ภาคผนวก จ
เอกสารสอบเทียบเครื่องมือที่ใช้ในการตรวจวิเคราะห์

List of Instruments Certification for Water Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
เครื่องมือสำหรับวิเคราะห์คุณภาพอากาศ									
1	Analytical Balance (Readability 0.1 mg)	ฝุ่นละอองรวม (TSP) ฝุ่นละอองขนาดไม่เกิน 10 ไมครอน (PM-10)	Mettler-Toledo	XSR205DU / C009071872	National Food Institute, Ministry of Industry, Thailand	2502226-001-01	20 Mar 25	19 Mar 26	-
2	Analytical Balance (Readability 0.1 mg)		Mettler-Toledo	SR205DU / C210685394	National Food Institute, Ministry of Industry, Thailand	2502226-002-01	20 Mar 25	19 Mar 26	-
3	UV-VIS Spectrophotometer	ก๊าซออกไซด์ของไนโตรเจนในรูป ไนโตรเจนไดออกไซด์	Hitachi	U-2900 / 21E22-009	DQE Services Co.,Ltd.	SP25-001	3 Jan 25	2 Jan 26	-

สถาบันอาหาร
ศูนย์บริการวิชาการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Certificate

Certificate No.: 2562226-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhanong, Bangkok 10260

Equipment:	Electronic Balance
Manufacturer:	METTLER TOLEDO
Model:	XSR205DU
Serial No.:	C809071872
ID No.:	UAE.WAO.012/2563
Order No.:	2562226
Operation No.:	2562226-002
Date of Receipt:	19 March 2025
Date of Calibration:	20 March 2025

Calibrated by Mr.Yosrin Charoensuk — Scientist
Approved by [redacted] (Mr.Phamphat Tuarjit) — 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.

เอกสารไม่ควบคุม

สถาบันอาหาร
ศูนย์บริการวิชาการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2562226-001-01
Equipment: Electronic Balance — Manufacturer: METTLER TOLEDO
Model: XSR205DU — Resolution: 0.00001 g / 0.0001 g
Serial No.: C809071872 — ID No.: UAE.WAO.012/2563
Capacity: 82 g / 220 g

Date of Calibration: 20 March 2025

Environment Condition: Ambient Temperature: 21.2 ± 0.6 °C Relative Humidity: 48 ± 3.5 %
Place of Calibration: 708 Balance Room, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Condition of Equipment: Good Condition
Condition of This Results of Calibration:

1. Calibration Method: NFI Method W-MA-001 In-House Method based on UNAS Lab 14 : 2019
2. Reference Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 200g	050556252	TCS	M24041006	19 April 2025
Instrument	**Model**	**Serial No.**	**Calibrated By**	**Certificate No.**	**Due Date**
Thermo-Hygro Meter	605-H1	NFI.ETH 057/23	Quality Reborn	QR25-0542	10 February 2026

3. This certificate is traceable to SI UNIT
4. This certificate was certified only for the instrument we calibrated.
5. This result of calibration was found accurate as stated on date and place of calibration only.

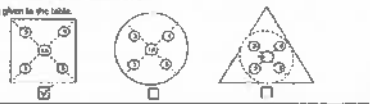
Calibration Results:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
40	0.0000052
80	0.0000042
100	0.0000000
200	0.0000000

2. Off-Center Error:

A mass of 100 g was placed and moved to various position on pan.
The balance reading received is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	6 (g)	(Maximum Difference) (g)
100.0001	100.0001	100.0001	100.0001	100.0001	100.0002	0.0001

[redacted]

เอกสารไม่ควบคุม

สถาบันอาหาร
ศูนย์บริการวิชาการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2562226-001-01
Equipment: Electronic Balance — Manufacturer: METTLER TOLEDO
Model: XSR205DU — Resolution: 0.00001 g / 0.0001 g
Serial No.: C809071872 — ID No.: UAE.WAO.012/2563
Capacity: 82 g / 220 g

Date of Calibration: 20 March 2025

Calibration Results: (Continued)
Calibration Range: 0-80 g
Calibration Adjustment: Internal Calibration
3. Departure from Nominal Value: (Range: 0 - 82 g ; Resolution: 0.00001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Unload	0.000000	0.00000	0.000000	0.0000089	2.00
0.001	0.001003	0.00100	0.00000	0.0000092	2.00
0.005	0.005002	0.00500	0.00000	0.0000094	2.00
0.01	0.010069	0.01000	0.00000	0.0000099	2.00
0.05	0.049996	0.05000	0.00000	0.0000096	2.00
0.1	0.100011	0.10000	0.00001	0.000011	2.00
0.5	0.500016	0.50000	0.00002	0.000014	2.00
1	1.000003	1.00003	-0.00001	0.000015	2.00
2	2.000023	2.00005	-0.00003	0.000017	2.00
5	5.000015	5.00005	-0.00010	0.000021	2.00
10	10.000009	10.00003	-0.00001	0.000026	2.00
20	20.000030	20.00012	-0.00009	0.000039	2.00
30	30.000035	30.00012	-0.00008	0.000050	2.00
50	50.000028	50.00014	-0.00011	0.000058	2.00
80	80.000057	80.00020	-0.00013	0.00011	2.00

[redacted]

เอกสารไม่ควบคุม

สถาบันอาหาร
ศูนย์บริการวิชาการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2562226-001-01
Equipment: Electronic Balance — Manufacturer: METTLER TOLEDO
Model: XSR205DU — Resolution: 0.00001 g / 0.0001 g
Serial No.: C809071872 — ID No.: UAE.WAO.012/2563
Capacity: 82 g / 220 g

Date of Calibration: 20 March 2025

Calibration Results: (Continued)
Calibration Range: >80-200 g
Calibration Adjustment: Internal Calibration
3. Departure from Nominal Value: (Range: >80 - 200 g ; Resolution: 0.0001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
90	90.00010	90.0002	-0.0001	0.00015	2.00
100	100.00006	100.0001	0.0000	0.00016	2.00
110	110.00007	110.0001	0.0000	0.00017	2.00
120	120.00009	120.0002	-0.0001	0.00018	2.00
130	130.00010	130.0002	-0.0001	0.00019	2.00
140	140.00013	140.0002	-0.0001	0.00019	2.00
150	150.00009	150.0002	-0.0001	0.00021	2.00
160	160.00010	160.0002	-0.0001	0.00022	2.00
170	170.00012	170.0002	-0.0001	0.00023	2.00
200	200.00013	200.0002	-0.0001	0.00028	2.00

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

---------- End ----------

[redacted]

เอกสารไม่ควบคุม

สถาบันอาหาร
Food Industrial Laboratory Service Center

Calibration Certificate

Certificate No.: 2502226-002-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhanong, Bangkok 10260

Equipment: Electronic Balance
Manufacturer: METTLER TOLEDO
Model: XSR205DU
Serial No.: C210685394
ID No.: UAE.WAO.010/2565
Order No.: 2502226
Operation No.: 2502226-002
Date of Receipt: 19 March 2025
Date of Calibration: 20 March 2025

Calibrated by Mr.Yothin Charoensuk, Scientist
Approved by [redacted] (Mr.Pheraphat Suanjit)
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 recognised 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

เอกสารไม่ควบคุม

สถาบันอาหาร
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2502226-002-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: XSR205DU — **Resolution:** 0.00001 g / 0.0001 g
Serial No.: C210685394 — **ID No.:** UAE.WAO.010/2565
Capacity: 82 g / 220 g

Date of Calibration: 20 March 2025
Environment Condition: Ambient Temperature: 21.2 ± 0.6 °C Relative Humidity: 49 ± 3.5 %
Place of Calibration: 208 Balance Room, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Condition of Equipment: Good Condition
Condition of This Results of Calibration:
1. Calibration Method: NFI Method W.MA-001 In-House Method based on UKAS Lab 14 - 2019
2. Reference Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date:
Standard Weight Class E2	1mg to 200g	8586567572	TCS	M24040055	19 April 2025
Instrument	**Model**	**Serial No.**	**Calibrated By**	**Certificate No.**	**Due Date**
Thermo-Hygro Meter	608 H1	NFI 0274 013723	Quality Reborn	QR25-0542	10 February 2026

3. This certificate is traceable to SI UNIT
4. This certificate was certified only for the instrument we calibrated.
5. The result of calibration was found accurate as shown on date and place of calibration only.

Calibration Results:
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
40	0.0000042
80	0.0000040
120	0.000000
200	0.000000

2. Off-Center Error:
A mass of 100 g was placed and moved to various position on pan
The balance reading obtained is given in the table.

1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	6 (g)	(Maximum Difference) (g)
100.0001	100.0004	100.0002	100.0001	100.0001	100.0001	0.0003

F-CS-013 Revision: 01 Date: 20-04-65

เอกสารไม่ควบคุม

สถาบันอาหาร
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2502226-002-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: XSR205DU — **Resolution:** 0.00001 g / 0.0001 g
Serial No.: C210685394 — **ID No.:** UAE.WAO.010/2565
Capacity: 82 g / 220 g

Date of Calibration: 20 March 2025
Calibration Results: (Continued)
Calibration Range: 0-80 g
Calibration Adjustment: Internal Calibration
3. Departure from Nominal Value: (Range: 0 - 82 g ; Resolution: 0.00001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Tarred	0.000000	0.000000	0.000000	0.0000087	2.00
0.001	0.001003	0.001000	0.000000	0.0000090	2.00
0.005	0.005002	0.005005	0.000001	0.0000092	2.00
0.01	0.010003	0.010002	0.000002	0.0000089	2.00
0.05	0.049996	0.050001	0.000001	0.0000096	2.00
0.1	0.100011	0.100002	-0.000001	0.0000111	2.00
0.5	0.500016	0.500014	-0.000002	0.0000114	2.00
1	1.000003	1.000005	-0.000005	0.0000105	2.00
5	5.000073	5.000076	-0.000004	0.0000112	2.00
5	5.000016	5.000006	-0.000005	0.0000070	2.00
10	10.000009	10.000005	-0.000004	0.0000076	2.00
20	20.000030	20.000027	-0.000004	0.0000027	2.00
30	30.000019	30.000009	-0.000010	0.0000050	2.00
50	50.000028	50.000008	-0.000020	0.0000068	2.00
80	80.000057	80.000013	-0.000044	0.0000111	2.00

[redacted]

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

เอกสารไม่ควบคุม

สถาบันอาหาร
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2502226-002-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: XSR205DU — **Resolution:** 0.00001 g / 0.0001 g
Serial No.: C210685394 — **ID No.:** UAE.WAO.010/2565
Capacity: 82 g / 220 g

Date of Calibration: 20 March 2025
Calibration Results: (Continued)
Calibration Range: >80-200 g
Calibration Adjustment: Internal Calibration
3. Departure from Nominal Value: (Range: >80 - 200 g ; Resolution: 0.0001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
90	90.00030	90.0001	-0.0001	0.00015	2.00
100	100.00006	100.0000	-0.0000	0.00016	2.00
110	110.00007	110.0002	-0.0001	0.00017	2.00
120	120.00009	120.0002	-0.0001	0.00018	2.00
130	130.00010	130.0002	-0.0001	0.00019	2.00
140	140.00013	140.0002	-0.0001	0.00019	2.00
150	150.00009	150.0003	-0.0001	0.00021	2.00
160	160.00018	160.0002	-0.0001	0.00022	2.00
170	170.00012	170.0002	-0.0001	0.00023	2.00
200	200.00013	200.0002	-0.0001	0.00026	2.00

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

End

[redacted]

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

เอกสารไม่ควบคุม

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

CERTIFICATE OF CALIBRATION

Certificate No. : SP25-001

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 : [redacted]
(Mr.Tanawat Rittidech)
Technical Manager

Approved by : [redacted]
(Ms. Chonthicha Singngern)
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 issuing laboratory.

เอกสารไม่ควบคุม

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

REPORT OF CALIBRATION

Certificate No. : SP25-001

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
Absobance Standard set	25760	115663	25 October 2025
Absobance 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

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

REPORT OF CALIBRATION

Certificate No. : SP25-001

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
	1.0800	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

เอกสารไม่ควบคุม

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

REPORT OF CALIBRATION

Certificate No. : SP25-001

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

เอกสารไม่ควบคุม

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

DQE Services

REPORT OF CALIBRATION

Certificate No. : SP25-001

Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor *k*
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
637.96	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 -

เอกสารไม่ควบคุม
FM-208-02 Rev 1/01/2021

List of Instrument Certificates for Environmental Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*
1	Analytical Balance	FAT OIL AND GREASE	Mettler Toledo	AB204-S/FACT / 1129361010	Technology Promotion Association (Thailand-Japan)	24MM292	11/5/2024	10/5/2025
			Mettler Toledo	AB204-S/FACT / 1129361010	United Analyst and Engineering Consultant Co., Ltd.	250422 1 BL002 25	23/4/2025	22/4/2026
2	Analytical Balance	PARTICULATE MATTER (PM10) TOTAL SUSPENDED PARTICULATE	Mettler Toledo	MS204TS/00 / C252436235	National Food Institute, Ministry of Industry, Thailand	2502228-003-01	19/3/2025	18/3/2026
3	Analytical Balance	TOTAL DISSOLVED SOLIDS	Mettler Toledo	XSR205DU / C210685394	National Food Institute,Ministry of Industry, Thailand	2402283-002-01	2/4/2024	1/4/2025
			Mettler Toledo	XSR205DU / C210685394	National Food Institute,Ministry of Industry, Thailand	2502226-002-01	20/3/2025	19/3/2026
4	Analytical Balance	TOTAL SUSPENDED SOLIDS	Mettler Toledo	XSR205DU / C009071872	National Food Institute,Ministry of Industry, Thailand	2402283-001-01	2/4/2024	1/4/2025
			Mettler Toledo	XSR205DU / C009071872	National Food Institute,Ministry of Industry, Thailand	2502226-001-01	20/3/2025	19/3/2026
5	BOD Incubator	BIOCHEMICAL OXYGEN DEMAND	ARCO	UC4-1320 / 1021	Technology Promotion Association (Thailand-Japan)	24TM1113	11/7/2024	16/7/2025
6	BOD Incubator	BIOCHEMICAL OXYGEN DEMAND	ARCO	UC4-1320 / 1021	Technology Promotion Association (Thailand-Japan)	24TM1114	11/7/2024	10/7/2025
7	BOD Incubator	BIOCHEMICAL OXYGEN DEMAND	ARCO	UR-1320 / -	Technology Promotion Association (Thailand-Japan)	24TM588	1/4/2024	31/3/2025

List of Instrument Certificates for Environmental Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*
8	DO Meter	BIOCHEMICAL OXYGEN DEMAND	YSI	5100 / 11B 101863	Technology Promotion Association (Thailand-Japan)	24TW39	21/2/2024	20/2/2025
			YSI	5100 / 11B 101863	Technology Promotion Association (Thailand-Japan)	25TW29	18/2/2025	16/2/2026
9	Digestion Units	TOTAL KJELDAHL NITROGEN	Foss Tecator	2520 Auto / 91794469			27/1/2025	26/1/2026
10	Hot Air Oven	TOTAL DISSOLVED SOLIDS	Memmert	UF55 / B212.0411	Technology Promotion Association (Thailand-Japan)	25TM579	19/3/2025	18/3/2026
11	Cooled Incubator	TOTAL COLIFORM BACTERIA	Binder	KB400 / WTB20200000015535	Technology Promotion Association (Thailand-Japan)	24TM647	1/4/2024	31/3/2025
			Binder	KB400 / WTB20200000015535	National Food Institute, Ministry of Industry, Thailand	2502229-006-01	19/3/2025	18/3/2026
12	Incubator	ESCHERICHIA COLI FECAL COLIFORM BACTERIA TOTAL COLIFORM BACTERIA	Binder	KB400 / 20220000022479	Technology Promotion Association (THAILAND-JAPAN)	24TM938	9/7/2024	8/7/2025
13	Incubator	ESCHERICHIA COLI FECAL COLIFORM BACTERIA TOTAL COLIFORM BACTERIA	Binder	KB400 / 20220000000391	Technology Promotion Association (Thailand-Japan)	24TM884	7/6/2024	6/6/2025
14	Incubator	PSEUDOMONAS AERUGINOSA	MEMMERT	IF75 / D317.0305	National Food Institute, Ministry of Industry, Thailand	2502229-004-01	20/3/2025	19/3/2026
15	Incubator	STAPHYLOCOCCUS AUREUS	Memmert	IPP260 / V615.0187	Technology Promotion Association (Thailand-Japan)	24TM648	1/4/2024	31/3/2025
			Memmert	IPP260 / V615.0187	National Food Institute, Ministry of Industry, Thailand	2502229-001-01	19/3/2025	18/3/2026

List of Instrument Certificates for Environmental Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*
16	Incubator	PSEUDOMONAS AERUGINOSA	Memmert	IPP260 / V616.0066	Technology Promotion Association (Thailand-Japan)	24TM650	2/4/2024	2/4/2025
			Memmert	IPP260 / V616.0066	National Food Institute, Ministry of Industry, Thailand	2502229-002-01	19/3/2025	18/3/2026
17	Kjeltec Distillation Unit	TOTAL KJELDAHL NITROGEN	FOSS	KT9 / 91905393	FOSS South East Asia	12875	5/7/2024	4/7/2025
18	Kjeltec System Distilling Unit	TOTAL KJELDAHL NITROGEN	Foss Tecator (Labtec)	KT200 / 91790524	FOSS South East Asia	13319	27/1/2025	26/1/2026
19	Kjeltec Distillation Unit	TOTAL KJELDAHL NITROGEN	FOSS	Kjeltec 8100 / 91889052	FOSS South East Asia	9807	8/2/2024	7/2/2025
			FOSS	Kjeltec 8100 / 91889052	FOSS South East Asia	13854	24/2/2025	23/2/2026
20	pH Meter	pH	Horiba	LAQUA-PH210 / HA9M0048	technology promotion association (thailand-japan	25CH586	21/5/2025	19/5/2026
21	pH Meter	pH	Horiba	LAQUA-PH210 / HA1M0036	technology promotion association (thailand-japan	25CH52	15/1/2025	14/1/2026
22	pH Meter	pH	Horiba	LAQUA-PH210 / HA0D0082	technology promotion association (thailand-japan	24CH727	19/6/2024	17/6/2025
23	pH Meter	pH	YSI Environmental	pH 100A / JC03354	Technology Promotion Association (Thailand-Japan)	24CH1379	5/11/2024	6/11/2025
24	UV-VIS Spectrophotometer	NITRATE	Hitachi	U-2900 / 21E22-009	DQE Services Co.,Ltd.	SP25-001	3/1/2025	2/1/2026
25	UV/VIS Spectrophotometer	AMMONIA	Hitachi	U-5100 / 23A4-008	DQE Services Co.,Ltd.	SP24-028	11/9/2024	9/9/2025
26	Water Bath	FECAL COLIFORM BACTERIA	Memmert	WNE 14 / L416.0606	National Food Institute Minnistry of Industry	2501624 001 01	10/2/2025	9/2/2026

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

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
53/49 PATTAMAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-39 FAX.0-2719-9484

Certificate of Calibration

Cert.No.: 24MM292
Page.: 1 of 3

Equipment :	Electronic Balance
Manufacturer :	Mettler Toledo
Model :	AB204-S/FACT
Serial No. :	1129361010
ID No. :	UAE.WAS.0022582
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Location :	Balance Room (106)
Received date :	11 May 2024
Calibration Date :	11 May 2024
Ambient Temperature :	15 °C to 40 °C
Relative Humidity :	30 % to 90 %
Calibrated by :	Khai Rueangpaopichai
Approved by :	[redacted] Approved signatory

( ) Ponpan Palpim
( ) Suvit Imjai
(✓) Kunchit Prompest

Issue Date : 15 May 2024

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 Head of Corporate Services 3 : Equipment Calibration and Testing Services.

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Procedure used :-

Calibration were conducted using in-house calibration procedure CP-CB01 based on UKAS LAB 14 according to direct measurement method against standard weight.

Condition of this result of calibration

1. Reference standard instruments:-

Instruments	Model	Serial No.	ID No.	Test report No.	Due date
1) Standard Weight Set (E2)	15884	24089	70RC007	MM-0013-24	25 Jan 2026

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This result of calibration was made on requested at the point specified by customer.
4. This certificate is not certified for any commercial transaction.
5. This certification is traceable to the International System of Unit.

Result of calibration ( ) Without Adjustment (✓) After Adjustment by Internal Calibration

Range capacity : 0 g to 220 g **Resolution** 0.0001 g

Before Adjustment :

Applied Weight (g)	Balance Reading (g)	Correction (g)	Measurement Uncertainty (± mg)	Coverage Factor (k)
100	100.0000	0.0000	0.19	2.03
200	200.0006	-0.0006	0.30	2

After Adjustment :

1. Determination of the standard deviation of weighing machine (n = 10)

Applied Weight (g)	Standard Deviation of Reading (g)
100	0.00007
200	0.00005

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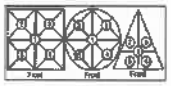
Result of calibration

2. Effect of off-center loading

A mass of 100 g was placed to various position on the pan.
The weighing machine reading error obtained is given in the table



Position 1 (g)	Position 2 (g)	Position 3 (g)	Position 4 (g)	Position 5 (g)	Maximum difference between off-center and central loading (g)
-0.0004	-0.0004	-0.0003	-0.0003	-0.0004	0.0001

3. Departure from nominal value

Applied Weight (g)	Balance Reading (g)	Correction (g)	Measurement Uncertainty (± mg)	Coverage Factor (k)
Unload	0.0000	0.0000	0.15	2.13
0.01	0.0100	0.0000	0.15	2.13
0.05	0.0500	0.0000	0.15	2.13
0.1	0.1000	0.0000	0.15	2.13
0.5	0.5000	0.0000	0.15	2.13
1	1.0000	0.0000	0.15	2.13
10	10.0000	0.0000	0.15	2.11
50	49.9999	+0.0001	0.17	2.08
100	99.9999	+0.0001	0.19	2.03
150	149.9998	+0.0002	0.29	2
200	199.9990	+0.0010	0.30	2

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

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Certificate of Calibration

Certificate No.: 250422-1-BL002-25
Code No.: BL002-25

Customer Name:	United Analyst and Engineering Consultant Co., Ltd.
Address:	3 Soi Udom suk 41, Sukhumvit Rd., Bang Chak, Phar Khanong, Bangkok 10260
Equipment:	Electronic Balance
Manufacturer:	Mettler Toledo
Model:	AB204-S/FACT
Serial No.:	1129361010
Asset No. :	UAE.WAS.002/2552
Building : N/A	**Floor : 1** **Room . 107**
Received Date:	April 22, 2025
Date of Calibration :	April 23, 2025
Calibration Conditions:	Temperature 22.8 °C to 23.4 °C
	Humidity 54.8 % to 58.9 %
	Pressure 756.6 mmHg to 758.2 mmHg
Calibrated by:	Sakkarin Srirahang
Approved by:	Suwit Chotnok Signature: [redacted]
Issued Date:	April 25, 2025

Note : 1) The uncertainties are for a confidence probability of approximately 95%

2) This Certificate is valid only to the item calibrated on date and place of calibration.

3) 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 United Analyst and Engineering Consultant Co.,Ltd. (UAE)

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment:	Electronic Balance	Manufacturer:	Mettler Toledo
Model:	AB204-S/FACT	Readability:	0.0001 g
Serial No.:	1129361010	ID No.:	UAE.WAS.002/2552
Max. Capacity:	220 g		
Calibration Date:	April 23, 2025		
Condition As-Received:	In Condition		

Condition of Equipment:

Condition of This Result of Calibration:

1. Calibration Method: This instrument was calibrated by method UAE.CP.CAL.001 In-House Method based on UNAS Lab 14 : 2022
2. Reference Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (1mg-1kg)		8749107122	ANARC	25-009359	Mettler-Toledo	21-Jan-27
Standard Weight Class F1 (1mg to 200 g		11919512	ANARC	24-013890	Mettler-Toledo	04-Feb-26
Instrument	**Model**	**Serial No.**	**Calibrated By**	**Certificate No.**	**Traceability**	**Due Date**
Thermo-Hygro-Baro Meter	MMB-38250	ME46957	SUCCESS	56-H-08997/67	Success Laboratory	21-Nov-25
Thermo Hygro-Baro Meter	MMB-38250	ME36953	TPA	25P095	TPA	25-Feb-26

3. This certification is traceable to SI Unit
4. This certification was certified only for the instrument we calibrated
5. This result of calibration was found accurate as show on date and place of calibration only.
6. Through the reference standard laboratory of ANARC 25-009359 Calibration 0152

Calibration Result:

1. Repeatability of Reading.

Nominal Value (g)	Standard Deviation of Reading (g)
20g*	0.000049

2. Eccentric or off-center loading

A mass of 100 g was placed and moved to various position on pan

The Balance reading obtained is given in the table.

1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	Maximum Difference (g)
100.0000	99.9996	99.9997	100.0003	100.0005	0.0009

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment:	Electronic Balance	Manufacturer:	Mettler Toledo
Model:	AB204-S/FACT	Readability:	0.0001 g
Serial No.:	1129361010	ID No.:	UAE.WAS.002/2552
Max. Capacity:	220 g		
Calibration Date:	April 23, 2025		

Calibration Result: (Continued)

Calibration Range: 0 - 200 g

Calibration Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value:

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.10	2.05
0.01	0.0100025	0.0099	0.0001	0.10	2.05
0.05	0.0500056	0.0500	0.0000	0.10	2.05
0.1	0.1000012	0.0999	0.0001	0.10	2.05
0.5	0.5000133	0.5000	0.0000	0.10	2.05
1	1.0000105	1.0000	0.0000	0.10	2.05
10	10.0000010	10.0000	0.0000	0.11	2.04
40	40.000074	40.0000	0.0000	0.14	2.00
50	50.000056	50.0000	0.0001	0.13	2.00
80	80.000107	80.0000	0.0001	0.18	2.00
100	100.000109	99.9999	0.0002	0.17	2.00
120	120.000115	119.9999	0.0003	0.21	2.00
150	150.000165	149.9998	0.0005	0.24	2.06
160	160.000175	159.9997	0.0005	0.26	2.00
200	200.000129	199.9998	0.0004	0.30	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000041	19.9999	0.0001
	40.000076	39.9996	0.0002
	60.000066	59.9997	0.0003
	80.000107	79.9998	0.0002
	100.000168	100.0006	-0.0003

Remark:

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

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สถาบันอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Certificate

Certificate No.: 2502228-003-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 61, Sukhumvit Road,
Bangchack, Prakhanong, Bangkok 10260

Equipment: Electronic Balance

Manufacturer: METTLER TOLEDO

Model: MS204TS/00

Serial No.: C252436235

ID No.: UAE.AIR.023/2566

Order No.: 2502228

Operation No.: 2502228-003

Date of Receipt: 19 March 2025

Date of Calibration: 19 March 2025

Calibrated by Mr.Yotsin Charoensuk
Scientist

Approved by [redacted]
(Mr.Phasuphat Tanrjit)
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.

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Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2502228-003-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: MS204TS/00 — **Resolution:** 0.0001 g
Serial No.: C252436235 — **ID No.:** UAE.AIR.023/2566
Capacity: 220 g

Date of Calibration: 19 March 2025

Environment Condition: Ambient Temperature: 21.1 ± 0.5 °C Relative Humidity: 55 ± 0.75 %
Place of Calibration: 206 Balance Room 2, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Condition of Equipment: Good Condition
Condition of This Results of Calibrations:
1. Calibration Method: NFI Method W-MA-004 In-House Method based on EMRS. Lab 34 : 2019
2. Reference Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 200g	8900567572	TCI	M2404005	15 April 2025
Instrument	**Model**	**Serial No.**	**Calibrated By**	**Certificate No.**	**Due Date**
Human-Hygro Meter	608-H1	NFE.BTH-017/23	Quality Reborn	QRJS-0542	18 February 2026

3. This certification is traceable to SI UNIT
4. This certificate was certified only for the instruments was calibrated.
5. The result of calibration was found accurate as shown on date and place of calibration only.

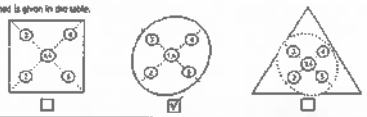
Calibration Results:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
100	0.000052
200	0.000079

2. Off-Center Error:

A mass of 200 g was placed and moved to various position on pan.
The balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	6 (g)	(Maximum Difference) (g)
99.9997	99.9995	99.9995	99.9997	99.9999	99.9996	0.0004

[redacted]

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ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2502228-003-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: MS204TS/00 — **Resolution:** 0.0001 g
Serial No.: C252436235 — **ID No.:** UAE.AIR.023/2566
Capacity: 220 g

Date of Calibration: 19 March 2025

Calibration Results: (Continued)
Calibration Range: 0-200 g
Calibration Adjustment: Internal Calibration
3. Departure from Nominal Value:

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Unload	0.00000	0.0000	0.0000	0.000089	2.00
0.1	0.10001	0.1001	-0.0001	0.000089	2.00
1	1.00008	1.0000	0.0000	0.000089	2.00
3	3.00003	3.0000	0.0000	0.000091	2.00
5	5.00002	5.0000	0.0000	0.000090	2.00
10	10.00001	9.9999	0.0001	0.000092	2.00
20	20.00003	20.0000	0.0000	0.000096	2.00
50	50.00003	49.9998	0.0002	0.00012	2.00
70	70.00006	69.9998	0.0002	0.00013	2.00
100	100.00006	99.9998	0.0002	0.00016	2.00
150	150.00009	149.9999	0.0001	0.00021	2.00
200	200.00013	200.0000	0.0001	0.00029	2.00

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

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ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Certificate

Certificate No.: 2402283-002-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 SOI UDONSUK 41, SUKHUMVIT ROAD, Bangchack, Prakhanong, Bangkok 10260

Equipment:	Electronic Balance
Manufacturer:	METTLER TOLEDO
Model:	XSR205DU
Serial No.:	C210685394
ID No.:	UAE.WAO.010/2565
Order No.:	2402283
Operation No.:	2402283-002
Date of Receipt:	2 April 2024
Date of Calibration:	2 April 2024

Calibrated by Mr.Jeramut Prapamuttipong, Scientist
Approved by [redacted] (Mr.Pheraphat Tuangit)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 9 April 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.

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Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2402283-002-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: XSR205DU — **Resolution:** 0.00001 g / 0.0001 g
Serial No.: C210685394 — **ID No.:** UAE.WAO.010/2565
Capacity: 220 g

Date of Calibration: 2 April 2024

Environment Condition: Ambient Temperature: 24.5 ± 0.5 °C Relative Humidity: 47.5 ± 2.5 %
Place of Calibration: Laboratory, UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Condition of Equipment: Good Condition
Condition of This Results of Calibration:
1. Calibration Method: nfi Method 97-MA-001 In-House Method based on OIML R 76-1 : 2019
2. Reference Standards.

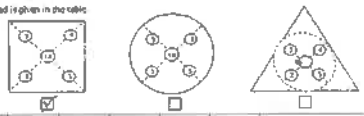
Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 200g	0505967572	TCS	M2004035	6 April 2024
Instrument	**Model**	**Serial No.**	**Calibrated By**	**Certificate No.**	**Due Date**
Thermo-Hygro Meter	608-H1	MFLEETH 016/23	Quality Room	QR24-0043	9 February 2025

3. This certificate is traceable to SI UNIT
4. This certificate was carried only for the instrument we calibrated.
5. This result of calibration was found accurate as shown on date and place of calibration only.

Calibration Results:
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
40	0.0000042
80	0.0000032
100	0.0000048
200	0.0000048

2. Off-Center Error:
A mass of 100 g was placed and moved to various positions on pan.
The balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	6 (g)	(Maximum Difference) (g)
100.0000	100.0001	99.9999	99.9999	100.0001	100.0000	0.0001

[redacted]

เอกสารไม่ควบคุม

สถาบันอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2402283-002-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: XSR205DU — **Resolution:** 0.00001 g / 0.0001 g
Serial No.: C210685394 — **ID No.:** UAE.WAO.010/2565
Capacity: 220 g

Date of Calibration: 2 April 2024

Calibration Results: (Continued)
Calibration Range: 0 - 80 g
Calibration Adjustment: Internal Calibration
3. Departure from Nominal Value: (Range: 0 - 80 g ; Resolution: 0.00001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Tested	0.000000	0.00000	0.00000	0.0000006	2.00
0.001	0.001002	0.00101	-0.00001	0.0000009	2.00
0.005	0.005003	0.00500	0.00000	0.0000002	2.00
0.01	0.010003	0.01000	0.00000	0.0000009	2.00
0.05	0.049996	0.05005	0.00004	0.0000006	2.00
0.1	0.100011	0.10000	0.00001	0.0000011	2.00
0.5	0.500016	0.50001	0.00001	0.0000014	2.00
1	1.000001	1.00007	0.00006	0.0000016	2.00
2	2.000021	2.00001	0.00001	0.0000017	2.00
5	5.000012	5.00002	0.00002	0.0000020	2.00
10	10.000009	10.00000	0.00001	0.0000026	2.00
20	20.000031	20.00003	0.00003	0.0000037	2.00
30	30.000010	30.00001	0.00001	0.0000050	2.00
50	50.000028	50.00002	0.00003	0.0000068	2.00
80	80.000068	80.00007	0.00008	0.0000114	2.00

[redacted]

เอกสารไม่ควบคุม

สถาบันอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2402283-002-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: XSR205DU — **Resolution:** 0.00001 g / 0.0001 g
Serial No.: C210685394 — **ID No.:** UAE.WAO.010/2565
Capacity: 220 g

Date of Calibration: 2 April 2024

Calibration Results: (Continued)
Calibration Range: 81 - 200 g
Calibration Adjustment: Internal Calibration
3. Departure from Nominal Value: (Range: 81 - 200 g ; Resolution: 0.0001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
90	90.00010	90.0001	0.0000	0.000015	2.00
100	100.00006	100.0001	0.0000	0.000017	2.00
110	110.00007	110.0001	0.0000	0.000016	2.00
120	120.00009	120.0000	0.0001	0.000017	2.00
130	130.00010	130.0000	0.0001	0.000019	2.00
140	140.00014	140.0000	0.0001	0.000020	2.00
150	150.00009	150.0001	0.0000	0.000025	2.00
160	160.00010	160.0001	0.0000	0.000022	2.00
170	170.00012	170.0001	0.0000	0.000023	2.00
200	200.00016	200.0002	0.0000	0.000028	2.00

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k , pro... level of confidence of approximately 95 %.

[redacted]

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เอกสารไม่ควบคุม

สถาบันอาหาร
กรมส่งเสริมอุตสาหกรรม
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Certificate

Certificate No.: 2502226-002-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhanong, Bangkok 10260

Equipment: Electronic Balance
Manufacturer: METTLER TOLEDO
Model: XSR205DU
Serial No.: C210665394
ID No.: UAE.WAO.010/2565
Order No.: 2502226
Operation No.: 2502226-002
Date of Receipt: 19 March 2025
Date of Calibration: 20 March 2025

Calibrated by Mr.Yothin Charoendusk
Scientist

Approved [redacted]
(Mr.Phenphisit Tiamjit)
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.

เอกสารไม่ควบคุม

สถาบันอาหาร
กรมส่งเสริมอุตสาหกรรม
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2502226-002-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: XSR205DU — **Resolution:** 0.00001 g / 0.0001 g
Serial No.: C210665394 — **ID No.:** UAE.WAO.010/2565
Capacity: 82 g / 220 g

Date of Calibration: 20 March 2025

Environment Condition: Ambient Temperature: 21.2 ± 0.6 °C Relative Humidity: 48 ± 3.5 %
Place of Calibration: 208 Balance Room, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Condition of Equipment: Good Condition

Condition of The Results of Calibration:

1. Calibration Method: NFI Method W-MA-001 In-House Method based on OIML Lab 14 : 2019
2. Reference Standard:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 200g	B505567572	TCS	M24041005	15 April 2029
Instrument	**Model**	**Serial No.**	**Calibrated By**	**Certificate No.**	**Due Date**
Thermo-hygro Meter	608-H1	NFI.BTH 013/23	Quality Reborn	QR25-0542	18 February 2026

3. This certification is traceable to SI UNIT
4. This certificate was certified only for the instrument we calibrated.
5. This result of calibration was issued separate as shown on date and place of calibration only.

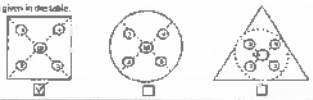
Calibration Results:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
40	0.0000042
80	0.0000042
160	0.000000
200	0.000000

2. Off-Center Error:

A mass of 100 g was placed and moved to various position on pan.
The balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	6 (g)	(Maximum Difference) (g)
100.0001	100.0001	100.0001	100.0001	100.0001	100.0001	0.0000

[redacted]

เอกสารไม่ควบคุม

สถาบันอาหาร
กรมส่งเสริมอุตสาหกรรม
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2502226-002-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: XSR205DU — **Resolution:** 0.00001 g / 0.0001 g
Serial No.: C210665394 — **ID No.:** UAE.WAO.010/2565
Capacity: 82 g / 220 g

Date of Calibration: 20 March 2025

Calibration Results: (Continued)
Calibration Range: 0-80 g
Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value: (Range: 0 - 82 g ; Resolution: 0.00001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Tared	0.000000	0.00000	0.00000	0.0000000	2.00
0.001	0.001003	0.00100	0.00000	0.0000010	2.00
0.005	0.005002	0.00501	-0.00001	0.0000030	2.00
0.01	0.010003	0.01002	-0.00002	0.0000059	2.00
0.05	0.049996	0.05001	-0.00004	0.0000096	2.00
0.1	0.100011	0.10002	-0.00001	0.0000011	2.00
0.5	0.500015	0.50004	-0.00002	0.0000014	2.00
1	1.000003	1.00005	-0.00005	0.0000015	2.00
2	2.000073	2.00006	-0.00004	0.0000017	2.00
5	5.000015	5.00006	-0.00005	0.0000019	2.00
10	10.000005	10.00005	-0.00004	0.0000025	2.00
20	20.000020	20.00007	-0.00004	0.0000037	2.00
30	30.000039	30.00009	-0.00005	0.0000050	2.00
50	50.000026	50.00008	-0.00005	0.0000068	2.00
80	80.000057	80.00013	-0.00005	0.0000111	2.00

[redacted]

เอกสารไม่ควบคุม

สถาบันอาหาร
กรมส่งเสริมอุตสาหกรรม
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2502226-002-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: XSR205DU — **Resolution:** 0.00001 g / 0.0001 g
Serial No.: C210665394 — **ID No.:** UAE.WAO.010/2565
Capacity: 82 g / 220 g

Date of Calibration: 20 March 2025

Calibration Results: (Continued)
Calibration Range: >80-200 g
Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value: (Range: >80 - 200 g ; Resolution: 0.0001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
90	90.00010	90.0002	-0.0001	0.00015	2.08
100	100.00006	100.0001	0.0000	0.00006	2.00
110	110.00007	110.0002	-0.0001	0.00007	2.08
120	120.00009	120.0002	-0.0001	0.00010	2.80
130	130.00010	130.0002	-0.0001	0.00010	2.80
140	140.00013	140.0002	-0.0001	0.00010	2.80
150	150.00009	150.0002	-0.0001	0.00010	2.80
160	160.00015	160.0002	-0.0001	0.00012	2.80
170	170.00012	170.0002	-0.0001	0.00013	2.80
200	200.00013	200.0002	-0.0001	0.00020	2.80

The reported uncertainty of measurement was stated as a standard uncertainty multiplied by a coverage factor k , providing a level of confidence of approximately 95 %.

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สถาบันพัฒนาอุตสาหกรรมอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Certificate

Certificate No.: 2402283-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhanong, Bangkok 10260

Equipment: Electronic Balance
Manufacturer: METTLER TOLEDO
Model: XSR205DU
Serial No.: C009071872
ID No.: UAE.WAO.012/2563
Order No.: 2402283
Operation No.: 2402283-001
Date of Receipt: 2 April 2024
Date of Calibration: 2 April 2024

Calibrated by Mr.Jaranut Prapawuttipong
Scientist

Approved by [redacted]
(Mr.Phirapohat Tumajit)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 9 April 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.

เอกสารไม่ควบคุม

สถาบันพัฒนาอุตสาหกรรมอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2402283-001-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: XSR205DU — **Resolution:** 0.00001 g / 0.0001 g
Serial No.: C009071872 — **ID No.:** UAE.WAO.012/2563
Capacity: 220 g

Date of Calibration: 2 April 2024

Environment Condition: Ambient Temperature: 24.5 ± 0.5 °C Relative Humidity: 47.5 ± 7.5 %
Place of Calibration: Laboratory, UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Condition of Equipment: Good Condition
Condition of This Results of Calibration:
1. Calibration Method: NFI Method WI-MA-001 In-House Method based on UKAS Lab 14 : 2019
2. Reference Standards:

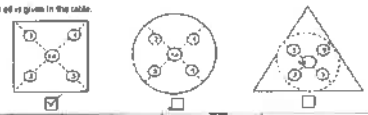
Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 200g	8505567572	TCS	23040535	8 April 2024
Instrument	**Model**	**Serial No.**	**Calibrated By**	**Certificate No.**	**Due Date**
Thermo-Hygro Meter	605-H1	NFI.ETH 0/6023	Quality Systems	0824-0343	5 February 2025

3. This calibration is traceable to SI Unit
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.

Calibration Results:
1. Repeatability of Reading:

Weighed Value (g)	Standard Deviation of Reading (g)
40	0.0000052
80	0.0000063
160	0.0000048
200	0.0000053

2. Off-Center Error:
A mass of 100 g was placed and moved to various position on pan.
The balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	6 (g)	(Maximum Difference) (g)
100.0002	100.0001	100.0002	99.9999	100.0001	100.0001	0.0003

[redacted]

เอกสารไม่ควบคุม

สถาบันพัฒนาอุตสาหกรรมอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2402283-001-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: XSR205DU — **Resolution:** 0.00001 g / 0.0001 g
Serial No.: C009071872 — **ID No.:** UAE.WAO.012/2563
Capacity: 220 g

Date of Calibration: 2 April 2024

Calibration Results: (Continued)
Calibration Range: 0 - 80 g
Calibration Adjustment: Internal Calibration
3. Departure from Nominal Value: (Range: 0 - 80 g ; Resolution: 0.00001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
Unload	0.000000	0.00009	-0.00000	0.0000038	2.00
0.001	0.001003	0.001001	0.000001	0.0000091	2.00
0.005	0.005003	0.005000	0.000003	0.0000094	2.00
0.01	0.010003	0.010000	0.000003	0.0000091	2.00
0.05	0.049996	0.050000	0.000004	0.0000098	2.00
0.1	0.100014	0.100000	0.000014	0.0000111	2.00
0.5	0.500016	0.500010	0.000006	0.0000134	2.00
1	1.000003	1.000002	0.000002	0.0000136	2.00
2	2.000023	2.000001	0.000021	0.0000117	2.00
5	5.000017	5.000002	0.000006	0.0000126	2.00
10	10.000009	10.000000	0.000001	0.0000136	2.00
20	20.000031	20.000002	0.000029	0.0000139	2.00
30	30.000049	30.000003	0.000046	0.0000152	2.00
50	50.000079	50.000014	0.000065	0.0000186	2.00
80	80.000068	80.000005	0.000063	0.0000211	2.00

[redacted]

เอกสารไม่ควบคุม

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ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2402283-001-01
Equipment: Electronic Balance — **Manufacturer:** METTLER TOLEDO
Model: XSR205DU — **Resolution:** 0.00001 g / 0.0001 g
Serial No.: C009071872 — **ID No.:** UAE.WAO.012/2563
Capacity: 220 g

Date of Calibration: 2 April 2024

Calibration Results: (Continued)
Calibration Range: 81 - 200 g
Calibration Adjustment: Internal Calibration
3. Departure from Nominal Value: (Range: 81 - 200 g ; Resolution: 0.0001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
90	90.000018	90.0000	0.0001	0.00015	2.00
100	100.000065	100.0000	0.0001	0.00015	2.00
110	110.000007	110.0001	0.0000	0.00012	2.00
120	120.000019	120.0000	0.0001	0.00018	2.00
130	130.000190	130.0000	0.0001	0.00019	2.00
140	140.000114	140.0000	0.0001	0.00020	2.00
150	150.000095	150.0001	0.0000	0.00023	2.00
160	160.000010	160.0001	0.0000	0.00022	2.00
170	170.000112	170.0001	0.0000	0.00023	2.00
200	200.000016	200.0000	0.0000	0.00028	2.00

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

---------- End ----------

[redacted]

เอกสารไม่ควบคุม

สถาบันพัฒนาอุตสาหกรรมอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Certificate

Certificate No.: 2502226-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhanong, Bangkok 10260

Equipment: Electronic Balance

Manufacturer: METTLER TOLEDO

Model: XSR205DU

Serial No.: C009071872

ID No.: UAE.WAO.012/2563

Order No.: 2502226

Operation No.: 2502226-001

Date of Receipt: 19 March 2025

Date of Calibration: 20 March 2025

Calibrated by Mr.Yodsin Charoenwuk
Scientist

Approved by [redacted]
(Mr.Phanphet Tuan[R])
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.

เอกสารไม่ควบคุม

สถาบันพัฒนาอุตสาหกรรมอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2502226-001-01
Equipment: Electronic Balance — Manufacturer: METTLER TOLEDO
Model: XSR205DU — Resolution: 0.00001 g / 0.0001 g
Serial No.: C009071872 — ID No.: UAE.WAO.012/2563
Capacity: 82 g / 220 g

Date of Calibration: 20 March 2025

Environment Condition: Ambient Temperature: 21.2 → 21.5 °C Relative Humidity: 48 ± 3.5 %
Place of Calibration: 206 Balance Room, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Condition of Equipment: Good Condition
Condition of This Results of Calibration:
1. Calibration Method: NFI Method TY-MA-001 In House Method based on UKAS Lab 14 : 2019
2. Reference Standards:

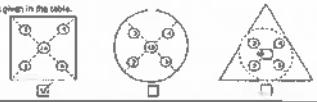
Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 200g	18.0636.7572	TCS	M24041806	19 April 2025
Instrument	**Model**	**Serial No.**	**Calibrated By**	**Certificate No.**	**Due Date**
Thermo-Hygro Meter	608-H1	NFI.BTH 017/23	Quality Reborn	QR25-0542	19 February 2026

3. This certificate is traceable to SI Unit
4. This certificate was certified only for the instrument was calibrated.
5. The result of calibration was found accurate as shown on date and place of calibration only.

Calibration Results:
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
40	0.0000052
80	0.0000042
100	0.0000006
200	0.0000008

2. Off-Center Error:
A mass of 100 g was placed and moved to various position on pan.
The balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	6 (g)	(Maximum Difference) (g)
100.0001	100.0001	100.0001	100.0001	100.0001	100.0002	0.0001

[redacted]

เอกสารไม่ควบคุม

สถาบันพัฒนาอุตสาหกรรมอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2502226-001-01
Equipment: Electronic Balance — Manufacturer: METTLER TOLEDO
Model: XSR205DU — Resolution: 0.00001 g / 0.0001 g
Serial No.: C009071872 — ID No.: UAE.WAO.012/2563
Capacity: 82 g / 220 g

Date of Calibration: 20 March 2025

Calibration Results: (Continued)
Calibration Range: 0-80 g
Calibration Adjustment: Internal Calibration
3. Departure from Nominal Value: (Range: 0 - 82 g ; Resolution: 0.00001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
0.00000	0.000000	0.00000	0.000000	0.0000000	2.00
0.001	0.001003	0.00100	0.00000	0.0000072	2.00
0.005	0.005002	0.00500	0.00000	0.0000494	2.00
0.01	0.010003	0.01000	0.00000	0.0000091	2.00
0.05	0.049996	0.05000	0.00000	0.0000098	2.00
0.1	0.100011	0.10000	0.00001	0.0000111	2.00
0.5	0.500016	0.50000	0.00002	0.0000134	2.00
1	1.000003	1.00001	-0.00004	0.0000045	2.00
2	2.000023	2.00005	-0.00003	0.0000127	2.00
5	5.000015	5.00005	-0.00003	0.0000121	2.00
10	10.000009	10.00005	-0.00004	0.0000105	2.00
20	20.000038	20.00012	-0.00009	0.0000097	2.00
30	30.000029	30.00012	-0.00008	0.0000050	2.00
50	50.000076	50.00014	-0.00011	0.0000058	2.00
80	80.000057	80.00008	-0.00013	0.0000116	2.00

[redacted]

เอกสารไม่ควบคุม

สถาบันพัฒนาอุตสาหกรรมอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2502226-001-01
Equipment: Electronic Balance — Manufacturer: METTLER TOLEDO
Model: XSR205DU — Resolution: 0.00001 g / 0.0001 g
Serial No.: C009071872 — ID No.: UAE.WAO.012/2563
Capacity: 82 g / 220 g

Date of Calibration: 20 March 2025

Calibration Results: (Continued)
Calibration Range: >80-200 g
Calibration Adjustment: Internal Calibration
3. Departure from Nominal Value: (Range: >80 - 200 g ; Resolution: 0.0001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (± g)	Coverage Factor k
90	90.00019	90.0002	-0.0001	0.000019	2.00
100	100.00008	100.0001	0.0000	0.000016	2.00
110	110.00007	110.0001	0.0000	0.000017	2.00
120	120.00008	120.0002	-0.0001	0.000018	2.00
130	130.00010	130.0002	-0.0001	0.000019	2.00
140	140.00013	140.0002	-0.0001	0.000019	2.00
150	150.00008	150.0002	-0.0001	0.000021	2.00
160	160.00018	160.0002	-0.0001	0.000022	2.00
170	170.00012	170.0002	-0.0001	0.000023	2.00
200	200.00013	200.0002	-0.0001	0.000028	2.00

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

---------- End ----------

[redacted]

เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
93/48 PRITTHAMKARN ROAD SOI 19, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3900-29 FAX.0-2719-9484

Certificate of Calibration

Equipment :	BOD Incubator
Manufacturer :	ARCO
Model :	UC4-1320
Serial No. :	-
ID No. :	UAE.WAO.002/2550
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Location :	Lab Floor 2
Received Order :	11 July 2024
Calibration Date :	11 July 2024
Ambient Temperature :	(28 ± 10) °C
Relative Humidity :	(50 ± 30) %
Calibrated by :	Tawatchai Parra
Approved by :	[redacted]

( ) Penpan Paipia
(√) Suwit Imjai
( ) Kunchit Promprat

Issue Date : 14 July 2024

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 head of Corporate Services 3 : Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม

Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2407-0243OC-1

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

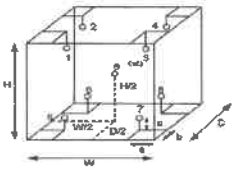
Instrument	Serial No.	Cert. No.	Traceable	Due Date
( ) Data Acquisition	MY49023932	22LM122	TPA	26 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Environment during calibration	Beginning	Finished
Temp. (°C)	29	32
REL.Humid. (%)	79	66
AC Supply (Volt)	233	234



Position :	Ref. Std. ID No.:
1	19-16RTD-01
2	19-16RTD-02
3	19-16RTD-03
4	19-16RTD-04
5	19-16RTD-05
6	19-16RTD-06
7	21-16RTD-07
8	19-16RTD-08
9 (ref.)	19-16RTD-09

Probe Installation Details :

a =	10	cm
b =	10	cm
c =	10	cm

Dimension of Chamber :

D =	0.82	m
W =	1.2	m
H =	1.2	m
Capacity =	0.89	m³

เอกสารไม่ควบคุม

Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2407-0243OC-1
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	19.8	0.55	0.66	1.5	2

Calibration Point	Measured Temperature (°C) Position									Uncertainty
(°C)	1	2	3	4	5	6	7	8	9 (ref.)	(±°C)
20.0	20.210	20.331	20.182	19.645	20.287	20.070	19.638	19.781	19.954	0.79

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature 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 or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND–JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
53/44 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3600-29 FAX.0-2719-9484

Certificate of Calibration

Cert. No.: 24TM1114
Page : 1 of 3

Equipment :	BOD Incubator
Manufacturer :	ARCO
Model :	UC4-1320
Serial No. :	-
ID No. :	UAE.WAO.018/2559
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumwit Road, Bangchak, Phrakhanong, Bangkok 10260
Location :	Lab Floor 2
Received Order :	11 July 2024
Calibration Date :	11 July 2024
Ambient Temperature :	(26 ± 10) °C
Relative Humidity :	(50 ± 30) %
Calibrated by :	[redacted]
Approved by :	[redacted] Approved Signatory

( ) Ponpan Palpim
(✓) Suwit Injai
( ) Kunchit Prompot

Issue Date : 14 July 2024

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 head of Corporate Services & Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).
The temperature scale used was based on ITS-90.

Condition of this result of calibration

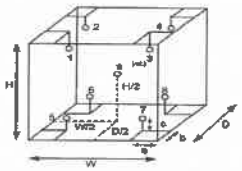
1. Reference standard instrument-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1] Data Acquisition	MY48023932	23LM122	TPA	26 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Environment during calibration	Beginning	Finished
Temp. (°C)	29	29
REL Humid. (%)	78	72
AC Supply (Volt)	233	234



Position :	Ref. Std. ID No.:
1	20-16RTD-10
2	20-16RTD-02
3	20-16RTD-03
4	23-16RTD-04
5	22-16RTD-05
6	20-16RTD-06
7	20-16RTD-07
8	22-16RTD-08
9 (ref.)	22-16RTD-09

Probe Installation Details :
a = 10 cm
b = 10 cm
c = 10 cm

Dimension of Chamber :
D = 0.62 m
W = 1.2 m
H = 1.2 m
Capacity = 0.89 m³

เอกสารไม่ควบคุม

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	19.9	0.29	0.81	1.2	2

Calibration Point	Measured Temperature (°C) Position									Uncertainty
(°C)	1	2	3	4	5	6	7	8	9 (ref.)	(± °C)
20.0	20.361	19.540	20.312	20.079	19.908	19.872	19.955	19.818	19.758	0.46

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature 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 or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
53/41 PATTANAKARN ROAD SOI 18, SUAN LUANG, SUAN LUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-0453

Cert. No.: 24TM588
Page : 1 of 3

Certificate of Calibration

Equipment :	BOD Incubator
Manufacturer :	ARCO
Model :	UR-1320
Serial No. :	-
ID No. :	UAE.WAO.006/2553
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Location :	Lab Floor 2
Received Order :	01 April 2024
Calibration Date :	01 April 2024
Ambient Temperature :	(25 ± 10) °C
Relative Humidity :	(50 ± 30) %
Calibrated by :	Kriada Malee
Approved by :	[redacted] Approved Signatory

( ) Porpan Paipin
(✓) Suwit Imjai
( ) Kunchit Prompral

Issue Date : 5 April 2024

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 head of Corporate Services & Equipment Calibration and Testing Services

เอกสารไม่ควบคุม

A 0065064

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
53/41 PATTANAKARN ROAD SOI 18, SUAN LUANG, SUAN LUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-0453

Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2404-0004OC-2
Procedure Used :-
Calibration were conducted using calibration procedure CP-DT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).
The temperature scale used was based on ITS-90.

Cert. No.: 24TM588
Page : 2 of 3

Condition of this result of calibration

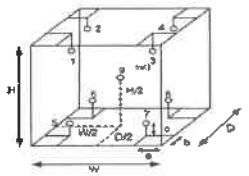
1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY57013711	23LM116	TPA	11 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	26	27
REL Humid. (%)	45	47
AC Supply (Volt)	220	221



Position :	Ref. Std. ID No.:
1	22-18RTD-2/1
2	18RTD-2/2
3	18RTD-2/3
4	18RTD-2/4
5	18RTD-2/5
6	18RTD-2/6
7	18RTD-2/7
8	18RTD-2/8
9 (ref.)	18RTD-2/9

Probe Installation Details :
a = 20 cm
b = 10 cm
c = 10 cm

Dimension of Chamber :
D = 0.62 m
W = 1.2 m
H = 1.2 m
Capacity = 0.89 m³

[redacted]

a 1209741

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
53/41 PATTANAKARN ROAD SOI 18, SUAN LUANG, SUAN LUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-0453

Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2404-0004OC-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Cert. No.: 24TM588
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	19.9	0.47	0.69	1.4	2

Calibration Point	Measured Temperature (°C) Position									Uncertainty
(°C)	1	2	3	4	5	6	7	8	9 (ref.)	(± °C)
20.0	20.289	19.635	20.129	19.985	20.190	20.160	20.300	20.457	20.248	0.67

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature 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 or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration.
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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เอกสา[redacted]

a 1209740

กำหนดจุดห้ามใช้งาน

References Certificate Number. : 234TM588

Equipment : BOD Incubator

Model : UR-1320

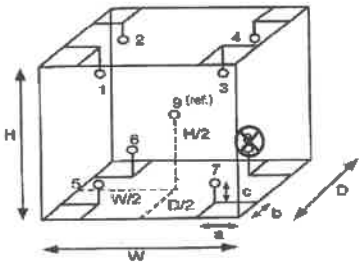
Serial No. : -

ID No. : UAE.WAO.006/2553

Manufacturer : ARCO

Calibration Point : 20.0 °C

Unit Under Calibration Setting : 20.0 °C



รูปภาพเครื่องมือ แสดงจุดที่ได้รับการสอบเทียบ และสัญลักษณ์⊗ แสดงจุดห้ามใช้งาน

กำหนดจุดห้ามใช้งานตำแหน่งที่....8.....

หมายเหตุ เต็มในกรณี.....

เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000 FAX. 0-2719-9494

Certificate of Testing

Equipment :	DO Meter
Manufacturer :	YSI
Model :	5100
Serial No. :	11B 101863
ID No. :	UAE.WAO.004/2554
Received Date :	20 February 2024
Test Date :	21 February 2024
Reference :	2402-0629DSC-1
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Laboratory Condition :	Temperature (25 ± 5) °C Humidity (50 ± 20) %
Test Procedure :	In - house method : CP-CH9 by Comparison Technique with Azide Modification Method
Tested by :	Walailak Skilhean
Approved by :	[redacted] Approved Signatory

( ) Pornthippa Tameyakul
( ) Unnopphol Harachai
(✓) Saithip Meangmal

Issue Date : 22 February 2024

เอกสารไม่ควบคุม

Condition of this result of calibration

1. Reference Standard Instruments :
   This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	23CG1172	22 Mar 2025
2. Balance	14233821	110RC001	23MM405	16 July 2024

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No.: 22B100125

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.20	8.19	0.0055

This report was certified only for the instrument we tested.It is allowable to use for study intend to use for advertising and referral purpose is prohibited.This report may not be reproduced other in full,without written approval of the laboratory

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เอกสารไม่[redacted]

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES
5344 PATTAMAKARN ROAD SOI 12, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000 FAX. 0-2719-9494

Certificate of Testing

Cert.No.: 25TW29

Equipment :	DO Meter
Manufacturer :	YSI
Model :	5100
Serial No. :	11B 101863
ID No. :	UAE.WAO.004/2554
Received Date :	14 February 2025
Test Date :	17 February 2025
Reference :	2502-0473DSC-1
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 46, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Laboratory Condition :	Temperature (25 ± 5) °C Humidity (50 ± 20) %
Test Procedure :	In - house method : OP-CH9 by Comparison Technique with Azide Modification Method
Tested by :	Wetaluk Siribaan
Approved by :	[redacted] Approved Signatory

( ) Cleavit Weerawanjua
( ) Ponpan Paipim
(✓) Salthip Meangmai

Issue Date : 18 February 2025

เอกสารไม่ควบคุม

Condition of this result of calibration

1. Reference Standard Instruments :
   This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	25CG1172	22 Mar 2025
2. Balance	14233821	110RC001	24NM131	04 July 2025

2. Standard Material :-

Material	Manufacturer	Lot No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : Dissolved Oxygen Meter Adjustment With Air (100 %
Dissolved Oxygen Probe No.: 24F100202

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.22	8.22	0.0055

This report was certified only for the instrument we tested.It is allowable to use for study intend to use for advertising and referral purpose is prohibited.This report may not be reproduced other in full, without written approval of the laboratory

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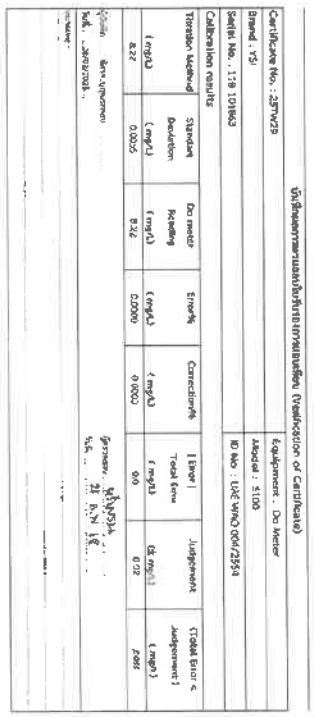
เอกสารไม่ควบคุม



เอกสารไม่ควบคุม

FOSS

FOSS South East Asia
3388 Sirinrat Building, 25th – 26th Floor, Unit No. 3388/90,
Rama IV Road, Klongton, Klongtoey, Bangkok, Thailand 10110

Customer Service Report

Report No.:	13320

Date:	Jan 27, 2025	Customer:	UAE
Job No.:	11676	Address:	Bangkok
Instrument:	DT7520	Serial:	91794469

	Travel To Customer (Hrs)		Labour (Hrs)		Travel From Customer (Hrs)	
Start	-		13.00	2	-	
Finish	-		15.00		-	

Job Type

Application		Special		Standard			
Distributor	x	Courtesy Visit	x	Installation	x	Training	x
Digital Service	x	PMA Onboarding	x	Quote	x	In House	x
Internal	x	Warranty	x	Repair	x	PM	x
Investigate	x	Sales Support	x	Remote	x	Health Check Visit	x

PMA Type						
	Smartcare	x	Smartcare Pro	x	Fosscare	x
	Smartcare Advance	x	Fosscare Pro	x	N/A	x

Details of Work / Test

- PM -
+ Visual Check +
- No damage - ok
- No corrosion - ok

- Function Check -
+ Quick Mode + - Set Temp / Time
- Set Contrast
- Change unit °C/°F
- Run / heating 120°C → 120°C

* T&S Auto lift (LS)

Instrument Ready for Use	OK	x	Not OK*	

Part No:	Batch	Description	Qty
60079730		FOSS PM Kit, Digester DT20 240V, 12 months	1

I confirm this report is accurate and complete

Signed FOSS	[redacted]	Signed Customer	[redacted]
Name		Name	

Email:		Customer Contact.:	

*Remark:

เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2718-9484

Certificate of Calibration

Cert. No.: 25TM579

Equipment :	Hot Air Oven
Manufacturer :	Memmert
Model :	UF 55
Serial No. :	B212.0411
ID No. :	UAE.WAO.005/2556
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak Phrakhanong, Bangkok 10260
Location :	Lab Floor 2
Received Order :	19 March 2025
Calibration Date :	19 March 2025
Ambient Temperature :	(26 ± 10) °C
Relative Humidity :	(50 ± 30) %
AC Line Voltage :	(220 ± 22) V
Calibrated by :	Man Pattanapongpaiboon
Approved by :	[redacted] Approved Signatory

( ) Chakrit Weewanjue
( ) Suvit Injai
(✓) Kunchit Promprat

Issue Date : 27 March 2025

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 head of Corporate Services 3 : Equipment Calibration and Testing Services

เอกสารไม่ควบคุม

Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2503-0437OC-3

Cert. No.: 25TM579

Procedure Used :-
Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

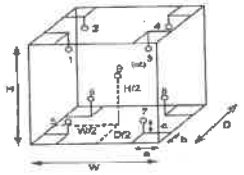
1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
( ) Data Acquisition	MY44073361	24LM73	TPA	18 May 2025

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	27	26
REL.Humid. (%)	49	55
AC Supply (Volt)	221	224



Probe Installation Details :

a =	5.0	cm	D =	0.50	m
b =	5.0	cm	W =	0.60	m
c =	5.0	cm	H =	0.75	m
			Capacity =	0.30	m³

	Ref. Std. ID No.: Calibration Point	
Position :	(120,180) °C	(104) °C
1	23-01TC-01	1RTD-2/1
2	23-01TC-02	1RTD-2/2
3	23-01TC-03	23-01RTD-03
4	23-01TC-04	1RTD-2/4
5	23-01TC-05	1RTD-2/5
6	23-01TC-06	1RTD-2/6
7	23-01TC-07	23-01RTD-07
8	23-01TC-08	1RTD-2/8
9 (ref.)	**23-01TC-09**	23-01RTD-09

เอกสารไม่ควบคุม

Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2503-0437OC-3
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 25TM579

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
104.0	104.0	104.0	0.040	0.43	0.78	2
120.0	120.0	120.0	0.64	1.3	1.6	2
180.0	180.0	180.0	0.49	1.5	1.8	2

Calibration Point (°C)	Measured Temperature (°C) Position									Uncertainty (±°C)
	1	2	3	4	5	6	7	8	9 (ref.)	
104.0	104.355	104.135	104.363	104.317	103.649	103.738	104.179	104.229	104.025	0.42
120.0	119.575	119.366	119.807	119.908	116.994	119.194	119.668	119.994	120.064	1.1
180.0	180.266	179.610	180.401	180.551	179.261	179.463	180.198	180.451	180.374	1.2

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature 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 or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
334/4 PATTANAKARN ROAD SOI 86, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-9000-29 FAX.0-2719-8484

Certificate of Calibration

Cert. No.: 24TM647
Page : 1 of 3

Equipment :	Incubator
Manufacturer :	Binder
Model :	KB 400 E6
Serial No. :	20200000015535
ID No. :	UAE.MIC.018/2564
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Location :	Microbiology Laboratory (302)
Received Order :	01 April 2024
Calibration Date :	01 April 2024
Ambient Temperature :	(25 ± 10) °C
Relative Humidity :	(50 ± 30) %
Calibrated by :	[redacted]
Approved by :	[redacted] Approved Signatory

( ) Ponpan Palpim
(✓) Suwit Injai
( ) Kunchit Promprai

Issue Date : 7 April 2024

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 head of Corporate Services 3 : Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม

Procedure Used :-

Calibration were conducted using calibration procedure CP-CT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).
The temperature scale used was based on ITS-90.

Condition of this result of calibration

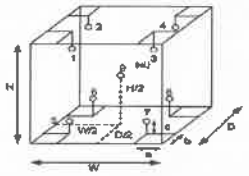
1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY49023832	23LM122	TPA	26 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air seting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	24	24
REL.Humid. (%)	64	67
AC Supply (VoR)	221	223



Position :	Ref. Std. ID No.:
1	20-16RTD-01
2	20-16RTD-02
3	20-16RTD-03
4	23-16RTD-04
5	22-16RTD-05
6	20-16RTD-06
7	20-16RTD-07
8	22-16RTD-08
9 (ref.)	22-16RTD-09

Probe Installation Details :
a = 10 cm
b = 10 cm
c = 10 cm

Dimension of Chamber :
D = 0.48 m
W = 0.65 m
H = 1.2 m
Capacity = 0.37 m³

เอกสารไม่ควบคุม

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
35.0	35.0	35.0	0.035	0.19	0.22	2

Calibration Point	Measured Temperature (°C) Position									Uncertainty
(°C)	1	2	3	4	5	6	7	8	9 (ref.)	(±°C)
35.0	35.000	35.022	34.841	34.851	35.027	35.011	35.029	35.038	35.007	0.30

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature 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 or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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เอกสารไม่ควบคุม

สถาบันอาหาร
กรมส่งเสริมอุตสาหกรรม
Food Industrial Laboratory Service Center

Calibration Certificate

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

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 Mr.Jeratarut Prapawuttipong
Scientist

Approved by [redacted]
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: 28-04-65

เอกสารไม่ควบคุม

สถาบันอาหาร
กรมส่งเสริมอุตสาหกรรม
Food Industrial Laboratory Service Center

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

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:

1. This instrument was calibrated by used 13 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (Ex 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	54972A	MY49016851	TE 67M477-01	4 May 2025	NATIONAL FOOD INSTITUTE
	RTD	Ch:201-303 / RTD:201-303			

3. This certificate is traceable to International System of Units (SI Units).
4. This certificate was certified only for the instruments 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 -
   - Close Fan -
   - Not Available
7. Result of Calibration : ☒ Without adjustment ☐ After adjustment

[redacted]

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

เอกสารไม่ควบคุม

สถาบันอาหาร
กรมส่งเสริมอุตสาหกรรม
Food Industrial Laboratory Service Center

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

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

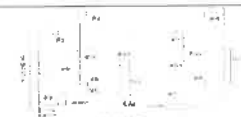


Table1 : Reporting of Temperature

Calibration Point	Measured Temperature (°C) @ Sensor No. (Sensor No.13 is REF)													Uncertainty
(°C)	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	± (°C)
35.0	34.98	35.17	34.99	34.92	35.18	35.01	35.00	35.13	35.03	34.96	35.02	35.17	35.04	0.17

Table 2 : Reporting of Characterization Result

UUC* Setting	UUC* Reading (°C)			Temperature Stability	Temperature Uniformity	Overall Variation
(°C)	MIN	MAX	Average	± (°C)	(°C)	(°C)
35.0	35.0	35.3	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
The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k=2, which for a normal distribution corresponds to a level of confidence of approximately 95 %

[redacted]

---------- End ----------

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

เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 16, SUANLUANG, SUANLUANG BANGKOK, 10250
TEL.0-2717-3000-29 FAX.0-2719-9454

Certificate of Calibration

Cert. No.: 24TM936

Equipment :	Incubator
Manufacturer :	Binder
Model :	KB 400 E6
Serial No. :	20220000022479
ID No. :	UAE.MIC.026/2566
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Location :	Microbiology Laboratory
Received Order :	09 July 2024
Calibration Date :	09 July 2024
Ambient Temperature :	(28 ± 10) °C
Relative Humidity :	(50 ± 30) %
Calibrated by :	Khit Rattanaprayoonsai
Approved by :	[redacted]

( ) Ponpan Paipim
(✓) Suwit Imjai
( ) Kunchit Prompral

Issue Date : 19 July 2024

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 Head of Corporate Services 3 : Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม

Procedure Used :-

Calibration was conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

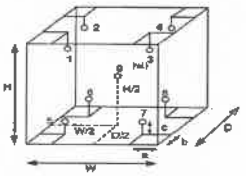
Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY48001461	24LM14	TPA	17 Mar 2025

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	23	24
REL.Humid. (%)	52	54
AC Supply (Volt)	221	222



Position :	Ref. Std. ID No.:
1	19RTD-2/1
2	19RTD-2/2
3	19RTD-2/3
4	19RTD-2/4
5	19RTD-2/5
6	24-19RTD-2/6
7	19RTD-2/7
8	19RTD-2/8
9 (ref.)	19RTD-2/9

Probe Installation Details :

a =	10	cm
b =	10	cm
c =	10	cm

Dimension of Chamber :

D =	0.47	m
W =	0.85	m
H =	1.2	m
Capacity =	0.37	m³

เอกสารไม่ควบคุม

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
35.0	35.0	35.0	0.090	0.31	0.33	2

Calibration Point	Measured Temperature (°C) Position									Uncertainty
(°C)	1	2	3	4	5	6	7	8	9 (ref.)	(±°C)
35.0	35.099	35.011	35.061	35.118	34.840	35.054	34.924	34.978	34.824	0.30

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature 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 or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

-end-

เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATTANAKARN ROAD SOI 13, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3808-29 FAX.0-2719-3464

Certificate of Calibration

Cert. No.: 24TM884
Page : 1 of 3

Equipment :	Incubator
Manufacturer :	Binder
Model :	KB 400
Serial No. :	20220000000391
ID No. :	UAE.MIC.029/2565
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Location :	Microbiology Laboratory
Received Order :	07 June 2024
Calibration Date :	07 June 2024
Ambient Temperature :	(25 ± 10) °C
Relative Humidity :	(50 ± 30) %
Calibrated by :	Teerathai Pama [redacted]
Approved by :	[redacted] Approved Signatory

( ) Ponpan Paipim
( ) Suwit Injai
(✓) Kunchit Prompeat

Issue Date : 11 June 2024

The Uncertainties are for a confidence probability of approximately 95%

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เอกสารไม่ควบคุม

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

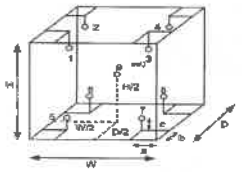
1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY49001451	24LM44	TPA	17 Mar 2025

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	21	19
REL.Humid. (%)	77	75
AC Supply (Volt)	228	229



Position :	Ref. Std. ID No.:
1	19RTD-271
2	19RTD-272
3	19RTD-273
4	19RTD-274
5	19RTD-275
6	24-19RTD-276
7	19RTD-277
8	19RTD-278
9 (ref.)	19RTD-279

Probe Installation Details :
a = 10 cm
b = 10 cm
c = 10 cm

Dimensions of Chamber :
ID = 0.50 m
W = 0.65 m
H = 1.2 m
Capacity = 0.39 m³

เอกสารไม่ควบคุม

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
35.0	35.0	35.0	0.028	0.25	0.53	2

Calibration Point (°C)	Measured Temperature (°C) Position									Uncertainty (±°C)
	1	2	3	4	5	6	7	8	9 (ref.)	
35.0	35.317	35.184	35.142	35.084	35.095	35.093	34.894	34.826	35.056	0.30

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature 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 or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

-end-

เอกสารไม่ควบคุม

กำหนดจุดห้ามใช้งาน

References Certificate Number. : 24TM884

Equipment : Incubator

Model : KB 400

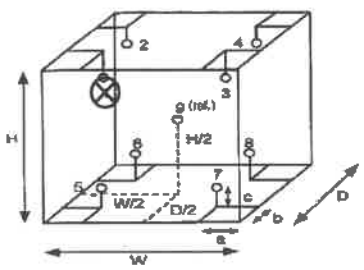
Serial No. : 20220000000391

ID No. : UAE.MIC.029/2565

Manufacturer : Binder

Calibration Point : 35.0 °C

Unit Under Calibration Setting : 35.0 °C



รูปภาพเครื่องมือ แสดงจุดที่ได้รับการสอบเทียบ และสัญลักษณ์ ⊗ แสดงจุดห้ามใช้งาน

กำหนดจุดห้ามใช้งานตำแหน่งที่....1.....

หมายเหตุ เก็บไว้ที่ฟิล์ม..... ...../...

เอกสารไม่ควบคุม

สถาบันอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Certificate

Certificate No.: 2502229-004-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 1 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhanong, Bangkok 10260

Equipment: CHAMBER (Incubator)
Manufacturer: MEMMERT
Model: IN75
Serial No.: 0317.0305
ID No.: UAE.MIC.022/2561
Order No.: 2502229
Operation No.: 2502229-004
Date of Receipt: 19 March 2025
Date of Calibration: 20 March 2025

Calibrated by Mr.Yothin Charoensuk
Scientist

Approved by [redacted]
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 28 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.

เอกสารไม่ควบคุม

สถาบันอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2502229-004-01
Equipment: CHAMBER (Incubator)
Model: IN75 Serial No.: 0317.0305
Resolution: 0.1 °C ID No.: UAE.MIC.022/2561
Manufacturer: MEMMERT
Date of Calibration: 20 March 2025

Location: 302, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Environment Condition:
Ambient Temperature (28.8 ± 1) °C
Relative Humidity (59 ± 1) %
Line Voltage (223 ± 3) Volt

Condition of the 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 :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY37031188	TE 670486-01	8 June 2025	NATIONAL FOOD INSTITUTE
	RTD	CH#101-109/RTD#101-109			

3. The 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 41.5 °C
   Fresh air Damper - Open Position -
   X Close Fan 100%
   - Not Available
7. Result of Calibration : [X] Without adjustment [ ] After adjustment

[redacted]

เอกสารไม่ควบคุม

สถาบันอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2502229-004-01
Equipment: CHAMBER (Incubator)
Model: IN75 Serial No.: 0317.0305
Resolution: 0.1 °C ID No.: UAE.MIC.022/2561
Manufacturer: MEMMERT
Date of Calibration: 20 March 2025

Calibration point: 41.5 °C
Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	28.6	58	220.0
MAX	28.9	60	225.0

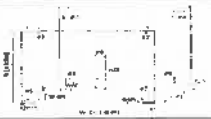


Table1 : Reporting of Temperature

Calibration point:	Measured Temperature (°C) @ Sensor No. (Sensor No.5 is REF)									Uncertainty
(°C)	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	± (°C)
41.5	41.50	41.39	41.45	41.40	41.50	41.35	41.29	41.32	41.34	0.27

Table 2 : Reporting of Characterization Result

UUC* Setting	UUC* Reading (°C)			Stability	Uniformity	Overall Variation
(°C)	MIN	MAX	Average	± (°C)	(°C)	(°C)
41.5	41.5	41.5	41.5	0.023	0.34	0.44

Note: The quoted uncertainty includes " 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 was 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, which provides a level of confidence of approximately 95 %.

[redacted]

---------- End ----------

เอกสาร

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
63/4/4 PATTANAKARN ROAD SOI 16, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3060-29 FAX.0-2719-9494

Certificate of Calibration

Cert. No.: 24TM648

Equipment :	Incubator
Manufacturer :	Memmert
Model :	IPP 260
Serial No. :	V915.0187
ID No. :	UAE.MIC.003/2559
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Location :	Microbiology Laboratory
Received Order :	01 April 2024
Calibration Date :	01 April 2024
Ambient Temperature :	(26 ± 10) °C
Relative Humidity :	(60 ± 30) %
Calibrated by :	Mon Pattanacompaibon
Approved by :	[redacted] Approved Signatory

( ) Ponpan Palpim
(✓) Suvit Injai
( ) Kunchit Promprat

Issue Date : 7 April 2024

The Uncertainties are for a confidence probability of approximately 95%

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เอกสารไม่ควบคุม

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

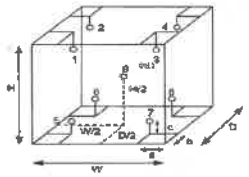
Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY49023932	23LM122	TPA	26 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Environment during calibration	Beginning	Finished
Temp. (°C)	24	24
REL.Humid. (%)	54	57
AC Supply (Volt)	221	223



Position :	Ref. Std. ID No.:
1	19-16RTD-01
2	19-16RTD-02
3	19-16RTD-03
4	19-16RTD-04
5	19-16RTD-05
6	19-16RTD-06
7	21-16RTD-07
8	19-16RTD-08
9 (ref.)	19-16RTD-09

Probe Installation Details :

a =	5.0	cm
b =	5.0	cm
c =	5.0	cm

Dimension of Chamber :

D =	0.50	m
W =	0.64	m
H =	0.80	m
Capacity =	0.26	m³

เอกสารไม่ควบคุม

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
35.0	35.0	35.0	0.026	0.13	0.24	2

Calibration Point	Measured Temperature (°C) Position								Uncertainty
(°C)	1	2	3	4	5	6	7	8	9 (ref.)	(±°C)
35.0	34.908	35.004	34.969	35.099	35.089	35.085	34.921	34.936	35.002	0.30

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature 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 or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

-end-

เอกสารไม่ควบคุม

สถาบันการพัฒนาอุตสาหกรรมอาหาร
กลุ่มบริการห้องปฏิบัติการสถาบันการพัฒนาอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Certificate

Certificate No.: 2502229-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 2 Soi Udomsuk 01, Sukhumvit Road,
Bangchack, Prakhanong, Bangkok 10260

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 Mr.Jaruwat Prapamuttipong
Scientist

Approved by [redacted]
Manager
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.

เอกสารไม่ควบคุม

สถาบันการพัฒนาอุตสาหกรรมอาหาร
กลุ่มบริการห้องปฏิบัติการสถาบันการพัฒนาอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

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

Location: LABORATORY, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Environment Condition:
Ambient Temperature (18.2 ± 1) °C
Relative Humidity (32 ± 4) %
Line Voltage (223 ± 3) Volt

Condition of the 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 :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY49015851	TE 670477-01	4 May 2025	NATIONAL FOOD INSTITUTE
	RTD	CH#101-109/ RTD#101-109			

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 [redacted]

เอกสารไม่ควบคุม

สถาบันการพัฒนาอุตสาหกรรมอาหาร
กลุ่มบริการห้องปฏิบัติการสถาบันการพัฒนาอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

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

Calibration point: 35.0 °C
Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	15.5	28	220.0
MAX	17.1	33	225.0

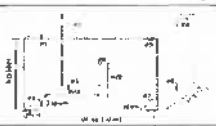


Table1 : Reporting of Temperature

Calibration point	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty
(°C)	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	± (°C)
35.0	34.94	34.95	34.91	34.93	35.15	35.01	34.98	35.05	35.12	0.29

Table 2 : Reporting of Characterization Result

UUC* Setting	UUC* Reading (°C)			Stability	Uniformity	Overall Variation
(°C)	MIN	MAX	Average	± (°C)	(°C)	(°C)
35.0	35.0	35.0	35.0	0.10	0.21	0.35

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 ke 2, providing a level of confidence of approximately 95 %.

---------- End ----------

[redacted]

เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
3344 PHATTANAKARN ROAD SOI 18, SUWALUNG, SUWALUNG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-0484

Certificate of Calibration

Cert. No.: 24TM650

Equipment :	Incubator
Manufacturer :	Memmert
Model :	IPP 260
Serial No. :	V616.0086
ID No. :	UAE.MIC.032/2559
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Sangchak, Phrakhanong, Bangkok 10260
Location :	Microbiology Laboratory (302)
Received Order :	01 April 2024
Calibration Date :	02 - 03 April 2024
Ambient Temperature :	(26 ± 10) °C
Relative Humidity :	(60 ± 30) %
Calibrated by :	Man Pattanapongpaiboon
Approved by :	[redacted]

( ) Ponpan Palpim
(√) Suwit Imjai
( ) Kunchit Pronprat

Issue Date : 7 April 2024

The Uncertainties are for a confidence probability of approximately 95%

The certificate may not be reproduced other than in full, except with the prior written Approval of the head of Corporate Services 2 : Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม

Equipment : Incubator
Condition As-Received : Used Item
Reference : 2404-0003OC-2
Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

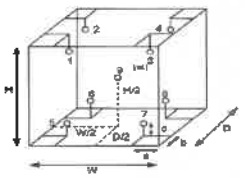
Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY49023932	23Lt122	TPA	26 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	25	25
REL.Humid. (%)	57	54
AC Supply (Volt)	221	222



Position :	Ref. Std. ID No.:
1	19-16RTD-01
2	19-16RTD-02
3	19-16RTD-03
4	19-16RTD-04
5	19-16RTD-05
6	19-16RTD-06
7	21-16RTD-07
8	19-16RTD-08
9 (ref.)	19-16RTD-09

Probe Installation Details :

a =	5.0	cm
b =	5.0	cm
c =	5.0	cm

Dimension of Chamber :

D =	0.50	m
W =	0.64	m
H =	0.80	m
Capacity =	0.26	m³

เอกสารไม่ควบคุม

Equipment : Incubator
Condition As-Received : Used Item
Reference : 2404-0003OC-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 24TM650

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
25.0	25.0	25.0	0.053	0.75	1.3	2
36.0	36.0	36.0	0.14	0.57	0.83	2

Calibration Point	Measured Temperature (°C)									Uncertainty
	Position									
(°C)	1	2	3	4	5	6	7	8	9 (ref.)	(±°C)
25.0	25.396	25.310	25.439	25.412	24.347	24.332	24.313	24.414	24.875	0.30
36.0	35.643	35.965	35.618	35.701	35.239	36.280	36.343	36.357	36.063	0.31

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature 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 or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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เอกสารไม่ควบคุม

Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Certificate

Certificate No.: 2502229-002-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 5 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhanong, Bangkok 10260

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 Mr.Yothin Charoenwit
Scientist

Approved by [redacted]
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.

เอกสารไม่ควบคุม

Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

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

Location: 302, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Environment Condition:
Ambient Temperature (21.7 ± 1) °C
Relative Humidity (59 ± 5) %
Line Voltage (223 ± 3) Volt

Condition of this results of Calibration:

1. This instrument was calibrated by Heart 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	MY57003188	TE 670486-01	8 June 2025	NATIONAL FOOD INSTITUTE
	RTD	CAL201-209/RTDF201-209			

3. This certificate is traceable to International System of Units (SI Units).
4. The certificate was certified only for the instrument we calibrated.
5. The 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 25.0 and 36.0 °C
   Fresh air Damper [^] Open Position [+]
   [X] Close [-]
   [v] Not Available
7. Result of Calibration : [X] Without adjustment [ ] After adjustment

เอกสารไม่ควบคุม

Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

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

Calibration point: 25.0 and 36.0 °C
Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	21.3	58	220.0
MAX	22.0	60	226.9

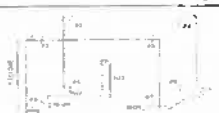

Table1 : Reporting of Temperature

Calibration point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty ± (°C)
	#1	#2	#3	#4	#5	#6	#7	#8	#9	
25.0	25.19	25.16	25.22	25.17	24.85	24.91	24.78	24.95	24.97	0.29
36.0	34.57	34.74	35.13	35.29	36.32	36.16	36.20	35.34	35.73	0.63

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
25.0	24.9	25.0	25.0	0.088	0.25	0.61
36.0	35.9	36.0	36.0	0.44	1.2	2.3

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 ----------

[redacted]

เอกสารไม่ควบคุม

FOSS

FOSS South East Asia
3388 Sirinrat Building, 25th – 26th Floor, Unit No. 3388/90,
Rama IV Road, Klongton , Klongtoey, Bangkok, Thailand 10110

Customer Service Report

Report No.:	12875

Date:	July 5, 2024	Customer:	UAE
Job No.:	8335	Address:	Bangkok
Instrument:	KTA Distillator	Serial:	91905393

	Travel To Customer (Hrs)		Labour (Hrs)		Travel From Customer (Hrs)	
Start	08.30	1	09.30	5	14.30	1.5
Finish	09.30		14.30		16.00	

Job Type							
Application		**Special**		**Standard**			
Distributor	x	Courtesy Visit	x	Installation	x	Training	x
Digital Service	x	PMA Onboarding	x	Quote	x	In House	x
Internal	x	Warranty	x	Repair	x	PM	x
Investigate	x	Sales Support	x	Remote	x	Health Check Visit	x

PMA Type						
	Smartcare	x	Smartcare Pro	x	Fosscare	x
	Smartcare Advance	x	Fosscare Pro	x	**N/A**	x

Details of Work / Test

- PM -
- Visual Check -
  + No leak
  + No damage
  } ok
- Change PM kit x1 set - ok
- Function Check -
  + Dilution 80 mL →
  + Alkali 50 mL → 52 mL
  + Receiver N/A → Natrise
  + Steam / Drain
  } Pass

Blank = , Recovery AVG => 100% SD =

Follow up* Follow up**

Instrument Ready for Use	OK	x	Not OK*	x

Part No:	Batch	Description	Qty
60100196	03.01.2024	PM kit Kjeltec 9 Distillator	1

I confirm this report is accurate and complete

Signed FOSS	[redacted]	Signed Customer	[redacted]
Name		Name	

Email:		Customer Contact.:	

*Remark:

เอกสารไม่ควบคุม

FOSS

FOSS South East Asia
3388 Sirinrat Building, 25th – 26th Floor, Unit No. 3388/90,
Rama IV Road, Klongton , Klongtoey, Bangkok, Thailand 10110

Customer Service Report

Report No.:	13319

Date:	Jan 27, 2025	**Customer:**	UAE
Job No.:	11675	**Address:**	Bangkok
Instrument:	KT200	**Serial:**	91790524

	Travel To Customer (Hrs)		Labour (Hrs)		Travel From Customer (Hrs)	
Start	09.00	1	10.00	3	-	
Finish	10.00		13.00		-	

Job Type							
Application		**Special**			**Standard**		
Distributor	x	Courtesy Visit	x	Installation	x	Training	x
Digital Service	x	PMA Onboarding	x	Quote	x	In House	
Internal	x	Warranty	x	Repair	x	PM	x
Investigate	x	Sales Support	x	Remote	x	Health Check Visit	

PMA Type							
	Smartcare	x	Smartcare Pro		Fosscare		x
	Smartcare Advance	x	Fosscare Pro	x	N/A		x

Details of Work / Test
- DM -
+ Visual Check +
- No leak - ok
- have damage on heater & main switch - not ok
+ เปลี่ยน heater , ปุ่ม main switch ใหม่ทั้งหมด Vaa - ok
+ เปลี่ยน PM kit จำนวน 1 set - ok
+ Function Check +
- Power on OFF ok / water pump - ok
- Alkali
- Steam
- Condenser

Instrument Ready for Use	OK	x	Not OK*	

Part No:	Batch	Description	Qty
100 09965	11-06-2024	FOSS PM kit KT200 Kjeltec Analyser/2100	1
10003592	29.03.2024	Heating element Steam	1
15630111	19.10.2022	Switch R595kmt+2 FA	1

I confirm this report is accurate and complete

Signed FOSS	[redacted]	Signed Customer	[redacted]
Name		Name	

Email:		Customer Contact.:	

*Remark:

เอกสารไม่ควบคุม

FOSS

FOSS South East Asia
3388 Sirinrat Building, 25th – 26th Floor, Unit No. 3388/90,
Rama IV Road, Klongton , Klongtoey, Bangkok, Thailand 10110

Customer Service Report

Report No:	9807

Date:	8-9 Feb 2024		
Customer:	UAE	Address:	BANGKOK
Instrument:	KT8100	Serial:	91889052

Hours	Travel To Customer		Labour		Travel From Customer	
Start	08:00	1.6hrs	09:30	2.5hrs	16:00	2hr
Finish	09:30		12:00		18:00	

Job Type							
Application		Special		Standard			
Normal	x	Courtesy Visit	x	Installation	x	Training	x
Distributor	x	PMA Onboarding	x	Quote	x	In House	x
Internal	x	Warranty	x	Repair	x	PM	X
Digital Service	x	Sales Support	x	Remote	x	Other	x

PO/Quote Number:	if applicable

PMA Type	FOSScare if applicable	Contract No.	if applicable

Details of Work / Test	Condition / Status
# PM KT8100	
- ตรวจสอบเครื่องก่อนทำ PM	done
น้ำยา Alkaline = 50 - 50 ml	
น้ำยา กรดกรด 6 mm - 180 ml	
- เปลี่ยนอะไหล่ PM kit	
- follow ตาม PM Protocol	
- ทดสอบเครื่องหลังทำ PM	
Blank - 0.1%	
Recovery = 106 %	

Instrument Ready for Use	OK	Not OK	If not OK - Comment

Part No:	Batch	Description	Qty
60031807	13.10.2023	FOSS PM kit 8100/8200 12 mo	1

I confirm this report is accurate and complete			
Signed FOSS	[redacted]	Signed Customer	[redacted]
Name		Name	

Would you be willing to participate in a brief survey in order to tell us how we performed?	Email

เอกสารไม่ควบคุม

FOSS

FOSS South East Asia
3388 Sirinrat Building, 25th – 26th Floor, Unit No. 3388/90,
Rama IV Road, Klongton , Klongtoey, Bangkok, Thailand 10110

Customer Service Report

Report No.:	13854

Date:	24 February 2025	Customer:	UAE
Job No.:	11735	Address:	BANGKOK
Instrument:	KT8100	Serial:	91889052

	Travel To Customer (Hrs)		Labour (Hrs)		Travel From Customer (Hrs)	
Start	07:00	2hrs	09:00-12:00	0hrs	16:00	
Finish	09:00		13:00-14:00		17:00	

Job Type							
Application		Special		Standard			
Distributor	x	Courtesy Visit	x	Installation	x	Training	
Digital Service	x	PMA Onboarding	x	Quote	x	In House	x
Internal	x	Warranty	x	Repair	x	PM	x
Investigate	x	Sales Support	x	Remote	x	Health Check Visit	x

PMA Type						
	Smartcare	x	Smartcare Pro	x	Fosscare	x
	Smartcare Advance	x	Fosscare Pro	x	N/A	x

Details of Work / Test

#PM KT8100 12MO

- test before PM
- cleaning KT8100, 36 MO replace
- fushing Akali pump
- test operation
  - DiNtan 80 - 50 ml
  - Destilation 6 min 150 - 170 ml
  - Akali 50 - 50 mL
  - all pass

Instrument Ready for Use	OK	x	Not OK*	x

Part No:	Batch	Description	Qty
60031810	08.01.2024	FOSS PM kit KT8100 8200 36 MO	1

I confirm this report is accurate and complete

Signed FOSS	[redacted]	Signed Customer	[redacted]
Name		Name	

Email:		Customer Contact.:	

*Remark:

เอกสารไม่ควร

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL 0-2717-3000-29 FAX 0-2719-9464

Certificate of Calibration

Cert.No.: 25CH586
Page.: 1 of 3

Equipment :	pH Meter
Manufacturer :	Horiba
Model :	LAQUA-PH210
Serial No. :	HA9M0048
ID No. :	UNEEPM.003/2563(EPM.pH.03/63)
Condition As-Received:	Used Item
Received Date :	20 May 2025
Calibration Date :	21 May 2025
Reference :	2505-0602WSC-1
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Ambient Temperature :	(25 ± 2.5) °C
Relative Humidity :	(50 ± 15) %
Calibration Procedure :	In - house method ; - CP-CH5 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM) - CP-CH6 by comparison with temperature standard
Calibrated by :	[redacted]
Approved by :	

( ) Chavit Wareewanjua
( ) Ponpan Paipim
(✓) Sathip Mesingma

Issue Date : 23 May 2025

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 head of Corporate Services 3 - Equipment Calibration and Testing Services

เอกสารไม่ควบคุม

Condition of this calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54010049	130RC116	2462759	25 Aug 2025
2) Ref. Standard Thermometer	4982054	110RC044	241757	14 July 2025

- This measurement result is traceable to SI throught Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials :The measurement results are traceable to SI through Hach Lange GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-KM-15184-01-00
:The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.007	CPA chem	1065555	18 Jan 2027
pH 7.000	Hach Lange GmbH	C03232	02 Dec 2026
pH 10.010	CPA chem	1058669	18 Jan 2026

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : mV Measurement

Performing standard cave by Document Process Calibrator at pH (4,7)(7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement	Coverage factor
	pH	mV	mV	pH	(±mV)	k
pH Meter	4.00	177.46	177.4	4.01	0.056	2.00
S/N.: HA9M0048	7.00	0.00	0.0	7.00	0.056	2.00
	7.00	0.00	0.0	7.00	0.056	2.00
	10.00	-177.46	-177.5	10.01	0.056	2.00

เอกสารไม่ควบคุม

Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7)(7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode	4.007	4.01	169.9	0.0071	2.00
S/N.: 09AD0211	7.000	7.00	-3.5	0.0095	2.00
	7.000	7.00	-3.0	0.0092	2.00
	10.010	10.01	-175.3	0.0095	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : 9952-10D
- Serial No. : 09AD0211

Dimension of probe

- Length : 503 mm.
- Diameter : 16 mm.
- Immersion Depth : 80 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (±°C)	Coverage factor k
15.0	15.002	15.0	-0.002	0.13	2.00
30.0	29.999	30.0	0.001	0.13	2.00
45.0	45.001	45.0	-0.001	0.13	2.00

Remark * UUC* = Unit Under Calibration

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

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เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
894/4 PATTANAKARN ROAD SOI 16, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9494

Certificate of Calibration

Cert.No.: 25CH52
Page.: 1 of 3

Equipment :	pH Meter
Manufacturer :	Horiba
Model :	LAQUA-PH210
Serial No. :	HA1M0036
ID No. :	UAE.EFM.0122565(EFM.pH.02/65)
Condition As-Received:	Used Item
Received Date :	14 January 2025
Calibration Date :	15 January 2025
Reference :	2501-0473WSC-2
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Ambient Temperature :	(25 ± 2.5) °C
Relative Humidity :	(50 ± 15) %
Calibration Procedure :	In - house method : - CP-CH5 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM) - CP-CH8 by comparison with temperature standard
Calibrated by :	[redacted]
Approved by :	

( ) Pornthippa Tameyakul
( ) Ponpan Palpim
(✓) Saithip Meengmai

Issue Date : 17 January 2025

The Uncertainties are for a confidence probability of approximately 95%

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เอกสารไม่ควบคุม

Condition of the calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1)Document Process Calibrator	54030049	130RC116	24E2759	25 Aug 2025
2)Ref. Standard Thermometer	4962054	110RC044	24I757	14 July 2025

- This Certification is traceable to SI Through Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials :The measurement results are traceable to SI through Hach Lange GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-PM-15184-01-00
:The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1635

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	1604203	27 Sep 2026
pH 6.999	Hach Lange GmbH	C03220	29 Oct 2026
pH 10.010	CPA chem	1604205	27 Sep 2025

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : mV Measurement

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

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement	Coverage factor
	pH	mV	mV	pH	(mV)	k
pH Meter	4.00	177.48	177.6	4.01	0.058	2.00
S/N.: HA1M0036	7.00	0.00	0.1	7.00	0.058	2.00
	7.00	0.00	0.1	7.00	0.058	2.00
	10.00	-177.48	-177.4	10.01	0.058	2.00

เอกสารไม่ควบคุม

Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7)(7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode	4.008	4.01	173.6	0.0071	2.00
S/N.: -	6.999	6.99	-0.6	0.0065	2.00
	6.999	7.01	-1.7	0.0092	2.00
	10.010	10.01	-173.4	0.0092	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : -
- Serial No. : -

Dimension of probe

- Length : 110 mm.
- Diameter : 16 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
15.0	15.003	15.0	-0.003	0.13	2.00
30.0	30.002	30.0	-0.002	0.13	2.00
45.0	45.002	45.1	0.098	0.13	2.00

Remark - UUC* = Unit Under Calibration

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

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เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATHUMWAN ROAD SOI 19, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2718-9481

Certificate of Calibration

Cert.No.: 24CH727
Page.: 1 of 3

Equipment :	pH Meter
Manufacturer :	Horiba
Model :	LAQUA-PH210
Serial No. :	HA0D0082
ID No. :	UAE.EFM.072/2594(EFM.pH.05/64)
Condition As-Received:	Used Item
Received Date :	18 June 2024
Calibration Date :	19 June 2024
Reference :	2405-0570/WSC-5
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Ambient Temperature :	(25 ± 2.5) °C
Relative Humidity :	(50 ± 15) %
Calibration Procedure :	In - house method : - CP-CH5 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM) - CP-CH6 by comparison with temperature standard
Calibrated by :	[redacted]
Approved by :	

( ) Unnaprot Harachat
( ) Ponpan Paipan
(✓) Sathip Mwangmai

Issue Date : 20 June 2024

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 head of Corporate Services 3 : Equipment Calibration and Testing Services.

Condition of this calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	2352602	27 Aug 2024
2) Ref. Standard Thermometer	4982054	110RC044	23I908	26 July 2024

- This Certification is traceable to SI Throught Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials : The measurement results are traceable to SI through CPA chem Ltd.,
ANSI-ASQ National Accreditation Board, Accredited No. AR-1535

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	970664	25 Apr 2026
pH 6.986	CPA chem	970662	25 Apr 2026
pH 9.997	CPA chem	970663	25 Apr 2025

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : mV Measurement

Performing standard curve by Document Process Calibrator at pH (4.7)(7.19)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement	Coverage factor
	pH	mV	mV	pH	(±mV)	k
pH Meter	4.00	177.48	177.5	4.01	0.058	2.00
S/N.: HA0D0082	7.00	0.00	0.2	7.00	0.058	2.00
	7.00	0.00	0.2	7.00	0.058	2.00
	10.00	-177.48	-177.0	10.01	0.058	2.00

Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4.7)(7.19)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode	4.008	4.01	176.9	0.0078	2.00
S/N.: QBAA0036	6.986	7.00	4.6	0.0099	2.00
	6.986	7.00	3.2	0.0093	2.00
	9.997	10.01	-171.2	0.0092	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe:

- Model : 9652-10D
- Serial No. : QBAA0036

Dimension of probe

- Length : 103 mm.
- Diameter : 18 mm.
- Immersion Depth : 80 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.001	25.0	-0.001	0.13	2.00
30.0	30.004	30.0	-0.004	0.13	2.00
35.0	35.002	35.0	-0.002	0.13	2.00

Remark - UUC* = Unit Under Calibration

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

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATEWNAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL 0-2717-3000-29 FAX.0-2719-3484

Certificate of Calibration

Equipment :	pH Meter
Manufacturer :	EcoSense
Model :	pH100A
Serial No. :	JC03354
ID No. :	UAE.EFM.063/2562(ENV.pH03/62)
Condition As-Received:	Used Item
Received Date :	05 November 2024
Calibration Date :	06 November 2024
Reference :	2411-0122WBC-1
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Ambient Temperature :	(25 ± 2.5) °C
Relative Humidity :	(50 ± 15) %
Calibration Procedure :	In - house method : - CP-CH5 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM) - CP-CH8 by comparison with temperature standard
Calibrated by :	[redacted]
Approved by :	[redacted] Approved Signatory

( ) Unnopphol Harachai
(✓) Ponpan Paipim
( ) Saithip Meangmai

Issue Date : 8 November 2024

The Uncertainties are for a confidence probability of approximately 95%

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เอกสารไม่ควบคุม

Condition of this calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1)Document Process Calibrator	54030049	180RC116	24E2769	25 Aug 2025
2)Ref. Standard Thermometer	4982064	110RD044	24I757	14 July 2025

- This Certification is traceable to SI Through Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials :The measurement results are traceable to SI through Hach Lange GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-PM-16194-01-06

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.006	CPA chem	1034203	27 Sep 2026
pH 6.999	Hach Lange GmbH	CD3145	26 Feb 2026
pH 10.010	CPA chem	1034205	27 Sep 2025

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : mV Measurement

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

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter	4.00	177.46	177	4.01	0.56	2.00
S/N.: JC03354	7.00	0.00	0	7.00	0.56	2.00
	7.00	0.00	0	7.00	0.56	2.00
	10.00	-177.46	-178	10.01	0.56	2.00

เอกสารไม่ควบคุม

Calibration Results

Function : pH Measurement

Performing these buffers standard curve by using buffer nominal pH (4,7)(7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode	4.008	4.01	173	0.0078	2.00
S/N.:24071003A805377	6.999	7.00	-2	0.0092	2.00
	6.999	7.00	+2	0.0095	2.00
	10.010	10.01	-178	0.0092	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : -
- Serial No. : 24071003A805377

Dimension of probe

- Length : 110 mm.
- Diameter : 12 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (±°C)	Coverage factor k
15.0	15.003	14.9	-0.103	0.13	2.00
30.0	30.001	29.9	-0.101	0.13	2.00
45.0	45.003	44.8	-0.203	0.13	2.00

Remark : UUC* = Unit Under Calibration

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

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เอกสารไม่ควบคุม

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

CERTIFICATE OF CALIBRATION

Certificate No. : SP25-001 Page 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 : [redacted] **Approved by :** [redacted]

(Mr. Thanawut Phetsuk) (Ms. Chonnikan Songngern)

Technical Manager 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 issuing laboratory.

เอกสารไม่ควบคุม

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

REPORT OF CALIBRATION

Certificate No. : SP25-001 Page 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
Absobance Standard set	25760	115663	25 October 2025
Absobance 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.

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Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP25-001 Page 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

เอกสารไม่ควบคุม

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

REPORT OF CALIBRATION

Certificate No. : SP25-001 Page 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

เอกสารไม่ควบคุม

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

DQE Services

REPORT OF CALIBRATION

Certificate No. : SP25-001

Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor k
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
748.35	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 reported 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 -

เอกสารไม่ควบคุม

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

CERTIFICATE OF CALIBRATION

Certificate No. : SP24-028 Page 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 : [redacted]
(Mr. Tanawat Khotdanh)
Technical Manager

Approved by : [redacted]
(Mr. Chanchai Singgam)
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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FM-708-02 REV 1/1/2021

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Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP24-028 Page 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
Absobance Standard set	25760	115663	25 October 2025
Absobance 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 : 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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FM-708-02 REV 1/1/2021

DQE Services Co.,Ltd.
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Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP24-028 Page 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	0.575	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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FM-708-02 REV 1/1/2021

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REPORT OF CALIBRATION

Certificate No. : SP24-028 Page 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	0.743	0.0039	0.0056	2.00
257	0.0000	0.000	0.0000	0.0050	2.00
	0.8674	0.862	0.0054	0.0059	2.00
313	0.0000	0.000	0.0000	0.0050	2.00
	0.2919	0.291	0.0009	0.0051	2.00
350	0.0000	0.000	0.0000	0.0050	2.00
	0.6430	0.639	0.0040	0.0055	2.00

เอกสารไม่ควบคุม
FM-708-02 REV 1/1/2021

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Phone : +66 (0)2 538 2054, Email : dqeservicesltd@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP24-028

Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor k
241.00	240.4	0.60	0.18	2.00
279.30	278.7	0.60	0.18	2.00
288.90	288.5	0.40	0.18	2.00
334.50	334.2	0.30	0.18	2.00
361.40	361.1	0.30	0.18	2.00
418.40	418.0	0.40	0.18	2.00
447.20	446.7	0.50	0.18	2.00
459.30	459.6	-0.30	0.18	2.00
537.00	536.6	0.40	0.18	2.00
638.00	637.4	0.60	0.18	2.00
441.29	440.8	0.49	0.18	2.00
479.28	479.6	0.28	0.18	2.00
513.75	513.5	0.25	0.18	2.00
528.59	528.6	-0.01	0.18	2.00
575.10	574.9	0.20	0.18	2.00
585.56	585.3	0.26	0.20	2.00
684.70	684.1	0.60	0.18	2.00
740.51	740.0	0.51	0.20	2.00
747.61	747.2	0.41	0.18	2.00
807.04	**806.3**	**0.74**	**0.18**	**2.00**
879.68	**878.9**	**0.78**	**0.18**	**2.00**

Remark : - UUC = Unit Under Calibration

- N/A = Not Available

- The result expanded uncertainty of measurement 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 -

เอกสารไม่ควบคุม

สถาบันวิจัยและพัฒนาอุตสาหกรรมอาหาร
กลุ่มบริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Certificate

Certificate No.: 2501624-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 61, Sukhumvit Road, Bangchack, Prakhanong, Bangkok 10260

Equipment: Water Bath
Manufacturer: MEMMERT
Model: WNE14
Serial No.: L416.0606
ID No.: UAE.MIC.002/2560
Order No.: 2501624
Operation No.: 2501624-001
Date of Receipt: 10 February 2025
Date of Calibration: 10 February 2025

Calibrated by Mr.Warapob Sookbang, Scientist, Wb — **Approved by** [redacted], Responsible for the Technical Management Team
Date of Issue: 19 February 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.

เอกสารไม่ควบคุม

สถาบันวิจัยและพัฒนาอุตสาหกรรมอาหาร
กลุ่มบริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2501624-001-01
Equipment: Water Bath
Model: WNE14 Serial No.: L416.0606
Resolution: 0.1 °C ID No.: UAE.MIC.002/2560
Manufacturer: MEMMERT
Date of Calibration: 10 February 2025

Calibration point: 44.5 °C
Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
Min	25.7	52	222.0
Max	26.3	66	225.0

Sensor Installation Location

Table1 : Reporting of Temperature

Calibration Point	Measured Temperature (°C) @ Sensor No. (Sensor No.5 is REF)					Uncertainty
(°C)	# 1	# 2	# 3	# 4	# 5	± (°C)
44.5	44.55	44.46	44.48	44.47	44.48	0.18

Table 2 : Reporting of Characterization Result

UUC* Setting	UUC* Reading (°C)			Stability	Uniformity	Overall Variation
(°C)	MIN	MAX	Average	± (°C)	(°C)	(°C)
44.5	44.5	44.5	44.5	0.002	0.070	0.29

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 [redacted] providing a level of confidence of approximately 95 %.

End

เอกสารไม่ควบคุม

สถาบันวิจัยและพัฒนาอุตสาหกรรมอาหาร
กลุ่มบริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

Calibration Report

Certificate No.: 2501624-001-01
Equipment: Water Bath
Model: WNE14 Serial No.: L416.0606
Resolution: 0.1 °C ID No.: UAE.MIC.002/2560
Manufacturer: MEMMERT
Date of Calibration: 10 February 2025

Location: 202 Microbiology Laboratory, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Environment Condition:
Ambient Temperature (26 ± 1) °C
Relative Humidity (59 ± 7) %
Line Voltage (224 ± 1) Volt

Condition of this results of Calibration:

1. This instrument was calibrated by insert 5 standard thermometer into its liquid bath and calibration according to W-TE-013 based on ASTM E715 80 (2022): Standard Specification for Gravity-Convection and Forced-Circulation Water Baths.
   - The temperature scale used is ITS - 90.
   - All data show below were final values and the initial data may be obtained upon request.
2. Reference Standard Instrument :

Instrument	Modal	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with probe	34972A	MY59002902	TE 670478-01	4-May-23	NATIONAL FOOD INSTITUTE
	RTD	[illegible]			

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 44.5 °C
7. Result of Calibration : [X] Without adjustment [ ] After adjustment

[redacted]

เอกสารไม่ควบคุม

List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient									
1	Orifice Transfer Standard Calibrator	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Tisch Environmental,Inc.	TE-5025A 3383	Jiranatee Associates Co., Ltd.	COF-039-67	27 Sep 24	26 Sep 25	-
2	U-Tube Manometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Dwyer	121-36-W/M -	Technology Promotion Association (Thailand-Japan)	25P112	19 Feb 25	18 Feb 26	-
3	Anerold Barometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	24P1856	4 Jun 24	3 Jun 25	-
4	Digital Thermo - Hygrometer	Total Suspended Particulate (TSP) Particulate Matter < 10 µm (PM_{10})	Digicon	TH-02 435031148	Technology Promotion Association (Thailand-Japan)	24H1487	15 Jul 24	14 Jul 25	-
5	Sound Level Calibrator (Acoustic Calibrator)	Calibrate Sound Level Meter	01dB	CAL31 84065	Innovative Instrument Co.,Ltd.	24-ACT-087	25 Jun 24	24 Jun 25	-
6	Sound Level Meter	$L_{Aeq\ 24\ hrs}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, L_{A90}, L_{Adn}	Larson Davis	LxT2 0005346	Innovative Instrument Co.,Ltd.	24-SLM-235	10 Jul 24	9 Jul 25	-

List of Instruments Certification for Water Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Water									
1	pH Meter	pH	Horiba	LAQUA-PH210 HA1G0008	Technology Promotion Association (Thailand-Japan)	24CH1153/1	18 Sep 24	17 Sep 25	-

Jiranatee Associates Co.,Ltd
63/14-15, 67/35-36
Petchkasem 7, 7/1, Rd, Wasitsapra, Bangkokyai,
Bangkok 10600 (Thailand)
Tel: +6602880812
Mobile: +66863899453
E-mail: jcal-calibration@jiranatee.com
Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Flow measurement laboratory
Calibration services department.

NSC – TISI – TIS 17025
CALIBRATION 0367

CERTIFICATE OF CALIBRATION

Certificate No. : COF-039-67

MEASUREMENT ITEM	: Top Load Orifice
MANUFACTURER	: TISCH
MODEL/TYPE	: TE-5025A
SERIAL NUMBER	: 3383
ID NUMBER	: UAE.EFM.063/2560
CONDITION AS-RECEIVED	: Used item
CUSTOMER	: United Analyst and Engineering Consultant Co., Ltd. 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
RECEIVED DATE	: 16 Sep 2024
MEASUREMENT DATE	: 27 Sep 2024
ISSUE DATE	: 27 Sep 2024

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow:

Temperature	: 23.0 ± 3.0	°C
Relative Humidity	: 55.0 ± 15.0	%RH
Atmospheric Pressure	: 1010 ± 10	hPa

CALIBRATION CONDITION:

Preconditioning	: 24 hours at ambient conditions.
Measurement Condition	: The average values during measurement are 23.9 °C and 49.0 %RH.

NOTED: The certificate is valid only to the item calibrated on date and place of calibration.

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibration procedure:
The Orifice gas flow device was calibrated against Standard Rotary Displacement Meter (Roots Meter) Model G65/MMC/M2-dp. The WI-CL-004 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of the measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number. MM-0063-23.

Uncertainty of Measurement:
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM 'Evaluation of measurement data - Guide to the expression of uncertainty in measurement'

Calibrated by:

(.) Mr. Sorawit Thachalad
(.) Miss Jittraporn Lertsomphot

Approved signatory: [redacted]
Mr. Parinya Booncharoen
Calibration Department Manager

THIS CERTIFICATE REPORT MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION IN PART HAS BEEN GRANTED IN WRITING FROM THE LABORATORY

เอกสารไม่ควบคุม

MEASUREMENT RESULTS:

The Orifice gas flow device was calibrated by direct comparison method with the Standard Rotary Displacement Meter (Roots Meter). The Humid air was used as a medium in the system. The standard conditions are 25°C (298.15 K) and 760 mmHg for standard temperature and standard pressure respectively.

Table 1: The results of Q Standard calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow (Q_s) m^3/min
1	0.703	758.131	23.92	22.49	56.556	1.738	1.319	0.654
2	1.000	758.205	23.70	22.81	68.034	3.473	1.865	0.922
3	1.121	758.284	23.64	22.69	42.633	4.642	2.157	1.064
4	1.167	758.274	23.64	22.65	31.359	5.197	2.282	1.125
5	1.409	758.325	24.00	23.14	30.402	7.654	2.768	1.358

Slope (m): 2.05577
Intercept (b): -0.02807
Correlation coefficient (r): 0.99985
Uncertainty ($k=2$): 0.015 m^3/min

Table 2: The results of Q actual calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_meter mmHg	Δp_Orifice inH_2O	Y	Standard Flow (Q_a) m^3/min
1	0.703	758.131	23.92	22.49	56.556	1.738	0.825	0.653
2	1.000	758.205	23.70	22.81	68.034	3.473	1.166	0.920
3	1.121	758.284	23.64	22.69	42.633	4.642	1.348	1.061
4	1.167	758.274	23.64	22.65	31.359	5.197	1.426	1.123
5	1.409	758.325	24.00	23.14	30.402	7.654	1.732	1.357

Slope (m): 1.28763
Intercept (b): -0.01756
Correlation coefficient (r): 0.99985
Uncertainty ($k=2$): 0.015 m^3/min

End of Certificate of Calibration

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9494

Certificate of Calibration

Certificate No. : 25P112

Equipment :	U-Tube Manometer
Manufacturer:	Dwyer
Model :	121-36-WM
Serial No.:	-
ID No.:	UAE.EFM.181/2561
Condition As-Received:	Used Item
Received Date:	10 February 2025
Calibration Date:	19 February 2025
Reference:	2502-0083WSC
Ambient Temperature:	(23 ± 2) °C
Relative Humidity:	(50 ± 15) %
Atmospheric Pressure:	1012 mbar

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Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to in-house calibration procedure CP-P04, using " DKD-R 6-1 ; Calibration of Pressure Gauges, Edition 03/2014 " as a guidelines.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Calibrator	PC108P	1189	MP-0113-24	10 Jul 2025

2.This result of calibration was made on requested at the point specified by customer.

3.Scale and conversion factor is 1 kPa = 4.0146293 inH_2O

4.This instrument was used clean air as pressure media.

5.This instrument was installed in vertical orientation and center of connector was used as the reference level.

6.The certificate is valid only to the item calibrated on date and place of calibration.

7.This Certification is traceable to the International System of Unit maintained at:-

-National Institute of Metrology Thailand (NIMT)

Calibrated by : Nopparat Phongam
Issue Date : 21 February 2025

Approved Signatory : [redacted]

[ ] Pratesa Prasopsuk
[ ] Sura Suwannasri
[✓] Attapol Pankrach

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B 0250406

Result of calibration:- Without adjustment
Function:- Pressure Measurement
Increasing Pressure

Range : 0 inH_2O to 36 inH_2O
Scale Interval : 0.1 inH_2O(The Fifth Estimate)

Applied Pressure (inH_2O)	UUC Indication: High-port side (inH_2O)	UUC Indication: Low-port side (inH_2O)	ΔP (inH_2O)	Error (inH_2O)
0.00	0.00	0.00	0.00	0.00
2.00	1.00	-0.98	1.98	-0.02
4.00	2.00	-1.98	3.98	-0.02
6.00	3.00	-3.02	6.02	0.02
8.00	4.00	-4.02	8.02	0.02
10.00	5.00	-5.04	10.04	0.04
12.00	6.00	-6.04	12.04	0.04
14.00	7.00	-7.06	14.06	0.06
16.00	8.00	-8.06	16.06	0.06
18.00	9.00	-9.06	18.06	0.06
20.00	10.00	-10.06	20.06	0.06
22.00	11.00	-11.08	22.08	0.08
24.00	12.00	-12.08	24.08	0.08
26.00	13.02	-13.10	26.12	0.12
28.00	14.02	-14.10	28.12	0.12
30.00	15.02	-15.10	30.12	0.12
32.00	16.02	-16.10	32.12	0.12
34.00	17.02	-17.08	34.10	0.10
35.50	17.86	-17.92	35.78	0.28

The uncertainty of measurement was ± 0.11 inH_2O

* UUC = Unit Under Calibration

* ΔP = High-port side - Low-port side

The 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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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/6 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9494

MDC-Y01-Y1017008
CALIBRATION 0008

Certificate of Calibration

Certificate No. : 24P1856
Page : 1 of 2

Equipment :	Aneroid Barometer
Manufacturer:	Barigo
Model :	-
Serial No.:	-
ID No.:	UAE.EMA2.110/2555
Condition As-Received:	Used Item
Received Date:	24 May 2024
Calibration Date:	04 June 2024
Reference:	2405-0919WSC
Ambient Temperature:	(23 ± 2) °C
Relative Humidity:	(50 ± 15) %
Atmospheric Pressure:	1006 mbar

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Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to in-house calibration procedure CP-P10, using " DKD-R 6-1 , Calibration of Pressure Gauges, Edition 03/2014 " as a guidelines.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Standard Barometer	DPI142	1422505048	MP-0094-24	03 May 2025

2.This instrument was installed in vertical orientation and center of the dial was used as the reference level.

3.This result of calibration was made on requested at the point specified by customer.

4.This result of calibration instrument was in absolute pressure.

5.This instrument was used clean air as pressure media.

6.The certificate is valid only to the item calibrated on date and place of calibration.

7.This Certification is traceable to the International System of Unit maintained through:-

-National Institute of Metrology Thailand (NIMT)

Calibrated by : Suksan Khankaew
Issue Date : 06 June 2024

Approved Signatory : [redacted]
( ) Sura Suwannasri
(✓) Atlapol Panurach

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B 0316956

Result of calibration:- Without adjustment **Range :** 720 mmHg to 800 mmHg
Function:- Absolute Pressure Measurement **Scale Interval :** 1 mmHg (The Fifth Estimate)

Increasing Pressure

Applied Pressure (mmHg)	720.43	730.67	740.34	751.52	756.56	761.83	773.53	798.76
UUC* Indication (mmHg)	720.0	730.0	740.0	750.0	755.0	760.0	770.0	790.0
Error (mmHg)	-0.43	-0.67	-0.34	-1.52	-1.56	-1.83	-3.53	-8.76

Decreasing Pressure

Applied Pressure (mmHg)	798.76	773.60	761.89	756.65	751.59	740.72	730.68	720.59
UUC* Indication (mmHg)	790.0	770.0	760.0	755.0	750.0	740.0	730.0	720.0
Error (mmHg)	-8.76	-3.60	-1.89	-1.65	-1.59	-0.72	-0.68	-0.59

The uncertainty of measurement was ± 0.24 mmHg
* UUC = Unit Under Calibration
The 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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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

NSC-TTIA-TH017025
CALIBRATION 0008

Certificate of Calibration

Certificate No. : 24H1487

Equipment :	Digital Thermo-Hygrometer
Manufacturer:	Digicon
Model .	TH-02A
Serial No.:	435031148
ID No.:	UAE.EFM.006/2567
Condition As-Received:	New Item
Received Date:	10 July 2024
Calibration Date:	15 July 2024 to 17 July 2024
Reference:	2407-0393WSC
Ambient Temperature:	(25 ± 3) °C
Relative Humidity:	(50 ± 20) %

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Submitted by: United Analyst and Engineering Consultant Co.,Ltd.

81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Procedure used: Calibration were conducted using in-house calibration procedure CP-H03 according to comparison with standard chilled mirror sensor for humidity measurement function and comparison with standard temperature probe for temperature measurement function into humidity / temperature chamber.

Condition of this result of calibration

1.Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Standard Chilled Mirror Hygrometer Sensor	Dew Prime II	31863	21819	25 Sep 2024
2) Handheld Thermometer With Sensor	1523	5717095	2311321	08 Nov 2024

2.The certificate is valid only to the item calibrated on date and place of calibration.

3.This Certification is traceable to the International System of Unit maintained through:-

-Thunder Scientific Corporation, NVLAB Accreditation No. Calibration 200582-0

-Technology Promotion Association (Thailand-Japan), NSC-ONSC Accredited No. Calibration 0008

Calibrated by : Surasit Phansudnoi
Issue Date : 17 July 2024

Approved Signatory : [redacted]

[ ] Chakrit Waewwanjue
[✓] Vipom Tantiyawutti
[ ] Unnopphol Harachai

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Result of Calibration:- Without Adjustment
Function: Humidity Measurement.

Reference Temperature (°C)	Standard Humidity (%R.H.)	UUC* Reading (%R.H.)	Error (%R.H.)	Uncertainty of Measurement (±%R.H.)
25.0	40.1	39	-1.1	1.4
25.0	50.1	48	-2.1	1.6
25.0	60.0	58	-2.0	1.6
25.0	70.2	68	-2.2	1.6

Result of Calibration:- Without Adjustment
Function: Temperature Measurement.

Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of Measurement (±°C)
20.014	20.3	0.286	0.42
24.984	25.2	0.216	0.42
30.050	30.1	0.050	0.42
40.027	40.0	-0.027	0.42

UUC* : Unit Under Calibration

The reported uncertainty of measurement was base on standard uncertainty multiplied by coverage factor k = 2.00, providing confidence level approximately 95%.

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Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD

Certificate No. : 24-ACT-087

Request No. : Req-2024-1365

Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Unit Under Calibration Details

Measurement item : Acoustic Calibrator

Class : 1

Manufacturer : 01dB

Range : 94 dB / 1000 Hz

Model : CAL31

Instrument Status : Used

Serial Number : 84065

ID : UAE.EFM 1632564

Calibration Environment and Details

Temperature : 23 ± 2 °C

Humidity : 50 ± 20 %RH

Barometric Pressure : 1013 ± 30.0 kPa

Received Date : 20 June 2024

Calibration Date : 25 June 2024

Location of Calibration : LAB 1 Acoustic

Calibration Procedure : In-house method CP-ACT-02 based on IEC 60942:2017 Electroacoustics - Sound calibrators

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Sound Calibrator	SV 35A	58079	EEI	12 June 2025
THD Multimeter	2015	1047765	NIMT	16 January 2025

Traceability : This certificate provides traceability of measurement to recognized national standard, and to the realization of the International System of Units (SI).

Note

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor k = 2, providing a level of confidence approximately 95 %

Calibrated By : [redacted]

Mr. Nuppadon Tuangart

Service Calibration Engineer

Approved By : [redacted]

Calibration Engineer Supervisor

Issue Date : 25 June 2024

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Certificate No : 24-ACT-087

Request No : Req-2024-1365

Sound pressure level — Calibration Results : Without Adjustment

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (± dB)	Acceptance limit Class 1 (± dB)	Result
	Measured	Deviated value	Measured	Deviated value			
94 dB / 1000 Hz	93.78	-0.22			0.13	0.25	Pass

Frequency of Sound pressure level

Calibration Range (Hz)	Without Adjustment		Adjustment		Uncertainty (± %)	Acceptance limit Class 1 (± %)	Result
	Measured (Hz)	Deviated	Measured (Hz)	Deviated			
94 dB / 1000 Hz	1000.00	0.00	-	-	0.01	0.70	Pass

Total Harmonic Distortion plus Noise of Sound pressure level (THD+N %)

Calibration Range (Hz)	Without Adjustment	Adjustment	Uncertainty (± %)	Acceptance limit Class 1 (± %)	Result
	Measured (%)	Measured (%)			
94 dB / 1000 Hz	0.14	-	0.00	2.5	Pass

Note :

Function	Maximum permitted Uncertainty of measurement
Sound pressure level	0.15 dB
Frequency	0.20%
Total distortion+noise	0.50%

- Acceptance limit as IEC 60942:2017 Class 1
- The calibration results exclude the calibrator pressure correction
- The calibration results exclude the microphone correction

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Certificate No : 24-ACT-087

Request No : Req-2024-1365

Decision Rule for Statements of Conformity

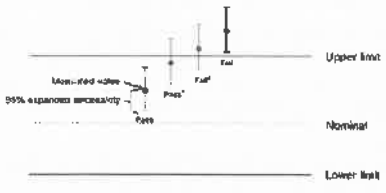
The results of measurements and the statements of conformity or non-conformity to the specified requirements will be applied using ILAC-G8:09/2019 "Guidelines on the Reporting of Compliance with Specification" as following (by) and statements

Pass : The measurement result plus the expanded uncertainty is less than or equal to the limit

Pass* : The measurement result is within the limit. However, a portion of the expanded uncertainty of measurement at 95% coverage probability is outside the limit

Fail* : The measurement result is outside the limit. However, a portion of the expanded uncertainty of measurement at 95% coverage probability is within the limit

Fail : The measurement result plus the expanded uncertainty, with a 95% coverage probability, is outside the limit



End of Calibration

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Certificate of Calibration

Customer

Name	UNITED ANALYSIS AND ENGINEERING CONSULTANT CO.,LTD.	Certificate No :	24-0136-235
Address	61 Soi Udomsuk, 81 Sukhumvit Road, Bangchak, Phrakanong, Bangkok 10260	Request No :	Req-2024-1454

Unit Under Calibration Details

Instrument type	Sound Level Meter	Microphone Class	2
Manufacturer	Larson Davis	Microphone Model	377B02
Model	LxT2	Microphone S/N	181568
Serial Number	0007486	Preamplifier Model	PRM831
ID	UNITED0003203	Preamplifier S/N	019438
Resolution	0.1 dB	Instrument Status	Used

Calibration Environment and Details

Temperature	23 °C ± 2 °C
Humidity	50 %RH ± 20 %RH
Barometric Pressure	1013 hPa ± 10 hPa
Received Date	8 July 2024
Calibrated Date	10 July 2024
Calibration Procedure	In-house method (LAB) based on IEC 61672-1 : 2013 (Electroacoustics - Sound level meters - Part 1: Specifications)
Location of Calibration	Lab Acoustics

Reference Standard

Instrument	Brand	Model	S/N	Due Calibration	Traceability
Standard Microphone	G.R.A.S.	40AN	198423	20 August 2024	G.R.A.S.
Multifrequency Calibrator	Quest	Quest-cal	PFA190234	26 July 2024	TEST
Audio Generator	Svantek	Svan101	131	2 October 2024	WK Phuket

Note

The reported uncertainty is based on a standard uncertainty multiplied by the Coverage Factor k = 2, providing a level of confidence approximately 95%.

Calibrated By : [redacted]
Mr. [redacted]
Senior Calibration Engineer

Approved By : [redacted]
Mr. Paul Matthews
Calibration Engineer Supervisor

Issue Date : 10 July 2024

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Certificate No : 24-0136-235
Request No : Req-2024-1454

1. Indication at the calibration check frequency

CUC Setting	Nominal	Before Adjust		After Adjust		UNCERTAINTY	Acceptance Limit	Result
FAST / A / 37.439	Level	CUC	ERR	CUC	ERR	± dB	± dB	
Calibrator Setting	dBA	dBA	dBA	dBA	dBA			
1000 Hz 114 dB	113.96	115.0	1.04	113.8	+0.04	0.20	0.30	Pass

Note : Microphone sensitivity was established by the use of Sound Calibrator Brand SVANTEK, Model SV 35A, S/N: 58859

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 37.439		
UUC Weighting	(dB)	(± dB)
A	21.4	0.10

3. Self-generated noise, Microphone replaced by the electrical input signal device

UUC Setting	Measured	UNCERTAINTY
FAST / 37.439		
UUC Weighting	(dB)	(± dB)
A	31.1	± 1.0
C	30.3	± 1.0
Z	35.0	± 1.0

4. Acoustic signal test of frequency weightings (Without Windscreen)

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY	Acceptance Limit	Result
FAST / 37.439	A	C	Z			
STD Setting	(dB)	(dB)	(dB)	± dB	(± dB)	
125 Hz	0.0	0.1	0.1	0.20	1.5	Pass
1000 Hz	0.0	0.0	0.0	± 0.20	1.0	Pass
8000 Hz	0.1	0.1	0.1	± 0.20	3.0	Pass
12500 Hz	2.5	2.5	2.5	± 0.20	5.0	Pass

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Certificate No : 24-0136-235
Request No : Req-2024-1454

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

UUC Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY	Acceptance Limit	Result
FAST / 37.439						
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)	(± dB)	
63 Hz	-0.1	0.0	0.1	0.20	1.0	Pass
125 Hz	-0.1	0.0	0.0		1.5	Pass
250 Hz	-0.1	0.0	0.0		1.5	Pass
500 Hz	0.0	0.0	0.0		1.5	Pass
1000 Hz	0.0	0.0	0.0		1.0	Pass
2000 Hz	0.0	0.0	0.0		2.0	Pass
4000 Hz	-0.1	-0.1	-0.1		3.0	Pass
8000 Hz	-0.1	-0.1	-0.1		5.0	Pass
16000 Hz	-0.1	-0.1	-0.1		-5, +3.0	Pass

6. Frequency and tone weightings at 4kHz

UUC Setting	STD	Measured		UNCERTAINTY	Acceptance Limit	Result
FAST / 37.439	REF	UUC	ERR			
UUC Weighting	(dB)	(dB)	(dB)	(± dB)	(± dB)	
A	114.00	114.0	0.0	0.20	0.30	Pass
C	114.00	114.0	0.0		0.30	Pass
Z	114.00	114.0	0.0		0.30	Pass

UUC Setting	STD	Measured		UNCERTAINTY	Acceptance Limit	Result
37.439 / A	REF	UUC	ERR			
UUC Time Response	(dB)	(dB)	(dB)	(± dB)	(± dB)	
Fast	114.00	114.0	0.0	0.20	0.30	Pass
Slow	114.00	114.0	0.0		0.30	Pass
Leq	114.00	114.0	0.0		0.30	Pass

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Certificate No : 24-0136-235
Request No : Req-2024-1454

7. Long Term Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance Limit	Result
FAST / A / 37.439	UUC			
STD Setting	(dB)	± dB	(± dB)	
Initial	114.0			
Final	114.0			
Deviated	0.0	0.10	0.30	Pass

8. Level linearity on the reference level range

UUC Setting	Applied	Deviation		UNCERTAINTY	Acceptance Limit	Result
FAST / A / 37.439	dBV	UUC	ERR			
STD dB	(dB)	(dB)	(dB)	± dB	(± dB)	
130.00	0.07	130.0	0.0		0.1	Pass
124.00	0.51	124.0	0.0		0.1	Pass
120.00	0.29	120.0	0.0		0.1	Pass
114.00	0.14	114.0	0.0		0.1	Pass
109.00	0.07	109.0	0.0		0.1	Pass
104.00	0.04	104.0	0.0		0.1	Pass
100.00	0.02	100.0	0.0		0.1	Pass
94.00	0.01	94.0	0.0		0.1	Pass
89.00	0.00	89.0	0.0		0.1	Pass
84.00	0.00	84.0	0.0		0.1	Pass
80.00	0.00	80.0	0.0		0.1	Pass
74.00	0.00	74.0	0.0		0.1	Pass
69.00	0.00	69.0	0.0		0.1	Pass
64.00	0.00	64.0	0.0		0.1	Pass
59.00	0.00	59.0	0.0		0.1	Pass
54.00	0.00	54.0	0.0		0.1	Pass
49.00	0.00	49.0	0.0		0.1	Pass
44.00	0.00	44.0	0.0		0.1	Pass
41.00	0.00	41.0	0.0		0.1	Pass
42.00	0.00	42.0	0.0		0.1	Pass
41.00	0.00	41.0	0.0		0.1	Pass

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Certificate No : 24-SLM-235
Request No : Req-2024-1454

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY	Acceptance Limit	Result
FAST / A	REF	UUC	ERR			
UUC Range	(dB)	(dB)	(dB)	(±dB)	(±dB)	
37-139	46.40	46.5	0.1	0.34	1.1	Pass
	114	114.0	0.0		1.1	Pass

10. Tone burst response

UUC Setting	STD	Antelopated	Measured		UNCERTAINTY	Acceptance Limit	Result
A / 37-139	Toneburst	Ref	UUC	ERR			
UUC Time Response	(ms)	(dB)	(dB)	(dB)	(±dB)	(±dB)	
Fast	200	135.0	134.9	-0.1	0.20	1.0	Pass
	2	119.6	117.6	-0.3		+1.0, -2.5	Pass
	0.25	109.6	108.5	-0.3		+1.5, -5.0	Pass
Slow	200	126.6	126.4	-0.2		1.0	Pass
	2	109.0	108.8	-0.2		+1.0, -5.0	Pass
SPL	200	129.0	129.0	0.0		1.0	Pass
	2	109.6	108.8	-0.2		+1.0, -2.5	Pass
	0.25	109.0	99.7	-0.3		+1.5, -5.0	Pass

11. Peak C Sound level

UUC Setting	Anelopated	Measured		UNCERTAINTY	Acceptance Limit	Result
FAST / C / 37-142	REF	UUC	ERR			
STD Setting	(dB)	(dB)	(dB)	(±dB)	(±dB)	
Complete cycle	137.4	136.8	-0.60	0.20	3.0	Pass
Positive half cycle	136.4	136.2	-0.20		2.0	Pass
Negative half cycle	136.4	136.2	-0.20		2.0	Pass

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Certificate No : 24-SLM-235
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12. Overload Indication

UUC Setting	Measured	UNCERTAINTY	Acceptance Limit	Result
FAST / A / 37-139	UUC			
STD Setting	(dB)	(±dB)	(±dB)	
Positive overhalf cycle	145.4			
Negative overhalf cycle	145.3			
Deviated	0.1	0.20	1.5	Pass

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance Limit	Result
FAST / A / 37-139	UUC			
STD Setting	(dB)	(±dB)	(±dB)	
Initial	138.0			
Final	138.0			
Deviated	0.0	0.10	0.30	Pass

Note :

Function	Maximum permitted Uncertainty of measurement
1. Indication of the calibrator check frequency	Not applicable
2. Self-generated noise, Microphone installed	Not applicable
3. Self-generated noise, Microphone replaced by the electrical input signal device	Not applicable
4. Acoustic signal test of frequency weightings at 1 kHz for A kHz	0.03 dB
5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz	0.20 dB
6. Frequency and time weightings at 8kHz	0.20 dB
7. Long Term Stability	0.03 dB
8. Level linearity at the reference level range	0.30 dB
9. Level linearity including the level range control	0.30 dB
10. Tone burst response	0.30 dB
11. Peak C Sound level	0.35 dB
12. Overload indication	0.25 dB
13. High Level Stability	0.70 dB

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Certificate No : 24-SLM-235
Request No : Req-2024-1454

Decision Rule for Statements of Conformity

The symbol decision rule employed for the statement of conformity in each calibration result will be applied using ILAC-G8:09/2019 Guidelines on the Reporting of Compliance with Specification as G8, using Fig. and statements.

Pass : The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit

Pass[1] : The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% coverage probability was outside the limit.

fail[2] : The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement at 95% coverage probability was within the limit

fail : The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.

End of Certificate

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
5344 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-3494

Certificate of Calibration

Cert.No.: 24CH1153/1
Page.: 1 of 3

This Certificate was issued to replace to the Certificate No. 24CH1153

Equipment :	pH Meter
Manufacturer :	Horiba
Model :	LAQUA-PH210
Serial No. :	HA1G0008
ID No. :	UAE.EFM.201/2564(EFM.pH.09/64)
Condition As-Received:	Used Item
Received Date :	17 September 2024
Calibration Date :	18 September , 25 October 2024
Reference :	2409-0632WSC-1
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Ambient Temperature :	(25 ± 2.5) °C
Relative Humidity :	(50 ± 15) %
Calibration Procedure :	In - house method : - CP-CH5 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM) - CP-CH6 by comparison with temperature standard
Calibrated by :	Warakorn Lamgagtrakul
Approved by :	[redacted]

( ) Umapphol Harachai
( ) Ponpan Palpim
(✓) Sakhip Meangmai

Issue Date : 28 October 2024

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 Head of Corporate Services 3 : Equipment Calibration and Testing Services

Condition of the calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1)Document Process Calibrator	54030049	136RC116	24E2759	25 Aug 2025
2)Ref. Standard Thermometer	4582054	116RC044	24I757	14 July 2025

- This Certification is traceable to SI Throught Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials :The measurement results are traceable to SI through Hach Lange GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-PL-18184-01-06
:The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1695

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.006	Hach Lange GmbH	C03146	23 Feb 2026
pH 7.000	Hach Lange GmbH	C03020	13 Dec 2024
pH 9.997	CPA chem	976953	26 Apr 2025

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : mV Measurement

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

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement	Coverage factor
	pH	mV	mV	pH	(mV)	k
pH Meter	4.00	177.46	177.5	4.01	0.058	2.00
S/N.: HA1G0008	7.00	0.00	0.0	7.02	0.058	2.00
	7.00	0.00	0.0	7.02	0.058	2.00
	10.00	-177.46	-177.5	10.01	0.058	2.00

Calibration Results

Function : pH Measurement

Calibration Date : 18 September 2024

Performing three buffers standard curve by using buffer nominal pH (4,7)(7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode	4.006	4.01	169.7	0.0077	2.00
S/N.: -	7.000	6.99	-3.2	0.0084	2.00
	7.000	7.00	-3.4	0.0092	2.05
	9.997	10.01	-174.4	0.011	2.05

Function : Temperature Measurement

Calibration Date : 25 October 2024

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : 9652
- Serial No. : -

Dimension of probe

- Length : 193 mm.
- Diameter : 16 mm.
- Immersion Depth : 90 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
20.0	20.001	20.0	-0.001	0.13	2.00
25.0	25.005	25.0	-0.005	0.13	2.00
45.0	45.004	44.9	-0.104	0.13	2.00

Remark - UUC* = Unit Under Calibration

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

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