

Certificate of Calibration

Certificate No. : 67-420034-1

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

540,540/1 Soi Bangkhae7, Bangkhae, 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 : Permpoon 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



The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 67-420034-1

Page : 2 of 2

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 measurment 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., Bangpood, Pakkred, Nonthaburi 11120

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



NSC-TISI-TIS 17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-300147-11

Page : 1 of 2

Submitted by : Envilab Co.,Ltd.

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

Equipment : Measuring Pipette

Manufacturer : Witeg

Class : A

Capacity : 25 ml

Graduation : 0.1 ml

ID No. : G-HM-013/23

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

Relative Humidity : (50 ± 10) %

Air Pressure : 1006.8 mbar.

Date of Received : 13 March 2024

Date of Calibration : 19 March 2024

Date of Issue : 19 March 2024

Calibrated by : Areerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceability</u>
241005	66-200388-4	02 Jun 2024	National Institute of Metrology (Thailand) (NIMT)

Approved by :



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Certificate of Calibration

Certificate No. : 67-300147-11

Page : 2 of 2

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

UUC Condition As-Received : Good

Delivery Time : 14.28 sec.

Nominal Volume (ml)	Measuring Volume (ml)
1	1.0304
10	9.9852
25	24.9764

Uncertainty of measurement with in \pm 0.0067 ml

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

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

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NSC-TISI-TIS17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-200060-2

Page : 1 of 2

Submitted by : Envilab Co., Ltd.
540, 540/1 Soi Bangkhae7, Bangkhae, Bangkok 10160

Equipment : Electronic Balance
Manufacturer : METTLER TOLEDO Model : XSR205DU
Serial No. : B911363567 ID No. : ELABBALANCEN06
Capacity : 220 g Resolution : 0.00001g/81g, 0.0001g/220g

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



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Certificate of Calibration

Certificate No. : 67-200060-2

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

Nominal Value (g)	Correction (g)	Uncertainty \pm (g)
0.1	0.00000	0.000015
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

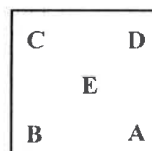
This result of calibration was found accurate as shown on date and place of calibration only.

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 g



Repeatability

Load test : 200 g

Stdev. : 0.000032 g

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Certificate of Calibration

Certificate No. : 67-400312-1

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

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

Equipment : COD Reactor

Manufacturer : Hanna

Model : HI839800

Range : N/A °C

Resolution : 0.1 °C

Serial No. : 06480040101

ID No. : ELABHI83980001

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

Relative Humidity : (50 ± 15) %

Date of Received : 30 May 2024

Date of Calibration : 04 June 2024

Date of Issue : 04 June 2024

Calibrated by : Chortip Samchusri

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

The temperature scale used was based on ITS-90

Reference Standard Instruments :

Standard Digital Thermometer with TC Type T probe

ID No.

Cert. No.

Due Date

Traceability

400046 & 400023

67-400198-1

01 Oct 2024

National Institute of Metrology Thailand (NIMT)

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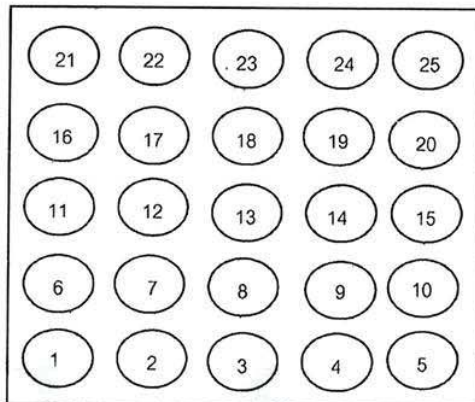
Certificate of Calibration

Certificate No. : 67-400312-1

Page : 2 of 2

Result of Calibration : Without Adjustment

Function : Temperature measurement



Controller

Test Point (° C)	UUC Setting (° C)	UUC Reading (° C)	Standard Reading at Position (° C)									
			1	2	3	4	5	6	7	8	9	10
150.0	150.0	150.0	148.9	149.1	149.4	148.4	148.3	148.5	149.8	148.8	148.9	149.5

Test Point (° C)	UUC Setting (° C)	UUC Reading (° C)	Standard Reading at Position (° C)									
			11	12	13	14	15	16	17	18	19	20
150.0	150.0	150.0	149.2	150.3	149.7	149.8	148.2	149.4	148.7	148.8	151.7	149.6

Test Point (° C)	UUC Setting (° C)	UUC Reading (° C)	Standard Reading at Position (° C)					Uncertainty (± ° C)
			21	22	23	24	25	
150.0	150.0	150.0	148.8	149.3	149.2	148.7	149.3	0.78

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%

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Certificate of Calibration

Certificate No. : 67-400054-1

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

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

Equipment : Water Bath

Manufacturer : Memmert

Model : WNB29

Range : N/A °C

Resolution : 0.1 °C

Serial No. : L617.0156

ID No. : ELABWBWNB29N01

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

Ambient Temperature : (25.0 to 26.0) °C

Relative Humidity : (45 to 50) %

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 : 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.	Cert. No.	Due Date	Traceability
400046 & 400024	66-400547-2	02 Apr 2024	National Institute of Metrology Thailand (NIMT)

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

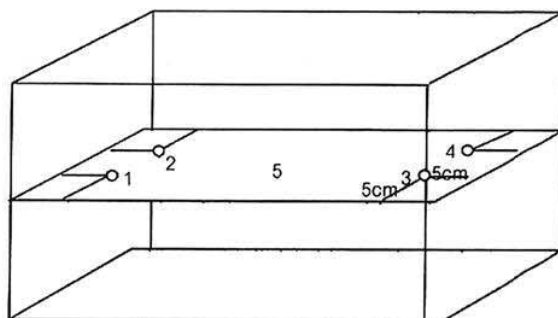
Certificate No. : 67-400054-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement



Front

Test Point (° C)	Setting Temperature (° C)	Indicating Temperature (° C)	Measured Temperature (° C) @ Sensor					Uncertainty (± ° C)	Measured Uniformity (° C)	Measured Stability (° C)
			No.							
			1	2	3	4	5			
95.0	95.0	95.0	95.38	95.52	95.56	95.74	95.55	0.20	0.27	0.07

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%

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Certificate of Calibration

Certificate No. : 67-400166-1

Page : 1 of 2

Submitted by : Envilab Co., Ltd.
540, 540/1 Soi Bangkhae 7, Bangkhae, 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 650) %
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

<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceability</u>
400046 & 400028	66-400547-3	05 Apr 2024	National Institute of Metrology Thailand (NIMT)

Appro



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Certificate of Calibration

Certificate No. : 67-400166-1

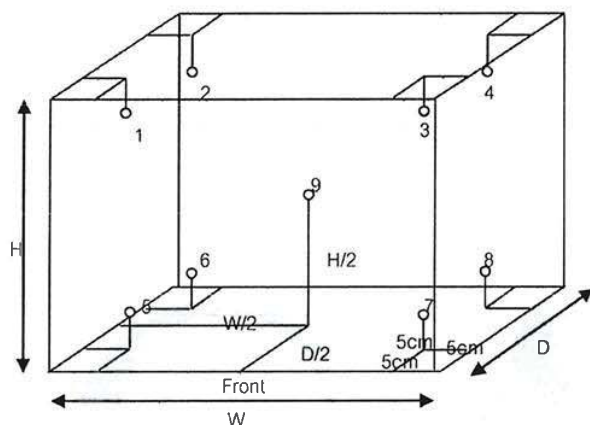
Page : 2 of 2

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 = 0.40 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%

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NSC-TISI-TIS17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-300293-10

Page : 1 of 2

Submitted by : Envilab Co.,Ltd.

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

Equipment : Cylinder

Manufacturer : BOROSIL

Class : A

Capacity : 50 ml

Graduation : 1 ml

ID No. : C-WW-004/24

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

Relative Humidity : (50 ± 10) %

Air Pressure : 1006.0 mbar.

Date of Received : 15 May 2024

Date of Calibration : 20 May 2024

Date of Issue : 20 May 2024

Calibrated by : Areerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.

Cert. No.

Due Date

Traceability

241002

66-200388-1

02 Jun 2024

National Institute of Metrology (Thailand) (NIMT)

Approved by



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Certificate of Calibration

Certificate No. : 67-300293-10

Page : 2 of 2

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

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
25	25.04
50	50.00

Uncertainty of measurement with in \pm 0.054 ml

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

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

- o0o -





SCIMET Co., Ltd.
1194 Soi Wachirathamsathit 57, Bangchak,
Phrakhanong, 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.: KSMT2400445

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, Bangkhuae, Bangkok 10160

Calibration Place

Environment Laboratory, SCIMET Co., Ltd.

1194 Soi Wachirathamsathit 57, Bangchak, Prakhnong, Bangkok 10260 Thailand

Calibration Date

14 March 2024

Environment Condition

Temperature: 23 °C ± 2 °C

Humidity: 50 %RH ± 15 %RH

The Method used

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

Traceability

This 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

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.



Envilab Co.,Ltd.

ผู้จัดการฝ่ายควบคุมคุณภาพ

Calibration Results:

Electrode Serial No. KC3N05V1R
Model : H176409
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 mn.
Diameter : 21 mn.
Immersion Depth 80 mn.

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



ใบตรวจสอบสภาพเครื่อง Do Meter

เลขที่ใบงาน: KSMT2400445

ชนิดเครื่องมือ: DO METER

รุ่น: HI9147

หมายเลขเครื่อง: H00007030

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
14 Mar 2024			14 Mar 2024		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิทช์ ปิด – เปิด เครื่อง (On-Off Swicth)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. อิเล็กโทรด (Electrode and Connection Cable)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. สายอิเล็กโทรด	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. เช็นเซอร์อิเล็กโทรด	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. ขาจับอิเล็กโทรด (Stand)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

ข้อแนะนำ :

Mr.Dumrong Boonsopon

Service Engineer

บริษัท ชายนีเมก จำกัด (SCIMET CO., LTD.)

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



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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



NSC-TISI-TIS17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-410025-1

Page : 1 of 2

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 : $(23 \pm 2) ^\circ\text{C}$
Relative Humidity : $(50 \pm 15) \%$

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	SG-H-00020/67	05 Jul 2024	Success Gateway Co., Ltd., Accredited by TISI Calibration No.0268

Approved



Envilab Co.,Ltd. ผู้จัดการฝ่ายควบคุมคุณภาพ

The Uncertainties are for a confidence probability of approximately 95%

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

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

Certificate of Calibration

Certificate No. : 67-430012-1

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

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

Equipment : Digital Conductivity meter with probe

Manufacturer : Hanna

Model : HI 98192

Serial No. : G0026637

ID No. : ELABCONHI98191

Electrode

Model : HI763133

Serial No. : TH107212

ID No. : ELABCONHI98191

Environment : Ambient Temperature (25 \pm 2) °C

Relative Humidity (50 \pm 15) %

Date of Received : 20 March 2024

Date of Calibration : 22 March 2024

Date of Issue : 25 March 2024

Calibrated by : Permpon Chanpu

Calibration Method : This instrument was calibrated by In-house method direct measurement by conductivity buffer solution

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

Standard Buffer Solution

<u>Material</u>	<u>Lot No.</u>	<u>Exp. Date</u>	<u>Traceability</u>
84 μ S/cm	7824	16 June 2025	National Institute of Standards and Technology (NIST), U.S.A., S.R.M.
1413 μ S/cm	7781	01 May 2027	National Institute of Standards and Technology (NIST), U.S.A., S.R.M.
12.88 mS/cm	7455	18 February 2027	National Institute of Standards and Technology (NIST), U.S.A., S.R.M.
80.0 mS/cm	7602	01 March 2027	National Institute of Standards and Technology (NIST), U.S.A., S.R.M.
111.8 mS/cm	7610	04 April 2027	National Institute of Standards and Technology (NIST), U.S.A., S.R.M.

Approved by :



Envilab Co.,Ltd.

The Uncertainties are for a confidence probability of approximately 95%

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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. : 67-430012-1

Page : 2 of 2

Result of Calibration :

UUC Condition As-Received : Good

Function : Conductivity measurement

Before Adjustment

Standard Conductivity Solution	UUC Reading	Correction	Uncertainty (±)	Unit
84.00	102.2	-18.2	1.1	µS/cm
1.413	1.038	0.375	0.0051	mS/cm
12.88	12.66	0.22	0.051	mS/cm
80.0	80.54	-0.54	0.21	mS/cm
111.8	106.7	5.1	0.41	mS/cm

After Adjustment : at 84,1413 µS/cm, 12.880, 80, 111.80 mS/cm

Standard Conductivity Solution	UUC Reading	Correction	Uncertainty (±)	Unit
84.00	84.00	0.00	1.1	µS/cm
1.413	1.413	0.000	0.0051	mS/cm
12.88	12.88	0.00	0.051	mS/cm
80.00	80.00	0.00	0.21	mS/cm
111.8	111.8	0.0	0.41	mS/cm

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%

- oOo -



CAL

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Certificate of Calibration

Certificate No. : 67-410025-1

Page : 2 of 2

UUC Condition As-Received : Good

Result of Calibration : Without Adjustment

Function : Temperature measurement

Reference Humidity @ 50 %R.H.

Standard Temperature (°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 -



CAL

Calibratech Co.,Ltd.

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

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



NSC-TISI-TIS 17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-400639-1

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

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

Equipment : Temperature controlled enclosure (Refrigerator)

Manufacturer : M-LAB

Model : BIC-140

Range : N/A °C

Resolution : 0.1 °C

Serial No. : 1011

ID No. : ELABBODC140N03

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

Ambient Temperature : (24.4 to 25.0) °C

Relative Humidity : (40 to 45) %

Line Voltage : (227.0 to 230.0) V

Date of Received : 07 November 2024

Date of Calibration : 07 November 2024

Date of Issue : 13 November 2024

Calibrated by : Permpon Chanpu

Calibration Method : CAL-M4004, TLAŞ 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

67-400442-1

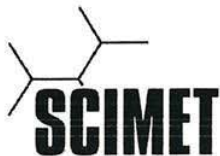
26 Jan 2025

National Institute of Metrology Thailand (NIMT)

The Uncertainties are for a confidence probability of approximately 95%

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



Certificate No. C17240309

Calibration Certificate

Equipment

Oven
Model: ED53
Serial No.(or ID): 13-02277 (ELABHAOVEN2277)
Manufacturer: Binder
Condition: In Condition
Ventilation Valve: Closed Shelves(pc.): 2

Job No.: KSMT2402655
Received Date: 27 September 2024
Issued Date: 30 September 2024
Page: 1 of 5

Customer

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

Calibration Place

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

Calibration Date

27 September 2024

Environment Condition

Temperature: 30.4 °C \pm 1.0 °C
Humidity: 70.3 %RH \pm 5.0 %RH

The Method used

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

Traceability

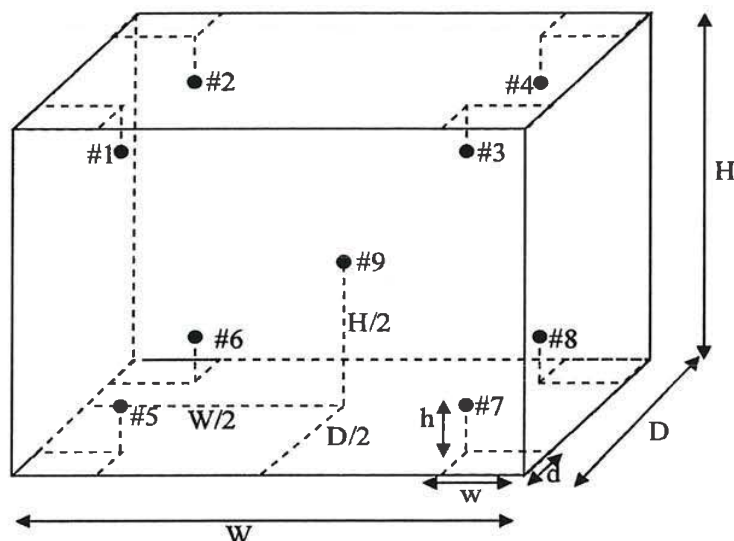
This certificate is traceable to the SI Units maintained by
National Institute of Metrology (NIMT), Thailand through
SCIMET Co.,Ltd.Certificate No. C23240083

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

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

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





Standard Installation Locations

Volume (Calibration Zone)= 21 (Liters)

Inside chamber: $W = 40 \text{ (cm)}$ $D = 33 \text{ (cm)}$ $H = 40 \text{ (cm)}$

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

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

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	101	102	103	104	105	106	107	108	109

Definitions

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

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

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

Measured Stability: The one-half of greatest maximum difference of measured temperature

Overall Variation: The difference of maximum and minimum measured temperatures throu

Calibration Results:

Before adjustment

Desired (°C)	Setting (°C)	Indicating (°C)	#1 (°C)	#2 (°C)	#3 (°C)	#4 (°C)	#5 (°C)	#6 (°C)	#7 (°C)	#8 (°C)	#9 (°C)
85.0	85.0	85.0	87.01	88.17	87.35	87.18	85.19	85.80	85.32	85.05	85.84

After adjustment

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 85.0 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	86.28	1.28	0.58
#2	87.39	2.39	0.58
#3	86.58	1.58	0.58
#4	86.54	1.54	0.58
#5	84.67	-0.33	0.58
#6	85.22	0.22	0.57
#7	84.76	-0.24	0.57
#8	84.63	-0.37	0.58
#9	85.14	0.14	0.58

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
85.0	85.0	85.0	86.28	87.39	86.58	86.54	84.67	85.22	84.76	84.63	85.14	0.58

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
85.0	2.29	0.07	2.89

Note: * Maximum uncertainty of the each position

After adjustment (Cont.)

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 104.5 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	104.52	0.52	0.82
#2	106.25	2.25	0.85
#3	105.03	1.03	0.82
#4	105.00	1.00	0.83
#5	103.10	-0.90	0.82
#6	103.32	-0.68	0.82
#7	103.12	-0.88	0.82
#8	102.58	-1.42	0.82
#9	103.17	-0.83	0.82

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
104.0	104.5	104.5	104.52	106.25	105.03	105.00	103.10	103.32	103.12	102.58	103.17	0.85

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
104.5	3.26	0.21	3.96

Note: * Maximum uncertainty of the each position

After adjustment (Cont.)

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 182.5 °C

Locations	Measured Temperature (°C)	Correction (°C)	Uncertainty (± °C)
#1	181.12	1.12	1.1
#2	183.67	3.67	1.3
#3	181.80	1.80	1.1
#4	181.92	1.92	1.1
#5	179.84	-0.16	1.2
#6	180.90	0.90	1.1
#7	179.77	-0.23	1.1
#8	179.38	-0.62	1.2
#9	179.75	-0.25	1.1

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
180.0	182.5	182.5	181.12	183.67	181.80	181.92	179.84	180.90	179.77	179.38	179.75	1.3

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
182.5	4.48	0.64	5.29

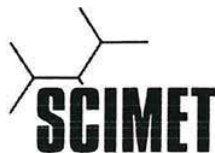
Note: * Maximum uncertainty of the each position

The End of Certificate

บริษัท ชายน์เมท จำกัด (SCIMET CO., LTD.)

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





Refer to Certificate No.: C17240309

Page: 1 of 2

Statements of conformity:

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

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

Tolerance and Decision rules:

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

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

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

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

; PFA: Probability of False Accept

**After adjustment****Desired Temperature : 85.0°C****Tolerances : 1.0 °C**

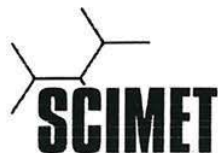
Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 85.0 °C

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	86.28	1.28	0.58	1.0	Condition Fail
#2	87.39	2.39	0.58	1.0	Fail
#3	86.58	1.58	0.58	1.0	Condition Fail
#4	86.54	1.54	0.58	1.0	Condition Fail
#5	84.67	-0.33	0.58	1.0	Pass
#6	85.22	0.22	0.57	1.0	Pass
#7	84.76	-0.24	0.57	1.0	Pass
#8	84.63	-0.37	0.58	1.0	Pass
#9	85.14	0.14	0.58	1.0	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environment

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Email: scimet2022@gmail.com, Tel: 02 460 9239



Refer to Certificate No.: C17240309

Page: 2 of 2

Statements of conformity:(Cont.)**After adjustment (Cont.)****Desired Temperature : 104.0°C****Tolerances : 2.0 °C****Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 104.5 °C**

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	104.52	0.52	0.82	2.0	Pass
#2	106.25	2.25	0.85	2.0	Condition Fail
#3	105.03	1.03	0.82	2.0	Pass
#4	105.00	1.00	0.83	2.0	Pass
#5	103.10	-0.90	0.82	2.0	Pass
#6	103.32	-0.68	0.82	2.0	Pass
#7	103.12	-0.88	0.82	2.0	Pass
#8	102.58	-1.42	0.82	2.0	Condition Pass
#9	103.17	-0.83	0.82	2.0	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

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

After adjustment (Cont.)**Desired Temperature : 180.0°C****Tolerances : 2.0 °C****Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 182.5 °C**

Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	181.12	1.12	1.1	2.0	Condition Pass
#2	183.67	3.67	1.3	2.0	Fail
#3	181.80	1.80	1.1	2.0	Condition Pass
#4	181.92	1.92	1.1	2.0	Condition Pass
#5	179.84	-0.16	1.2	2.0	Pass
#6	180.90	0.90	1.1	2.0	Pass
#7	179.77	-0.23	1.1	2.0	Pass
#8	179.38	-0.62	1.2	2.0	Pass
#9	179.75	-0.25	1.1	2.0	Pass

Correction of UUC.* = Measured Temperature - Desired Temperature

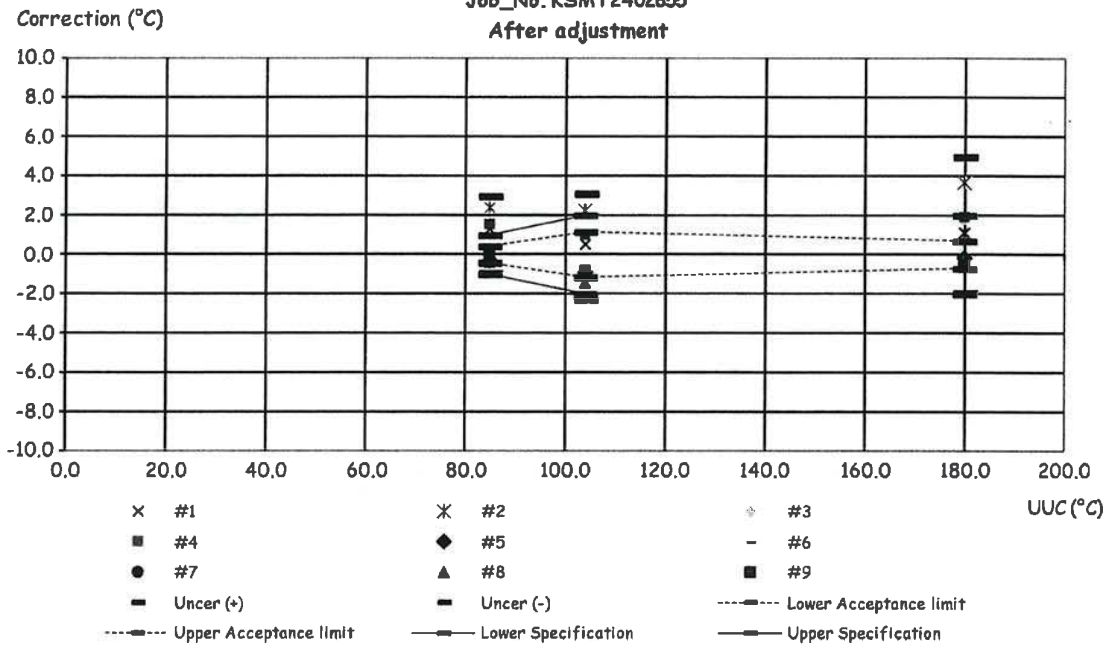
The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements of Conformity**บริษัท ชายนิเทศ จำกัด (SCIMET CO., LTD.)**1194 Soi Wachirathamsathit 57, Bangchak, Phrakhanong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

Corr_Distribution & Max_Measurement Uncertainty

Job_No. KSMT2402655

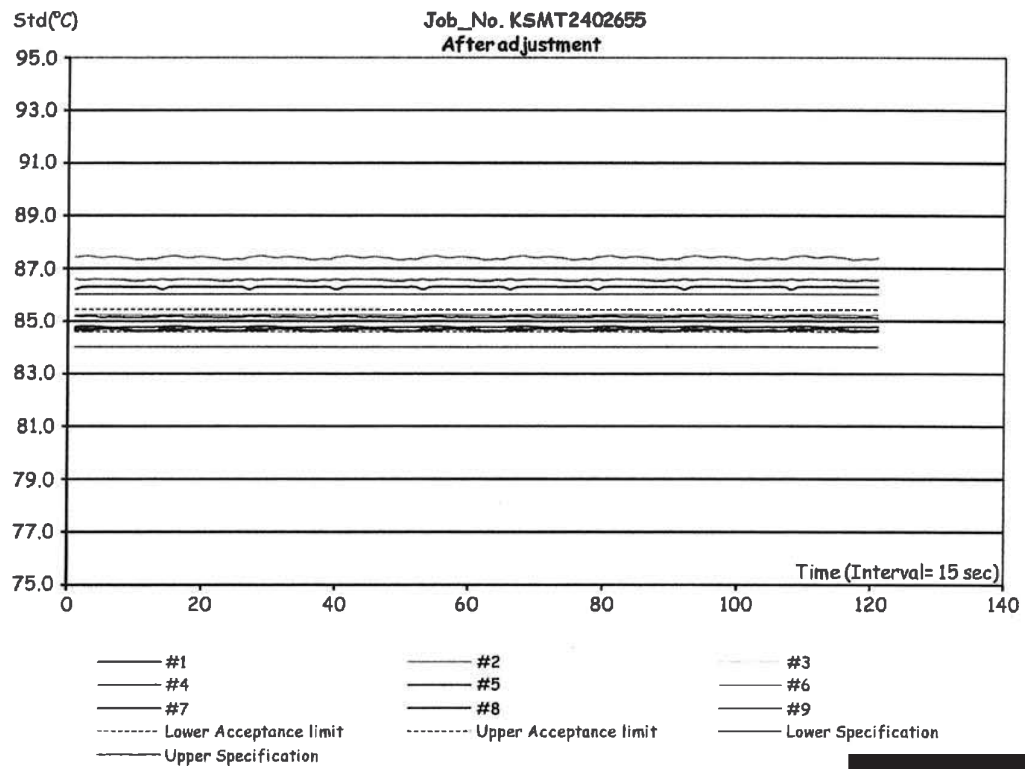
After adjustment

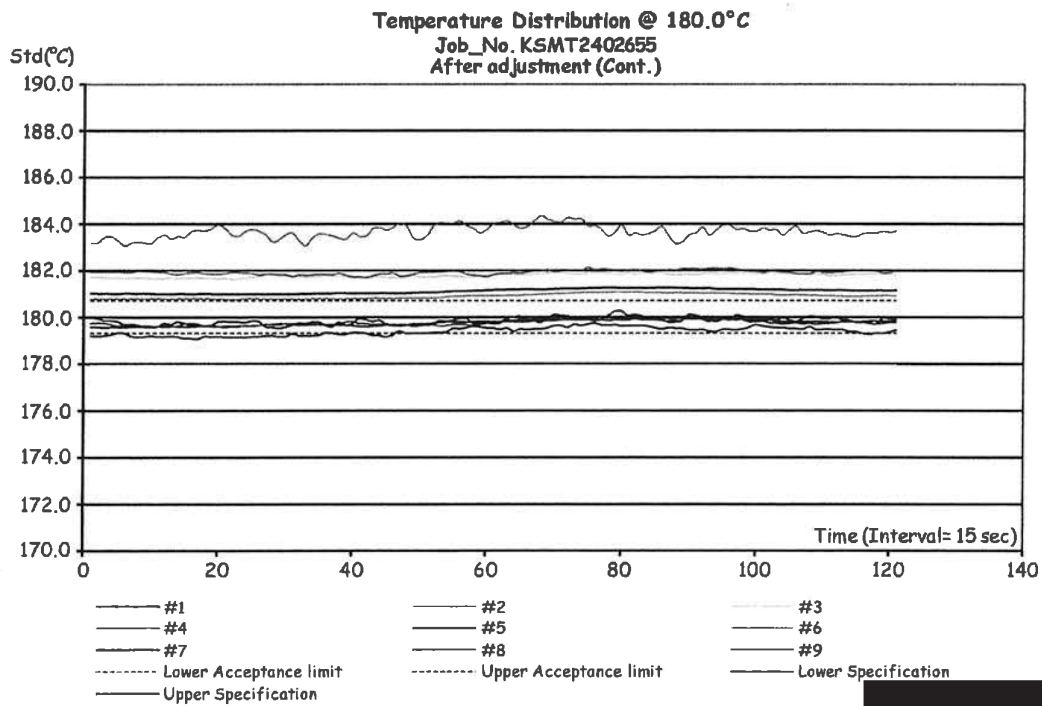
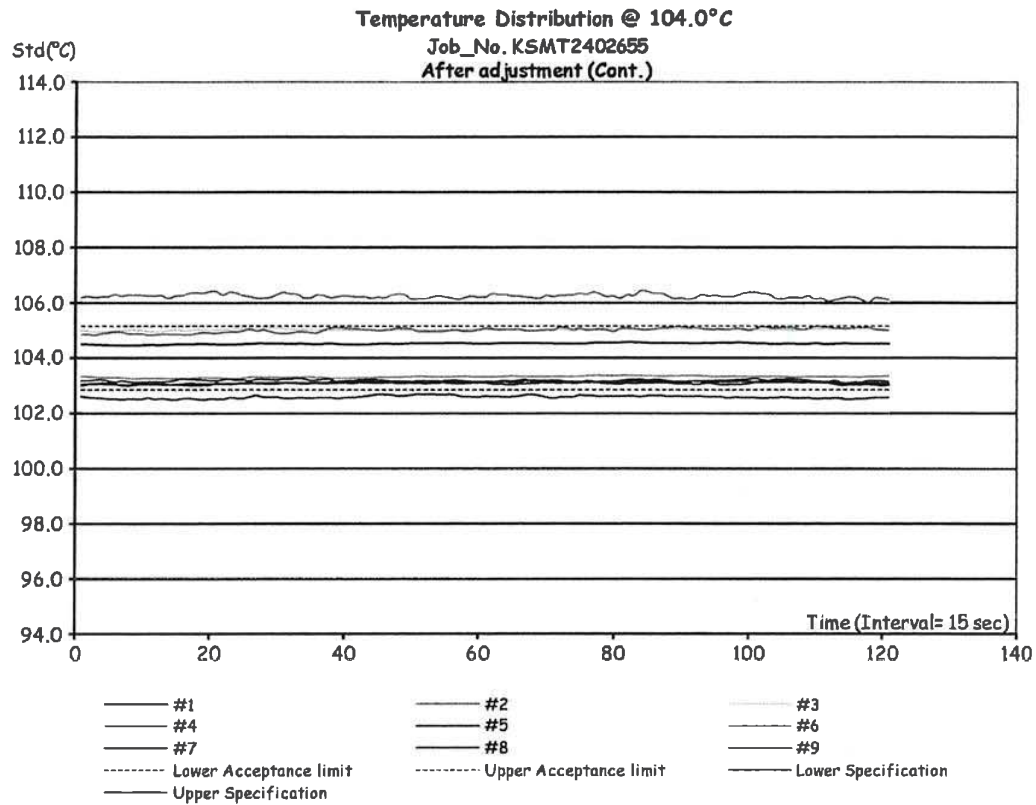


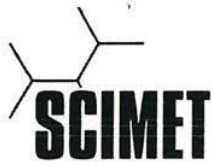
Temperature Distribution @ 85.0°C

Job_No. KSMT2402655

After adjustment







ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSMT2402655

ชนิดเครื่องมือ: Oven

รุ่น: ED53

หมายเลขเครื่อง: 13-02277 (ELABHAOVEN2277)

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

ข้อแนะนำ : * Control Modify Brand M-LAB

Mr. Mongkolwat Hasanon

Service Engineer



บริษัท ชายนันเมก จำกัด (SCIMET CO., LTD.)

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

Certificate of Calibration

Certificate No. : 67-200060-1

Page : 1 of 2

Submitted by : Envilab Co., Ltd.

540, 540/1 Soi Bangkhae7, Bangkhae, 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 :



Envilab Co.,

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.



CAL

Calibratech Co.,Ltd.

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

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

Certificate of Calibration

Certificate No. : 67-200060-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

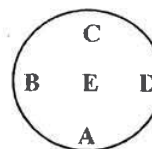
Nominal Value (g)	Correction (g)	Uncertainty \pm (g)
0.1	0.0000	0.00011
0.5	0.0000	0.00011
1	0.0000	0.00011
2	0.0000	0.00011
5	0.0000	0.00011
10	0.0000	0.00011
20	0.0000	0.00013
50	0.0001	0.00014
100	0.0001	0.00020
120	0.0000	0.00038

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 g

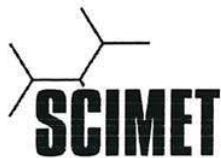


Repeatability

Load test : 100 g
Stdev. : 0.00004 g

- o o o -





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



Certificate No. C17240307

Calibration Certificate

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

Customer

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

Calibration Place

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

Calibration Date

27 September 2024

Environment Condition

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

The Method used

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

Traceability

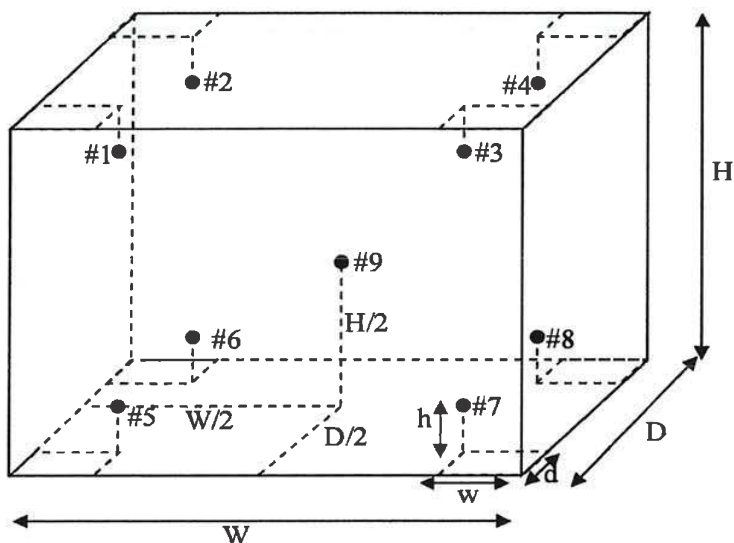
This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through SCIMET Co.,Ltd.Certificate No. C23240083

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

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

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





Standard Installation Locations

Volume (Calibration Zone)= 58 (Liters)

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

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

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

#9: Geometric center of the chamber

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

Definitions

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

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

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

Measured Stability: The one-half of greatest maximum difference of measured temperatures a

Overall Variation: The difference of maximum and minimum measured temperatures through

Calibration Results:

Without adjustment

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

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

Temperature Distribution

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

Chamber Characterization

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

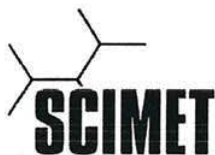
Note: * Maximum uncertainty of the each position

The End of Certificate



บริษัท ชายน์เมท จำกัด (SCIMET CO., LTD.)

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Email: scimet2022@gmail.com, Tel: 02 460 9239



Refer to Certificate No.: C17240307

Page: 1 of 1

Statements of conformity:

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

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

Tolerance and Decision rules:

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

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



Without adjustment

Desired Temperature : 20.0 °C

Tolerances : 1.0 °C

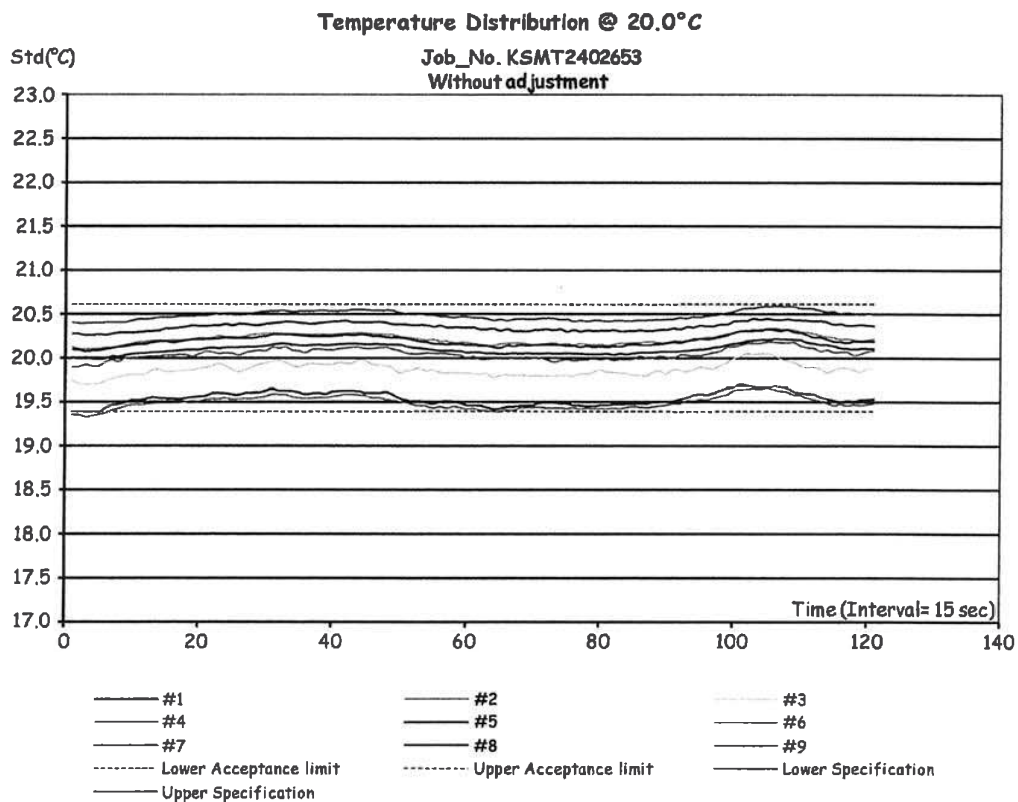
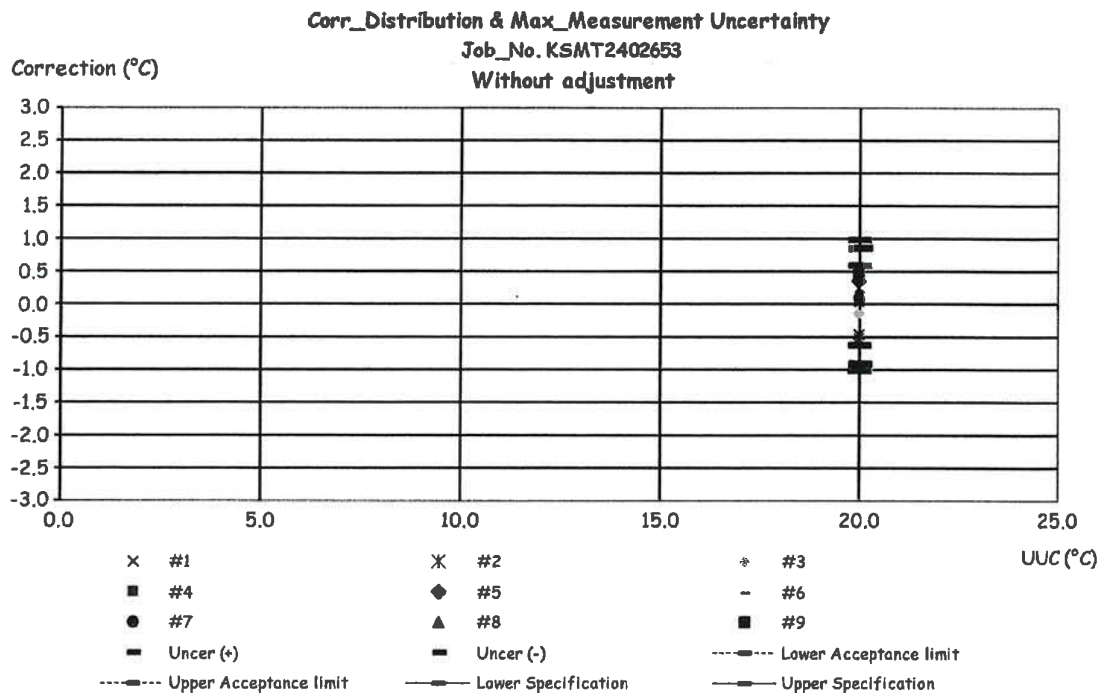
Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 20.0 °C

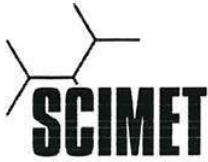
Locations	Measured (°C)	Correction of UUC. (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	19.54	-0.46	0.38	1.0	Pass
#2	19.49	-0.51	0.39	1.0	Pass
#3	19.87	-0.13	0.39	1.0	Pass
#4	20.04	0.04	0.37	1.0	Pass
#5	20.36	0.36	0.36	1.0	Pass
#6	20.21	0.21	0.37	1.0	Pass
#7	20.10	0.10	0.36	1.0	Pass
#8	20.19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

Correction of UUC.* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environm

The End of Statements of Conformity**บริษัท ชายน์เมท จำกัด (SCIMET CO., LTD.)**1194 Soi Wachirathamsathit 57, Bangchak, Phrakhanong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239





ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSMT2402653

ชนิดเครื่องมือ: Cooled Incubator

รุ่น: BIC-140

หมายเลขเครื่อง: 100613-1 (ELABBODC140NO1)

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

ข้อแนะนำ :

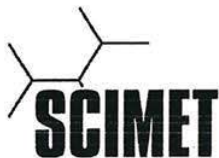
Mr. Mongkolwat Hasanon

Service Engineer



บริษัท ชายนันเมก จำกัด (SCIMET CO., LTD.)

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Phrakhanong, Bangkok 10260 Thailand
Email:scimet2022@gmail.com, Tel: 02 460 9239
https://www.scimet.co.th



Certificate No. C07240032

Calibration Certificate

Equipment:

SPECTROPHOTOMETER

Model:

CARY 60UV-VIS

Serial No.(or ID):

MY17490026 (ELABSPECTRO0002)

Manufacturer:

Agilent

Condition:

In Condition

Job No.:

KSMT2400444

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, Bangkhuae, Bangkok 10160

Calibration Place

Envilab Co., Ltd.(B301 CO-THC ROOM)

540, 540/1 Soi Bangkhuae 7,Bangkhuae, Bangkhuae, 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 Starna Scientific Limited.

The standard for Wavelength Certificate No. 108691 and 108692

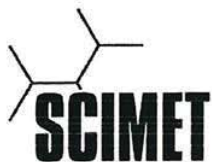
The standard for Photometric Certificate No. 109010 , 114655 and 109009

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.



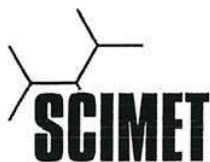
**Calibration Results:****Without Adjustment****Wavelength Accuracy (nm), The spectral bandwidth of Std at 1.5 nm and UUC at 1.5 nm**

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
	0.7293	0.7273	0.0020	0.0080
257 nm	0.0000	-0.0003	0.0003	0.0080
	0.8497	0.8457	0.0040	0.0080
313 nm	0.0000	0.0004	-0.0004	0.0080
	0.2833	0.2810	0.0023	0.0080
350 nm	0.0000	0.0001	-0.0001	0.0080
	0.6299	0.6259	0.0040	0.0080

บริษัท ชายนิเมท จำกัด (SCIMET CO., LTD.)1194 Soi Wachirathamsthit 57, Bangchak, Phrakhanong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

**Calibration Results:**

Without Adjustment

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance (Abs)	Unit Under Calibration (Abs)	Correction (Abs)	Uncertainty of Measurement(\pm Abs)
420 nm	0.0000	0.0000	0.0000	0.0045
	0.2373	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

บริษัท ชัยนิเทศ จำกัด (SCIMET CO., LTD.)

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Refer to Certificate No.: C07240032

Page: 1 of 3

Statements of conformity:

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

The error of temperature determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, ASTM E 275-08 and ASTM E 387-04. Therefore, those parameters have not been assessed separately.

Tolerance and Decision rules:

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

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

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

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

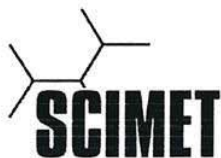
; PFA – Probability of False Accept



บริษัท ชายน์เมท จำกัด (SCIMET CO., LTD.)

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

FC07-03: 30 MAY 2023



Refer to Certificate No.: C07240032

Page: 2 of 3

Without Adjustment**Wavelength Accuracy (nm), The spectral bandwidth of Std at 1.5 nm and UUC at 1.5 nm**

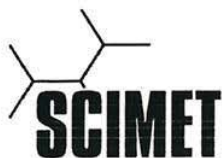
Unit Under Calibration	Correction	Guard Band (w)	Tolerance (\pm)	Conformity
220.0	-0.27	0.14	1.0	Pass
241.8	-0.25	0.16	1.0	Pass
287.6	-0.04	0.14	1.0	Pass
333.7	0.07	0.19	1.0	Pass
360.1	0.35	0.14	1.0	Pass
417.0	0.59	0.14	1.0	Pass
472.3	0.20	0.14	1.0	Pass
513.4	0.07	0.14	1.0	Pass
528.9	-0.02	0.14	1.0	Pass
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 (\pm)	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 ชายนันท์ จำกัด (SCIMET CO., LTD.)**1194 Sol Wachirathamsathit 57, Bangchak, Phrakhanong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

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 (\pm)	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
	1.0542	0.0008	0.0045	0.015	Pass
440 nm	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
	0.7222	0.0008	0.0045	0.015	Pass
	1.0343	-0.0019	0.0045	0.015	Pass
465 nm	0.0000	0.0000	0.0045	0.015	Pass
	0.2143	-0.0017	0.0045	0.015	Pass
	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
546.1 nm	0.0000	0.0000	0.0045	0.015	Pass
	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
590 nm	0.0000	0.0000	0.0045	0.015	Pass
	0.2452	-0.0009	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
635 nm	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.

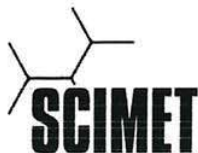
The End of Statements of Conformity



บริษัท ชายนิเมท จำกัด (SCIMET CO., LTD.)

1194 Soi Wachirathamsathit 57, Bangchak, Phrakhanong, Bangkok 10260 Thailand

Email: scimet2022@gmail.com, Tel: 02 460 9239



ใบตรวจสอบสภาพเครื่อง Spectrophotometer

เลขที่ใบงาน: KSMT2400444

ชนิดเครื่องมือ: SPECTROPHOTOMETER

รุ่น: CARY 60UV-VIS

หมายเลขเครื่อง: MY17490026

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
04 Mar 2024			04 Mar 2024		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิทช์ ปิด – เปิด เครื่อง (On-Off Swicth)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. ความยาวคลื่น (Wavelength Check)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. แหล่งกำเนิดแสง (UV < 3,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. แหล่งกำเนิดแสง (Visible < 5,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	10. ช่องวัดหลายตัวอย่าง (Carousel Module)	<input type="checkbox"/>	<input type="checkbox"/>	-

เพิ่มเติม/ข้อแนะนํา :

Mr. Dumrong Boonsopon
Service Engineer

บริษัท ชายนันเมก จำกัด (SCIMET CO., LTD.)

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Agilent CrossLab Start Up Services

Agilent 5100 5110 ICP-OES Preventive Maintenance

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides what you need to reduce unplanned downtime and keep your systems operating at their peak performance.

This checklist is used as a guide for completing the preventive maintenance tasks. A signed copy of this checklist is provided for your records.



Introduction

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures. Customers are responsible for regular maintenance and are encouraged to observe the service representative.
- Any parts not included in the Parts Lists section of this document are not part of the recommended Preventive Maintenance service nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.
- For customers using HF applications, the instrument should be returned to its standard sample introduction system.

Important Customer Web Links

- To access **Agilent University**, visit <http://www.agilent.com/crosslab/university/> to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- To access the **Agilent Resource Center** web page, visit <https://www.agilent.com/en-us/agilentresources>. The following information topics are available:
 - Sample Prep and Containment
 - Chemical Standards
 - Analysis
 - Service and Support
 - Application Workflows
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit <https://community.agilent.com/welcome>
- Videos about specific preparation requirements for your instrument can be found by searching the **Agilent YouTube** channel at <https://www.youtube.com/user/agilent>
- **Need to place a service call?** Flexible Repair Options | Agilent



Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using either a "X" or tick mark "✓".
- Check **"Service not applicable"** check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance services in the most logical order relevant to the individual system service in the order of the tasks listed.
- Complete the **Service Review** section together with the customer.
- Complete the fields for page numbers at the foot of each selected page
- Add relevant page numbers to selected pages and complete the total number of pages field in the Service Completion section
- **Ask the customer to sign the Service Verification section including the customer's and your signature.**

Instrument Maintenance

System Information

- ☐ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument System Name and ID	Instrument System Site and Location
5110 VDU ICP-OES	Envilab Company Limited

List System Component Product Numbers List the Serial Numbers of each Component

1. G 9015 A NY 17490002
2. G 9410 A AU17393768
3. G 9441-80002 1709-05327
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.

ICP-OES Configuration Table	Circle the type or write in the type if other
Nebulizer Type	SeaSpray OneNeb Conical Other
Spray Chamber	Cyclonic Single Pass Cyclonic Double Pass Other
Torch	Radial Dual View Other
Torch Type	One Piece Semi Demountable Fully Demountable Other
	2.4mm 1.8mm 1.4mm 0.8mm Other
	Quartz Ceramic Other

Preparation

- ☒ Discuss any specific issues with the customer before starting.
- ☒ Review the instrument logbook for recorded problems and comments.
- ☒ Save instrument control settings before starting the procedure.
- ☒ Perform a general inspection of the system for cleanliness.
- ☒ Check for proper installation of parts, assemblies, sensors etc.
- ☒ Check system for required installation of components and implementation of Service Notes
- ☒ Check for required firmware/software updates and verify with customers if they would like them installed.
- ☐ For HF application systems, if standard sample introduction system was not installed, ask the customer to install it. With
- ☒ Ask the customer to remove any samples from the ICP-OES sample introduction area, auto sampler or around the ICP-OES.

Preventive Maintenance Procedures

Record Pre-PM Instrument performance

- ☒ Run Instrument Performance test.
- ☒ Record results in Instrument Performance Test Results Table – Pre-PM.

Clean and inspect ICP-OES system

- ☒ Look for any obvious external damage or problems.
- ☒ Inspect water cooling hoses, gas lines and power cord for excessive wear or damage.
- ☒ Perform a general internal inspection of the system for excessive dust accumulation, clean if necessary.
- ☒ Inspect sample introduction components and record any required maintenance in the Service Engineer Comments and notify the customer as the required actions required.
- ☒ Record the instrument operating conditions in the ICP-OES Status Results Table.
- ☒ Replace the polychromator purge filter.
- ☒ Replace the radial pre-optics window
- ☒ Replace the axial pre-optics window for SVDV and VDV instruments.
- ☒ Check exhaust flow for the correct positive extraction at the exhaust duct to insure they meet minimum specifications.
- ☒ Replace air inlet dust filter.
- ☒ Replace high capacity air inlet dust filter element if installed N18
- ☒ Remove and clean instrument water inlet filter.

Agilent Water Recirculator

- ☒ Service not applicable
- ☒ Drain cooling fluid and remove any particles from the chiller reservoir
- ☒ Remove, clean and reinstall water inlet metal mesh filter if present.
- ☒ Cool Clear cooling fluid.
- ☒ system Air filter and the condenser.

SPS 3 Auto Sampler

- ☒ Service not applicable
- ☒ Power cycle the autosampler and verify successful initialization.
- ☒ Inspect X and Z axis belts for wear. Replace is necessary.
- ☒ Clean X and Z axis slide shafts.
- ☒ Using customer's racks and the Agilent software move the sample probe to the 4 outermost corners and rinse port, ensure that the probe is approximately centered in the vial.

SPS 4 Auto sampler

- ☒ Service not applicable
- ☒ Clean the spill tray, rack location mat, end frames and chassis with a damp soft cloth and diluted mild detergent.
- ☒ Clean the auto sampler cover panels, if cover kit is installed, with domestic window cleaner.
- ☒ Check the X-axis and Z-axis drive belts for cracks, splits, damaged teeth, excessive fraying, color changes or degradation from fumes.
- ☒ Check the X-axis, Theta-axis and Z-axis FFC cables for cracks, incorrect positioning, damaged edges or damaged connectors.
- ☒ Pump Tubing Replacement. Replace peristaltic pump tubing. Replace all tubing that goes from the rinse station to the pump and from the pump to the waste/rinse bottles only checked, passed
- ☒ Test using customer's tray and move the sample probe to the sample vial 1, wash vial and rinse port and ensure that the probe is centered in the vial. If not use calibration wizard and calibrate the position.

AVS 4, 6, 7 Advanced Valve System

- ☒ Service not applicable
- ☒ Replace valve rotor seal
- ☒ Check fittings for signs of leaks
- ☒ Check tubing including autosampler tubing for kinks or excessive wear
- ☒ Check high flow pump for signs of leaks

ICP-OES adjustment

- ☒ Check position of Zn peak, adjust if required.
- ☒ Check Argon Ratio, adjust to specified value if required.
- ☒ Perform Detector Calibration.
- ☒ Perform Instrument Calibration.

Record Post-PM instrument performance

- ☒ Run Instrument Performance test.
- ☒ Record results in Instrument Performance Test Results Table - Post PM.
- ☒ For systems using ICP Expert version 7.3 and above, run the following instrument tests

- ☒ Subsystem Communications Test
- ☒ Air Flow
- ☒ Water Flow
- ☒ Gas Flows
- ☒ RF Generator
- ☒ Camera Test
- ☒ Optics Test
- ☒ Nebulizer Test

- ☒ Record the result in the Instrument Test Results Table



2022

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Restore Instrument

- ☐ For HF applications, ask the customer to reinstall their sample introduction system. N/A
- ☒ Leave system in an Idle state: on and purging.
- ☒ Guidance: If the PM service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

Service Review

- ☒ Attach available reports/printouts of all tests to this documentation.
- ☒ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☒ Record the PM event in the Smart Alerts logbook, if applicable.
- ☒ Update/reset instrument maintenance counters as appropriate.
- ☒ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☒ Complete the Service Engineer Comments section if there are additional comments.
- ☒ Review this service, parts replaced, and test results obtained with the customer.
- ☒ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box. Systems in a compliant environment may need additional documentation.
- ☒ Complete the Signature Page with both Service Engineer and Customer signatures.

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Document Number: 68014-90075
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Test Results

Instrument Performance Test Results Table

Note: These measurements do not form part of any specification and are for reference only.

	Pre PM Sensitivity Check		Post PM Sensitivity Check	
	Radial	Axial*	Radial	Axial*
Zn 213.857 nm SRBR	1597.1	3332.6	2349.2	6129.9
Mn 257.610 nm SRBR	10945.3	16143.3	10764.1	39033.2
Al 396.152 nm SBR	7.0	16.3	8.5	25.7
K 766.491 nm SBR	0.2	67.3	4.7	83.6

* Axial result is not applicable for G8016AA, G8012AA Radial View instruments.

Instrument Test Results Table

Note: The Instrument Test results are for systems using ICP Expert version 7.3 and above only.

Instrument Test	Result
Subsystem Communications Test	Pass
Air Flow	Pass
Water Flow	Pass
Gas Flows	Pass
RF Generator	Pass
Camera Test	Pass
Optics Test	Pass
Nebulizer Test	Pass

ICP-OES Status Results Table

Note: These measurements do not form part of any specification and are for reference only.

Measurement	Standby Mode		Plasma On	
Mains Voltage	219.371	VAC	217.434	VAC
Mains Current	0.082	A	0.098	A
Instrument Temperature	23.5	°C	23.1	°C
RF Air Flow (sensor speed)	13.0	Hz	19.0	Hz
Plasma Exhaust Temperature	No measurement		36.4	°C
Water Flow Oscillator	No measurement		1.91	L/min
Water Flow Detector	1.09	L/min	1.06	L/min
Water Inlet Temperature	16.9	°C	16.7	°C
Polychromator Temperature	35.0	°C	35.0	°C
CCD Temperature	-39.6	°C	-39.4	°C
Thermal Stabilizer	55.0	°C	55.0	°C
Argon Supply Pressure	619.13	kPa	550.32	kPa
Purge Gas Supply Pressure*1	616.63	kPa	597.43	kPa
Option Gas Supply Pressure*1	-	kPa	-	kPa
Nebulizer Flow	No measurement		0.70	L/min
Nebulizer Back Pressure	No measurement		293.17	kPa
Plasma Gas Flow	No measurement		11.99	L/min
Auxiliary Gas Flow	No measurement		1.00	L/min
RF Power	No measurement		195.1	W
RF Supply Current	No measurement		8.190	A
RF Supply Voltage	No measurement		194.557	V

*1 If option installed

Consumed PM Parts

Part Description	Part Number	Product or Model# where used	Quantity consumed
Axial Pre-Optic Window	G8010-68014	G8010A, G8011A, G8014A/G8015A	1
Radial Pre-Optic Window	G8010-68015	All	1
Agilent Cool Clear Coolant Fluid	5799-0037	Agilent Water Recirculator	-
Purge Gas Filter	G8010-60136	All	1
Air Inlet filter	G8000-60002	All	1
High Capacity Air Filter	G8010-60189	Optional	-
Rotor seal for 6-7 port valve for AVS6/7	G8494-60002	G8494A/G8495	-
Rotor seal for 4 port valve for AVS4	G8493-60002	G8493A	-
Rinse solution to rinse station 2.5mm id x 1m	G8410-80123	SPS 4	-
Barb connector 2.5mm-1.5mm ID	G8410-80124	SPS 4	-
PVC waste tubing 8mm od x 5mm id, 2m	G8410-80122	SPS 4	-
Additional Parts may be required from engineer's stock:			
X axis drive belt	5410047500	SPS 3	-
Z axis drive belt	5410047400	SPS 3	-
Peristaltic pump tubing, PVC SolvaFlex 3 bridged,	3710049000	SPS 4	-

Consumed Parts Reference

(Purchased by customer, not included as part of PM)

Section Not Applicable.

Part Description	Part Number	Product or Model# where used	Quantity consumed
------------------	-------------	------------------------------	-------------------

Signature Page

Service Engineer Comments (optional)

If there are any specific points you wish to note as part of performing the installation or other items of interest for the customer, please write in this box.

Service Verification

Service Request Number: 6006121636
Service Engineer Name: Kanyakorn S.
Service Engineer Signature: Kanyakorn S.
Date Service Completed: 31 May 2023
Customer Name: Kanyakorn S.
Customer Signature: Kanyakorn S.
Total number of pages in this document: 14

Report Summary

Instrument Model

Agilent 5100/5110 VDV ICP-OES

Instrument ID

G8011A/G8015A

Instrument Serial Number

MY17490002

Software Version

7.4.0.10280

Firmware Version

3562

Tested By

Kanyakorn S.

Test Started On

5/31/2023 12:22:01 PM

Test Completed On

5/31/2023 12:26:21 PM

Result Summary

Subsystem Communications Test

Pass

Air Flow Test

Skipped

Water Flow Test

Skipped

Gas Flows Test

Skipped

RF Generator Test

Skipped

Camera Test

Skipped

Optics Test

Pass

Advanced Valve System Test

Skipped

Resolution Test

Pass

Sensitivity Test

Pass

Precision Test

Pass

Subsystem Communications Test

Pass

Optics Test

Radial

Intensity

3397602

Axial

2923418

Wavelength

737.212

Resolution Test				Pass
Element	Wavelength	Specification	Width	
N	(174.213 nm)	≤ 9.40	6.72	
As	(188.980 nm)	≤ 8.20	6.49	
C	(193.027 nm)	≤ 11.50	8.01	
Mo	(202.032 nm)	≤ 8.20	6.43	
Cr	(206.158 nm)	≤ 13.40	8.50	
Zn	(213.857 nm)	≤ 8.70	7.16	
Pb	(220.353 nm)	≤ 9.50	7.51	
Co	(228.615 nm)	≤ 17.20	11.32	
Ba	(230.424 nm)	≤ 9.40	7.80	
Mn	(257.610 nm)	≤ 13.30	9.78	
Mn	(260.568 nm)	≤ 20.30	13.88	
Cr	(267.716 nm)	≤ 11.00	9.09	
Cu	(324.754 nm)	≤ 25.00	18.88	
Cu	(327.395 nm)	≤ 14.20	12.41	
Sr	(338.071 nm)	≤ 33.50	24.27	
Ba	(455.403 nm)	≤ 44.00	34.07	
Sr	(460.733 nm)	≤ 36.00	22.56	
Ba	(493.408 nm)	≤ 36.00	27.79	
Ba	(614.171 nm)	≤ 42.00	27.97	
Ar	(675.283 nm)	≤ 74.00	62.41	
K	(766.491 nm)	≤ 80.00	65.95	

Sensitivity Test

Pass

Radial

Element Wavelength	Specification	Method	Ratio	Standard	Blank
As (188.980 nm)	≥ 46.0	SRBR	108.0	934.0	64.8
Se (196.026 nm)	≥ 41.0	SRBR	110.2	1159.4	93.6
Zn (213.857 nm)	≥ 1421.0	SRBR	2348.2	23561.0	99.8
Pb (220.353 nm)	≥ 46.0	SRBR	98.7	1075.1	98.0
Mn (257.610 nm)	≥ 3518.0	SRBR	10768.1	218704.5	411.0
Al (396.152 nm)	≥ 3.4	SBR	8.5	40909.0	4325.8
Ba (493.408 nm)	≥ 34.0	SBR	111.9	1396218.4	12367.4
K (766.491 nm)	≥ 1.8	SBR	4.7	108989.7	19076.8

Axial

Element Wavelength	Specification	Method	Ratio	Standard	Blank
As (188.980 nm)	≥ 208.0	SRBR	267.6	3134.3	126.3
Se (196.026 nm)	≥ 159.0	SRBR	284.6	4158.5	194.0
Zn (206.200 nm)	≥ 234.0	SRBR	495.4	1165.9	5.5
Zn (213.857 nm)	≥ 1743.0	SRBR	6129.9	92298.3	225.6
Cd (214.439 nm)	≥ 4227.0	SRBR	16998.9	48382.7	8.1
Pb (220.353 nm)	≥ 320.0	SRBR	416.4	6520.1	228.4
Mn (257.610 nm)	≥ 10625.0	SRBR	39073.2	1331904.8	1159.9
Cr (267.716 nm)	≥ 1048.0	SRBR	5986.5	203686.5	1144.7
Cu (324.754 nm)	≥ 19.0	SBR	77.1	389900.7	4991.6
Al (396.152 nm)	≥ 6.0	SBR	25.7	268775.7	10073.7
Ba (493.408 nm)	≥ 60.0	SBR	293.9	8244793.3	27957.8
K (766.491 nm)	≥ 24.0	SBR	83.6	3030541.1	35817.8



Precision Test

Pass

Radial

Element Wavelength	Specification	Measured Value % RSD
As (188.980 nm)	≤ 2.60	0.75
Se (196.026 nm)	≤ 2.60	0.69
Zn (213.857 nm)	≤ 1.50	0.27
Pb (220.353 nm)	≤ 2.60	1.06
Mn (257.610 nm)	≤ 1.50	0.30
Al (396.152 nm)	≤ 1.50	0.27
Ba (493.408 nm)	≤ 1.50	0.99
K (766.491 nm)	≤ 1.50	0.25

Axial

Element Wavelength	Specification	Measured Value % RSD
As (188.980 nm)	≤ 1.50	0.54
Se (196.026 nm)	≤ 1.50	0.48
Zn (206.200 nm)	≤ 1.50	1.06
Zn (213.857 nm)	≤ 1.50	0.48
Cd (214.439 nm)	≤ 1.50	0.33
Pb (220.353 nm)	≤ 1.50	0.37
Mn (257.610 nm)	≤ 1.50	0.77
Cr (267.716 nm)	≤ 1.50	0.62
Cu (324.754 nm)	≤ 1.50	0.45
Al (396.152 nm)	≤ 1.50	0.45
Ba (493.408 nm)	≤ 1.50	0.80
K (766.491 nm)	≤ 1.50	0.91

Report Summary

Instrument Model	Agilent 5100/5110 VDV ICP-OES
Instrument ID	G8011A/G8015A
Instrument Serial Number	MY17490002
Software Version	7.4.0.10280
Firmware Version	3562
Tested By	Kanyakorn S.
Test Started On	5/31/2023 12:34:17 PM
Test Completed On	5/31/2023 12:46:55 PM

Result Summary

Subsystem Communications Test	Pass
Air Flow Test	Pass
Water Flow Test	Pass
Gas Flows Test	Pass
RF Generator Test	Pass
Camera Test	Pass
Optics Test	Skipped
Advanced Valve System Test	Skipped
Resolution Test	Skipped
Sensitivity Test	Skipped
Precision Test	Skipped

Subsystem Communications Test Pass

Air Flow Test		Pass
30% Air Flow (relative speed)	75% Air Flow (relative speed)	
12.00	18.00	

Water Flow Test	Pass
-----------------	------

RF Water Flow(L/min)	Camera Water Flow (L/min)	Water Inlet Temperature (°C)
1.45	1.06	16.78

Gas Flows Test	Pass
----------------	------

Nebulizer Target Flow	Actual Flow	Back Pressure
0.70	0.71	280.77

Makeup Target Flow	Actual Flow	Back Pressure
2.00	1.99	95.26

RF Generator Test	Pass
-------------------	------

RF Power Supply Test	Passed
RF Power Supply (V)	147.418

RF Oscillator Test	Passed
RF Oscillator Frequency (MHz)	25.961
Work Coil Current (A)	45.326
RF Power Supply Current (A)	2.000

Camera Test	Pass
-------------	------

	Integration Time (ms)	Standard Deviation	Status
Electronic Offset Test	1000	5.120	Passed
Array Test	5	0.015	Passed
Linearity Test		0.122	Passed



PinAAcle 900F Preventive Maintenance Report

Company Name: ENVILAB CO.,LTD
Instrument Location: 540-540/1, SOI BANGKHAE 7, BANGKHAE
BANGKOK, 10160,
Instrument Serial No.: PFBS20011403
Date: 05-Oct-2023

PinAAcle 900F Preventive Maintenance (PM)				
Company Name:		ENVILAB CO.,LTD		
Address (Instrument Location):		540-540/1, SOI BANGKHAE 7, BANGKHAE, BANGKOK, 10160,		
Serial Number:	PFBS20011403	PM Number:	3/4	
Customer Name (if applicable):	K. JENJIRA	Telephone Number:	095-550-0510	
Customer Support Engineer Name:	K. DUANG	Service Order Number:		
Date PM Performed: (DD-MM-YYYY)	Oct 5, 2023	Next PM Due Date: (DD-MM-YYYY)	Apr 5, 2024	
Standard Labor Hours to Complete PM :			5 hours	

Part Number	Release	Publication Date	
09370145 Rev.9	A	January 2018	

Scope
The purpose of this PM is to ensure the continued functionality of the PinAAcle 900F by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer.
The customer should save their method before the PM begins.

General Instructions:
The customer must provide the engineer operational data to demonstrate recent instrument performance prior to starting the PM.
Always check with the customer before making any changes that may affect the customer's analysis or calibration, including a current back-up of system software and/or data files.
The completed document should be signed by an authorized PerkinElmer and customer representative and left with the customer.
Update the PM sticker and instrument logbook as required.

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Component List

Component / Specific Model	Serial #	Configuration Notes

Parts Lists

Parts included with the PM		
Part Number (if applicable)	Description	Quantity
B0501696	Fan Filters	N/A
N3160156	O-Ring Kits for Sampling Introduction (Stainless Steels Nebulizer)	N/A
N3160157	O-Ring Kits for Sampling Introduction (Plastic Nebulizer)	N/A
N9301714	Replacement Acetylene Filter Cartridge	N/A
TH001022	Replacement Air Filter Cartridge	N/A

Additional Reagents and Standards Required for PM			
Part Number (if applicable)	Description	Quality	Batch/Lot # Expired Date (MM/YY)
N9300183	1000 mg/L Copper Standard	AR	27-86CUY1 30-Jan-2024

Additional Reagents and Standards Required for PM (Customer Support Solution)			
Part Number (if applicable)	Description	Quantity	Batch/Lot # Expiration Date (MM/YY)
N/A	DI Water	250 mL	AR AR
N/A	0.5% HNO ₃	250 mL	AR AR

Additional Tools Required for PM			
Part Number (if applicable)	Description	Quantity	Serial #
N1013000	0.2A Neutral density filter	1	MGO-252
N1013002	1.0A Neutral density filter	1	MGO-358
03030997	System 2 EDL Driver	1	03030997
N3050605	As System 2 EDL	1	16148
N3050121	Cu Lumina HCL	1	092216-010130
N3050109	Ba Lumina HCL	1	102416-040160
N3050139	K Lumina HCL	1	110716-010060
N3050152	Ni Lumina HCL	1	100516-030190

Procedure Checklist

Use (✓) to check off those steps in the checklist that have been completed.

1. General:

- ☒ Review the instrument performance with the customer and document any recent problems.
- ☒ Review the customer log book and make any appropriate PM entries.
- ☒ Perform general inspection of system for cleanliness.

2. PC Instrument Software:

- ☒ Instrument Software user files/databases archived, packed, and/or deleted as needed.

3. Mechanical:

- ☒ Inspect and clean all fans and filters. Replace filters if necessary.
- ☒ Inspect all gas lines for leaks and/or wear. Replace if needed.
- ☒ Clean exterior of the instrument.
- ☒ Inspect the burner head, burner chamber, and nebulizer. Clean if needed as stated in the Hardware Guide.
- ☒ Check burner head dimensions with the feeler gauge as stated in the Hardware Guide in the Maintenance chapter section on cleaning the burner head and checking sloth width. Replace if out of specification.
- ☒ Check the condition of the end cap, burner head, and nebulizer O-rings. Replace if necessary.
- ☒ Check the drain system for signs of wear. Replace worn or damaged parts.
- ☒ Visually check for proper flame conditions when igniting the Air-C2H2 and N2O-C2H2 flames (if applicable).

4. Electrical:

- ☒ Inspect PC boards. Clean if necessary.
- ☒ Carefully check all internal and external cable connections.
- ☒ Check instrument firmware revisions upgrade to current levels (if necessary)
- ☒ Run Diagnostics Test within the Advanced function of the Spectrometer page. Check the results in the service log folder in the Spectrometer BM Log Viewer.

5. Optics:

- ☒ Inspect and clean the sample compartment windows, if needed.
- ☒ Inspect optics. Clean or replace if necessary,

6. Gasses:

- ☒ Verify that the Gasses supplied to the instrument are within the pressure and purity specifications found in the PinAAcle 900 Series Pre-Installation Checklist SDB.
- ☒ Verify that the acetylene filter and air filter element is dry. Replace if necessary.

7. Flame Interlock Check:

Description: Check to ensure that all safety interlocks are closed.

Parameter	Specification	Test Results	Pass/Fail
Flame Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Passed
Drain Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Passed
Nebulizer Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Passed
C ₂ H ₂ Pressure Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Passed
Air Pressure Sensor	Air/C ₂ H ₂ Flame correctly shuts down	Active	Passed
Burner Head Sensor	Choosing Nitrous Oxide as the oxidant should trigger an interlock shuts down	Active	Passed

8. After PM Performance tests:

8.1 Detector Linearity with Barium

Description: Ensures that the detector is linear in the Visible Range.

Parameter	Specification	Certificate Value at 553.6 nm (Abs.)	Test Results	Pass/Fail
1.0 A ND Filter	± 5% from Cert.	0.9798	0.9915	Passed
0.2 A ND Filter	± 5% from Cert.	0.2042	0.2037	Passed

8.2 Baseline Noise at 1.0 Absorbance with Barium

Description: Ensures that a high absorbance will not produce excessive noise.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.010	0.0014	Passed

8.3 AA Baseline Noise with Copper

Description: Check baseline noise.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.001	0.0004	Passed



8.4 D₂ Background Compensation with Copper

Description: Verifies the instruments ability to compensate for background absorption.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤0.010	0.0091	Passed

8.5 AA-BG Baseline Noise with Copper

Description: Ensures that background correction does not produce excessive noise.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤0.005	0.0003	Passed

8.6 AA-BG Baseline Noise with Arsenic

Description: Ensures that background correction does not produce excessive noise at a low wavelength.

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤0.005	0.0025	Passed

8.7 Flame Sensitivity

Description: Instrument Sensitivity checked against Copper standard.

Standard Copper Sensitivity	Specification	Results (Abs.)	Pass/Fail
5 mg/L Sensitivity SS Neb (if applicable)	> 0.250 Abs.	NA	Not Applicable
2 mg/L Sensitivity HS Neb (if applicable)	> 0.250 Abs.	0.3421	Passed

Review:

- ☒ Review with the customer PM work performed.
- ☒ Review with the customer routine maintenance procedures.
- ☒ Discuss recommended customer supplied materials to have on hand.
- ☒ Attach PM sticker.



Additional Comments

Additional Comments Regarding the PM

Review

The preventive maintenance checks and if applicable performance tests for PinAAcle 900F have been completed.

This PinAAcle 900F ☒ Passes ☐ Fails ☐ the preventive maintenance.

Review of Preventive Maintenance:

Authorized PerkinElmer Representative:	<i>Wang</i>	Date: 05-Oct-2023 (DD-MMM-YYYY)
Authorized Customer Representative:	<i>1314931</i>	Date: 05-Oct-2023 (DD-MMM-YYYY)

Atomic Absorption/FIAS 100/400 Preventive Maintenance (PM)				
Company Name:	ENVILAB CO.,LTD			
Address (Instrument Location):	540-540/1, SOI BANGKHAE 7, BANGKHAE, BANGKOK, 10160,			
Room Number:	-			
Asset Number (if applicable):		Customer System ID:	K.JENJIRA	
Service Engineer Name:	K. DUANG	Service Order Number:		
Date PM Performed: (DD-MM-YYYY)	05-Oct-2023	Next PM Due Date: (DD-MM-YYYY)	05-Apr-2024	

Part Number	Release	Publication Date	 PerkinElmer®
09370005	C	January 2013	

Scope
The purpose of this PM is to ensure the continued functionality of the Atomic Absorption/FIAS 100/400 by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer.
The customer should save their method before the PM begins.

General Instructions:
Always check with the customer before making any changes that may affect the customer's analysis or calibration.
The completed document should be signed by an authorized PerkinElmer and customer representative and left with the customer.
Update the PM sticker and instrument logbook as required.

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Component List

Component / Specific Model	Serial #	Firmware Version	Configuration Notes

Parts Lists

Parts Included with the PM			
Part Number (if applicable)	Description	Quantity	Expiration Date (MM/YY)
B050 2706	Fan Filter	1	

Additional Tools Required for PM			
Part Number (if applicable)	Description	Quantity	Calibration Due Date (MM/YY)
	Digital Volt Meter	1	

Additional Reagents and Standards Required for PM			
Part Number (if applicable)	Description	Quantity	Expiration Date (MM/YY)

Procedure Checklist

Use (✓) to check off those steps in the checklist that have been completed.

1. General:

- ☒ Review the instrument performance with the customer and document any recent problems.

☒ Is the Working Environment Acceptable? If not, document.

NO

☒ Visual Damage (if yes, describe)

NO

- ☒ Check incoming AC line voltage for proper levels and grounding.
☒ Verify Voltage switch on back of instrument is correct.
☒ Perform general inspection of system for cleanliness. Clean if needed.
☒ Gas supply cylinders secured, lines leak checked and argon or nitrogen supply pressure verified (45 – 58 psi).
☒ Inspect the customer log book and make any appropriate PM entries.
☒ Fan checked and filter cleaned
☒ Heating mantle or Universal Cell Holder checked

2. Instrument components

- ☒ Non-return valve checked/repairs/replaced if needed (B019 8111). Clean the valve if there is any liquid in it. Replace the rubber sleeve (B013 5123) if it is worn. Check the flow meter for any signs of fluid in it. Clean the flow meter if needed.
☒ Verify condition of pump pressure adjustment levers (B050 7794 - look for cracks or problems with the springs), pump rollers (B300 0251 check for wear), and thumb screws (B050 7796).
☒ Check the Multiport valve for proper switching, flow, and insure there are no leaks. Clean valve parts and replace o-rings if needed (large o-ring: B050 1250, small o-ring: B004 5095). Use a squirt bottle & fishing line to try to dislodge clogs.
☒ Firmware Version checked. Latest is 2.20.

Mixing/Separation Assembly & Pump Tubing:

- ☒ Mixing separator assembly checked
☒ Filter/membrane checked (B050 8306)
☒ Condition of the pump tubing (replace if necessary), correct pump tubing for the solutions being run. Make sure the correct magazines are being used. B050 7791 for 0.13 – 1.80 mm tubing. B050 7792 for 1.60 – 3.18 mm tubing.

4. Cell, Cell Windows, Transfer Line:

- ☒ Cell checked
☒ Cell windows checked
☒ Transfer line checked for moisture (if moisture is a problem, the Nafion dryer might be needed)

5. Operational Tests:

- ☒ Run DI water through the carrier/reductant/sample system. Verify smooth flow of liquid throughout without leaks. Replace tubing & fittings if needed.

6. Review:

- ☒ Review with the customer PM work performed.
☒ Review with the customer routine maintenance procedures.
☒ Discuss recommended customer-supplied materials to have on hand.
☒ Attach PM sticker.
☒ Update Logbook.

2. Instrument components

- ☒ Non-return valve checked/repairs/replaced if needed (B019 8111). Clean the valve if there is any liquid in it. Replace the rubber sleeve (B013 5123) if it is worn. Check the flow meter for any signs of fluid in it. Clean the flow meter if needed.
☒ Verify condition of pump pressure adjustment levers (B050 7794 - look for cracks or problems with the springs), pump rollers (B300 0251 check for wear), and thumb screws (B050 7796).
☒ Check the Multiport valve for proper switching, flow, and insure there are no leaks. Clean valve parts and replace o-rings if needed (large o-ring: B050 1250, small o-ring: B004 5095). Use a squirt bottle & fishing line to try to dislodge clogs.
☒ Firmware Version checked. Latest is 2.20.

Mixing/Separation Assembly & Pump Tubing:

- ☒ Mixing separator assembly checked
☒ Filter/membrane checked (B050 8306)
☒ Condition of the pump tubing (replace if necessary), correct pump tubing for the solutions being run. Make sure the correct magazines are being used. B050 7791 for 0.13 – 1.80 mm tubing. B050 7792 for 1.60 – 3.18 mm tubing.

Additional Comments

Additional Comments Regarding the PM

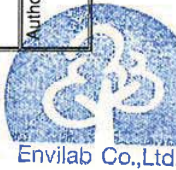
Review

The preventive maintenance checks and if applicable performance tests for FIAS 100/400 have been completed.

This FIAS 100/400 Passes ☒ Fails ☐ the preventive maintenance.

Review of Preventive Maintenance:

Authorized PerkinElmer Representative:	<i>Augy</i>	Date: 05-Oct-2023 (DD-MMM-YYYY)
Authorized Customer Representative:	<i>king</i>	Date: 05-Oct-2023 (DD-MMM-YYYY)



Document History

Revision	Description of Change	Page(s)	Date
A	First release		May 2008
B	Addition of Batch/Lot Number, Expiration Date, and Report Fields.	2,7	February 2009
C	Update to new format	All	January 2013



PerkinElmer

PerkinElmer TruQ

PerkinElmer Number: N9300183

Element and Matrix: 1000 µg/mL Copper in 2% HNO₃

Starting Material: Copper Metal

Starting Material Lot No: 06201C

Density: 1.012 g/mL @ 20°C

Lot No: 26-87CUIY1

Certification Date: JUL -- 2022

Expiration Date: JAN 30 2024

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/mL	Element	µg/mL	Element	µg/mL
Ag	0.002	Dy	<0.001	Li	<0.005
Al	<0.003	Er	<0.001	Lu	<0.001
As	<0.002	Eu	<0.001	Mg	<0.002
Au	<0.002	Fe	<0.004	Mn	<0.001
B	<0.002	Ga	<0.001	Mo	<0.001
Ba	<0.001	Gd	<0.001	Na	0.06
Be	<0.001	Ge	<0.001	Nb	<0.001
Bi	<0.001	Hf	<0.001	Nd	<0.001
Ca	0.006	Hg	<0.001	Ni	<0.001
Cd	<0.001	In	<0.001	P	<0.2
Ce	<0.001	Ir	<0.001	Pb	0.001
Co	<0.001	K	<0.1	Pd	<0.001
Cr	<0.001	La	<0.001	Pr	<0.001
Cs	<0.001				
		Pt	<0.001	Tb	<0.001
		Rb	<0.001	Ta	<0.001
		Re	<0.001	Te	<0.001
		Rh	0.002	Th	<0.001
		Ru	<0.001	Ti	<0.001
		Sb	<0.001	Tl	<0.001
		Sc	<0.001	Tm	<0.001
		Se	<0.003	U	<0.001
		Si	<0.1	V	<0.001
		Sm	<0.001	W	<0.001
		Sn	<0.001	Y	<0.001
		Sr	<0.001	Yb	<0.001
		Ta	<0.001	Zn	<0.005
				Zr	<0.001

Traceability Documentation for Solution Standard:

Certified Value: 1001 µg/mL ±5 µg/mL (refer to side 2)

Certified Value is Traceable to: NIST SRM #3114

* Classical Wet Assay: 1000 µg/mL

Method: EDTA titration using PAN as Indicator. EDTA standardized against Pb(NO₃)₂ NIST SRM #528.

*Instrument Analysis using ICP Spectrometer: 1001 µg/mL

NIST SRM #3114

We guarantee that our PerkinElmer TruQ Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is Class A.

Y. Parikh
Yogesh Parikh, Senior Spectroscopist

Secondary Spectrometric Calibration Standards

Certificate of Calibration

Ordinate Calibration

Calibration Data for Secondary Calibration Standards:

Wavelength / Absorbance	Number	Ordinate Reading (Absorbance) at the following wavelengths:			
Wavelength		193.70	232.00	324.76	553.66
Standard 1	MG2-368	0.9208	0.8992	0.9078	0.8653

The uncertainty of the given absorbance values is ±0.003 A at the given wavelengths.
The uncertainty is the expanded uncertainty expressed at an approximate level of confidence of 95% and a coverage factor of k=2 based on JCGM 100:2008 Evaluation of measurement data - Guide to the expression of uncertainty in measurement.

Conditions of Calibration

The following settings were used on the Lambda 900 UV/Vis/NIR Spectrometer employed to obtain the calibration data quoted on this certificate:

Measurement of Calibration

Ordinate mode	Absorbance	
Slit mode UV/Vis	Fix	1 nm
Integration time UV/Vis	5 s	
Slit mode NIR	Servo	Servo
Integration time NIR	5 s	2

The PerkinElmer "Certification Software" program - "Photometric Accuracy Vis/NIR" method utilizing the instrument set-up parameters as outlined above was used to measure the absorbance of the standards at the prescribed wavelengths reflected in the Calibration Data grid.

This set of Spectrometric Solution was calibrated on a PerkinElmer high performance Lambda 900 UV/Vis/NIR Spectrometer.

Serial Number: 101N0089015

This instrument is used solely for calibration purposes. The most recent quality control check of this instrument was performed on:

Date / Time: 1/14/2015

using the standard PerkinElmer quality control procedure, A set of NIST or NBS/PTB Standard Reference Standard Materials:

NIST SRM PK-1930 SN 00038 Calibration Date 05/23/2014 National Research Council of Canada Calibration Report No. PAR 2014 3152 was used during this procedure. Measurements were performed at an ambient temperature of 22.1 °C and the humidity of 53.9 %

Date / Time: 6/17/2015 / 8:21:03 AM

Operator: Cam La Horvath

PerkinElmer LAS, Inc., 710 Bridgeport Avenue, Shelton, CT

End of Report

Secondary Spectrometric Calibration Standards

Certificate of Calibration

Ordinate Calibration

Calibration Data for Secondary Calibration Standards:

Wavelength / Absorbance	Number	Ordinate Reading (Absorbance) at the following wavelengths:			
Wavelength		193.70	232.00	324.76	553.55
Standard 1	MGO-262	0.2762	0.2469	0.2124	0.2042
					0.1912

The uncertainty of the given absorbance values is ± 0.003 A at the given wavelengths.
The uncertainty is the expanded uncertainty expressed at an approximate level of confidence of 95% and a coverage factor of $k=2$ based on JCGM 100:2008 Evaluation of measurement data - Guide to the expression of uncertainty in measurement.

Conditions of Calibration

The following settings were used on the Lambda 900 UV/Vis/NIR Spectrometer employed to obtain the calibration data quoted on this certificate:

Measurement of Calibration

Ordinate mode	Absorbance	
Slit mode UV/Vis	Fix	1 nm
Integration time UV/Vis	5 s	
Slit mode NIR	Servo	Servo
Integration time NIR	5 s	2

The PerkinElmer "Certification Software" program - "Photometric Accuracy Vis/NIR" method utilizing the instrument set-up parameters as outlined above was used to measure the absorbance of the standards at the prescribed wavelengths reflected in the Calibration Data grid.

The Lambda 900 Spectrometric Solution was calibrated on a PerkinElmer high performance Lambda 900 UV/Vis/NIR Spectrometer.

Serial Number:

101N0089015

This instrument is used solely for calibration purposes. The most recent quality control check of this instrument was performed on:

Date / Time:

12/12/2014

Standard Reference Materials:

N 00038 Calibration Date 05/23/2014 NRC Calibration Report No. PAR 2014 3162

Measurements were performed at an ambient temperature of 24.1 °C and the humidity of 19.8 %

4 / 5:37:41 PM

EnviLab

1 Avenue, Shelton,

End of



CERTIFICATE OF COMPLETION

This is to certify that

Duang Hiranuk

has completed the course

AA PinAcle 900 T, H, Z, F and 500, S10/SA93+ and AS900

26 October 2018

Vinny Maharaj - Sr. Manager Service

Training

Certified by

Date

This Certificate has been generated electronically from PerkinElmer Learning Management System, LMS ES-009-000, 0-05-55-11



CERTIFICATE OF COMPLETION

This is to certify that

Duang Hiransuk

has completed the course

AA Theory, Operation and WinLab 32 and Syngistix Software

12 October 2018

Vinny Maharaj - Sr. Manager Service
Training

Date

Certified by

This Certificate has been generated electronically from PerkinElmer Learning Management System, LMS ES-009-000, 0-05-55-11

