

ภาคผนวก ค-2
เอกสารสอบเทียบเครื่องมือตรวจวัด



RECALIBRATION
DUE DATE:
February 9, 2025

Certificate of Calibration

Calibration Certification Information			
Cal. Date: February 9, 2024	Rootsmeier S/N: 438320	Ta: 295	°K
Operator: Jim Tisch		Pa: 749.0	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: 5411		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3950	3.2	2.00
2	3	4	1	0.9840	6.4	4.00
3	5	6	1	0.8790	7.9	5.00
4	7	8	1	0.8430	8.8	5.50
5	9	10	1	0.6940	12.7	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 (x-axis)
0.9914	0.7106	1.4111	0.9957
0.9871	1.0032	1.9956	0.9915
0.9851	1.1207	2.2312	0.9895
0.9839	1.1672	2.3401	0.9883
0.9787	1.4103	2.8222	0.9830
QSTD	m= 2.02024 b= -0.02667 r= 0.99993	QA	m= 1.26504 b= -0.01677 r= 0.99993

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= $1/m \left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} - b \right)$	Qa= $1/m \left(\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)} - b \right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH:	calibrator manometer reading (in H2O)
ΔP:	rootsmeier 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	

Environmental, Inc.
South Miami Avenue
Cleveland, OH 44115

www.tisch-env.com
TOLL FREE: (877)263-7610
FAX: (513)467-9009



Certificate of Calibration

Certificate No. : 67-200034-1 Page : 1 of 2

Submitted by :
Envilab Co.,Ltd.
540, 540/1 Soi Bangkhlae 7, Bangkhlae, Bangkok 10160Equipment :
Electronic Balance
Manufacturer : Sartorius Model : SECURA224-1S
Serial No. : 0034803270 ID No. : ELABBALANCEN04
Capacity : 220 g Resolution : 0.0001 gEnvironment :
On site calibration was carried out at the Balance Room, Envilab Co., Ltd.
Ambient Temperature : (22.8 to 23.6) °C
Relative Humidity : (44.6 to 45.3) %
Air Pressure : 1014.0 mbarDate of Received : 01 February 2024
Date of Calibration : 01 February 2024
Date of Issue : 06 February 2024
Calibrated by : Akaradath ThippichaiCalibration 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

ID No.	Cert. No.	Due Date	Traceability
E261-E2624	C02232088	08 Nov 2024	National Institute of Metrology (Thailand), (NIMT)

Approved by :



(Surachai Promthong)
Laboratory Manager
Envilab Co.,Ltd. ผู้ดูแลระบบการสอบเทียบ
รับรองว่าผลการสอบเทียบถูกต้อง

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. : 67-200034-1 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 ± (g)
0.01	0.0001	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
-0.0001	-0.0001	-0.0001	0.0001	0.0000

g

Repeatability Load test : 200 g

Sidev. : 0.00005 g

-o0o-



CAL

Calibratech Co., Ltd.

7/106-7 Moo 2, Sukhaphrachasam 3 Rd., Bangpoed, 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. : 67-410025-1

Submitted by : EnviLab Co., Ltd.

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

Equipment :

Digital Thermo-Hygrometer

Manufacturer : Jedto

Model : HTC-1

Range Temperature : N/A °C

Resolution : 0.1 °C

Range Humidity : N/A %R.H.

Resolution : 1 %R.H.

Serial No. : PONPE5852094

ID No. : ELABTMHTC10003

Environment :

Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Date of Received : 20 February 2024

Date of Calibration : 22 February 2024

Date of Issue : 22 February 2024

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 & 400035

05 Jul 2024

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

Approved by :



(Surachai Promthong)

Laboratory Manager



The Uncertainties are for a confidence probability of approximately 95%

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EnviLab Co., Ltd. ผู้จัดการฝ่ายควบคุมคุณภาพ



CAL

Calibratech Co., Ltd.

7/106-7 Moo 2, Sukhaphrachasam 3 Rd., Bangpoed, 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. : 67-410025-1

UUC Condition As-Received : Good

Result of Calibration : Without Adjustment

Function :

Temperature measurement

Reference Humidity @ 50 %R.H.

Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
24.98	25.0	0.0	0.46

Result of Calibration : Without Adjustment

Function :

Humidity measurement

Reference Temperature @ 25 °C

Standard Humidity (%R.H.)	UUC Reading (%R.H.)	Correction (%R.H.)	Uncertainty (± %R.H.)
50.03	50	0	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%

- o0o -




EnviLab Co., Ltd. ผู้จัดการฝ่ายควบคุมคุณภาพ





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 6 April, 2024 Certification No. 172/24

Page : 1 of 6

Object : เครื่องมือตรวจวัดอุตุนิยมวิทยา

Manufacturer : NovaLynx

Type : Data Logger 110-WS-25DL-D

Serial No. : EWSNV110WS2503

Customer : ENVILAB Co.,Ltd.

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

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1009.2 hPa

NATIONAL STANDARD WIND TUNNEL

: Wind Aloft Plotting Board

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

N.I.S.T. Test Reference Number 7317241460 : 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.02849057

STANDARD BAROMETER : Digital Barometer Vaisala Type PTB220 No.10220046

Calibrated by : Netthapong Signed : Mr. Paod Promsut

Mr. Watchapol Subwat

Mechanical Engineer

Authorized Signatory
for the Chief

Sub-Standard Instrument

EnviLab Co.Ltd. ผู้ให้บริการฝ่ายควบคุมคุณภาพ

Netthapong

ผู้ให้บริการฝ่ายควบคุมคุณภาพ

EnviLab Co.Ltd. ผู้ให้บริการฝ่ายควบคุมคุณภาพ



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

The Result of Calibration

Sensor model EWSNV110WS2503 Certification No. 172/24

6 April, 2024 Page : 2 of 6

Standard Ultrasonic Anemometer m/sec	HOOK GAGE NO. 1425		TESTED ANEMOMETER	
	Pressure Inches H2O	Vacuum Inches H2O	Velocity m/sec	Correction m/sec
1.00	-	-	0.3	0.70
3.02	-	-	2.4	0.62
5.00	-	-	4.9	0.10
7.04	-	-	6.9	0.14
9.02	-	-	8.8	0.22
11.01	-	-	10.9	0.11
13.01	-	-	12.8	0.21
15.01	-	-	15.1	-0.09
17.02	-	-	16.8	0.22
20.02	-	-	20.1	-0.08

Wind Aloft Plotting Board.

US. DEPARTMENT OF COMMERCE WEATHER BUREAU

WIND DIRECTION	TESTED WIND DIRECTION
0	0
90	91
180	179
270	

Calibrated by : Netthapong

Mr. Watchapol Subwat

Mechanical Engineer

Calibration & Test Section

Meteorological Instruments Bureau

EnviLab Co.Ltd. ผู้ให้บริการฝ่ายควบคุมคุณภาพ

Netthapong

ผู้ให้บริการฝ่ายควบคุมคุณภาพ

EnviLab Co.Ltd. ผู้ให้บริการฝ่ายควบคุมคุณภาพ



THAI METEOROLOGICAL DEPARTMENT

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



THAI METEOROLOGICAL DEPARTMENT

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

The Result of Calibration

Sensor model EWSNV110WS2503

Certification No. 172/24

6 April, 2024

Page : 3 of 6

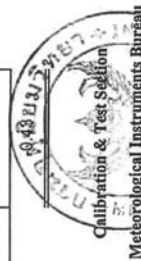
Standard Barometer Pressure	Tested Barometer Pressure	Correction
1009.59	1010.02	-0.43
1009.45	1009.95	-0.50
1010.10	1010.53	-0.43
1010.94	1011.36	-0.42
1011.46	1011.85	-0.39
1011.84	1012.34	-0.50
1012.06	1012.47	-0.41
1013.04	1013.48	-0.44
1013.18	1013.56	-0.38
1012.89	1013.27	-0.38
1013.20	1013.61	-0.41
1013.44	1013.85	-0.41
1013.81	1014.21	-0.40
1014.19	1014.68	-0.49
1015.96	1016.32	-0.36
1016.23	1016.65	-0.42
1015.64	1016.03	-0.39
1015.23	1015.68	-0.45
1012.87	1013.31	-0.44
1013.63	1014.10	-0.47
Average		

Average

Calibrated by : *Watchapol*

Mr. Watchapol Subwat

Mechanical Engineer



รับรองสำเนาถูกต้อง
ผู้จัดการฝ่ายควบคุมคุณภาพ
Envisab Co., Ltd.

The Result of Calibration

Sensor model

EWSNV110WS2503

Certification No. 172/24

6 April, 2024

Page : 4 of 6

Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.6	46.0	-0.4
30.1	30.3	-0.2
15.4	15.7	-0.3

Calibrated by : *Watchapol*

Mr. Watchapol Subwat

Mechanical Engineer



รับรองสำเนาถูกต้อง
ผู้จัดการฝ่ายควบคุมคุณภาพ
Envisab Co., Ltd.



THAI METEOROLOGICAL DEPARTMENT

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



The Result of Calibration

6 April, 2024
Sensor model EWSNV110WS2503
Certification No. 172/24
Page : 5 of 6

Date of Issue 6 April, 2024

Certification No. 172/24

Page: 6 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
85.2	91.5	-6.3
62.4	67.7	-5.3
41.5	46.2	-4.7

ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ซีพียู Davis Instruments แบบ TIPPING
BUCKET Product No. #7852 Mfg. Code. EWSNV110WS2503 ทำการสอบเทียบกับแก้ววัดฝน
แบบแก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No.
71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm./TIP)

Calibrated by : *Wattapol*
Mr. Watchapol Subwat
Mechanical Engineer



ลงชื่อ.....
(นายวัชรพล ทวีพัฒน์)

วิศวกรชำนาญการ



Wattapol
รับรองสำเนาถูกต้อง
ผู้จัดการฝ่ายควบคุมคุณภาพ



Wattapol
รับรองสำเนาถูกต้อง
ผู้จัดการฝ่ายควบคุมคุณภาพ



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0391

MTC No. EEL, BP, 30/0467

CALIBRATION CERTIFICATE

Submitted by : EnviLab Co., Ltd.

Address : 540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkok 10160.

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

Instrument Calibrated :

Description : Sound Level Calibrator : (23 ± 3) °C
Manufacturer : Brüel & Kjær : (50 ± 15) %
Model : 4230 : Ambient Pressure : (101.325 ± 1.500) kPa
Serial No. : 1351075

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

2. Measuring Amplifier Brüel&Kjær 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 Keithley 2015-P S/N4106495.

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

Calibration Procedure: CP-102-04 based on IEC 60942-2003; The sound pressure level generated by sound calibrator under test shall be 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 : 9 Apr. 2024

Date of Calibration : 10 Apr. 2024

1/2

The results relate only to the items tested/calibrated or value assigned.

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

Head Office

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Changwat Pathumthani 12120, Thailand
Tel. (66) 0 2577 9036
x. (66) 0 2577 9009

Office/Laboratory

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Changwat Samutprakarn 10280, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5220, 5217
(66) 08 3219 9440
E-mail : mtc@tistr.or.th Website : www.tistr.or.th

Office

196 Phahonyothin Road, Lady's Palace,
Bangkok 10900, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5220, 5217
EnviLab Co., Ltd. 55568271-1 บัณฑิตวิศวกรรม

FM.BLMTC.002 Rev.5



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0391

MTC No. EEL, BP, 30/0467

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 20µPa at 1000 Hz

Acoustic Output in dB re 20µPa, 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
1/2 inch Brüel&Kjær 4180	93.72	-0.28	± 0.10	IEC60942:2003 Class 1 ±0.40 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit
1/2 inch Brüel&Kjær 4180	994.9	-5.1	± 1.5	IEC60942:2003 Class 1 ±1.0%

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit
1/2 inch Brüel&Kjær 4180	1.25	± 0.50	IEC60942:2003 Class 1 ±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 :



Electrical and Electronic Standards Laboratory
Industrial Metrology and Testing Service Centre

Date of Calibration : 10 Apr. 2024

Date of Issue : 11 Apr. 2024

End of Certificate

Ref : 2011267040901374001

2 / 2

The results relate only to the items tested/calibrated or value assigned.

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(66) 08 3219 9440
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Bangkok 10900, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5220, 5217
EnviLab Co., Ltd. 55568271-1 บัณฑิตวิศวกรรม

FM.BLMTC.002 Rev.5



บริษัท เอ็นวิเลบ จำกัด 50/506/1 ซอยบางนา 7 แขวงบางนา เขตบางนา กรุงเทพมหานคร 10150
EnviLab Co., Ltd. 50/506/1 Soi Bangna 7 Bangnahe Bangkok 10150
Tel : 02-602-3577-8 Fax : 02-602-3577-3 E-mail : info@envilab.com



EnviLab Co., Ltd. 50/506/1 Soi Bangna 7 Bangnahe Bangkok 10150
Tel : 02-602-3577-8 Fax : 02-602-3577-3 E-mail : info@envilab.com

TSP High Volume Sampler Calibration

Verification Report No.
SO2400034-E006 -TSP 01

☐ PM ☒ Onsite
Site: ไร่จันทน์
UTM: 48Q N 251645 E 1777869
Sampler: ETSP#30
Recorder: 0
Date: 1 Jun 24
Technical: Terapol M.
Approval: Visan R.

CONDITIONS

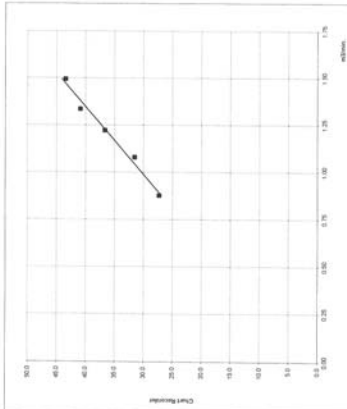
Barometric Press. (hPa): 755.0
Corrected Pressure (mm Hg): 566.3
Temperature (deg C): 33.0
Temperature (deg K): 306.0
Average Press. (hPa): 1013.0
Corrected Avg Press. (mm Hg): 759.8
Average Temp. (deg C): 30.0
Average Temp. (deg K): 303.0

CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc
Model: TE-5025A
Serial#: 5411
Orifice Slope: 2.02024
Orifice Intercept: -0.02667
Date Certified: 9 Feb 2024
Due Date: 9 Feb 2025

CALIBRATIONS

Plate or Test #	H ₂ O (m)	Q _{std} (m ³ /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
1	12.33	1.494	51.0	43.44	Slope = 27.6236
2	9.83	1.335	48.0	40.89	Intercept = 2.5211
3	8.20	1.221	43.0	36.63	Corr. coeff = 0.9911
4	6.40	1.080	37.0	31.52	
5	4.20	0.877	32.0	27.26	
# of Observations: 5					
Range of Chart at 1.1 - 1.7 m ³ /min					39 58



Calibrated by: (Terapol Maneenate)
1 June 2024

Approved by: (Visan Ritthikamon)
1 June 2024

www.evtesting.com

This report shall not be reproduced except in full, without the written approval of EnviLab Co., Ltd.
Environmental responsibility with accuracy measurements

14 MAY 24 14:00:00 (GMT+7)



ผู้จัดการฝ่ายควบคุมคุณภาพ



บริษัท เอ็นวิเลบ จำกัด 50/506/1 ซอยบางนา 7 แขวงบางนา เขตบางนา กรุงเทพมหานคร 10150
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EnviLab Co., Ltd. 50/506/1 Soi Bangna 7 Bangnahe Bangkok 10150
Tel : 02-602-3577-8 Fax : 02-602-3577-3 E-mail : info@envilab.com

PM10 High Volume Sampler Calibration

Verification Report No.
SO2400034-E006 -PM 01

☐ PM ☒ Onsite
Site: ไร่จันทน์
UTM: 48Q N 251645 E 1777869
Sampler: EPW10#11
Recorder: 0
Date: 1 Jun 24
Technical: Terapol M.
Approval: Visan R.

CONDITIONS

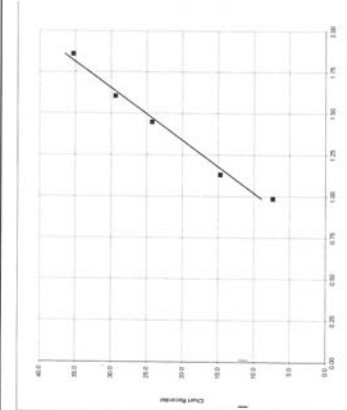
Barometric Press. (hPa): 755.0
Corrected Pressure (mm Hg): 566.3
Temperature (deg C): 33.0
Temperature (deg K): 306.0
Average Press. (hPa): 1013.0
Corrected Avg Press. (mm Hg): 759.8
Average Temp. (deg C): 30.0
Average Temp. (deg K): 303.0

CALIBRATION ORIFICE

Brand: Tisch Environmental, Inc
Model: TE-5025A
Serial#: 5411
Orifice Slope: 1.2654
Orifice Intercept: -0.01667
Date Certified: 9 Feb 2024
Due Date: 9 Feb 2025

CALIBRATIONS

Plate or Test #	H ₂ O (m)	Q _{std} (m ³ /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
1	10.10	1.859	48.0	35.28	Slope = 31.5530
2	7.50	1.604	40.0	29.40	Intercept = -22.1458
3	6.10	1.448	33.0	24.26	Corr. coeff = 0.9932
4	3.70	1.131	20.0	14.70	SFR = 1.531
5	2.80	0.985	10.0	7.35	SSP = 35.60
# of Observations: 5					
Range of Chart at SFR ±10%					32 39



Calibrated by: (Terapol Maneenate)
1 June 2024

Approved by: (Visan Ritthikamon)
1 June 2024

www.evtesting.com

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Environmental responsibility with accuracy measurements

14 MAY 24 14:00:00 (GMT+7)



ผู้จัดการฝ่ายควบคุมคุณภาพ



บริษัท เอ็นวีแล็บ จำกัด 540/540/1 ซอยบางนา 7 แขวงบางนา เขตบางนา กรุงเทพมหานคร 10160
Envilab Co., Ltd. 540/540/1 Soi Bangkhoe 7 Bangkhoe Bangkok 10160
Tel : 02-802-35771-8 Fax: 02-802-3773 E-mail : info@evltesting.com



Envilab & Envilab Supply Instrument

Verification Test Report

Report No.:

SO2400034-E006 -SLM 02

☐ PM ☒ Onsite UTM : 48Q N 251011 E 1777709

Calibrated Date: 5 June 2024

Site : ภายในสำนักงาน

Equipment: Sound Level Meter

Manufacturer: PULSAR

Model: 45

Serial : 0016

Environment: Temperature 33 °C Humidity 72 %RH

Reference Standard: Acoustic Calibrator Class 1 Model 4230, Bruel&Kjaer

Serial No.1351075

Date of Calibration : 10 Apr 2024

Due Date : 10 Apr 2025

Result of Test

Reference Standard (dB)	Instrument reading (dB)	Error (dB)	Adjust (dB)
93.72	94.10	0.38	93.72

Calibrated By:

(Terapol Maneenate)

Date:

5 June 2024

Approve By:

(Wisan Ritthikamon)

Date:

5 June 2024

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Envilab Co., Ltd.

Environmental responsibility with accuracy measurement

FE-MNT-01-22 Rev.01

วันที่พิมพ์ 01/02/2566



บริษัท เอ็นวีแล็บ จำกัด 540/540/1 ซอยบางนา 7 แขวงบางนา เขตบางนา กรุงเทพมหานคร 10160
Envilab Co., Ltd. 540/540/1 Soi Bangkhoe 7 Bangkhoe Bangkok 10160
Tel : 02-802-35771-8 Fax: 02-802-3773 E-mail : info@evltesting.com



Envilab & Envilab Supply Instrument

Verification Test Report

Report No.:

SO2400034-E006 -SLM 01

☐ PM ☒ Onsite UTM : 48Q N 251628 E 1777862

Calibrated Date: 5 June 2024

Site : โรงเรือนปรับอากาศ

Equipment: Sound Level Meter

Manufacturer: PULSAR

Model: 45

Serial : 0013

Environment: Temperature 33 °C Humidity 72 %RH

Reference Standard: Acoustic Calibrator Class 1 Model 4230, Bruel&Kjaer

Serial No.1351075

Date of Calibration : 10 Apr 2024

Due Date : 10 Apr 2025

Result of Test

Reference Standard (dB)	Instrument reading (dB)	Error (dB)	Adjust (dB)
93.72	94.20	0.48	93.72

Calibrated By:

(Terapol Maneenate)

Date:

5 June 2024

Approve By:

(Wisan Ritthikamon)

Date:

5 June 2024

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Envilab Co., Ltd.

Environmental responsibility with accuracy measurement

FE-MNT-01-22 Rev.01

วันที่พิมพ์ 01/02/2566

SO2 Analyzer Verification Test Report

Calibration Report No.: ES-S6706001
Calibrated Date: 1-Jun-24

☒ PM ☐ Onsite

Instruments Information

Analyzer Type: SO2 Analyzer Model: AF22e	Manufacturer: Environnement SA, France S/N: ESOESAF22E2485
---	---

Calibration System

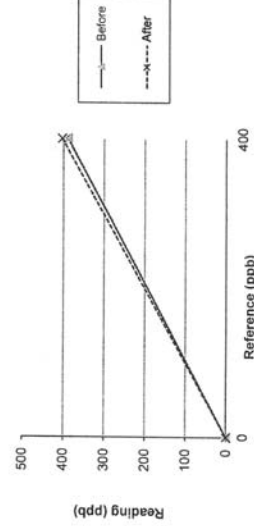
Calibrator Unit		Standard Gas	
Dilutor Model: ESA MGC101 S/N: 792	NOx Conc: 46.50 PPM	NO Conc: 46.50 PPM	PPM
ZERO AIR Generator ZAG7001 S/N: 644	SO2 Conc: 45.59 PPM	CO Conc: 4507 PPM	PPM
Expire Date: Mar 31, 2026 EB0160267			

Environment: Temperature 27.3 °C Humidity: 63 %RH

Calibration Report

Status	Zero		Span	
	Reference (ppb)	Reading (ppb)	Reference (ppb)	Drift%
Before	0.0	0.5	400.0	-1.4
After	0.0	0.3	403.0	0.4

Single Point Calibration Chart



SO2 Analyzer Verification Test Report

Calibration Report No.: ES-S6706001
Calibrated Date: 1-Jun-24

☒ PM ☐ Onsite

Page: 2/2

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

Calibrate By: *Sirirak Poonlak*

Date: 1-Jun-24

Approve By: *Sarawat Kowarinnal*

Date: 1-Jun-24

NOx Analyzer Verification Test Report

Calibration Report No.: AP-N6706001
Calibrated Date: 1-Jun-24
Page:1/1

☒ PM ☐ Onsite

Instruments Information

Analyzer Type: NO/NO2/NOx Analyzer	Manufacturer API
Model: T200	S/N: ENOAIT20003573

Calibration System

Calibrator Unit	Standard Gas
Dilutor Model ESA MGC101 S/N: 792	NOx Conc 48.50 PPM
ZERO AIR Generator ZAG7001 S/N: 644	NO Conc 46.50 PPM
	SO2 Conc 45.59 PPM
	CO Conc 4507 PPM
	Expire Date: Mar 31, 2026 EB0160267

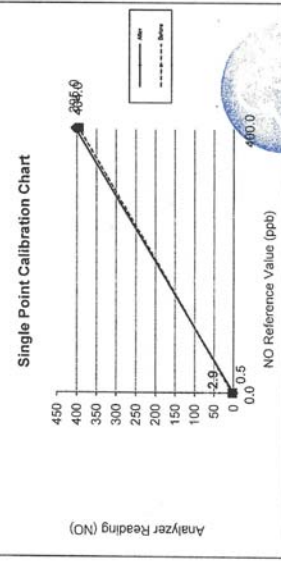
Environment: Temperature 26.0 °C Humidity: 62 %RH

Calibration Check (Before adjust)

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	2.4	0.0	2.4	393.5	400.0	-0.8
NO ₂	0.5	0.0	0.5	1.5	0.0	0.2
NOx	2.9	0.0	2.9	395.0	400.0	-0.6

Calibration Check (After adjust)

GAS	Zero			Span		
	Reading Value (ppb)	Expected Value (ppb)	Drift (ppb)	Reading Value (ppb)	Expected Value (ppb)	Drift%
NO	0.4	0.0	0.4	402.0	400.0	0.2
NO ₂	0.1	0.0	0.1	2.0	0.0	0.2
NOx	0.5	0.0	0.5	404.0	400.0	0.5



neediss บริษัท เน็ดิส ซัพพลาย อินสตรูเมนต์ จำกัด
Neediss Supply Instrument Co., Ltd.
333 หมู่ 7 ตำบลบ้านใหม่ อำเภอบางพลี จังหวัดสมุทรปราการ 10540
T: 02-30245292 F: 02-30245293 E: info@neediss.com

NOx Analyzer Verification Test Report

Calibration Report No.: AP-N6706001
Calibrated Date: 1-Jun-24
Page:1/1

☒ PM ☐ Onsite

Test Function Value	Normal range	Unit	Before	After	Note
Date	1-Jun-24				
Time	9:25				
Range	0.00 - 500.00 PPB	PPB	500	500	
Stability (Zero Gas)	< 0.2	PPB	0.5	0.2	
Sample Flow	500 +/- 50	cc/min	481	485	
Ozone Flow	60-80	cc/min	80	80	
PMT Detector	0-5000	mV	85.0	25.0	
AZERO	-20-150	mV	94.1	14.5	
HYPS	400-900 constant	V	734	734	
DCPS	2500 +/- 200	mV	-	-	
RCCELL TEMP	50 +/- 1	Degree C	50	50	
BOX TEMP	20-35	Degree C	34.7	33.6	
PMT TEMP	7 +/- 1	Degree C	7.0	7.0	
IZS TEMP	50 +/- 4	Degree C	-	-	
MOLY Temp	315 +/- 5	Degree C	314.0	314.0	
RCCEL PRES	4-10 constant	IN-Hg-A	5.0	5.0	
SAAMP PRES	20-30 constant	IN-Hg-A	28.8	27.9	
NO Slope	1 +/- 0.3		1.135	1.197	
NOx Slope	1 +/- 0.3		1.260	1.114	
NO Offset	-10 to + 150	mV	0.8	-3.6	
NOx Offset	-10 to + 150	mV	-2.6	6.1	

Span and Cal Values	NO	NOx
Zero Value	0	0
Span Value	400	400

Calibrate By: Sirirat Poonlark
Date: 1-Jun-24
Approve By: Sarawut Keawsumrit
Date: 1-Jun-24

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Neediss Supply Instrument Co., Ltd.



neediss บริษัท เน็ดิส ซัพพลาย อินสตรูเมนต์ จำกัด
Neediss Supply Instrument Co., Ltd.
333 หมู่ 7 ตำบลบ้านใหม่ อำเภอบางพลี จังหวัดสมุทรปราการ 10540
T: 02-30245292 F: 02-30245293 E: info@neediss.com

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CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaphrachuan 3 Rd., Banggood, 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. : 67-420034-1

Submitted by :

Envilab Co., Ltd.

540,540/1 Soi Bangkhiae7, Bangkhiae, Bangkok 10160

Equipment :

pH Meter with electrode

pH meter

Manufacturer : Horiba

Model : F-74BW-G

Range : N/A pH

Resolution : 0.001 pH

Serial No. : B41J0001

ID No. : ELABPHHB74BW01

Electrode

Model : 9615S

Serial No. : 9X1K0003

Environment :

On site calibration was carried out at the Laboratory, Envilab Co., Ltd.

Ambient Temperature : (22.0 to 23.0)°C

Relative Humidity : (50 to 55) %

Date of Received : 20 March 2024

Date of Calibration : 20 March 2024

Date of Issue : 23 March 2024

Calibrated by : Permon Chanpu

Calibration Method : In-house method CAL-M4201 direct measurement by using standard voltage calibrator
and using certified reference material (CRM)

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

1. Multiproduct Calibrator

ID No.	Cert. No.	Due Date	Traceability
400005	SG-E-00307/66	23 Aug 2025	National Institute of Metrology Thailand (NIMT)

2. Standard Buffer Solution

pH	Cert. No.	Lot No.	Exp. Date	Traceability
4.008	61293328	944535	27 Nov 2025	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
6.986	61281486	944537	17 Nov 2024	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
9.997	61281073	944536	17 Nov 2024	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025

Approved by :

(Surachai Promthong)

Laboratory Manager



Envilab Co., Ltd.

The Uncertainties are for a confidence probability of approximately 95%

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CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaphrachuan 3 Rd., Banggood, 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. : 67-420034-1

Result of Calibration :

UUC Condition As-Received : Good

Function :

Electrical measurement

pH meter

Performing standard curve by Multiproduct Calibrator at pH (4,7,10)

Adjustment Curve at nominal pH	Applied Voltage (mV)	Nominal Value (pH)	UUC Reading		Correction (mV)	Uncertainty (± mV)
			(pH)	(mV)		
4, 7, 10	177.4800	4	3.998	177.5	0.0	0.12
	0.0000	7	7.000	0.0	0.0	0.086
	-177.4800	10	10.000	-177.4	-0.1	0.12

Function :

pH meter with electrode

Performing a three - buffer standard curve using buffer nominal pH (4,7,10)

Adjustment Curve at nominal pH	Standard Buffer (pH)	UUC Reading (pH)	Correction (pH)	Uncertainty (± pH)
4, 7, 10	4.008	4.009	-0.001	0.0084
	6.986	7.000	-0.014	0.0092
	9.997	10.008	-0.011	0.014

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%

- o/o -



Envilab Co., Ltd.



CAL

Calibratech Co., Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Banggood, 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. : 67-400167-1 **Page : 1 of 2**

Submitted by : Envilab Co., Ltd.

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

Equipment : Temperature Indicator with Thermistor Probe

Temperature Indicator

Manufacturer : Horiba

Model : F-74BW-G

Range : N/A °C

Resolution : 0.1 °C

Serial No. : B41J0001

ID No. : ELABPHHB74BW01

Thermistor probe

Model : 961SS

Diameter : 12 mm.

Serial No. : 9X1K0003

ID No. : ELABPHHB74BW01

On site calibration was carried out at the Laboratory, Green Earth Environment Co., Ltd.

Ambient Temperature : (22.0 to 23.0) °C

Relative Humidity : (50 to 55) %

Line Voltage : (220.0 to 223.0) VAC

Date of Received : 20 March 2024

Date of Calibration : 20 March 2024

Date of Issue : 23 March 2024

Calibrated by : Permpon Chanpu

Calibration Method : This instrument was calibrated by In-house method comparison technique CAL-M4003

by compared with PRT in the liquid bath at the constant controlled temperature.

The temperature scale used was based on ITS-90

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

1. Platinum Resistance Thermometer (PRT)

ID No. Cert. No. Due Date Traceability

400002 TT-0074-22 20 Jun 2024 National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No. Cert. No. Due Date Traceability

400003/400004 23E1866 01 Jun 2025 National Institute of Metrology Thailand (NIMT)

Approved by : 

(Surachai Promthong)

Laboratory Manager



รับรองสำนักงานมาตรฐาน

ผู้พิจารณา : 

Envilab Co., Ltd.

รับรองสำนักงานมาตรฐาน

ผู้พิจารณา : 

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

Certificate of Calibration

Certificate No. : 67-400167-1 **Page : 2 of 2**

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

Immersion Depth (mm.)	Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
130	25.002	25.0	0.0	0.19

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%

-o0o-





Envilab Co., Ltd.

รับรองสำนักงานมาตรฐาน

ผู้พิจารณา : 

Envilab Co., Ltd.

รับรองสำนักงานมาตรฐาน

ผู้พิจารณา : 

Envilab Co., Ltd.

รับรองสำนักงานมาตรฐาน



CALIBRATION CERTIFICATE



Certificate No. : S2024040558-0002

Date Issued : 03-May-24

Customer : EnviLab Co., Ltd.
540, 540/1 Soi Bangkhuae 7, Bangkhuae, Bangkok, Thailand
10160

Equipment : Lab Refrigerator (TMF-PLR221)

Manufacturer : Thermo Scientific
Model : PLR221
Serial No. : 2210M319042801
ID No./Tag No. : ELABREFRIGEN02
Date Received : 02-May-24
Date Calibrated : 02-May-24

Calibrated by : Mr. Varuch Jearrajinda

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.

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Approved by: *Saranyuth T.*
(Mr. Saranyuth Tochua)

Page 1 of 2



Certificate No. : S2024040558-0002

Environment : Ambient Temperature : Start record 26.6 °C, Stop record 26.8 °C

Relative Humidity : Start record 54.1 %RH, Stop record 54.5 %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	0.88	0.69	1.94

Without adjustment

Calibration Temperature (°C)	STD No. 1	STD No. 2	STD No. 3	STD No. 4	STD No. 5	STD No. 6	STD No. 7	STD No. 8	STD No. 9
4	4.23	4.35	4.44	4.46	4.35	4.24	4.34	3.96	4.13

Decision Rule with Guard Band

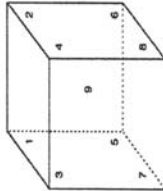
Calibration Temperature (°C)	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
4	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Pass = $|\text{error}| + |\text{uncertainty}| \leq |\text{MPE}|$

Fail = $|\text{error}| + |\text{uncertainty}| > |\text{MPE}|$

Note : Probe No. 9 is Reference Probe

Setting Air Fresh No. 0



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. L202403007-0012 for Digital Thermometer with Probe (Agilent) Module 1 (93) Serial No. MY41008700, Due 10-Sep-24

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





Certificate of Calibration

Page : 1 of 2

Certificate No. : 67-400166-1

Submitted by : EnviLab Co., Ltd.

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

Equipment :

Temperature controlled enclosure (Oven)

Manufacturer : Memmert

Range : N/A °C

Serial No. : B319,0600

Model : UF 75

Resolution : 0.1 °C

ID No. : ELABHAOVEN0600

Environment : On site calibration was carried out at the Laboratory, EnviLab Co., Ltd.

Ambient Temperature : (29.0 to 30.0) °C

Relative Humidity : (60 to 65) %

Line Voltage : (224.2 to 225.2) V

Date of Received : 20 March 2024

Date of Calibration : 20 March 2024

Date of Issue : 22 March 2024

Calibrated by : Kittisak Kokaco

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 Thermocouple probe

ID No.

400046 & 400028

Traceability

National Institute of Metrology Thailand (NIMT)

Due Date

05 Apr 2024

Approved by :

(Surachai Promthong)

Laboratory Manager



The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Page : 2 of 2

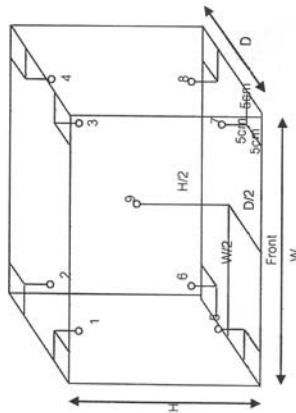
Certificate No. : 67-400166-1

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 = 0.40 m
D = 0.33 m
H = 0.56 m
Capacity = 0.07 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	
104.0	103.5	103.5	104.1	104.4	104.1	104.3	104.1	104.0	104.0	103.7	104.3	0.70
110.0	109.5	109.5	110.1	110.4	110.1	110.3	110.2	110.1	110.1	109.4	110.3	0.72
180.0	179.0	179.0	179.5	180.9	180.3	180.6	180.5	180.3	180.2	180.2	180.8	0.95

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
104.0	103.5	103.5	0.7	0.1	1.0
110.0	109.5	109.5	1.1	0.1	1.2
180.0	179.0	179.0	1.5	0.2	1.6

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%

-o0o-



EnviLab Co., Ltd.



CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Banggood, 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

Page : 1 of 2

Certificate No. : 67-400166-2

Submitted by : Envilab Co., Ltd.

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

Equipment :

Water Bath

Manufacturer : Memmert

Model : WNB 14

Range : N/A °C

Resolution : 0.1 °C

Serial No. : L412.2222

ID No. : ELABWBWNB29N01

Environment :

On site calibration was carried out at the Laboratory, Envilab Co., Ltd.

Ambient Temperature : (29.0 to 30.0) °C

Relative Humidity : (60 to 65) %

Line Voltage : (224.2 to 225.2)V

Date of Received : 20 March 2024

Date of Calibration : 20 March 2024

Date of Issue : 22 March 2024

Calibrated by : Kittisak Kokaeo

Calibration Method : This instrument was calibrated by In-house method CAL-M4006 based on ASTM E715-80

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. 400046 & 400024

Cert. No. 66-400547-2

Due Date 02 Apr 2024

Traceability

National Institute of Metrology Thailand (NIMT)

Approved by :

(Signature)

(Surachai Promthong)

Laboratory Manager



The Uncertainties are for a confidence probability of approximately 95%

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



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

Certificate of Calibration

Certificate No. : 67-400166-2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

Page : 2 of 2



Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @					Uncertainty (± °C)	Measured Uniformity (°C)	Measured Stability (°C)
			Sensor No.							
95.0	94.5	94.5	1	2	3	4	5	0.23	0.26	0.12
			95.12	95.18	95.11	95.02	95.17			

Remark The uncertainty is not combine uniformity of the water bath

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 -

(Signature)



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



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Calibratech Co.,Ltd.

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Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.comNSC-TSI-TS17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-200060-1

Page : 1 of 2

Submitted by :

EnviLab Co., Ltd.

540, 540/1 Soi Bangkhue7, Bangkhuae, Bangkok 10160

Equipment :

Electronic Balance

Manufacturer : Sartorius

Model : SECURA125-1S

Serial No. : 0034606552

ID No. : ELABBALANCEN05

Capacity : 120 g Resolution : 0.0001 g

Environment :

On site calibration was carried out at the B304 Balance Room, EnviLab Co., Ltd.

Ambient Temperature : (20.0 to 20.7) °C

Relative Humidity : (56.2 to 60.3) %

Air Pressure : 1013.0 mbar

Date of Received :

20 February 2024

Date of Calibration :

20 February 2024

Date of Issue :

21 February 2024

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

C02232088

08 Nov 2024

National Institute of Metrology (Thailand), (NIMT)

Approved by :

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 67-200060-1

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 ± (g)
0.1	0.0000	0.00011
0.5	0.0000	0.00011
1	0.0000	0.00011
2	0.0000	0.00011
5	0.0000	0.00011
10	0.0000	0.00011
20	0.0000	0.00013
50	0.0001	0.00014
100	0.0001	0.00020
120	0.0000	0.00038

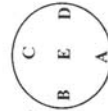
This result of calibration was found accurate as shown on date and place of calibration only.

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 : 20 g

A	B	C	D	E
0.0001	0.0001	0.0000	0.0000	0.0000



Repeatability

Load test : 100 g

Sidev. : 0.00004 g

-o0o-

EnviLab Co.,Ltd. ผู้ให้บริการมาตรฐาน



EnviLab Co.,Ltd. ผู้ให้บริการมาตรฐาน



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NSC-TISI-TIS17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-300293-9

Submitted by : EnviLab Co.,Ltd.

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

Page : 1 of 2

Equipment

: Cylinder

Manufacturer : Wieg

Class : A

Capacity : 50 ml

Graduation : 1 ml

ID No. : C-HM-001/24

Environment

: Ambient Temperature : (20 ± 3) °C

: Relative Humidity : (50 ± 10) %

: Air Pressure : 1006.0 mbar.

Date of Received : 15 May 2024

Date of Calibration : 20 May 2024

Date of Issue : 20 May 2024

Calibrated by : Areearat 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.

241002 66-200388-1

Due Date

02 Jun 2024

Traceability

National Institute of Metrology (Thailand) (NIMT)

Approved by :

(Wipa Toivalee)

Supervisor



The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 67-300293-9

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)
25	25.09
50	49.99

Uncertainty of measurement with in ± 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%

-o0o-



รับรองคุณภาพถูกต้อง
ผู้จัดการฝ่ายควบคุมคุณภาพ
EnviLab Co.,Ltd.



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Calibratech Co.,Ltd.

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NSC-TIS-71817025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-300147-5

Submitted by : Envilab Co.,Ltd.

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

Page : 1 of 2

Equipment

: Cylinder

Manufacturer : PYREX

Class : A

Capacity : 500 ml

Graduation : 5 ml

ID No. : C-WW-005/21

Environment

: Ambient Temperature : (20 ± 3) °C

: Relative Humidity : (50 ± 10) %

: Air Pressure : 1009.3 mbar.

Date of Received : 13 March 2024

Date of Calibration : 19 March 2024

Date of Issue : 19 March 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. : 241002

Cert. No. : 66-200388-1

Due Date : 02 Jun 2024

Traceability

National Institute of Metrology (Thailand) (NIMT)

Approved by :

(Wipa Torndee)

Supervisor



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Certificate of Calibration

Certificate No. : 67-300147-5

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Page : 2 of 2

Nominal Volume (ml)	Measuring Volume (ml)
250	250.57
500	500.25

Uncertainty of measurement with in ± 0.12 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-

Approved by :



Supervisor



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NSC-TIS-TIS17095
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-300147-4

Submitted by : EnviLab Co.,Ltd.

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

Page : 1 of 2

Equipment : Cylinder

Manufacturer : PYREX

Class : A

Capacity : 250 ml

Graduation : 2 ml

ID No. : C-WW-007/23

Environment : Ambient Temperature : (20 ± 3) °C

Relative Humidity : (50 ± 10) %

Air Pressure : 1009.4 mbar.

Date of Received : 13 March 2024

Date of Calibration : 19 March 2024

Date of Issue : 19 March 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

241002 66-200388-1 02 Jun 2024

National Institute of Metrology (Thailand) (NIMT)

Approved by :

(Wipa Toivadee)

Supervisor



EnviLab Co.,Ltd. ผู้ให้บริการมาตรฐาน



The Uncertainties are for a confidence probability of approximately 95%

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Calibratech Co.,Ltd.

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

Certificate of Calibration

Certificate No. : 67-300147-4

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)
150	150.31
250	250.38

Uncertainty of measurement with in ± 0.087 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%

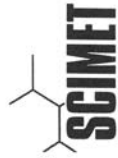
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Signature



EnviLab Co.,Ltd. ผู้ให้บริการมาตรฐาน





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



Certificate No. C27240001

Calibration Certificate

Equipment: DO METER
Model: HI9147
Serial No.(or ID): H00007030
Manufacturer: HANNA
Condition: In Condition
Job No.: KSM2400445
Received Date: 04 March 2024
Issued Date: 14 March 2024
Page: 1 of 2

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

Calibration Place
Environment Laboratory, SCIMET Co., Ltd.
1194 Soi Wachirathamsathit 57, Bangkok, Prakhonong, Bangkok 10260 Thailand

Calibration Date
14 March 2024
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.

The Method used
In-house method, W127, 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. 29E31, through Quality Reborn Co.,LTD certificate No.QR23-1169

Mr.Dumrong Boonsopon
Person in charge
SCIMET CO.,LTD.
บริษัท ชัยวัฒน์ จำกัด

Mr.Thalengkeat Pongthong
Authorized signatory.
รับรองสำเนาถูกต้อง
SCIMET CO.,LTD.
บริษัท ชัยวัฒน์ จำกัด

Calibration Results:

Electrode Serial No. KC3N05V1R
Model: HI76409
Brand: HANNA

Electrode Test

Atmospheric pressure measured while calibrating. 755.54 mmHg
Temperature measured while calibrating.(± 0.2 °C) 25.0 °C
The Oxygen Solubility was calculated from the ambient conditions. 8.21 \pm 0.03 mg/L
The Oxygen Solubility reading from the DO METER 8.23 mg/L

Sample Test

Standard Oxygen Solution	Unit Under Calibration Reading	Correction	Coverage Factor (k)	Uncertainty of Measurement (\pm)
0.00 mg/L	0.00 mg/L	0.000 mg/L	2.00	0.13 mg/L

Temperature Electrode

Dimension of Probe;
Length : 140 mm.
Diameter : 21 mm.
Immersion Depth 80 mm.

STD. Reading (°C)	UUC. Reading (°C)	Correction of UUC (°C)	Coverage Factor (k)	Uncertainty of Measurement (\pm °C)
25.01	25.0	0.01	2.00	0.15

The End of Certificate

บริษัท ชัยวัฒน์ จำกัด (SCIMET CO., LTD.)
1194 Soi Wachirathamsathit 57, Bangkok, Prakhonong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 095 552 4939

รับรองสำเนาถูกต้อง
ผู้ตรวจผ่านความถูกต้อง
Envilab Co.Ltd.



ใบตรวจสอบสภาพเครื่อง Do Meter

ชนิดเครื่องมือ: DO METER เลขที่ใบงาน: KSMT2400445
รุ่น: HI9147 หมายเลขเครื่อง: H00007030

ตรวจสอบ (รับ)		ตรวจสอบ (ส่ง)		หมายเหตุ
14 Mar 2024	14 Mar 2024	14 Mar 2024	14 Mar 2024	
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ข้อแนะนำ :

Mr.Dumrong Boonsopon
Service Engineer



บริษัท ขายน้ก จำกัด (SCIMET CO., LTD.)
1194 Soi Wachirathamsehit 57, Bangchak, Phrakhanong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 095 552 4939

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



NSC-TLS-TS17025
CALIBRATION 0030

Certificate of Calibration

Page : 1 of 2

Certificate No. : 67-200060-2

Submitted by : Envilab Co., Ltd.

540, 540/1 Soi Bangkhuae7, Bangkhuae, 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 : (20.0 to 20.5) °C

Relative Humidity : (54.2 to 59.1) %

Air Pressure : 1013.0 mbar

Date of Received : 20 February 2024

Date of Calibration : 20 February 2024

Date of Issue : 21 February 2024

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	C02232088	08 Nov 2024	National Institute of Metrology (Thailand), (NIMT)

Approved by :

(Surchai Promthong)
Laboratory Manager



The Uncertainties are for a confidence probability of approximately 95%

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CAL

Calibratech Co.,Ltd.

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

Certificate of Calibration

Certificate No. : 67-200060-2

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	0.000015
0.5	0.00001	0.000022
1	0.00000	0.000026
2	0.00001	0.000034
5	-0.00001	0.000043
10	0.00000	0.000053
50	0.00003	0.00011
100	0.0001	0.00020
150	0.0001	0.00038
200	0.0002	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
	0.00000	0.00000	0.00010	0.00000	0.00000

C

D

E

B

A

Repeatability	Load test : 200 g	
Stdev.	: 0.000032 g	

-o0o-



รับรองสำเนาถูกต้อง
EnviLab Co.,Ltd. ผู้ให้บริการมาตรฐานคุณภาพ



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



ISO 17025
CALIBRATION 0454

Certificate No. C07240032

Calibration Certificate

Equipment: SPECTROPHOTOMETER

Model: CARY 60UV-VIS
Serial No.(or ID): MY17490026 (ELABSPECTRO0002)
Manufacturer: Agilent
Condition: In Condition
Job No.: KSM72400444
Received Date: 04 March 2024
Issued Date: 04 March 2024
Page: 1 of 3

Customer

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

Calibration Place

EnviLab Co., Ltd.(B301 CO-THC ROOM)
540, 540/1 Soi Bangkhuae 7,Bangkhuae, Bangkok, Bangkok 10160

Calibration Date

04 March 2024

Environment Condition

Temperature: 22.3 °C \pm 0.6 °C
Humidity: 65.7 %RH \pm 0.5 %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 Siama Scientific Limited.

The standard for Wavelength Certificate No. 108691 and 108692

The standard for Photometric Certificate No. 109010 , 114655 and 109009

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. Thalerngkeat Pongngam)
Authorized signatory



EnviLab Co.,Ltd.
ผู้ให้บริการมาตรฐานคุณภาพ
ISO 17025
CALIBRATION 0454
FC07-433-30 MAY 2023



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)
219.73	220.0	-0.27	0.14
241.55	241.8	-0.25	0.16
287.56	287.6	-0.04	0.14
333.77	333.7	0.07	0.19
360.45	360.1	0.35	0.14
417.59	417.0	0.59	0.14
472.50	472.3	0.20	0.14
513.47	513.4	0.07	0.14
528.88	528.9	-0.02	0.14
537.18	537.1	0.08	0.14
641.58	642.3	-0.72	0.16
740.72	741.3	-0.58	0.14
748.55	749.1	-0.55	0.14
807.03	807.4	-0.37	0.14
879.28	879.0	0.28	0.14

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance (Abs)	Unit Under Calibration (Abs)	Correction (Abs)	Uncertainty of Measurement(± Abs)
235 nm	0.0000	0.0000	0.0000	0.0080
257 nm	0.7283	0.7273	0.0020	0.0080
313 nm	0.0000	-0.0003	0.0003	0.0080
350 nm	0.8487	0.8457	0.0040	0.0080
	0.0000	0.0004	-0.0004	0.0080
	0.2833	0.2810	0.0023	0.0080
	0.0000	0.0001	-0.0001	0.0080
	0.6299	0.6259	0.0040	0.0080



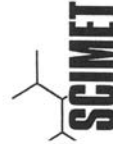
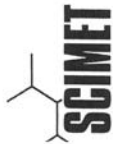
Calibration Results:
Without Adjustment

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance (Abs)	Unit Under Calibration (Abs)	Correction (Abs)	Uncertainty of Measurement(± Abs)
420 nm	0.0000	0.0000	0.0000	0.0045
	0.2373	0.2386	-0.0013	0.0045
	0.5617	0.5637	-0.0020	0.0045
	0.7392	0.7382	0.0010	0.0045
	1.0550	1.0542	0.0008	0.0045
440 nm	0.0000	0.0000	0.0000	0.0045
	0.2335	0.2354	-0.0019	0.0045
	0.5513	0.5539	-0.0026	0.0045
	0.7230	0.7222	0.0008	0.0045
	1.0324	1.0343	-0.0019	0.0045
465 nm	0.0000	0.0000	0.0000	0.0045
	0.2126	0.2143	-0.0017	0.0045
	0.5036	0.5059	-0.0023	0.0045
	0.6735	0.6729	0.0006	0.0045
	0.9615	0.9638	-0.0023	0.0045
546.1 nm	0.0000	0.0000	0.0000	0.0045
	0.2201	0.2213	-0.0012	0.0045
	0.5176	0.5196	-0.0020	0.0045
	0.6930	0.6925	0.0005	0.0045
	0.9908	0.9925	-0.0017	0.0045
590 nm	0.0000	0.0000	0.0000	0.0045
	0.2443	0.2452	-0.0009	0.0045
	0.5530	0.5544	-0.0014	0.0045
	0.7196	0.7195	0.0001	0.0045
	1.0301	1.0316	-0.0015	0.0045
635 nm	0.0000	0.0000	0.0000	0.0045
	0.2646	0.2651	-0.0005	0.0045
	0.5370	0.5394	-0.0024	0.0045
	0.6862	0.6872	-0.0010	0.0045
	0.9822	0.9855	-0.0033	0.0045

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 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. Thalerngkeat Pongngam)

Authorized signatory

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 (±)	Conformity
220.0	-0.27	0.14	1.0	Pass
241.8	-0.25	0.16	1.0	Pass
287.6	-0.04	0.14	1.0	Pass
333.7	0.07	0.19	1.0	Pass
360.1	0.35	0.14	1.0	Pass
417.0	0.59	0.14	1.0	Pass
472.3	0.20	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	0.08	0.14	1.0	Pass
642.3	-0.72	0.16	1.0	Pass
741.3	-0.58	0.14	1.0	Pass
749.1	-0.55	0.14	1.0	Pass
807.4	-0.37	0.14	1.0	Pass
879.0	0.28	0.14	1.0	Pass

Photometric Accuracy (Absorbance)

Wavelength	Unit Under Calibration	Correction	Guard Band (w)	Tolerance (±)	Conformity
235 nm	0.0000	0.0000	0.0080	0.020	Pass
	0.7273	0.0020	0.0080	0.020	Pass
257 nm	-0.0003	0.0003	0.0080	0.020	Pass
	0.8457	0.0040	0.0080	0.020	Pass
313 nm	0.0004	-0.0004	0.0080	0.020	Pass
	0.2810	0.0023	0.0080	0.020	Pass
350 nm	0.0001	-0.0001	0.0080	0.020	Pass
	0.6259	0.0040	0.0080	0.020	Pass

บริษัท ชัยนิเมก จำกัด (SCIMET CO., LTD.)

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



รับรองสำเนาถูกต้อง
ผู้จัดทำด้วยความสุจริต
EnviLab Co.,Ltd.

FC07-03-30 MAY 2023



บริษัท ชัยนิเมก จำกัด (SCIMET CO., LTD.)

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

รับรองสำเนาถูกต้อง
ผู้จัดทำด้วยความสุจริต
EnviLab Co.,Ltd.

FC07-03-30 MAY 2023



Refer to Certificate No.: C07240032 Page: 3 of 3

Without Adjustment

Photometric Accuracy (Absorbance)

Wavelength	Unit Under Calibration	Correction	Guard Band (w)	Tolerance (±)	Conformity
420 nm	0.0000	0.0000	0.0045	0.015	Pass
	0.2386	-0.0013	0.0045	0.015	Pass
	0.5637	-0.0020	0.0045	0.015	Pass
	0.7382	0.0010	0.0045	0.015	Pass
440 nm	1.0542	0.0008	0.0045	0.015	Pass
	0.0000	0.0000	0.0045	0.015	Pass
	0.2354	-0.0019	0.0045	0.015	Pass
	0.5539	-0.0026	0.0045	0.015	Pass
465 nm	0.7222	0.0008	0.0045	0.015	Pass
	1.0343	-0.0019	0.0045	0.015	Pass
	0.0000	0.0000	0.0045	0.015	Pass
	0.2143	-0.0017	0.0045	0.015	Pass
546.1 nm	0.5059	-0.0023	0.0045	0.015	Pass
	0.6729	0.0006	0.0045	0.015	Pass
	0.9638	-0.0023	0.0045	0.015	Pass
	0.0000	0.0000	0.0045	0.015	Pass
590 nm	0.2213	-0.0012	0.0045	0.015	Pass
	0.5196	-0.0020	0.0045	0.015	Pass
	0.6925	0.0005	0.0045	0.015	Pass
	0.9925	-0.0017	0.0045	0.015	Pass
635 nm	0.0000	0.0000	0.0045	0.015	Pass
	0.2452	-0.0008	0.0045	0.015	Pass
	0.5544	-0.0014	0.0045	0.015	Pass
	0.7195	0.0001	0.0045	0.015	Pass
	1.0316	-0.0015	0.0045	0.015	Pass
	0.0000	0.0000	0.0045	0.015	Pass
	0.2651	-0.0005	0.0045	0.015	Pass
	0.5394	-0.0024	0.0045	0.015	Pass
	0.6872	-0.0010	0.0045	0.015	Pass
	0.9855	-0.0033	0.0045	0.015	Pass

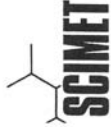
The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements of Conformity



บริษัท ขายนีเมก จำกัด (SCIMET CO., LTD.)
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Email: scimet2022@gmail.com, Tel: 02 460 9239



ใบตรวจสอบสภาพเครื่อง Spectrophotometer

เลขที่ใบงาน: KSM72400444

ชื่อนัดเครื่อง: SPECTROPHOTOMETER รุ่น: CARY 60UV-VIS

หมายเลขเครื่อง: MY17490026

ตรวจสอบ (รับ)	04 Mar 2024	ไม่ปกติ	รายการตรวจเช็ค	ตรงตาม (ส่ง)	หมายเหตุ
ปกติ	ไม่ปกติ	ไม่ปกติ			
✓	□	□	1. ความสมบูรณ์เครื่อง	✓	□
✓	□	□	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	✓	□
✓	□	□	3. สวิตช์ ปิด - เปิด เครื่อง (On-Off Switch)	✓	□
✓	□	□	4. ปุ่มกด (Keypad)	✓	□
✓	□	□	5. หน้าจอ (Display, Screen Contrast)	✓	□
✓	□	□	6. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	✓	□
✓	□	□	7. ความยาวคลื่น (Wavelength Check)	✓	□
✓	□	□	8. แหล่งกำเนิดแสง (UV < 3,000 hour)	✓	□
✓	□	□	9. แหล่งกำเนิดแสง (Visible < 5,000 hour)	✓	□
□	□	□	10. ช่องวัดหลายตัวอย่าง (Carousel Module)	□	□

เห็นด้วย/ความเห็น:

Mr. Dumrong Boonsopon
Service Engineer



บริษัท ขายนีเมก จำกัด (SCIMET CO., LTD.)
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Email: scimet2022@gmail.com, Tel: 02 460 9239



CERTIFICATION OF TEST REPORT

Equipment : Biological Safety Cabinet (Class II)
Manufacturer : Heal Force
Model : HFSafe-1200LC
Serial Number : EX042012LC5497
Identification Number : ELABMICROBSC01
Report Number : B224051
Issued Date : 1 March 2024
Job Number : B224051
Page : 1 of 7

Customer : ENVILAB CO.,LTD. (HEAD OFFICE)
540, 540/1 Soi Bangkhae 7, Bangkhae, Bangkok, Bang 10160

Environment Condition : Temperature: 20.8 °C ± 0.5 °C
Humidity: 53.0 %RH ± 3.1 %RH
Voltage: 221.5 VAC ± 0.3 VAC

Test Place : ENVILAB CO.,LTD. (HEAD OFFICE) Laboratory Floor 3

Test By : Mr.Achira Kaewpaitoon
Test Date : 29 February 2024
Due Date : 28 February 2025
Test Procedure : 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 TAT Certificate Number : ITTH-0-86850
Leak test of HEPA filter is traceable to WK Certificate Number :WK2309-176-1
Illumination test is traceable to SP Certificate Number :SPR23030030-1
UltravioletRadiation test is traceable to EEI Certificate Number :CO20230085EA
Sound test is traceable to SP Certificate Number :SPR23030030-2

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. Waicharin Tavera
Authorized Signatory



Primary Test Results
1. Downflow Velocity Test

Test equipment used : Thermo anemometer Model: 425
Serial number: 3101751
Brands: Testo Calibration due: 6-Nov-2024

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. Measure in 2 rows along a line 1/4 of the depth of the working space forward of the rear wall and along a line the same distance behind the front window. Start 150 mm from the left side window and with 300 mm between the measuring spots.

Back			
0.35	0.36	0.35	0.34
0.33	0.35	0.35	0.34
Front			

Characteristic of downflow velocities

Mean downflow velocity to achieve product protection : 0.25 m/s - 0.50 m/s. All measurements should be within ±20 % of mean values.	0.35	0.36	0.33	0.28	-	0.42
---	------	------	------	------	---	------

Result Summary : Pass

Test equipment used


- Thermo anemometer
- Brand: Testo
- Model: 425
- Serial number: 3101751
- Calibration due: 6-Nov-2024

... .. to determine inflow velocity uses a thermoanemometer in a constricted window access

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.

1.29	1.28	1.29	1.31	1.32	1.32	1.31	1.32	1.32
------	------	------	------	------	------	------	------	------

Characteristic of air velocities in the work opening

Mean Inflow velocity to achieve product protection : ≥ 0.40 m/s.	0.50
	

Result Summary :

Pass

Adjustments Required

Fan speed

Damper

No Change

✓ No Change

10 cm. x 10 cm. X : Media leak position G : Gasket leak position M : Maximum leak position

Test equipment used

- Aerosol Photometer
- Brand: ATI
- Model: 2H
- Serial number: 20627
- Calibration due: 20-Sep-2024

Test equipment used:

- Aerosol Generator
- Brand: ATI
- Model: 6C
- Serial number: 20554
- Calibration date: -

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

Characteristic of PAO test	
Concentration of PAO	34 µg/l
Concentration of PAO	0.001 %
Concentration of PAO	0.001 %

Main HEPA Filter

Leak position

[illegible]



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 luminarity 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

View Screen Retention Test

Work Opening Edge Retention Test

Sash/Window Seal Test

Pass

Pass

Pass

Pass



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: Daiichi

● Model: LM507

● Serial number: 1300421511013

● Calibration due: 2-Mar-2024

819	923	944	1059	1049
Back		Front		

Lighting should be adequate for safe working within the cabinet. Illumination measured at the work surface should be at least 750 lux.

Result Summary : Pass



Continuation of the Certificate of Test Report Number : B224051

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: Q853559
- Calibration due: 26-Sep-2024

Back			
Front			
2300	2920	3350	2080 1960

Ultraviolet radiation where UV lamps are fitted, the intensity of radiation at a wave length of 254 nm shall be not less than 400 mW/m² when measured at the work floor surface.

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, or 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: 19090231
- Calibration due: 2-Mar-2024

- * Sound pressure level of the background: 50.6 dBA
- * Sound levels: 59.2 dBA

Result Summary : Pass

End of Certificate of Test Report

AIR FM - SV - 08 : 01 Sep 2021

51/04 Moo 9, Ladawan, Lamukha Phatthana 121/09 Thailand
Tel: 0 2152 8350 - 0 2152 8348 - 0 2152 8070 08 4340 2558 - 0 2152 8348
http://www.airflow-calibration.com E-mail: bn.airflow@gmail.com

Enviab Co.,Ltd. ผู้จัดการควบคุมคุณภาพ



Global Leader in Test Equipment Solutions

99/28-29 Nuea Convent House Dorming, Phatthayakul Road, Samutprakarn, Dorming Bangkok 10120
Tel: +662331-5141



AC-1736.08

CERTIFICATE OF CALIBRATION

Customer: AIR FLOW CALIBRATION CO.,LTD.
51/04 Moo 9, Ladawan, Lamukha,
Phatthana 12150 Thailand

Manufacturer: Testo
Model Number: 425
Description: Hot Wire Anemometer
Asset Number: LAF001
Serial #: 03101751
P.O. #: N/A
Procedure: CPML-09 (Sep, 2020)
Certificate Number: TTH-O-86850

Temperature: 21 °C
Relative Humidity: 48 %RH
Calibration Location: In Lab
Calibrated By: ATTAKORN THORAKSA
Calibration Date: 06/Nov/2023
Next Due Date: 06/Nov/2024
Condition Received: IN TOLERANCE
Condition Returned: IN TOLERANCE

This certifies that the above instrument was calibrated in compliance with the Calibration System Requirements of ISO/IEC 17025:2017, ANSI/NCCL Z540-1-1994 (R2002) in accordance with referenced procedures. Standards used to perform this calibration are traceable to SI units; their source of traceability derives from a National Metrology Institute such as NIST, CENAM, NPL, DIN, from national physical constants, consensus standards or derived by the ratio type of calibrations. Collective uncertainties are determined as required with a distribution that corresponds to a probability of approximately 95% (k=2). Unless otherwise noted calibrations are performed to manufacturer's specifications. Compliance statements are in conformance with ILAC-G8:2019 simple acceptance decision rule. This form shall not be reproduced, except in full, without the expressed written consent of Techmaster. Contact our customer service representative for clarification of this document.

Standards Utilized			Test Report #
Standard #	Description	Manufacturer	Model #
5840	Anemometer	OMEGA	HHF 141
			23/Jan/2024
			TTH-O-60929

Remarks:

W. Cheetan

Wannipa Cheetan
Quality Assurance

P. Moenmuangsan

Pornthep Moenmuangsan
Technical Manager

N. Hanta

Nopparat Hanta
Approved By

Issued on: 2023-11-05 20:38:45.4400000 -08:00

540.1 2105

TTH-O-86850

TTH 29



AIR FM - SV - 08 : 01 Sep 2021

51/04 Moo 9, Ladawan, Lamukha Phatthana 121/09 Thailand
Tel: 0 2152 8350 - 0 2152 8348 - 0 2152 8070 08 4340 2558 - 0 2152 8348
http://www.airflow-calibration.com E-mail: bn.airflow@gmail.com

Enviab Co.,Ltd. ผู้จัดการควบคุมคุณภาพ



WK Electric Co., Ltd.

68/242 Moo 5, Sawaipracharaj Rd., Tumbol Ladsawai, Amphur Lamlukka, Pathumthani 12150
Tel. +66 2993 4773, +66 2153 7132-3 Fax. +66 2994 5509 E-mail : wk.calibrations@gmail.com www.wk-etc.com

Certificate of Calibration

Page 1 of 2

Certificate No. : WK2309-176-1
Customer : AIR FLOW CALIBRATION CO., LTD.
51/104 Moo 9, Latsawai, Lumlukka,
Phathumtani 12150 Thailand
Instrument : Aerosol Photometer
Manufacturer : ATI
Model : 2H
Serial No. : 20627
Identity No. : LAF 012
Range : See to Data
Resolution : See to Data
Calibration Method : CP-WK-E12, WK-CP-PR04, CP-WK-M10
Reference standard instruments :
Instrument Serial No Certificate No Due Date Traceability to
Digital Multimeter 2823A05967 EU231296 30-Mar-25 NA
Flow Meter 140215-134 L202304114-001 18-Apr-25 MIT
Digital Light Meter S.008960 23PH11 18-Jan-24 TPA
Illuminance standard lamp

NA: NA Caltechnologies Co., Ltd.
MIT: Miracle International Technology Co., Ltd.
TPA: Technology Promotion Association (Thailand-Japan)

This result calibrate was found accurate as shown on date place of calibrate only
This certificate is traceability to the International System of Unit (SI).

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

Calibrated by : Mr. Kritsada Ouparatha

Approved by :

Ms. Budsagorn Patcha

Authorized Signatory

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F5100



Calibration Results

Asset No. LAF001

Serial No. 03101751

Report No. TTH-O-86850

Model # : 425

Velocity Accuracy Test

Calibration Point	STD Reading	As Found		As Left		Uncertainty	Tolerance	
		UUT Reading	Error	UUT Reading	Error		Min	Max
0.1 m/s	0.13 m/s	0.14	0.01	Pass	Same	0.02	0.09	0.17
0.2 m/s	0.21 m/s	0.23	0.02	Pass	Same	0.02	0.17	0.25
0.3 m/s	0.32 m/s	0.33	0.01	Pass	Same	0.02	0.27	0.37
0.4 m/s	0.42 m/s	0.41	-0.01	Pass	Same	0.02	0.37	0.47
0.5 m/s	0.52 m/s	0.54	0.02	Pass	Same	0.02	0.46	0.58
1.0 m/s	0.99 m/s	1.01	0.02	Pass	Same	0.03	0.91	1.07
1.5 m/s	1.48 m/s	1.51	0.03	Pass	Same	0.03	1.38	1.58
2.0 m/s	2.02 m/s	2.05	0.03	Pass	Same	0.04	1.89	2.15
2.5 m/s	2.49 m/s	2.52	0.03	Pass	Same	0.05	2.34	2.64
3.0 m/s	3.05 m/s	3.09	0.04	Pass	Same	0.05	2.87	3.23
3.5 m/s	3.52 m/s	3.56	0.04	Pass	Same	0.06	3.31	3.73
4.0 m/s	4.03 m/s	3.98	-0.05	Pass	Same	0.06	3.80	4.26
4.5 m/s	4.51 m/s	4.57	0.06	Pass	Same	0.07	4.25	4.77
5.0 m/s	5.05 m/s	5.14	0.09	Pass	Same	0.07	4.77	5.33
5.5 m/s	5.56 m/s	5.64	0.08	Pass	Same	0.08	5.25	5.87

- Notes :
- 1) Conversion Unit : 1 fpm = 0.00508 m/s
 - 2) The instrument was calibrated for the parameter and at the points specified by the customer.
 - 3) The calibration results are verified its tolerance with the manufacturer's specification.
 - 4) This result of calibration was found accurate as show on date and place of calibration only.

End of Certificate



WK Electric Co., Ltd.

68/242 Moo 5, Sawaipracharaj Rd., Tambol Ladsawai, Amphur Lamlukka, Pathumthani 12150
Tel. +66 2993 4773, +66 2153 7132-3 Fax. +66 2994 5509 E-mail : wk.calibrations@gmail.com www.wk-etc.com

Calibration Results

Certificate No.: WK2309-176-1

Page : 2 of 2

Calibration Results

DC Voltage Calibration

Location	Applied Value	Actual Value		Uncertainty (±)	Tolerance Limit Values
		As Found	As Left		
J6-WHT	220 mV	287.45	292.36	0.0078 mV	> 220 mV/Def.
J9-1	5 V	5.01	5.01	0.0058 V	4.90 ~ 5.10 V
J9-5	15 V	14.93	14.93	0.0059 V	14.55 ~ 15.45 V
J9-6	-15 V	-14.91	-14.91	0.0056 V	-15.45 ~ -14.55 V
U4-3	-12 V	-11.91	-11.90	0.0056 V	-12.50 ~ -11.50 V
U8-1	12 V	11.56	11.57	0.0059 V	11.50 ~ 12.50 V
U12-6	5 V	5.01	5.01	0.0058 V	4.98 ~ 5.02 V
U13-1	10 V	9.89	9.89	0.0059 V	9.60 ~ 10.10 V

DC Current Calibration

Performance	Applied Value	Actual Value		Uncertainty (±)	Tolerance Limit Values
		As Found	As Left		
0.001 %	0.80 pA	0.81	0.81	6.0 pA	0.76 ~ 0.84 pA
0.01 %	0.80 nA	0.81	0.80	0.0060 nA	0.76 ~ 0.84 nA
0.1 %	0.80 μA	0.80	0.80	0.0060 nA	0.76 ~ 0.84 nA
1 %	0.80 mA	0.80	0.80	0.0060 nA	0.76 ~ 0.84 nA
10 %	0.80 A	0.80	0.80	0.0058 μA	0.76 ~ 0.84 μA

Sniff Flow Calibration

Performance	Applied Value	Actual Value		Uncertainty (±)	Tolerance Limit Values
		As Found	As Left		
Sniff flow	28.3 slpm	28.35	28.35	0.0045 slpm	25.50 ~ 31.10 slpm

Straylight Calibration

Performance	Applied Value	Standard Reading		Uncertainty (±)	Tolerance Limit Values
		As Found	As Left		
Straylight	N/A	0.0043	0.0041	0.000069 lx	≤ 0.007

(X) Without Adjustment () After Adjustment
* Remark : Not Include Accreditation ISO/IEC 17025

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**** End of Certificate****

F5100



REV.00 27 Oct 16

ผู้ตรวจการควบคุมคุณภาพ

ผู้รับรองมาตรฐานห้องปฏิบัติการ

EnviLab Co., Ltd.



METROLOGY SYSTEM (THAILAND) CO.,LTD.



Certificate of Calibration

Certificate Number : SPR23030030-1

Page : 1 of 3

Customer : AIRFLOW CALIBRATION CO.,LTD.

51/104 Moo.9, Ladsawai, Lamlukka, Pathumthani 12150 Thailand

Equipment Name : Light Meter
Manufacturer : Dalichi
Model : LM507
Serial Number : 01300421511013
ID. Number : LAF 008
Environmental Conditions
Ambient Temperature : 23 °C ± 3 °C
Relative Humidity : 50 % ± 15 %
Location of Calibration : In-Lab
Calibration Procedure : SP-CPE-04-32
Received Date : 02 Mar 2023
Calibration Date : 02 Mar 2023
Recommend Due Date : 02 Mar 2024
Date of Issue : 03 Mar 2023

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.

All calibrations are performed within manufacturer's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Karoon Pengsalung

Approved by :

Calibration Officer

(Mr. Nirut Loha)

Authorized Signatory



ผู้ตรวจการควบคุมคุณภาพ
ผู้รับรองมาตรฐานห้องปฏิบัติการ
EnviLab Co., Ltd.
SP-FM-04-15 rev.0



Calibration Report

Certificate Number : SPR23030030-1

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due Date
Digital Light Meter	LX-73	Q842777	22PH471	13 Sep 2023

Traceability

This certification is traceable to the International System of Unit maintained at :
TPA - Technology Promotion Association (Thailand-Japan)



Result of Calibration

Certificate No. : SPR23030030-1

Page : 3 of 3

Function: Illumination Measurement

Unit : Lux

Calibration Point	Standard Reading	UUC Reading	Error	Uncertainty (±)
200	200.0	196.0	-4.0	6.6
500	501	490	-11	6.7
1000	1000	986	-14	13
1500	1500	1473	-27	20
2000	2001	1959	-42	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 -




ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT
975 Moo 4, Bangpoo Industrial Estate, Soi 8, Sukhumvit Road km. 37,
Phraek Sa, Mueang Samut Prakan, Samut Prakan 10280
Tel: +66 2709 4860 Fax: +66 2324 0917

Certificate No.: CO20230085EA
Operation No.: CO2023090002

Certificate of Calibration

Equipment: UVC LIGHT METER
Manufacturer: Lutron
Model/Type: UVC-254SD
Serial No.: Q853539
ID No.: LAF018
Customer: Airflow Calibration Co., Ltd.
Address: 51/104 Moo 9, Lamlukka Klong 3
Ladsawai Lamukka, Patumthani 12150 Thailand
Received Date: 5 September 2023
Calibrated Date: 26 September 2023
Issued Date: 29 September 2023
Calibrated by: Mr. Chalermpon Tongpurn

Approved by: 
(Mr. Suntiop Janboonna)
Group Manager

This report was prepared electronically using applicable electronic signature. Printing or copy of file are considered as a copy of the document.

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor (k) providing a level of confidence of approximately 95%. This certificate may not be reproduced other than in full except with the prior written approval of the Electrical and Electronics Institute, Foundation for Industrial Development.



ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CO20230085EA
Calibration Report

Equipment: UVC LIGHT METER
Manufacturer: Lutron
Model/Type: UVC-254SD
Serial No.: Q853539
ID No.: LAF018
Ambient Temperature: $(23 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 15) \%$
Method of Calibration :-

In-house method base on ASTM G130-06. The UUC is calibrated against the scanning type spectroradiometer (Bentham model IDR300) whose calibration factors have been determined by calibration against irradiance standard lamps (Deuterium Lamp). The Germicidal lamp used for the UV irradiance tests emit more than 90% of ultraviolet radiation at the 254 nm. It spectral irradiance value are calculated from the calibration factor of standard spectroradiometer. The calibration factor for narrowband UVC integrated irradiance responsivity (245 nm to 265 nm) is calculated from the ratio of the integrated irradiance value of UUC's reading.

Condition of this result of calibration

1. Reference standards instrument :-

Instrument Model Serial No. Cert. No. Due Date
1) Deuterium Lamp OL UV-40 926 TI-1004-21 24 March 2024
2. This result of calibration was found accurate as shown on date and place of calibration only.
3. This certification is traceable to the international system of unit maintained at :-
- National Institute of Metrology (Thailand).

Result of Calibration:-

Function : UVC

UUC. Range (mW/cm ²)	Standard Value (mW/cm ²)	UUC. Reading (mW/cm ²)	UUC. Error (mW/cm ²)	Uncertainty of Measurement (mW/cm ²)
1.999	0.500	0.500	0	0.035

Remark: 1. UUC : Unit Under calibration
2. The coverage factor $k = 2.00$

--- End of Report ---



METROLOGY SYSTEM (THAILAND) CO.,LTD.



Certificate of Calibration

Certificate Number : SPR23030030-2

Page : 1 of 3

Customer : AIRFLOW CALIBRATION CO.,LTD.

51/104 Moo 9, Ladsawai, Lamlukka, Pathumthani 12150 Thailand

Equipment Name : Sound Level Meter
Manufacturer : Daiichi
Model : SL-332
Serial Number : 19092031
ID. Number : LAF 016

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Received Date : 02 Mar 2023
Relative Humidity : $50\% \pm 15\%$ Calibration Date : 02 Mar 2023
Location of Calibration : In-Lab Recommend Due Date : 02 Mar 2024
Calibration Procedure : SP-CPE-04-01 Date of Issue : 03 Mar 2023

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 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.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Karoon Pengsalung

Approved by :

Calibration Officer

(Mr. Nirut Loha)



Authorized Signatory
รับรอง SP-M-04-13803
EnviLab Co., Ltd. ผู้จัดการฝ่ายควบคุมคุณภาพ



METROLOGY SYSTEM (THAILAND) CO.,LTD.



Calibration Report

Certificate Number : SPR23030030-2

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Sound Level Calibrator	ST-120	211203773	EELBP. 1140166	17 Jan 2024

Traceability

This certification is traceable to the International System of Unit maintained at :
TISTR - Thailand Institute of Scientific and Technological Research



JSP METROLOGY SYSTEM (THAILAND) CO.,LTD.



Result of Calibration

Certificate No. : SPR23030030-2

Page : 3 of 3

Range : 94 to 114 dB

Function : @1kHz

Select A 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

Unit : dB

Select C Standard Setting	UUC Reading		Error		Uncertainty (±)
	Fast	Slow	Fast	Slow	
94	94.4	94.4	0.4	0.4	0.15
114	114.3	114.2	0.3	0.2	0.15

Unit : dB

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 -



กรมวิทยาศาสตร์การแพทย์

ขอมอบประกาศนียบัตรฉบับนี้ให้เพื่อแสดงว่า

นายวัชรินทร์ ธาระ

เข้าอบรมหลักสูตร

ความรู้เบื้องต้นในการใช้งานและการตรวจรับรองตู้ชีววิทย์

วันที่ ๙ - ๑๐ กุมภาพันธ์ พ.ศ. ๒๕๕๘

(นายแพทย์อภิชัย มงคล)
อธิบดีกรมวิทยาศาสตร์การแพทย์
กระทรวงสาธารณสุข



Envisab College
รับรองเป็น ม.ศ. ๕๑๒๐๖



รับรองสำเนาถูกต้อง
ผู้จัดการระบบ KM-004-15-REV.

CAL

Calibratech Co., Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpoed, Pakkred, Nonthaburi 11120
Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com



NSG-TS17025
CALIBRATION 0030

Certificate of Calibration

Page : 1 of 2

Certificate No. : 67-400054-2

Submitted by : Envilab Co., Ltd.

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

Equipment : Autoclave

Manufacturer : Tomy
Range : N/A °C
Serial No. : 55133094
Model : SX-500
Resolution : 1 °C
ID No. : N/A

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

Ambient Temperature : (30.0 to 31.0) °C
Relative Humidity : (50 to 55) %
Line Voltage : (224.0 to 225.0) V

Date of Received : 01 February 2024

Date of Calibration : 01 February 2024

Date of Issue : 03 February 2024

Calibrated by : Pempon 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

Traceability

ID No. Cert. No. Due Date

400039 66-400707-1 27 Jun 2024

400040 66-400707-2 27 Jun 2024

400041 66-400707-3 27 Jun 2024

National Institute of Metrology Thailand (NIMT)
National Institute of Metrology Thailand (NIMT)
National Institute of Metrology Thailand (NIMT)

บริษัท แอร์โฟล แคลลิเบรชั่น จำกัด
AIR FLOW CALIBRATION CO., LTD.



Certificate of Training

ขอมอบวุฒิบัตรนี้ไว้เพื่อแสดงว่า

คุณอจิร แก้วไพฑูรย์

ได้รับการอบรมเชิงปฏิบัติการหลักสูตร
การตรวจรับรองตู้ชีวอนามัยระดับต้น

(Introduction to Biological Safety Cabinet Certification)

วันที่ 23 - 31 มกราคม พ.ศ. 2563

W

(นายวัชรินทร์ อารยะ)

Instructor



บริษัท แอร์โฟล แคลลิเบรชั่น จำกัด
AIR FLOW CALIBRATION CO., LTD.

Approved by :

(Surachai Promthong)

Laboratory Manager



The Uncertainties are for a confidence probability of approximately 95%

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CAL-00031/003

CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaphrachasan 3 Rd., Banggood, Pakkred, Nonthaburi 11120

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

Certificate of Calibration

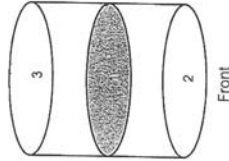
Certificate No. 67-400054-2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

Page : 2 of 2



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 (MPa)
			1	2	3					
121	121	121	121.4	121.4	121.4	1.0	1.0	0.5	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, Sukhaphrachasan 3 Rd., Banggood, 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. : 67-400101-1

Submitted by : Envilab Co., Ltd.

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

Equipment : Temperature controlled enclosure (Incubator)

Manufacturer : Memmert

Range : N/A °C

Serial No. : D419.0525

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

Ambient Temperature : (23.0 to 24.0) °C

Relative Humidity : (50 to 55) %

Line Voltage : (223.0 TO 225.0) V

Date of Received : 20 February 2024

Date of Calibration : 20 February 2024

Date of Issue : 22 February 2024

Calibrated by : Kittisak Kokaso

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

400046 & 400042 67-400047-1

25 Jul 2024

National Institute of Metrology Thailand (NIMT)

Approved by :

(Surachai Promthong)

Laboratory Manager



The Uncertainties are for a confidence probability of approximately 95%

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CAL-00011-03

CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaphachan 3 Rd., Banggood, Pakkred, Nonthaburi 11120
Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

CAL

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7/106-7 Moo 2, Sukhaphachan 3 Rd., Banggood, Pakkred, Nonthaburi 11120
Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.comNSC-TISI-TIS 17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-400101-1

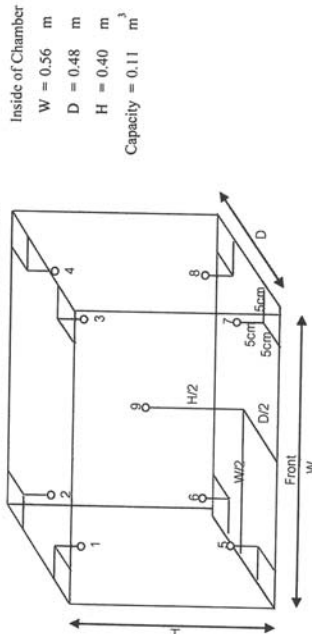
Page : 2 of 2

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
 $W = 0.56 \text{ m}$
 $D = 0.48 \text{ m}$
 $H = 0.40 \text{ m}$
 $\text{Capacity} = 0.11 \text{ m}^3$

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	35.00	35.10	35.16	35.14	35.15	35.14	35.03	35.00	35.12	0.30
37.0	37.0	37.0	37.01	37.11	37.17	37.15	37.16	37.15	37.04	37.01	37.13	0.30

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured		Overall Variation (°C)
			Uniformity (°C)	Stability (°C)	
35.0	35.0	35.0	0.1	0.0	0.2
37.0	37.0	37.0	0.1	0.0	0.2

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%

-o0o-

Certificate No. : 66-400477-1

Page : 1 of 2

Submitted by :

Envilab Co.,Ltd.

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

Equipment :

Water Bath

Manufacturer : LAUDA

Model : A 24

Range : N/A °C

Resolution : 0.1 °C

Serial No. : CN21001882

ID No. : ELABWBALPHA241

Environment :

On site calibration was carried out at the Laboratory, ENVILAB CO.LTD

Ambient Temperature : (22.5 to 23.0) °C

Relative Humidity : (40 to 45) %

Line Voltage : (228.0 to 230.1) V

Date of Received : 25 August 2023

Date of Calibration : 25 August 2023

Date of Issue : 25 August 2023

Calibrated by : Permpon Chanpu

Calibration Method :

This instrument was calibrated by In-house method CAL-M4006 based on ASTM E715-80

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.

Traceability

400046 & 400024

Due Date

06 Oct 2023

National Institute of Metrology Thailand (NIMT)

Approved by :

(Bunjerd Masri)

Supervisor



The Uncertainties are for a confidence probability of approximately 95%

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Envilab Co.,Ltd.

CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhaphrasan 3 Rd., Banggood, Pakkred, Nonthaburi 11120
Tel.(02) 964-6211 Fax.(02) 964-5155 e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

Certificate of Calibration

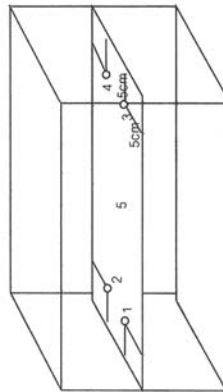
Certificate No. : 66-400477-1

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

Page : 2 of 2



Front

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.					Uncertainty (± °C)	Measured Uniformity (°C)	Measured Stability (°C)
			1	2	3	4	5			
44.5	44.5	44.5	44.52	44.50	44.50	44.50	44.50	0.18	0.06	0.01

Remark: The uncertainty is not combine uniformity of the water bath

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-

[Signature]

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บริษัท อีเน็ลแล็บ จำกัด
ผู้จัดการฝ่ายเทคนิค

