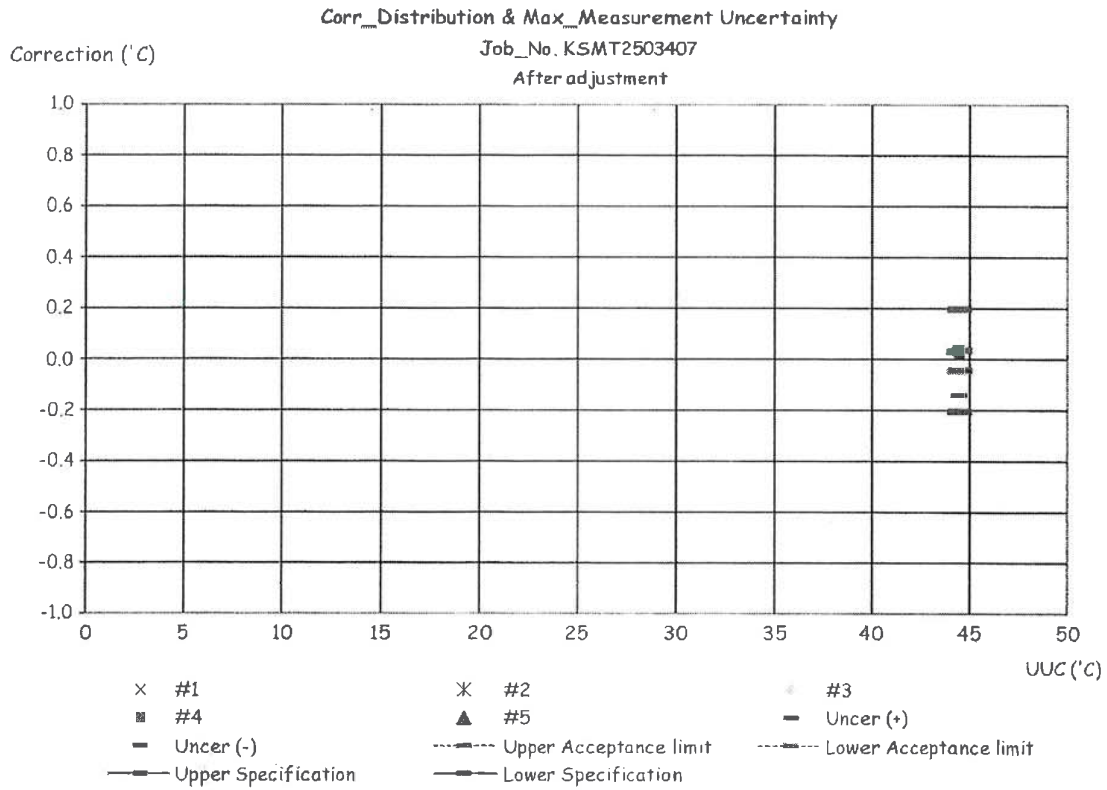
The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

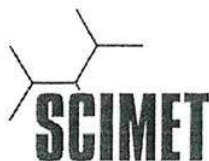
The End of Statements of Conformity

บริษัท ซายน์เมท จำกัด (SCIMET CO., LTD.)

818/124 Udomsuk rd., Bangna-Nuea, Bangna, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

2025





ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSMT2503407

ชนิดเครื่องมือ: Liquid Bath

รุ่น: A 24

หมายเลขเครื่อง: CN21001882

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
22 Aug 2025			22 Aug 2025		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. สายไฟ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. การทำงาน Main Switch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. การทำงาน Selector Key	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. การแสดงผล Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. การทำงาน Circulator	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. สภาพ Lever door open / close	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. ท่อระบายน้ำทิ้ง (DRAIN)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	8. การทำงานของระบบทำความเย็น	<input type="checkbox"/>	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. สภาพตัวเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. สภาพแวดล้อม ณ สถานที่ตั้งเครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อแนะนำ :

Mr. Mongkolwat Hasanon

Service Engineer

บริษัท ชายนันเบก จำกัด (SCIMET CO., LTD.)

818/124 Udomsuk rd, Bangna-Nuea, Bangna, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

F118-01: 27 JAN 2025



MIRACLE INTERNATIONAL TECHNOLOGY CO., LTD

214 Bangwaek Rd. Bangpai Bangkhae Bangkok 10160
Tel.: 0-2865-4647-8 Fax: 0-2865-4649 <http://www.mit.in.th>



CALIBRATION CERTIFICATE

Page 1 of 2

Certificate No. : S2025040468-0002

Date Issued : 25-Apr-25

Customer : Envilab Co., Ltd.
540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkok, Thailand
10160

Equipment : Lab Refrigerator (TMF-PLR221)

Manufacturer : Thermo Scientific

Model : PLR221

Serial No. : 2210M319042801

ID No./Tag No. : ELABREFRIGEN02

Date Received : 24-Apr-25

Date Calibrated : 24-Apr-25

Calibrated by : Chanon Konyawong

Calibration Method or Calibration Procedure Used

Standard method : CP-05 TLAS G-20.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

Result of Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2$, providing a level confidence approximately 95 percent.

This certificate may not be reproduced other than in full except with the prior written approval of the Miracle International Technology Company Limited.

Approved by:

Sarayuth T.
(Sarayuth Tochua)



Certificate No. : S2025040468-0002

Environment : Ambient Temperature : Start record 25.4 °C, Stop record 25.7 °C
Relative Humidity : Start record 50.5 %RH, Stop record 50.4 %RH

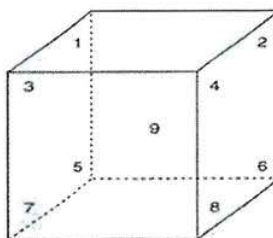
Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability ¹ (°C)	Measured Uniformity ² (°C)	Overall Variation ³ (°C)
4	4	4	1.29	0.55	2.68

Without adjustment

Calibration Temperature (°C)	STD No. 1 (°C)	STD No. 2 (°C)	STD No. 3 (°C)	STD No. 4 (°C)	STD No. 5 (°C)	STD No. 6 (°C)	STD No. 7 (°C)	STD No. 8 (°C)	STD No. 9 (°C)	Uncertainty ⁴ (±°C)
4	4.29	4.11	4.12	4.05	4.32	4.38	4.05	4.07	4.00	1.6

Note : Probe No. 9 is Reference Probe

Setting Air Fresh No. -



Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :

The International System of Units (SI) through

MIT Certificate No. L202412300-0027 for Temperature Indicator with Sensor Serial No. US37020317, Due 09-Sep-25

- Notes :
1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.
 2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.
 3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.
 4. The uncertainty of measurement is included temperature stability.
 5. The temperature uniformity, stability, overall variation and indicating temperature is applicable to all air or gas filled temperature controlled enclosures at atmospheric pressure.

End of Certificate



Agilent CrossLab Start Up Services

Agilent 5100 5110 ICP-OES

Preventive Maintenance



Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides what you need to reduce unplanned downtime and keep your systems operating at their peak performance.

This checklist is used as a guide for completing the preventive maintenance tasks. A signed copy of this checklist is provided for your records.



Introduction

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures. Customers are responsible for regular maintenance and are encouraged to observe the service representative.
- Any parts not included in the Parts Lists section of this document are not part of the recommended Preventive Maintenance service nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.
- For customers using HF applications, the instrument should be returned to its standard sample introduction system.



Important Customer Web Links

- ✓ To access **Agilent University**, visit <http://www.agilent.com/crosslab/university/> to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- To access the **Agilent Resource Center** web page, visit <https://www.agilent.com/en-us/agilentresources>. The following information topics are available:
 - Sample Prep and Containment
 - Chemical Standards
 - Analysis
 - Service and Support
 - Application Workflows
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit <https://community.agilent.com/welcome>
- Videos about specific preparation requirements for your instrument can be found by searching the **Agilent YouTube** channel at <https://www.youtube.com/user/agilent>
- Need to place a service call?** Flexible Repair Options | Agilent

Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using either a "X" or tick mark "✓".
- Check "Service not applicable" check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance services in the most logical order relevant to the individual system service in the order of the tasks listed.
- Complete the **Service Review** section together with the customer.
- Complete the fields for page numbers at the foot of each selected page
- Add relevant page numbers to selected pages and complete the total number of pages field in the Service Completion section
- Ask the customer to sign the **Service Verification** section including the customer's and your signature.

Instrument Maintenance

System Information

- ☐ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument System Name and ID	G8015A / MY17490002
Instrument System Site and Location	Envilab Company Limited

List System Component Product Numbers		List the Serial Numbers of each Component
1	G8410A	AU17393768
2	G8015A	MY17490002
3	G8481	1709-05327
4		
5		
6		
7		
8		
9		

Duration Table		Circle the type or write in the type if other
	SeaSpray	OneNeb Conical Other
	Cyclonic Single Pass	Cyclonic Double Pass Other
	Radial Dual View	Other
	One Piece Semi Demountable Fully Demountable Other	
	2.4mm 1.8mm 4mm 0.8mm Other	
	Quartz Ceramic Other	

Preparation

- ☒ Discuss any specific issues with the customer before starting.
- ☒ Review the instrument logbook for recorded problems and comments.
- ☒ Save instrument control settings before starting the procedure.
- ☒ Perform a general inspection of the system for cleanliness.
- ☒ Check for proper installation of parts, assemblies, sensors etc.
- ☒ Check system for required installation of components and implementation of Service Notes
- ☒ Check for required firmware/software updates and verify with customers if they would like them installed.
- ☐ For HF application systems, if standard sample introduction system was not installed, ask the customer to install it.
- ☒ Ask the customer to remove any samples from the ICP-OES sample introduction area, auto sampler or around the ICP-OES.

Preventive Maintenance Procedures

Record Pre-PM Instrument Performance

- ☒ Run Instrument Performance test.
- ☒ Record results in Instrument Performance Test Results Table – Pre-PM.

Clean and inspect ICP-OES system

- ☒ Look for any obvious external damage or problems.
- ☒ Inspect water cooling hoses, gas lines and power cord for excessive wear or damage.
- ☒ Perform a general internal inspection of the system for excessive dust accumulation, clean if necessary.
- ☒ Inspect sample introduction components and record any required maintenance in the Service Engineer Comments and notify the customer as the required actions required.
- ☒ Record the instrument operating conditions in the ICP-OES Status Results Table.
- ☒ Replace the polychromator purge filter.
- ☒ Replace the radial pre-optics window
- ☒ Replace the axial pre-optics window for SVDV and VDV instruments.
- ☒ Check exhaust flow for the correct positive extraction at the exhaust duct to insure they meet minimum specifications.
- ☒ Replace air inlet dust filter.
- ☒ Replace high capacity air inlet dust filter element if installed.
- ☒ Remove and clean instrument water inlet filter.

Water Recirculator

not applicable

Drain cooling fluid and remove any particles from the chiller reservoir. Clean and reinstall water inlet metal mesh filter if present with Agilent Cool Clear cooling fluid. Replace cooling system Air filter and the condenser.

SPS 3 Auto Sampler

Service not applicable

- ☒ Service not applicable
- ☐ Power cycle the autosampler and verify successful initialization.
- ☐ Inspect X and Z axis belts for wear. Replace is necessary.
- ☐ Clean X and Z axis slide shafts.
- ☐ Using customer's racks and the Agilent software move the sample probe to the 4 outermost corners and rinse port, ensure that the probe is approximately centered in the vial.

SPS 4 Auto sampler

Service not applicable

- ☒ Clean the spill tray, rack location mat, end frames and chassis with a damp soft cloth and diluted mild detergent.
- ☒ Clean the auto sampler cover panels, if cover kit is installed, with domestic window cleaner.
- ☒ Check the X-axis and Z-axis drive belts for cracks, splits, damaged teeth, excessive fraying, color changes or degradation from fumes.
- ☒ Check the X-axis, Theta-axis and Z-axis FFC cables for cracks, incorrect positioning, damaged edges or damaged connectors.
- ☒ Pump Tubing Replacement: Replace peristaltic pump tubing. Replace all tubing that goes from the rinse station to the pump and from the pump to the waste/rinse bottles
- ☒ Test using customer's tray and move the sample probe to the sample vial 1, wash vial and rinse port and ensure that the probe is centered in the vial. If not use calibration wizard and calibrate the position.

AVS 4, 6, 7 Advanced Valve System

Service not applicable

- ☒ Service not applicable
- ☐ Replace valve rotor seal
- ☐ Check fittings for signs of leaks
- ☐ Check tubing, including autosampler tubing for kinks or excessive wear
- ☐ Check high flow pump for signs of leaks

ADS 2 Advanced Dilution System (5110 only)

- ☒ SERVICE NOT APPLICABLE
- ☐ LOOK FOR ANY OBVIOUS EXTERNAL DAMAGE OR PROBLEMS.
- ☐ REPLACE VALVE ROTOR SEAL ON VALVES A AND B.
- ☐ REPLACE BOTH SYRINGES.
- ☐ REPLACE ACID VAPOR FILTER (WASTE VESSEL)
- ☐ REPLACE VENTING VALVE (DILUENT CARRIER BOTTLE)
- ☐ CHECK FITTINGS FOR SIGNS OF LEAKS.
- ☐ CHECK TUBING INCLUDING AUTOSAMPLER TUBING FOR KINKS OR EXCESSIVE WEAR.

ICP-OES adjustment

- ☒ Check position of Zn peak, adjust if required
- ☒ Check Argon Ratio, adjust to specified value if required.
- ☒ Perform Detector Calibration.
- ☒ Perform Instrument Calibration.

Record Post-PM instrument performance

- ☒ Run Instrument Performance test
- Fill in Instrument Performance Test Results Table - Post PM.
- As using ICP Expert version 7.3 and above, run the following Instrument tests

system Communications Test
Flow
er Flow
Flows
Generator
nera Test
cs Test
ulizer Test

result in the Instrument Test Results Table

Restore Instrument

- ☐ For HF applications, ask the customer to reinstall their sample introduction system.
- ☐ Leave system in an idle state: on and purging.
- ☐ Guidance: If the PM service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

Service Review

- ☒ Attach available reports/printouts of all tests to this documentation.
- ☒ Record the Preventive Maintenance service activity in the customer's records/logbook
- ☒ Record the PM event in the Smart Alerts logbook, if applicable.
- ☒ Update/reset instrument maintenance counters as appropriate.
- ☒ Affix the PM sticker to the system or instrument logbook based on the customer's request
- ☒ Complete the Service Engineer Comments section if there are additional comments.
- ☒ Review this service, parts replaced, and test results obtained with the customer.
- ☐ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box. Systems in a compliant environment may need additional documentation.
- ☒ Complete the Signature Page with both Service Engineer and Customer signatures.

Test Results

Instrument Performance Test Results Table

Note: These measurements do not form part of any specification and are for reference only.

Pre PM Sensitivity Check				Post PM Sensitivity Check	
	Radial	Axial *		Radial	Axial*
70/25/30/6.7 nm SPR	2745.8	3632.4		14128.0	23024.3
Mn 25/610 nm SPR	12504.7	26566.0		86470.0	215311.9
Al 396.152 nm SBR	5.0	14.9		564.1	2335.7
K 746.401 nm SRR	4.4	71.4		639.6	11029.3

* Axial result is not applicable for G8016AA, G8012AA Radial View instruments.

Instrument Test Results Table

Note: The Instrument Test results are for systems using ICP Expert version 7.3 and above only.

Instrument Test	Result
Subsystem Communications Test	Pass
Air Flow	Pass
Water Flow	Pass
	Pass
	Pass
	Pass
	Pass
	Pass

ICP-OES Status Results Table

Note: These measurements do not form part of any specification and are for reference only.

Measurement	Standby Mode		Plasma On
Mains voltage	220.640	VAC	219.053 VAC
Mains Current	0.080	A	0.099 A
Insolvent Temperature	23.2	°C	22.3 °C
RF Air Flow (sensor speed)	7.0	Hz	20.0 Hz
Plasma Exhaust Temperature	No measurement		46.5 °C
Water Flow Oscillator	No measurement		1.51 L/min
Water Flow Detector	1.20	L/min	1.17 L/min
Water inlet Temperature	18.3	°C	18.3 °C
Polychromator Temperature	35.3	°C	35.0 °C
CCD Temperature	-39.7	°C	-39.8 °C
Thermal Stabilizer	35.0	°C	35.0 °C
Argon Supply Pressure	611.44	kPa	584.69 kPa
Purge Gas Supply Pressure*1	610.40	kPa	594.52 kPa
Option Gas Supply Pressure*1	-	kPa	- kPa
Nebulizer Flow	No measurement		0.70 L/min
Nebulizer Back Pressure	No measurement		280.74 kPa
Plasma Gas Flow	No measurement		12.03 L/min
Auxiliary Gas Flow	No measurement		1.00 L/min
RF Power	No measurement		1203.4 W
RF Supply Current	No measurement		8.24 A
RF Supply Voltage	No measurement		194.6 V

*1 If option installed

Consumed PM Parts

Part Description	Part Number	Product or Model# where used	Quantity consumed
Axial Pre-Optic Window	G8010-68014	G8010A, G8011A, G8014A/G8015A	1
Radial Pre-Optic Window	G8010-68015	All	1
Agilent Cool Clear Coolant Fluid	5799-0037	Agilent Water Recirculator	N/A
Purge Gas Filter	G8010-60136	All	1
Air Inlet Filter	G8000-68002	All	1
High Capacity Air Filter	G8010-60199	Optional	N/A
Rotor seal for 6-7 port valve for AVS6/7	G8494-60002	G8494A/G8495, ADS 2	N/A
Rotor seal for 4 port valve for AVS4	G8493-60002	G8493A	N/A
Rinse solution to rinse station 2.5mm id x 1m	G8410-80123	SPS 4	N/A
Barb connector 2.5mm-1.5mm ID	G8410-80124	SPS 4	N/A
PVC waste tubing 8mm od x 5mm id, 2m	G8410-80122	SPS 4	N/A
Syringe, 5mL	5299-0037	ADS 2	N/A
Syringe, 10mL	5299-0038	ADS 2	N/A
Acid vapor filter	5043-1193	ADS 2	N/A
Venting valve	5043-1190	ADS 2	N/A

Parts may be required from engineer's stock:

belt	5410047500	SPS 3	N/A
belt	5410047400	SPS 3	N/A
pump tubing, PVC SolvaFlex, 3	3710049000	SPS 4	N/A

ed Parts Reference
sed by customer, not included as part of PM)

Not Applicable.

Option	Part Number	Product or Model# where used	Quantity consumed
--------	-------------	------------------------------	-------------------

Part Description	Part Number	Product or Model# where used	Quantity consumed
------------------	-------------	------------------------------	-------------------

Signature Page

Service Engineer Comments (optional)

If there are any specific points you wish to note as part of performing the installation or other items of interest for the customer, please write in this box.

- Torch is broken. Should be replaced and should be spaerd.

Service Verification

Service Request Number
6007747651
Service Engineer Name:
Suwan Onkhom

Date Service Completed
June 26, 2025
Customer Name:



Service Engineer Signature:

Suwan O.

Total number of pages in this document

15 pages

Customer Signature:





PinAAcle 900F Preventive Maintenance Report

Company Name: ENVI LAB Co.,Ltd
Instrument Location: AAS ROOM
540 soi Bangkhae 7, Bangkhae, Bangkok 10160
Instrument Serial No.: PFBS20011403
Date: 4 APR 2025

PinAAcle 900F Preventive Maintenance (PM)				
Company Name:	ENVI LAB Co.,Ltd			
Address (Instrument Location):	540 soi Bangkhae 7, Bangkhae, Bangkok 10160			
Serial Number:	PFBS20011403	PM Number:	2/2	
Customer Name (if applicable):	K.Janlira	Telephone Number:	095-5500510	
Customer Support Engineer Name:	Prasit	Service Order Number:	WO-03026378	
Date PM Performed: (DD-MMM-YY)	4 APR 2025	Next PM Due Date: (DD-MMM-YY)	4 OCT 2025	
Standard Labor Hours to Complete PM :			5 hours	

Part Number	Release	Publication Date
09370145 Rev.9	A	January 2018

Scope
The purpose of this PM is to ensure the continued functionality of the PinAAcle 900F by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer.
The customer should save their method before the PM begins.

General Instructions:
The customer must provide the engineer operational data to demonstrate recent instrument performance prior to starting the PM.
Always check with the customer before making any changes that may affect the customer's analysis or calibration, including a current back-up of system software and/or data files.
The completed document should be signed by an authorized PerkinElmer and customer representative and left with the customer.
Update the PM sticker and instrument logbook as required.

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Component List

Component / Specific Model	Serial #	Configuration Notes
PinAAcile 900F	PFBS20011403	Syngistix Ver 5.10.2066

Parts Lists

Parts Included with the PM		
Part Number (if applicable)	Description	Quantity
B0501696	Fan Filters	N/A
N3160156	O-Ring Kits for Sampling Introduction (Stainless Steels Nebulizer)	N/A
N3160157	O-Ring Kits for Sampling Introduction (Plastic Nebulizer)	N/A
N9301714	Replacement Acetylene Filter Cartridge	N/A
TH001022	Replacement Air Filter Cartridge	N/A

Additional Reagents and Standards Required for PM			
Part Number (if applicable)	Description	Quality	Batch/Lot # Expired Date (MM/YY)
N9300183	1000 mg/L Copper Standard	AR	26-87CUY1 APR-2025

Additional Reagents and Standards Required for PM (Customer Support Solution)			
Part Number (if applicable)	Description	Quantity	Batch/Lot # Expiration Date (MM/YY)
N/A	DI Water	250 mL	AR AR
N/A	0.5% HNO ₃	250 mL	AR AR

Additional Tools Required for PM			
Part Number (if applicable)	Description	Quantity	Serial #
N1013000	0.2A Neutral density filter	1	MGD-135
N1013002	1.0A Neutral density filter	1	MG2-258
03030997	System 2 EDL Driver	1	030309-97E
N3050505	As System 2 EDL	1	17986
N3050121	Cu Lumina HCL	1	000003793D12
N3050109	Ba Lumina HCL	1	041123-010120
N3050139	K Lumina HCL	1	000003788E1D
N3050152	Ni Lumina HCL	1	

Procedure Checklist

Use (✓) to check off those steps in the checklist that have been completed.

- General:**
 - ☒ Review the instrument performance with the customer and document any recent problems.
 - ☒ Inspect the customer log book and make any appropriate PM entries.
 - ☒ Perform general inspection of system for cleanliness.
- PC Instrument Software:**
 - ☒ Instrument Software user files/databases archived, packed, and/or deleted as needed.
- Mechanical:**
 - ☒ Inspect and clean all fans and filters. Replace filters if necessary
 - ☒ Inspect all gas lines for leaks and/or wear. Replace if needed.
 - ☒ Clean exterior of the instrument.
 - ☒ Inspect the burner head, burner chamber, and nebulizer. Clean if needed as stated in the Hardware Guide.
 - ☒ Check burner head dimensions with the feeler gauge as stated in the Hardware Guide in the Maintenance chapter section on cleaning the burner head and checking sloth width. Replace if out of specification
 - ☒ Check the condition of the end cap, burner head, and nebulizer O-rings. Replace if necessary.
 - ☒ Check the drain system for signs of wear. Replace worn or damaged parts.
 - ☒ Visually check for proper flame conditions when igniting the Air-C2H2 and N2O-C2H2 flames (if applicable).
- Electrical:**
 - ☒ Inspect PC boards. Clean if necessary.
 - ☒ Carefully check all internal and external cable connections.
 - ☒ Check instrument firmware revisions upgrade to current levels (if necessary)
 - ☒ Run Diagnostics Test within the Advanced function of the Spectrometer page. Check the results in the service log folder in the Spectrometer BM Log Viewer.

Optics:

- ☒ Inspect and clean the sample compartment windows, if needed.
- ☒ Inspect optics. Clean or replace if necessary.

Gasses:

- ☒ Verify that the Gasses supplied to the instrument are within the pressure and purity specifications found in the PinAdele 900F Series Pre-installation Checklist SDB.
- ☒ Verify that the acetylene filter and air filter element is dry. Replace if necessary.

7. Flame Interlock Check:

Description: Check to ensure that all safety interlocks are closed.

Parameter	Specification	Test Results	Pass/Fail
Flame Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Passed
Drain Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Passed
Nebulizer Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Passed
C ₂ H ₂ Pressure Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Passed
Air Pressure Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Passed
Burner Head Sensor	Choosing Nitrous Oxide as the oxidant should trigger an interlock shuts down	Active	Passed

8. After PM Performance tests:

8.1 Detector Linearity with Barium

Description: Ensures that the detector is linear in the Visible Range.

Parameter	Specification	Certificate Value at 553.6 nm (Abs.)	Test Results	Pass/Fail
1.0 A ND Filter	± 5% from Cert.	0.9995	1.0277	Passed
0.2 A ND Filter	± 5% from Cert.	0.1936	0.2024	Passed

8.2 Baseline Noise at 1.0 Absorbance with Barium

Description: Ensures that a high absorbance will not produce excessive noise.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.010	0.0015	Passed

8.3 AA Baseline Noise with Copper

Description: Check baseline noise.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.001	0.0003	Passed

8.4 D₂ Background Compensation with Copper

Description: Verifies the instrument's ability to compensate for Background absorption.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.010	0.0013	Passed

8.5 AA-BG Baseline Noise with Copper

Description: Ensures that background correction does not produce excessive noise.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.005	0.0004	Passed

8.6 AA-BG Baseline Noise with Arsenic

Description: Ensures that background correction does not produce excessive noise at a low wavelength.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.005	0.0001	Passed

8.7 Flame Sensitivity

Description: Instrument Sensitivity checked against Copper standard.

Standard Copper Sensitivity	Specification	Results (Abs.)	Pass/Fail
5 mg/L Sensitivity SS Neb (if applicable)	> 0.250 Abs.	N/A	Passed
2 mg/L Sensitivity HS Neb (if applicable)	> 0.250 Abs.	0.2987	Passed

Review:

- ☒ Review with the customer PM work performed.
- ☒ Review with the customer routine maintenance procedures.
- ☒ Discuss recommended customer supplied materials to have on hand.
- ☒ Attach PM sticker.

Additional Comments

Additional Comments Regarding the PM

Review

The preventive maintenance checks and if applicable performance tests for PinAAcle 900F have been completed.	
This PinAAcle 900F Passes <input checked="" type="checkbox"/> Fails <input type="checkbox"/> the preventive maintenance.	
Review of Preventive Maintenance:	
Authorized PerkinElmer Representative:	Date: 4 APR 2025 (DD-MMM-YYYY)
Authorized Customer Representative:	Date: 4 APR 2025 (DD-MMM-YYYY)

Rasit

Introduction

Agilent CrossLab Start Up Services Agilent 7890 Gas Chromatograph Preventive Maintenance Checklist

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures.
- Any parts not included in the Parts Lists section of this document, are not part of the recommended Preventive Maintenance service, nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Important Customer Web Links

- For more information about **Agilent Technologies services**, please visit our website using the following URL: <http://www.agilent.com/en-us/products/crosslab-instrument-services/service-repair>
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit <https://community.agilent.com/welcome>.
- To access **Agilent University**, visit <http://www.agilent.com/crosslab/university/> to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- A useful **Agilent Resource Center** web page is available, which includes short videos on maintenance, quick lists of consumables for new instruments, and other valuable information. Check out the **Resource Page** here: <https://www.agilent.com/en-us/agilentresources>.
- Need technical support, FAQs, supplies? – visit our **Support Home page** <http://www.agilent.com/search/support>.
- Videos about specific preparation requirements for your instrument can be found by searching the **Agilent YouTube channel** at <https://www.youtube.com/user/agilent>.
- **7890B Manuals** are also available on Agilent.com:
 - **Safety** https://www.agilent.com/cs/library/usermanuals/public/7890B_Safety.pdf
 - **Installation and First Startup** https://www.agilent.com/cs/library/usermanuals/Public/7890B_Installation.pdf
 - **Operation Manual** https://www.agilent.com/cs/library/usermanuals/Public/7890B_Operation.pdf
 - **Maintaining Your GC** https://www.agilent.com/cs/library/usermanuals/public/G3430-90352%207890B_Maintaining%20Guide.pdf

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results.

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides everything you need to reduce unplanned downtime and keep your systems operating at their peak. This checklist will be completed at the end of the service and provided to you as a record of the preventive maintenance activities.

Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using either a "X" or tick mark "✓".
- Check "Section not applicable" check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance service in the order of the tasks listed.
- Complete the Service Review section together with the customer.
- Complete the fields for page numbers at the foot of each selected page.
- Complete the total number of pages field in the Service Completion section.
- Ask the customer to sign the Service Completion section including the customer's and your signature.

Additional Instruction Notes

- Check for any active service notes for this unit. If there are any applicable "Safety" or "Modification Recommended" Service notes, plan to implement the changes on this unit before doing any qualification service.
- Do not implement firmware updates, unless you get approval from the customer and are sure that they are compatible with the instrument control software.

System Information

- ☐ Check this box if an instrument configuration report is attached instead of completing the table below.

Instrument System Name and ID	7890B /
Instrument System Site and Location	INST Room B305

List System Component	Product Numbers	List the Serial Numbers of each Component
1.	G3440 B	CN16403029
2.	G4513 A	RO23275085
3.	G4514 A	CN16140018
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Preparation

- ☒ Discuss any specific issues with the customer before starting.
- ☒ Review the instrument logbook for recorded problems and comments.
- ☒ Save instrument control settings before starting the procedure.
- ☒ Perform a general inspection of the system for cleanliness.
- ☒ Check for proper installation of parts, assemblies, sensors etc.
- ☒ Check system for required installation of components, settings as defined by current Service Notes.
- ☒ Check for required firmware updates and verify with customers if they would like them installed.
- ☒ Before starting the following procedures, record the Detector Signal Output(s) in the results table. If the GC is turned OFF or in a service mode, comparing the detector outputs before and after the service is not possible.

Preventive Maintenance Procedure

Clean and inspect GC

- ☒ Unplug power cord from the power source.
- ☒ Open GC covers and vacuum/remove any dust/debris. Pay particular attention to cooling fans.
- ☒ Inspect internal connectors for proper contact and placement.
- ☒ Reconnect Power to the GC. Power the GC on and verify the power on self-test passed.
- ☒ Verify oven motor spins freely and turns on with the oven door closed; off when the door is opened.
- ☐ Verify operation of all other fans - the inlet and EPC cooling fans.
- ☐ Verify oven intake/outlet flap assembly is operating smoothly while heating and cooling the oven

Inlet and detector consumable replacement

- ☒ For the inlets installed, perform inlet maintenance as defined in the 7890 manual - "Maintaining Your GC" - for the inlet(s) installed.
- ☒ Replace the split vent trap cartridge filter on units with these inlets: Split/Spillless Capillary (SSL), Multi-Mode Inlet (MMI), Programmed Temperature Vaporizer (PTV), Volatiles Interface (VI).
- ☒ If the inlet system is used in Split Mode with viscous samples, inspect and clean the split vent tube on the inlet and flush or replace the tubing between the inlet and the split vent trap.
- ☒ If the GC includes a Flame Ionization Detector (FID), replace the jet. If the ignitor shows any buildup of sample or corrosion, replace the ignitor. Examine the FID collector and castle assemblies for contamination - clean as necessary.

Zero Sensors and Leak test

- ☒ Zero all pressure sensors per the procedure in the 7890 "Advanced User Guide".
 - ☒ Perform inlet pressure decay test(s) as defined in the 7890 "Troubleshooting Manual".
- PM is done in preparation for an Operational Qualification, then the pressure decay test defined that protocol can be used for the PM.
- If test passed or failed in the results table.

ALS Maintenance

- ☐ Section NOT applicable
- ☒ Check all cabling and configuration settings between GC, tray, and injectors.
- ☒ Vacuum or remove any dust, especially around fans.
- ☒ Check operation of all fans.
- ☒ Check syringe for smooth plunger operation.
- ☒ Check for smooth operation of the needle support - clean if necessary

Restore Instrument

- ☒ Restore the normal operating conditions or customer method using the Data System.
- ☒ Purge the system with carrier flow for 15 minutes
- ☒ Bake out the system, then restore the normal operating conditions
- ☒ After equilibration, check and record the post PM detector signal output values. Results should be similar or lower than the detector outputs recorded prior to PM.
- ☒ Perform a chemical checkout. If this is a routine PM, inject the customer's sample using the ALS if applicable. This will act as a final checkout of both the ALS and the GC.

Note: If the PM Service is performed prior to a qualification service, then: use the qualification procedure as a guide for final instrument set up and checkout.

Signature Page

Service Review

- ☐ Attach available reports/printsouts of all tests to this documentation.
- ☐ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☐ Update/reset instrument maintenance counters as appropriate.
- ☐ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☐ Complete the Service Engineer Comments section if there are additional comments.
- ☐ Review with the customer this service, parts replaced, and test results obtained.
- ☐ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box or if necessary, in the customer's IQ records.
- ☐ Supply the customer with a copy of the Smart Alerts flyer.
- ☐ Describe Smart Alerts to the customer.
- ☐ Install Smart Alerts if requested.

7890 GC Test Results Table

Detector/Signal Outputs	Before PM Service	After PM Service
Front detector output	NA	18.4
Back detector output	NA	NA
AUX detector output	NA	NA
Decay test	Expected test result	Actual test result
pressure decay test	Pass	Pass
pressure decay test	Pass	NA

7890 Parts List Table

The following kits are recommended for capillary and purged packed inlets. If this is a general PM and the customer has a preferred set of consumables, you may use the customer's consumables.

Part description	Part number	Product or model# where used	Quantity consumed
SSL Capillary Inlet PM kit, Splitless	5188-6497	7890A/B	NA
SSL Capillary Inlet PM kit, split	5188-6496	7890A/B	1
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	7890A/B	NA
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	7890A/B	NA
SSL Capillary Ultra Inert Inlet Low Pressure Drop Split Liner - with Glass Wool	5190-2295	7890A/B	NA
PP Inlet PM kit	5188-6498	7890A/B	NA
Split vent trap PM kit, single cartridge (for MMI, PTV & V)	5188-6495	7890A/B	NA
MMI Cleaning Kit	G3510-60820	7890A/B	NA
PTV Septumless Head Rebuild Kit	5182-9747	7890A/B	NA
PTV Septumless Head Teflon Guide	5182-9748	7890A/B	NA
Ignitor (glow plug) assembly with O-ring	19231-60680	7890A/B	1
FID Collector Rebuild/Cleaning Kit	G1531-67000	7890A/B	NA
Standard .011-inch FID Jet for capillary FID base	G1531-80560	7890A/B	NA
High Temperature .18-inch FID Jet for capillary FID base	G1531-80620	7890A/B	NA
Standard .018-inch FID Jet for packed column with packed FID base	18710-20119	7890A/B	NA
Standard .071-inch FID Jet for capillary column with packed/adaptable FID base	19244-80620 5206-6136	7890A/B	1
High Temperature .018-inch FID Jet for capillary column with packed/adaptable FID base	19244-80620	7890A/B	NA
NPD Jet, universal .011-inch ID	G1534-80580	7890A/B	NA
NPD Jet, universal .011-inch ID Extended tip	G1534-80590	7890A/B	NA
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	7890A/B	NA
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	7890A/B	NA
**FID Collector Replacement Kit, if needed	G1531-67001	7890A/B	NA

Agilent 7890 GC Preventive Maintenance Checklist

Service Engineer Comments

If there are any specific points you wish to note as part of performing the service or other items of interest for the customer, please write include them in this box.

Service Completion

Service request number 6007650451 Date service completed 4 Jun 2025
Signature Chawarikul P. Customer signature [Signature]
Number of pages in this document 9

01, Issued: September 15, 2021
Document Number: D0013618
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