

ภาคผนวก ข
เอกสารสอบเทียบเครื่องมือตรวจวัด

รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม และมาตรการติดตามตรวจสอบผลกระทบสิ่งแวดล้อม

โครงการ CHAPTER ONE SHINE BANGPO (ระยะดำเนินการ) ระหว่างเดือนมกราคม-มิถุนายน พ.ศ. 2568

นิติบุคคลอาคารชุด แชนเตอร์วัน ชายน์ บางโพ

List of Instrument/Equipment Certification for Quality Analysis.

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
Laboratory Instrument/Equipmen for Water Analysis									
1	Cooled Incubator	Total Coliforms	Binder	KB400/ WTB20200000015535	National Food Institute, Ministry of Industry, Thailand	2502229-006-1	19 Mar 25	18 Mar 26	-
		Fecal Coliforms							
2	Cooled Incubator	E.Coli	Binder	BD 53 13-07343	National Food Institute, Ministry of Industry, Thailand	2403982-003-01	7 Aug 24	6 Aug 25	-
3	Incubator	<i>Pseudomonas Aeruginosa</i>	Memmert	IPP260/V616.0066	National Food Institute, Ministry of Industry, Thailand	2502229-002-01	19 Mar 25	18 Mar 26	-
		<i>Staphylococcus Aureus</i>							
4	Incubator		Memmert	IPP260/V615.0187	National Food Institute, Ministry of Industry, Thailand	2502229-001-01	19 Mar 25	18 Mar 26	-
5	UV-VIS Spectrophotometer	Nitrate	Hitachi	U-2900/21E22-009	DQE Services Co.,Ltd.	SP25-001	3 Jan 25	2 Jan 26	-
6	UV-VIS Spectrophotometer	Ammonia	Hitachi	U-5100/23A4-008	DQE Services Co.,Ltd.	SP24-028	11 Sep 24	10 Sep 25	-


Due Date of Calibration* : Based on the annual calibration plan. At least 1 time per year.

Calibration Certificate

Certificate No.: 2502229-006-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhonong, Bangkok 10260

Page 1 of 3

Equipment: CHAMBER (Incubator)
Manufacturer: BINDER
Model: KB 400
Serial No.: 20200000015535
ID No.: UAE.MIC.018/2564
Order No.: 2502229
Operation No.: 2502229-006
Date of Receipt: 19 March 2025
Date of Calibration: 19 March 2025

Calibrated by  **Approved by** 
Scientist Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team
Date of Issue: 25 March 2025

The uncertainties are for a confidence probability of approximately 95 %.
This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 01 Date: 20-04-65

Calibration Report

Certificate No.: 2502229-006-01
Equipment: CHAMBER (Incubator)
Model: KB 400 Serial No.: 20200000015535
Resolution: 0.1 °C ID No.: UAE.MIC.018/2564
Manufacturer: BINDER
Date of Calibration: 19 March 2025

Page 2 of 3

Location: LABORATORY, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Environment Condition: Ambient Temperature (18 ± 1) °C
Relative Humidity (50 ± 5) %
Line Voltage (223 ± 3) Volt

Condition of this results of Calibration:

- This instrument was calibrated by insert 13 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
 - The temperature scale used was based on ITS - 90.
 - All data show below were final values and the initial data may be obtained upon request.
- Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY49016851	TE 670477-01	4 May 2025	NATIONAL FOOD INSTITUTE
RTD	CH#201-303 / RTD#201-303				

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

UUC Description :

Time of Record	1	Hour	9	Minute	At	35.0 °C
Fresh air Damper	-	Open	Position	-		
	X	Close	Fan	-		
	-	Not Available				

- Result of Calibration : ☒ Without adjustment ☐ After adjustment

F-CS-012 Revision: 01 Date: 20-04-65

Calibration Report

Certificate No.: 2502229-006-01
Equipment: CHAMBER (Incubator)
Model: KB 400 Serial No.: 20200000015535
Resolution: 0.1 °C ID No.: UAE.MIC.018/2564
Manufacturer: BINDER
Date of Calibration: 19 March 2025

Page 3 of 3

Calibration point: 35.0 °C

Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	17.1	45	220.0
MAX	18.1	55	225.0

Table1 : Reporting of Temperature

Calibration point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.13 is REF)													Uncertainty ± (°C)
35.0	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	
35.0	34.98	35.17	34.99	34.92	35.18	35.01	35.00	35.13	35.00	34.96	35.02	35.17	35.04	0.27

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* Reading (°C)			Temperature Stability ± (°C)	Temperature Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
35.0	35.0	35.0	35.0	0.029	0.15	0.30

Note The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) "

UUC* = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

Uniformity = The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time.

Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time.

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

----- End -----

F-CS-012 Revision: 01 Date: 20-04-65

Calibration Certificate

Certificate No.: 2403982-003-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhonong, Bangkok 10260

Page 1 of 3

Equipment: CHAMBER (Incubator)
Manufacturer: BINDER
Model: BD 53
Serial No.: 13-07343
ID No.: UAE.MIC.005/2558
Order No.: 2403982

Operation No.: 2403982-003
Date of Receipt: 7 August 2024
Date of Calibration: 7 August 2024

Calibrated by  **Approved by** 
Specialist Vice President, Department of Laboratory Services
Responsible for the Technical Management Team
Date of Issue: 14 August 2024

The uncertainties are for a confidence probability of approximately 95 %.
This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 01 Date: 20-04-65

Calibration Report

Certificate No.: 2403982-003-01
Equipment: CHAMBER (Incubator)
Model: BD 53 Serial No.: 13-07343
Resolution: 0.1 °C ID No.: UAE.MIC.005/2558
Manufacturer: BINDER
Date of Calibration: 7 August 2024

Page 2 of 3

Location: MICROBIOLOGY LABORATORY (302), UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Environment Condition: Ambient Temperature (24.8 ± 1) °C
Relative Humidity (55 ± 5) %
Line Voltage (230 ± 3) Volt

Condition of this results of Calibration:

- This instrument was calibrated by insert 9 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
 - The temperature scale used was based on ITS - 90.
 - All data show below were final values and the initial data may be obtained upon request.

2. Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A RTD	MYS9002902 CH#201-209/ RTD#201-209	TE 670478-01	4 May 2025	NATIONAL FOOD INSTITUTE

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

UUC Description :

Time of Record 1 Hour 9 Minute At 44.0 °C
Fresh air Damper - Open Position -
X Close Fan -
- Not Available

- Result of Calibration : ☐ Without adjustment ☒ After adjustment

F-CS-012 Revision: 01 Date: 20-04-65

2008 อาคารพาณิชย์ 35 ถนนสุขุมวิท แขวงคลองตัน เขตคลองเตย กรุงเทพมหานคร 10700
2008 Soi 35, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
Tel +66(0) 2422 8688 Fax +66(0) 2422 8545



Calibration Report

Certificate No.: 2403982-003-01
Equipment: CHAMBER (Incubator)
Model: BD 53 Serial No.: 13-07343
Resolution: 0.1 °C ID No.: UAE.MIC.005/2558
Manufacturer: BINDER
Date of Calibration: 7 August 2024

Page 3 of 3

Calibration point: 44.0 °C

Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	24.8	50	227.0
MAX	24.9	60	232.0

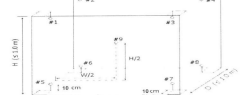


Table1 : Reporting of Temperature

Calibration point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
44.0	44.24	44.33	44.30	44.46	43.42	43.51	43.40	43.53	43.97	0.30

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
44.0	44.0	44.0	44.0	0.083	0.57	1.2

Note The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) "

UUC* = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

Uniformity = The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time.

Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time.

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

----- End -----

F-CS-012 Revision: 01 Date: 20-04-65

2008 อาคารพาณิชย์ 35 ถนนสุขุมวิท แขวงคลองตัน เขตคลองเตย กรุงเทพมหานคร 10700
2008 Soi 35, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
Tel +66(0) 2422 8688 Fax +66(0) 2422 8545



Calibration Certificate

Certificate No.: 2502229-002-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakanong, Bangkok 10260

Page 1 of 3

Equipment: CHAMBER (Incubator)

Manufacturer: MEMMERT

Model: IPP260

Serial No.: V616.0066

ID No.: UAE.MIC.032/2559

Order No.: 2502229

Operation No.: 2502229-002

Date of Receipt: 19 March 2025

Date of Calibration: 19 March 2025

Calibrated by

Scientist

Approved by

Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 25 March 2025

The uncertainties are for a confidence probability of approximately 95 %.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 01 Date: 20-04-65

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2008 Soi 35, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
Tel +66(0) 2422 8688 Fax +66(0) 2422 8545



Calibration Report

Certificate No.: 2502229-002-01
Equipment: CHAMBER (Incubator)
Model: IPP260 Serial No.: V616.0066
Resolution: 0.1 °C ID No.: UAE.MIC.032/2559
Manufacturer: MEMMERT
Date of Calibration: 19 March 2025

Page 2 of 3

Location: 302, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Environment Condition: Ambient Temperature (21.7 ± 1) °C
Relative Humidity (59 ± 1) %
Line Voltage (223 ± 3) Volt

Condition of this results of Calibration:

- This instrument was calibrated by insert 9 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
 - The temperature scale used was based on ITS - 90.
 - All data show below were final values and the initial data may be obtained upon request.

2. Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A RTD	MYS7003188 CH#201-209/ RTD#201-209	TE 670486-01	8 June 2025	NATIONAL FOOD INSTITUTE

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

UUC Description :

Time of Record 1 Hour 9 Minute At 25.0 and 36.0 °C
Fresh air Damper - Open Position -
X Close Fan -
- Not Available

- Result of Calibration : ☒ Without adjustment ☐ After adjustment

F-CS-012 Revision: 01 Date: 20-04-65

2008 อาคารพาณิชย์ 35 ถนนสุขุมวิท แขวงคลองตัน เขตคลองเตย กรุงเทพมหานคร 10700
2008 Soi 35, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
Tel +66(0) 2422 8688 Fax +66(0) 2422 8545



Calibration Report

Certificate No.: 2502229-002-01
Equipment: CHAMBER (Incubator)
Model: IPP260 Serial No.: V616.0066
Resolution: 0.1 °C ID No.: UAE.MIC.032/2559
Manufacturer: MEMMERT

Date of Calibration: 19 March 2025 Page 3 of 3

Calibration point: 25.0 and 36.0 °C

Calibration result:

Table with 4 columns: Calibration Condition, Temperature (°C), Relative Humidity (%), Line Voltage (Volt). Rows for MIN, MAX, and average values.

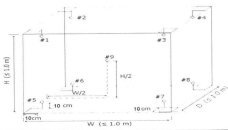


Table 1 : Reporting of Temperature

Table with 11 columns: Calibration point (°C), Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF), and Uncertainty ± (°C). Rows for 25.0 and 36.0 °C.

Table 2 : Reporting of Characterization Result

Table with 6 columns: UUC* Setting (°C), UUC* Reading (°C) (MIN, MAX, Average), Stability ± (°C), Uniformity (°C), Overall Variation (°C). Rows for 25.0 and 36.0 °C.

Note: The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) " UUC* = Unit Under Calibration... The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k = 2, providing a level of confidence of approximately 95 %.

----- End -----

F-CS-012 Revision: 01 Date: 20-04-65

2008 ๒๕๕๑-๒๕๕๒ ๓๖ หมู่๑๓ตำบลบ้านใหม่ อำเภอจตุรพักตรพิมาน จังหวัดร้อยเอ็ด ประเทศไทย ๔๓๑๖๓
2008 Soi 36, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
Tel +66(0) 2422 8688 Fax +66(0) 2422 8545 nfi.or.th

Calibration Certificate

Certificate No.: 2502229-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhonong, Bangkok 10260

Page 1 of 3

Equipment: CHAMBER (Incubator)

Manufacturer: MEMMERT

Model: IPP 260

Serial No.: V615.0187

ID No.: UAE.MIC.003/2559

Order No.: 2502229

Operation No.: 2502229-001

Date of Receipt: 19 March 2025

Date of Calibration: 19 March 2025

Calibrated by Scientist Approved by Manager, Division of Calibration Laboratory
Date of Issue: 25 March 2025 Responsible for the Technical Management Team

The uncertainties are for a confidence probability of approximately 95 %. This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 01 Date: 20-04-65

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2008 Soi 36, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
Tel +66(0) 2422 8688 Fax +66(0) 2422 8545 nfi.or.th

Calibration Report

Certificate No.: 2502229-001-01
Equipment: CHAMBER (Incubator)
Model: IPP 260 Serial No.: V615.0187
Resolution: 0.1 °C ID No.: UAE.MIC.003/2559
Manufacturer: MEMMERT

Date of Calibration: 19 March 2025 Page 2 of 3

Location: LABORATORY, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Environment Condition: Ambient Temperature (16.2 ± 1) °C
Relative Humidity (32 ± 4) %
Line Voltage (223 ± 3) Volt

Condition of this results of Calibration:

- 1. This instrument was calibrated by insert 9 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures. - The temperature scale used was based on ITS - 90. - All data show below were final values and the initial data may be obtained upon request.

2. Reference Standard Instrument :

Table with 6 columns: Instrument, Model, Serial No./ID No., Certificate No., Due Date, Through. Rows for Digital Thermometer with sensor and Reference Standard Instrument.

- 3. This certificate is traceable to International System of Units (SI Units).
- 4. This certificate was certified only for the instrument we calibrated.
- 5. This result of calibration was found accurate as shown on date and place of calibration only.
- 6. Condition of Calibrated item : Good

UUC Description :
Time of Record 1 Hour 9 Minute At 35.0 °C
Fresh air Damper - Open Position -
X Close Fan -
- Not Available

7. Result of Calibration : X Without adjustment After adjustment

F-CS-012 Revision: 01 Date: 20-04-65

2008 ๒๕๕๑-๒๕๕๒ ๓๖ หมู่๑๓ตำบลบ้านใหม่ อำเภอจตุรพักตรพิมาน จังหวัดร้อยเอ็ด ประเทศไทย ๔๓๑๖๓
2008 Soi 36, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
Tel +66(0) 2422 8688 Fax +66(0) 2422 8545 nfi.or.th

Calibration Report

Certificate No.: 2502229-001-01
Equipment: CHAMBER (Incubator)
Model: IPP 260 Serial No.: V615.0187
Resolution: 0.1 °C ID No.: UAE.MIC.003/2559
Manufacturer: MEMMERT

Date of Calibration: 19 March 2025 Page 3 of 3

Calibration point: 35.0 °C

Calibration result:

Table with 4 columns: Calibration Condition, Temperature (°C), Relative Humidity (%), Line Voltage (Volt). Rows for MIN, MAX, and average values.

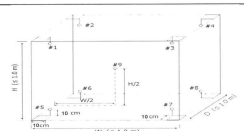


Table 1 : Reporting of Temperature

Table with 11 columns: Calibration point (°C), Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF), and Uncertainty ± (°C). Rows for 35.0 °C.

Table 2 : Reporting of Characterization Result

Table with 6 columns: UUC* Setting (°C), UUC* Reading (°C) (MIN, MAX, Average), Stability ± (°C), Uniformity (°C), Overall Variation (°C). Rows for 35.0 °C.

Note: The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) " UUC* = Unit Under Calibration... The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k = 2, providing a level of confidence of approximately 95 %.


----- End -----

F-CS-012 Revision: 01 Date: 20-04-65

2008 ๒๕๕๑-๒๕๕๒ ๓๖ หมู่๑๓ตำบลบ้านใหม่ อำเภอจตุรพักตรพิมาน จังหวัดร้อยเอ็ด ประเทศไทย ๔๓๑๖๓
2008 Soi 36, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
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DQEServices

DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com


MSC-T88-T18 17023
CALIBRATION 0484

CERTIFICATE OF CALIBRATION

Certificate No. : SP25-001Page 1 of 5

Customer : United Analyst and Engineering Consultant Co.,Ltd. (Head Office)

Address : 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Location of calibration : Laboratory 213

Equipment : UV-Vis Spectrophotometer

Manufacturer : Hitachi

Model : U-2900

Serial No. : 21E22-009

ID No. : UAE.WAT.051/2564

Received Date : 3 January 2025

Calibration Date : 3 January 2025

Issue Date : 8 January 2025

Condition Instrument : Good

Calibrated by : (Mr.Tanawut Rittidach)Approved by : (Ms.Chonthicha Sangngern)

Technical ManagerQuality Manager

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.


The measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of DQE Services Co.,Ltd.

เอกสารไม่ควบคุม

FM-708-02 R01 1/11/2021

DQEServices

DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com


MSC-T88-T18 17023
CALIBRATION 0484

REPORT OF CALIBRATION

Certificate No. : SP25-001Page 2 of 5

Environment Condition : Ambient Temperature 25 ± 5 °C

Relative humidity 55 ± 20 %RH

Calibration method : In-house method CP-01 Based on ASTM E275-08

Certified Reference Materials :

Material	Serial No.	Certificate No.	Due date
Absorbance Standard set	25760	115663	25 October 2025
Absorbance Standard set	25757	115638	25 October 2025
Wavelength Standard set	25806	115657	25 October 2025
Wavelength Standard set	25758	115665	25 October 2025

Traceability : This certification is traceable to the International System of Unit maintained at National -
Institute of Standards and Technology (NIST) through Starna Scientific Limited

Spectral Band Width of UUC : 1.5 nm.

Scan Speed of UUC : 200 nm/min

Scan Interval of UUC : 0.1 nm.

Resolution of UUC : Photometric 0.001 Abs.


Wavelength 0.1 nm.

เอกสารไม่ควบคุม

FM-708-02 R01 1/11/2021

DQEServices

DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com


MSC-T88-T18 17023
CALIBRATION 0484

REPORT OF CALIBRATION

Certificate No. : SP25-001Page 3 of 5

Calibration Results : Without adjustment

Photometric Accuracy :


Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
420	0.0000	0.000	0.0000	0.0028	2.00
	0.5780	0.578	0.0000	0.0031	2.00
	1.0484	1.045	0.0034	0.0029	2.00
	2.1876	2.192	-0.0044	0.0075	2.00
440	0.0000	0.000	0.0000	0.0028	2.00
	0.5595	0.560	-0.0005	0.0034	2.00
	1.0239	1.023	0.0009	0.0035	2.00
	2.1230	2.125	-0.0020	0.0079	2.00
465	0.0000	0.000	0.0000	0.0028	2.00
	0.5230	0.521	0.0020	0.0030	2.00
	0.9633	0.961	0.0023	0.0029	2.00
	1.9753	1.977	-0.0017	0.0070	2.00
546.1	0.0000	0.000	0.0000	0.0028	2.00
	0.5181	0.518	0.0001	0.0031	2.00
	1.0002	0.998	0.0022	0.0033	2.00
	1.9973	1.993	0.0043	0.0084	2.00
590	0.0000	0.000	0.0000	0.0028	2.00
	0.5517	0.552	-0.0003	0.0030	2.00
	1.0803	1.079	0.0013	0.0030	2.00
	2.0373	2.032	0.0053	0.0079	2.00
635	0.0000	0.000	0.0000	0.0028	2.00
	0.5591	0.559	0.0001	0.0031	2.00
	1.0518	1.050	0.0018	0.0030	2.00
	1.9274	1.923	0.0044	0.0079	2.00

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DQEServices

DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com


MSC-T88-T18 17023
CALIBRATION 0484

REPORT OF CALIBRATION

Certificate No. : SP25-001Page 4 of 5

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
235	0.0000	0.000	0.0000	0.0050	2.00
	0.7469	0.744	0.0029	0.0057	2.00
257	0.0000	0.000	0.0000	0.0050	2.00
	0.8674	0.863	0.0044	0.0059	2.00
313	0.0000	0.000	0.0000	0.0050	2.00
	0.2919	0.290	0.0019	0.0051	2.00
350	0.0000	0.000	0.0000	0.0050	2.00
	0.6430	0.640	0.0030	0.0055	2.00

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Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor <i>k</i>
241.72	241.1	0.62	0.18	2.00
279.45	279.0	0.45	0.18	2.00
287.81	287.3	0.51	0.18	2.00
334.06	333.8	0.26	0.18	2.00
360.93	360.6	0.33	0.18	2.00
418.59	418.2	0.39	0.18	2.00
445.94	445.5	0.44	0.18	2.00
453.66	453.4	0.26	0.18	2.00
460.02	459.8	0.22	0.18	2.00
536.59	536.6	-0.01	0.18	2.00
637.98	637.7	0.28	0.18	2.00
431.38	431.1	0.28	0.18	2.00
472.50	472.3	0.20	0.18	2.00
513.47	513.4	0.07	0.18	2.00
528.88	528.9	-0.02	0.18	2.00
573.17	573.3	-0.13	0.18	2.00
585.35	585.1	0.25	0.20	2.00
684.40	684.5	-0.10	0.18	2.00
740.72	741.0	-0.28	0.20	2.00
748.55	748.8	-0.25	0.18	2.00
807.03	807.3	-0.27	0.18	2.00
879.28	879.6	-0.32	0.18	2.00

Remark : - UUC = Unit Under Calibration
- N/A = Not Available
- The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor *k*,
which for a normal distribution corresponds to a coverage probability of approximately 95%

- End of Certificate -

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CERTIFICATE OF CALIBRATION

Certificate No. : SP24-028Page 1 of 5

Customer : United Analyst and Engineering Consultant Co.,Ltd. (Head Office)

Address : 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Location of calibration : Laboratory 315

Equipment : UV-Vis Spectrophotometer

Manufacturer : HITACHI

Model : U-5100

Serial No. : 23A4-008

ID No. : UAE.WAS.010/2567

Received Date : 10 September 2024

Calibration Date : 10 September 2024

Issue Date : 13 September 2024

Condition Instrument : Good

Calibrated by :

(Mr.Tanawut Rittidach)

Technical Manager

Approved by :

(Ms.Chonthicha Sangnern)

Quality Manager

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

The measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the DQE Services Co., Ltd.

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REPORT OF CALIBRATION

Certificate No. : SP24-028Page 2 of 5

Environment Condition : Ambient Temperature 25 ± 5 °C

Relative humidity 55 ± 20 %RH

Calibration method : In-house method CP-01 Based on ASTM E275-08

Certified Reference Materials :

Material	Serial No.	Certificate No.	Due date
Absorbance Standard set	25760	115663	25 October 2025
Absorbance Standard set	25757	115638	25 October 2025
Wavelength Standard set	25806	115657	25 October 2025
Wavelength Standard set	25758	115665	25 October 2025

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

Institute of Standards and Technology (NIST) through Sarna Scientific Limited

Spectral Band Width of UUC : 5.0 nm.

Scan Speed of UUC : 40

Scan Interval of UUC : 0.1 nm.

Resolution of UUC : Photometric 0.001 Abs.

Wavelength 0.1 nm.

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REPORT OF CALIBRATION

Certificate No. : SP24-028Page 3 of 5

Calibration Results : Without adjustment

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor <i>k</i>
420	0.0000	0.000	0.0000	0.0028	2.00
	0.5780	0.575	0.0030	0.0031	2.00
	1.0484	1.044	0.0044	0.0029	2.00
	2.1876	2.190	-0.0024	0.0075	2.00
440	0.0000	0.000	0.0000	0.0028	2.00
	0.5595	0.557	0.0025	0.0034	2.00
	1.0239	1.021	0.0029	0.0035	2.00
	2.1230	2.121	0.0020	0.0079	2.00
465	0.0000	0.000	0.0000	0.0028	2.00
	0.5230	0.519	0.0040	0.0029	2.00
	0.9633	0.961	0.0023	0.0028	2.00
	1.9753	1.975	0.0003	0.0070	2.00
546.1	0.0000	0.000	0.0000	0.0028	2.00
	0.5181	0.515	0.0031	0.0031	2.00
	1.0002	0.997	0.0032	0.0033	2.00
	1.9973	1.996	0.0013	0.0085	2.00
590	0.0000	0.000	0.0000	0.0028	2.00
	0.5517	0.549	0.0027	0.0030	2.00
	1.0803	1.078	0.0023	0.0029	2.00
	2.0373	2.031	0.0063	0.0081	2.00
635	0.0000	0.000	0.0000	0.0028	2.00
	0.5591	0.557	0.0021	0.0031	2.00
	1.0518	1.049	0.0028	0.0029	2.00
	1.9274	1.923	0.0044	0.0080	2.00

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REPORT OF CALIBRATION

Certificate No. : SP24-028
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Photometric Accuracy :

Table with 6 columns: Wavelength (nm.), CRMs Values (Abs), UUC Reading (Abs), Correction (Abs), Uncertainty (Abs), Coverage factor k. Rows include data for 235, 257, 313, and 350 nm.

REPORT OF CALIBRATION

Certificate No. : SP24-028
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Wavelength Accuracy :

Table with 5 columns: CRMs Values (nm.), UUC Reading (nm.), Correction (nm.), Uncertainty (nm.), Coverage factor k. Rows include data for 241.00, 279.30, 288.90, 334.50, 361.40, 418.40, 447.20, 459.30, 537.00, 638.00, 441.29, 479.88, 513.75, 528.59, 575.10, 585.56, 684.70, 740.51, 747.61, 807.04, and 879.68 nm.

Remark : - UUC = Unit Under Calibration
- N/A = Not Available
- The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k, which for a normal distribution corresponds to a coverage probability of approximately 95%
- End of Certificate -