

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
Water									
1	DO Meter	DO	YSI	Pro 20i 24F101576	Technology Promotion Association (Thailand-Japan)	25TW237	20 Nov 25	19 Nov 26	-



Certificate of Testing

Cert.No.: 25TW237
Page.: 1 of 2

Equipment : DO Meter
Manufacturer : YSI Environmental
Model : Pro 20i
Serial No. : 24F101576
ID No. : UAE.EFM.047/2567(EFM DO.02/67)
Received Date : 18 November 2025
Test Date : 20 November 2025
Reference : 2511-0529WSC-3
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangkok,
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 : Watsak Srinhean
Approved by :
Approved Signatory
() Chakrit Waewwanjua
() Ponpan Polpim
(✓) Sathip Meangmai
Issue Date : 21 November 2025

Condition of this result of calibration

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

Instruments	ID No.	Certificate No.	Due Date
1. Burette	130BU10	25CG1126	18 Mar 2027
2. Balance	110RC001	25UM316	02 July 2026

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.: 24E100431

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.22	6.20	0.0084

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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Certificate of Calibration

Cert. No.: 25LM173
Page.: 1 of 2

Equipment : DO Meter with Sensor
Manufacturer : YSI Environmental
Model : Pro 20i
Serial No. : 24F101576
ID No. : UAE.EFM.047/2567(EFM DO.02/67)
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : TPA On Site Calibration Laboratory
Received Order : 18 November 2025
Calibrated Date : 21 November 2025
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V
Calibrated by : Warakorn Lemgegrakul
Approved by :
Approved Signatory
() Chakrit Waewwanjua
() Suwit Injal
(✓) Kunhit Promprai
Issue Date : 24 November 2025

Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2511-0529WSC-4
Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with
Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.

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) Digital Thermometer	A7B843	25117	TPA	06 Jan 2028

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

3. This measurement result is traceable to the International System of Unit maintained through :

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

Result of Calibration :- () Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 24E100431

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC ^a Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
15.0	110	15.004	15.0	-0.004	0.16	2.00
30.0	110	29.998	29.9	-0.098	0.16	2.00
45.0	110	45.000	44.9	-0.100	0.16	2.00

UUC^a : 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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The Uncertainties are for a confidence probability of approximately 95%.

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

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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	United Analyst and Engineering Consultant Co., Ltd.	250422-1-BL002-25	23/4/2025	22/4/2026
			Mettler Toledo	AB204-S/FACT / 1129361010	United Analyst and Engineering Consultant Co., Ltd.	260318-1-BL007-26	3/4/2026	2/4/2027
2	Analytical Balance	TOTAL DISSOLVED SOLIDS	Mettler Toledo	XSR205DU / C210685394	National Food Institute, Ministry of Industry, Thailand	2502226-002-01	20/3/2025	19/3/2026
			Mettler Toledo	XSR205DU / C210685394	United Analyst and Engineering Consultant Co., Ltd (UAE)	260311-2-BL001-26	12/3/2026	11/3/2027
3	Analytical Balance	TOTAL SUSPENDED SOLIDS	Mettler Toledo	XSR205DU / C009071872	National Food Institute, Ministry of Industry, Thailand	2502226-001-01	20/3/2025	19/3/2026
			Mettler Toledo	XSR205DU / C009071872	United Analyst and Engineering Consultant Co., Ltd. (UAE)	260311-2-BL002-26	12/3/2026	11/3/2027
4	BOD Incubator	BIOCHEMICAL OXYGEN DEMAND	ARCO	UC4-1320 / 1021	Technology Promotion Association (Thailand-Japan)	25TM1001	7/7/2025	6/7/2026
5	Cyanuric Acid Photometer	CYANURIC ACID	Hanna Instrument Inc., Romania	H197722C / 905060058111	Hanna Instruments (Thailand) Ltd.	HIT-2513-0437	24/3/2025	23/3/2026
			Hanna Instrument Inc., Romania	H197722C / 905060058111	Hanna Instruments (Thailand) Ltd.	C26030162	17/3/2026	16/3/2027
6	DO Meter	BIOCHEMICAL OXYGEN DEMAND	YSI	5100 / 11B 101863	Technology Promotion Association (Thailand-Japan)	25TW29	17/2/2025	16/2/2026
			YSI	5100 / 11B 101863	Technology Promotion Association (Thailand-Japan)	26TW50	2/3/2026	1/3/2027
7	Digestion Units	TOTAL KJELDAHL NITROGEN	FOSS Analytical Co., Ltd (China)	DT2508/2520 / 91905060	FOSS South East Asia	15257	12/2/2026	11/2/2027
8	Hot Air Oven	TOTAL SUSPENDED SOLIDS	Memmert	UF55 / B216.1666	National Food Institute, Ministry of Industry, Thailand	2600149-001-01	7/10/2025	6/10/2026

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*
9	Hot Air Oven	TOTAL DISSOLVED SOLIDS	Memmert	UF55 / B212.0411	National food institute ministry of Industry	2602300 001 01	11/3/2026	11/3/2027
10	Cooled Incubator	ESCHERICHIA COLI FECAL COLIFORM BACTERIA TOTAL COLIFORM BACTERIA	Binder	KB400 / WTB20200000015535	National Food Institute, Thailand Ministry of Industry, Thailand	2502229-006-01	19/3/2025	18/3/2026
			Binder	KB400 / WTB20200000015535	National Food Institute, Thailand Ministry of Industry, Thailand	2602303-006-01	11/3/2026	10/3/2027
11	Incubator	PSEUDOMONAS AERUGINOSA	MEMMERT	IF75 / D317.0305	National Food Institute, Thailand Ministry of Industry, Thailand	2502229-004-01	20/3/2025	19/3/2026
12	Incubator	PSEUDOMONAS AERUGINOSA	MEMMERT	IN75 / D317.0307	National Food Institute Ministry of Industry	2602303-005-01	11/3/2026	10/3/2027
13	Incubator	FECAL COLIFORM BACTERIA	Memmert	IPP260 / V615.0187	National Food Institute, Thailand Ministry of Industry, Thailand	2502229-001-01	19/3/2025	18/3/2026
			Memmert	IPP260 / V615.0187	National Food Institute, Thailand Ministry of Industry, Thailand	2602303 001 01	11/3/2026	10/3/2027
14	Kjeltec Distillation Unit	TOTAL KJELDAHL NITROGEN	FOSS	KT9 / 91905393	FOSS South East Asia	15256	12/2/2026	11/2/2027
15	pH Meter	pH	Horiba	LAQUA-PH210 / HA9M0047	technology promotion association (thailand-japan)	26CH231	26/2/2026	26/2/2027
16	pH Meter	pH	Horiba	LAQUA-PH210 / HA0D0082	technology promotion association (thailand-japan)	25CH588	21/5/2025	20/5/2026
17	UV-VIS Spectrophotometer	NITRATE	Hitachi	U-2900 / 21E22-009	DQE Services Co.,Ltd.	SP25-021	26/5/2025	25/5/2026
			Hitachi	U-2900 / 21E22-009	DQE Services Co.,Ltd.	SP26-012	18/5/2026	17/5/2027
18	UV/VIS Spectrophotometer	AMMONIA	Hitachi High-Tech Science Corporation Tokyo Japan	U-5100 / 23A4-008	DQE Services Co.,Ltd.	SP25-024	17/6/2025	16/6/2026
			Hitachi High-Tech Science Corporation Tokyo Japan	U-5100 / 23A4-008	DQE Services Co.,Ltd.	SP26-014	18/5/2026	17/5/2027
19	Water Bath	FECAL COLIFORM BACTERIA	Memmert	WNE 14 / L416.0612	Technology Promotion Association (Thailand-Japan)	26TM194	2/2/2026	1/2/2027

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



Equipment : Water Bath
 Condition As-Received : Used Item
 Reference : 2002-0004QC-2
 Result of Calibration : (') Without Adjustment
 Function of UUC* : Temperature Source

Cert. No.: 28TM104
 Page : 2 of 3

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)					Uncertainty (± °C)
			1	2	3	4	5 (ref.)	
44.5	44.8	44.6	44.616	44.483	44.472	44.508	44.621	0.15

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Coverage Factor k
44.5	0.11	0.044	2

Average* : The average of 30 values in each position.

Uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature of 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.

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

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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Equipment : Water Bath
 Condition As-Received : Used Item
 Reference : 2002-0004QC-2
 Procedure Used :-

Cert. No.: 28TM104
 Page : 2 of 3

Calibration were conducted using in-house calibration procedure CP-0104 Based on ASTM E715 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

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 : MYSD13711 : 25LM17 : TPA : 17 Jul 2025

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

3. This measurement result is traceable to the International System of Unit maintained through :

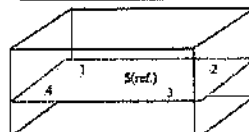
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (') Without Adjustment

Function of UUC* : Temperature Source

Heat transfer medium used : Water

	Environmental		AC Voltage Supply (Volt)
	(°C)	(%R.H.)	
Beginning of Calibration	25	52	221
Finished of Calibration	24	51	220



Front

Position :	Ref. Std. ID No. :
1	4803988-001
2	4803988-002
3	4803988-003
4	4803988-004
5(ref.)	4803988-005

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
 CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
 5344 PATTAMAKARN ROAD B0118, SUKHUMVIT, SUKUMVIT BANGKOK 10250
 TEL 0-2717-3000 FAX 0-2718-9484



Certificate of Calibration

Cert. No.: 28TM104
 Page : 1 of 3

Equipment : Water Bath
 Manufacturer : Maxmert
 Model : WNE 14
 Serial No. : L416.0912
 ID No. : MIC.003/2560
 Submitted by : United Analyst and Engineering Consultant Co., Ltd.
 8 Soi Udomauk 41, Sukhumvit Road,
 Bangkok, Phraekhanong,
 Bangkok 10260
 Location : Microbiology Laboratory (302)
 Received Order : 02 February 2026
 Calibration Date : 02 February 2026
 Ambient Temperature : (26 ± 10) °C
 Relative Humidity : (60 ± 30) %
 AC Line Voltage : (220 ± 22) V
 Calibrated by : Kriado Maine
 Approved by : Kunchit
 Approved Signatory
 () Chakrit Wawwanjue
 () Suddi Ingal
 (✓) Kunchit Prompratt
 Issue Date : 17 February 2026

The Uncertainties are for a confidence probability of approximately 95%

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 Approval of the head of Corporate Services & Equipment Calibration and Testing Services

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 32 Soi Ladprao-Wangthong 55, Ladprao-Wangthong Rd., Ladprao, Bangkok 10220
 Phone : +66 (0)2 536 2054, Email : dqs@dqeservices.co.th, dqs@waf.com

REPORT OF CALIBRATION

Certificate No. : SP26-014
 Page 5 of 5

Wavelength Accuracy :

CRM's Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor k
241.00	240.3	0.70	0.18	2.00
279.30	278.9	0.40	0.18	2.00
283.90	283.2	0.70	0.18	2.00
334.50	333.8	0.70	0.18	2.00
361.40	360.7	0.70	0.18	2.00
418.40	417.9	0.50	0.18	2.00
447.20	446.6	0.60	0.18	2.00
459.30	459.4	-0.10	0.18	2.00
537.00	536.5	0.50	0.18	2.00
638.00	637.3	0.70	0.18	2.00
441.29	440.6	0.69	0.18	2.00
479.88	479.2	0.68	0.18	2.00
513.75	513.0	0.75	0.18	2.00
528.39	528.1	0.49	0.18	2.00
575.10	574.5	0.60	0.18	2.00
585.56	585.0	0.56	0.20	2.00
664.70	664.2	0.50	0.18	2.00
740.51	739.9	0.61	0.20	2.00
747.61	747.0	0.61	0.18	2.00
807.04	806.5	0.54	0.18	2.00
879.68	879.0	0.68	0.18	2.00

Remark : - UUC = Unit Under Calibration
 - N/A = Not Available
 - The mean expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k.
 - which gives normal distribution coverage factor k at approximately 95%
 - * k=2.00 is a 95% confidence level

- End of Certificate -

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FM-008-02 Rev. 1/11/2021

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

REPORT OF CALIBRATION

Certificate No. : SP26-014 Page 4 of 5

Photometric Accuracy :

Wavelength (nm)	CRMs Value (Abs)	UTC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
235	0.0000 0.7455	0.000 0.744	0.0000 0.0015	0.0050 0.0056	2.00 2.00
257	0.0000 0.8656	0.000 0.863	0.0000 0.0026	0.0050 0.0059	2.00 2.00
313	0.0000 0.2910	0.000 0.290	0.0000 0.0010	0.0050 0.0051	2.00 2.00
350	0.0000 0.6414	0.000 0.640	0.0000 0.0014	0.0050 0.0055	2.00 2.00

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PL-701-02 Rev. 1/1/2021

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REPORT OF CALIBRATION

Certificate No. : SP26-014 Page 3 of 5

Calibration Results : Without adjustment

Photometric Accuracy :

Wavelength (nm)	CRMs Value (Abs)	UTC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
420	0.0000 0.5772 1.0478	0.000 0.574 1.043	0.0000 0.0032 0.0048	0.0028 0.0031 0.0029	2.00 2.00 2.00
	2.1879	2.182	0.0059	0.0082	2.00
	440	0.0000 0.5581 1.0224	0.000 0.556 1.020	0.0000 0.0021 0.0024	0.0028 0.0034 0.0035
2.1227		2.121	0.0017	0.0079	2.00
465		0.0000 0.5225 0.9628	0.000 0.518 0.961	0.0000 0.0045 0.0018	0.0028 0.0029 0.0028
	1.9744	1.974	0.0004	0.0070	2.00
	546.1	0.0000 0.5174 0.9990	0.000 0.514 0.996	0.0000 0.0034 0.0030	0.0028 0.0031 0.0033
1.9953		1.995	0.0003	0.0087	2.00
590		0.0000 0.5508 1.0801	0.000 0.549 1.078	0.0000 0.0018 0.0023	0.0028 0.0030 0.0029
	2.0356	2.028	0.0076	0.0079	2.00
	635	0.0000 0.5579 1.0512	0.000 0.558 1.050	0.0000 -0.0001 0.0012	0.0028 0.0031 0.0029
1.9257		1.923	0.0027	0.0083	2.00

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PL-701-02 Rev. 1/1/2021

DQE Services Co., Ltd.
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REPORT OF CALIBRATION

Certificate No. : SP26-014 Page 2 of 5

Environment Condition : Ambient Temperature 23 ± 5 °C
Relative humidity 55 ± 20 %RH

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

Certified Reference Materials :

Material	Serial No.	Certificate No.	Due date
Absorbance Standard set	25760	136858	5 November 2027
Absorbance Standard set	25757	136848	5 November 2027
Wavelength Standard set	25806	136824	5 November 2027
Wavelength Standard set	25758	136827	5 November 2027

Traceability : This certification is traceable to the International System of Unit maintained at National Institute of Standards and Technology (NIST) through Sigma 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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PL-701-02 Rev. 1/1/2021

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

CERTIFICATE OF CALIBRATION

Certificate No. : SP26-014 Page 1 of 5

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

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

Location of calibration : Instrument room (267)

Equipment : UV-Vis Spectrophotometer

Manufacturer : HITACHI

Model : U-5100

Serial No. : 33A4-008

ID No. : UAE.WAS.010/2567

Received Date : 18 May 2026

Calibration Date : 18 May 2026

Issue Date : 21 May 2026

Condition Instrument : Good

Calibrated by : Mr. Parit Mahavorn
(Mr. Parit Mahavorn)
Calibration Engineer

Approved by : Ms. Chonicha Sangsorn
(Ms. Chonicha Sangsorn)
Quality Manager

The calibration made is applied only to the above calibrated items and was found accurate as shown on table and place of calibration only.

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

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REPORT OF CALIBRATION

Certificate No. : SP25-024 Page 5 of 5

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	278.8	0.50	0.18	2.00
288.90	288.3	0.60	0.18	2.00
334.50	333.9	0.60	0.18	2.00
361.40	360.8	0.60	0.18	2.00
418.40	417.9	0.50	0.18	2.00
447.20	446.6	0.60	0.18	2.00
459.30	459.1	0.20	0.18	2.00
537.00	536.4	0.60	0.18	2.00
638.00	637.5	0.50	0.18	2.00
441.29	440.7	0.59	0.18	2.00
479.88	479.4	0.48	0.18	2.00
513.75	513.3	0.45	0.18	2.00
528.59	528.2	0.39	0.18	2.00
575.10	574.5	0.60	0.18	2.00
585.56	585.4	0.16	0.20	2.00
684.70	684.1	0.60	0.18	2.00
740.51	740.2	0.31	0.20	2.00
747.61	747.0	0.61	0.18	2.00
807.04	806.4	0.64	0.18	2.00
879.68	879.1	0.58	0.18	2.00

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

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794-904-02 R01 1/11/2021

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REPORT OF CALIBRATION

Certificate No. : SP25-024 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	0.747	-0.0001	0.0057	2.00
257	0.0000	0.000	0.0000	0.0050	2.00
	0.8674	0.864	0.0034	0.0059	2.00
313	0.0000	0.000	0.0000	0.0050	2.00
	0.2919	0.293	-0.0011	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

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794-904-02 R01 1/11/2021

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REPORT OF CALIBRATION

Certificate No. : SP25-024 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	0.574	0.0040	0.0031	2.00
	1.0484	1.044	0.0044	0.0029	2.00
	2.1876	2.185	0.0026	0.0075	2.00
440	0.0000	0.000	0.0000	0.0028	2.00
	0.5595	0.558	0.0015	0.0035	2.00
	1.0239	1.021	0.0029	0.0035	2.00
	2.1230	2.122	0.0010	0.0079	2.00
465	0.0000	0.000	0.0000	0.0028	2.00
	0.5230	0.519	0.0040	0.0030	2.00
	0.9633	0.961	0.0023	0.0029	2.00
	1.9753	1.975	0.0003	0.0071	2.00
546.1	0.0000	0.000	0.0000	0.0028	2.00
	0.5181	0.515	0.0031	0.0032	2.00
	1.0002	0.996	0.0042	0.0033	2.00
	1.9973	1.994	0.0033	0.0084	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	0.0030	2.00
	2.0373	2.031	0.0063	0.0082	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	0.0030	2.00
	1.9274	1.924	0.0034	0.0081	2.00

เอกสารไม่ควบคุม
794-904-02 R01 1/11/2021

DQE Services Co., Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230
Phone : +66 (0)2 536 2054, Email : dgeserviceinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP25-024 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
Absorbance Standard set	25760	115663	25 October 2025
Absorbance Standard set	25757	115638	25 October 2025
Wavelength Standard set	25806	115657	25 October 2025
Wavelength Standard set	25758	115665	25 October 2025

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

Spectral Band Width of UUC : 5.0 nm.
Scan Speed of UUC : 40
Scan Interval of UUC : 0.1 nm.
Resolution of UUC : Photometric 0.001 Abs.
Wavelength 0.1 nm.

เอกสารไม่ควบคุม
794-904-02 R01 1/11/2021

DQE Services Co., Ltd.
32 Soi Ladprao-Wangthong 55, Ladprao-Wangthong Rd., Ladprao, Bangkok 10250
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

CERTIFICATE OF CALIBRATION

Certificate No. : SP25-024 Page 1 of 5

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

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

Location of calibration : Instrument room (207)

Equipment : UV-Vis Spectrophotometer

Manufacturer : HITACHI

Model : U-5100

Serial No. : 23A4-008

ID No. : UAE.WAS.010/2567

Received Date : 17 June 2025

Calibration Date : 17 June 2025

Issue Date : 20 June 2025

Condition Instrument : Good

Calibrated by : ณัฐพงศ์ Approved by : ชลจิษฐ์
(Mr. Tanawat Bhandach) (Ms. Chonjithe Sangsarn)
Technical Manager Quality Manager

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

The manufacturer's responsibility of the laboratory and its capability to recognize national standards and to the unit of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced otherwise in full except with the prior written approval of the DQE Services Co., Ltd.

เอกสารไม่ควบคุม

FSM-708-02-R01 (1/1/2021)

DQE Services Co., Ltd.
32 Soi Ladprao-Wangthong 55, Ladprao-Wangthong Rd., Ladprao, Bangkok 10250
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP26-012 Page 5 of 5

Wavelength Accuracy :

CRM's Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor k
241.72	241.3	0.42	0.18	2.00
279.45	279.0	0.45	0.18	2.00
287.81	287.4	0.41	0.18	2.00
334.06	333.8	0.26	0.18	2.00
360.93	360.5	0.43	0.18	2.00
418.59	418.0	0.59	0.18	2.00
445.94	445.5	0.44	0.18	2.00
453.66	453.5	0.16	0.18	2.00
460.02	459.5	0.52	0.18	2.00
536.39	536.5	0.09	0.18	2.00
637.98	638.0	-0.02	0.18	2.00
431.38	431.0	0.38	0.18	2.00
472.50	472.5	0.00	0.18	2.00
513.47	513.3	0.17	0.18	2.00
528.86	528.5	0.38	0.18	2.00
573.17	573.0	0.17	0.18	2.00
585.35	585.0	0.35	0.20	2.00
684.40	684.0	0.40	0.19	2.00
740.72	740.5	0.22	0.20	2.00
748.55	748.3	0.05	0.18	2.00
807.03	807.0	0.03	0.18	2.00
879.28	879.3	-0.02	0.18	2.00

Remark : - UUC = Unit Under Calibration
- N/A = Not Available
- The stated expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k.
- When the normal distribution corresponds to a coverage probability of approximately 95%
- * Indicates not TSI accredited

- End of Certificate -

เอกสารไม่ควบคุม

FSM-708-02-R01 (1/1/2021)

DQE Services Co., Ltd.
32 Soi Ladprao-Wangthong 55, Ladprao-Wangthong Rd., Ladprao, Bangkok 10250
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP26-012 Page 4 of 5

Photometric Accuracy :

Wavelength (nm.)	CRM's Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
235	0.0000	0.000	0.0000	0.0050	2.00
	0.7455	0.742	0.0035	0.0056	2.00
257	0.0000	0.000	0.0000	0.0050	2.00
	0.8656	0.860	0.0056	0.0059	2.00
313	0.0000	0.000	0.0000	0.0050	2.00
	0.2910	0.288	0.0030	0.0051	2.00
350	0.0000	0.000	0.0000	0.0050	2.00
	0.6414	0.635	0.0064	0.0055	2.00

เอกสารไม่ควบคุม

FSM-708-02-R01 (1/1/2021)

DQE Services Co., Ltd.
32 Soi Ladprao-Wangthong 55, Ladprao-Wangthong Rd., Ladprao, Bangkok 10250
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP26-012 Page 3 of 5

Calibration Results : Without adjustment

Photometric Accuracy :

Wavelength (nm.)	CRM's Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
420	0.0000	0.000	0.0000	0.0028	2.00
	0.5772	0.575	0.0022	0.0031	2.00
	1.0478	1.043	0.0048	0.0029	2.00
	2.1879	2.197	-0.0091	0.0075	2.00
440	0.0000	0.000	0.0000	0.0028	2.00
	0.5581	0.558	0.0001	0.0034	2.00
	1.0224	1.022	0.0004	0.0035	2.00
	2.1227	2.131	-0.0083	0.0079	2.00
465	0.0000	0.000	0.0000	0.0028	2.00
	0.5225	0.518	0.0045	0.0029	2.00
	0.9628	0.961	0.0018	0.0028	2.00
	1.9744	1.981	-0.0066	0.0070	2.00
546.1	0.0000	0.000	0.0000	0.0028	2.00
	0.5174	0.515	0.0024	0.0031	2.00
	0.9990	0.997	0.0020	0.0033	2.00
	1.9953	1.995	0.0003	0.0084	2.00
590	0.0000	0.000	0.0000	0.0028	2.00
	0.5508	0.549	0.0018	0.0030	2.00
	1.0801	1.079	0.0011	0.0029	2.00
	2.0356	2.036	-0.0004	0.0079	2.00
635	0.0000	0.000	0.0000	0.0028	2.00
	0.5579	0.558	-0.0001	0.0031	2.00
	1.0512	1.050	0.0012	0.0029	2.00
	1.9257	1.928	-0.0023	0.0079	2.00

เอกสารไม่ควบคุม

FSM-708-02-R01 (1/1/2021)

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

REPORT OF CALIBRATION

Certificate No. : SP26-012 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
Absorbance Standard set	25760	136858	5 November 2027
Absorbance Standard set	25757	136848	5 November 2027
Wavelength Standard set	25806	136824	5 November 2027
Wavelength Standard set	25758	136827	5 November 2027

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

PM-704-02 001 1/1/2021

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

CERTIFICATE OF CALIBRATION

Certificate No. : SP26-012 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 : Instrument room (207)

Equipment : UV-Vis Spectrophotometer

Manufacturer : HITACHI

Model : U-2900

Serial No. : 21E22-009

ID No. : UAE.WAT.051/2564

Received Date : 18 May 2026

Calibration Date : 18 May 2026

Issue Date : 21 May 2026

Condition Instrument : Good

Calibrated by : ณัฐ (Mr.Patit Mahavorn) Calibration Engineer
Approved by : ฉัตรจิรา (Ms.Chanichsa Sangsuan) Quality Manager

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

The measurement capability of the laboratory and its traceability to recognized national standards and to the unit of measurement, attested at the corresponding national standards laboratory. This certificate may not be reproduced without prior in full except with the prior written approval of the DQE Services Co., Ltd.

เอกสารไม่ควบคุม

PM-704-02 001 1/1/2021

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

REPORT OF CALIBRATION

Certificate No. : SP25-021 Page 5 of 5

Wavelength Accuracy :

CRM's Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor k
241.72	241.0	0.72	0.18	2.00
279.45	278.8	0.65	0.18	2.00
287.81	287.2	0.61	0.18	2.00
334.06	333.6	0.46	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	445.6	0.34	0.18	2.00
460.02	459.8	0.22	0.18	2.00
516.59	516.6	-0.01	0.18	2.00
637.98	638.0	-0.02	0.18	2.00
431.38	431.2	0.18	0.18	2.00
472.50	472.4	0.10	0.18	2.00
513.47	513.4	0.07	0.18	2.00
528.88	528.8	0.08	0.18	2.00
573.17	573.2	-0.03	0.18	2.00
585.35	585.0	0.35	0.20	2.00
684.40	684.4	0.00	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	807.2	-0.17	0.18	2.00
879.28	879.6	-0.32	0.18	2.00

Remark : - UUC = Ultraviolet Calibration

- N/A = Not Available

- The stated expanded uncertainty of measurement U is stated at the standard uncertainty u/coverage factor k multiplied by the coverage factor k.

which for a normal distribution corresponds to a coverage probability of approximately 95%.

- End of Certificate -

เอกสารไม่ควบคุม

PM-704-02 001 1/1/2021

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

REPORT OF CALIBRATION

Certificate No. : SP25-021 Page 4 of 5

Photometric Accuracy :

Wavelength (nm.)	CRM's 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	0.748	-0.0011	0.0057	2.00
257	0.0000	0.000	0.0000	0.0050	2.00
	0.8674	0.866	0.0014	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	0.640	0.0030	0.0055	2.00

เอกสารไม่ควบคุม

PM-704-02 001 1/1/2021

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

REPORT OF CALIBRATION

Certificate No.: SP25-021 Page 3 of 5

Calibration Results: Without adjustment

Photometric Accuracy:

Wavelength (nm.)	CRAs 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	0.574	0.0040	0.0031	2.00
	1.0484	1.043	0.0054	0.0029	2.00
	2.1876	2.185	0.0026	0.0075	2.00
440	0.0000	0.000	0.0000	0.0028	2.00
	0.5595	0.558	0.0015	0.0034	2.00
	1.0239	1.022	0.0019	0.0035	2.00
	2.1230	2.123	0.0020	0.0079	2.00
465	0.0000	0.000	0.0000	0.0028	2.00
	0.5230	0.519	0.0040	0.0030	2.00
	0.9633	0.960	0.0033	0.0029	2.00
	1.9753	1.973	0.0023	0.0070	2.00
546.1	0.0000	0.000	0.0000	0.0028	2.00
	0.5181	0.516	0.0021	0.0031	2.00
	1.0002	0.998	0.0022	0.0033	2.00
	1.9973	1.995	0.0023	0.0084	2.00
590	0.0000	0.000	0.0000	0.0028	2.00
	0.5517	0.550	0.0017	0.0030	2.00
	1.0803	1.080	0.0003	0.0030	2.00
	2.0373	2.036	0.0013	0.0079	2.00
635	0.0000	0.000	0.0000	0.0028	2.00
	0.5591	0.558	0.0011	0.0031	2.00
	1.0518	1.051	0.0008	0.0030	2.00
	1.9274	1.926	0.0014	0.0079	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 : dqeserviceinfo@gmail.com

REPORT OF CALIBRATION

Certificate No.: SP25-021 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
Absorbance Standard set	25760	115663	25 October 2025
Absorbance Standard set	25757	115638	25 October 2025
Wavelength Standard set	25806	115657	25 October 2025
Wavelength Standard set	25758	115665	25 October 2025

Traceability: This certification is traceable to the International System of Unit maintained at National Institute of Standards and Technology (NIST) through Sigma 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.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeserviceinfo@gmail.com

CERTIFICATE OF CALIBRATION

Certificate No.: SP25-021 Page 1 of 5

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

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

Location of calibration: Instrument room (207)

Equipment: UV-Vis Spectrophotometer

Manufacturer: HITACHI

Model: U-2900

Serial No.: 21E22-009

ID No.: UAB.WAT.03/2564

Received Date: 26 May 2025

Calibration Date: 26 May 2025

Issue Date: 29 May 2025

Condition Instrument: Good

Calibrated by: [Signature] Approved by: [Signature]

(Mr. Tanawat Ritthach) (Ms. Chonticha Sangsom)

Technical Manager Quality Manager

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

The measurement capability of the laboratory and its capability to recognize national standards and to the unit of measurement, verified 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.

เอกสารไม่ควบคุม

Calibration Results

Function: pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4.7, 7.0)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (k)	Coverage factor k
pH Electrode S/N: 09AA0008	4.007	4.01	180.4	0.0086	2.00
	7.000	7.00	-13.5	0.0095	2.00
	7.000	7.01	-12.6	0.0086	2.00
	10.010	10.00	-186.0	0.0092	2.00

Function: Temperature Measurement

(°C) Without adjustment

This equipment was connected with Temperature Probe:

- Model: 6652-100

- Serial No.: 09AA0008

Dimension of probe

- Length: 103 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



Cert.No.: 25CH568
Page.: 2 of 3

Condition of this 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	4862054	110RC044	24I767	14 July 2025

- This measurement result 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-RM-15184-01-00
:The measurement results are traceable to SI through CPA chem Ltd.,
ANAS-ASQ National Accreditation Board, Accredited No. AN-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.007	CPA chem	1068885	18 Jan 2027
pH 7.000	Hach Lange GmbH	C03232	02 Dec 2026
pH 10.010	CPA chem	1068559	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 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 S/N: HA00082	4.00	177.48	177.3	4.01	0.058	2.00
	7.00	0.00	0.0	7.00	0.058	2.00
	7.00	0.00	0.0	7.00	0.058	2.00
	10.00	-177.48	-177.3	10.01	0.058	2.00

เอกสารไม่ควบคุม



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATANAKARNI ROAD SOI 18, SUKHUMVIT, SUKHUMVIT BANGKOK 10260
TEL:0-2717-3000-79 FAX:0-2719-9484

HAQ-MRA



Certificate of Calibration

Cert.No.: 25CH568
Page.: 1 of 3

Equipment: pH Meter
Manufacturer: Horiba
Model: LAQUA-PH210
Serial No.: HA00082
ID No.: UAE EFM.072/2584 (EFM pH.05/84)
Condition As-Received: Used Item
Received Date: 20 May 2025
Calibration Date: 21 May 2025
Reference: 2505-0602WSQ-3
Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
3 Sol Udomsuk 41, Sukhumvit Road, Bangkok,
Phra Khanong, Bangkok 10260

Ambient Temperature: (25 ± 2.5) °C
Relative Humidity: (50 ± 15) %
Calibration Procedure: In-house method;
- GP-CH5 by direct measurement with DG voltage standard and direct measurement with certified reference material (CRM)
- GP-CH6 by comparison with temperature standard

Calibrated by: Watsak Sinihaen

Approved by:

Approved Signatory

() Chakrit Waeuwajua
() Ponpan Palpin
(x) Sathip Meangmal

Issue Date:

23 May 2025

The uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced (copied) in full, except with the prior written approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

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Cert.No.: 26CH231
Page.: 3 of 3

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 (pH)	Coverage factor k
pH Electrode S/N: -	4.008	4.01	161.1	0.0079	2.00
	7.000	7.00	-10.4	0.0098	2.00
	7.000	7.00	-9.9	0.0065	2.00
	10.010	10.02	-177.9	0.0085	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model: -

- Serial No.: -

Dimension of probe

- Length: 103 mm.

- Diameter: 15 mm.

- Immersion Depth: 90 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
15.0	15.001	15.0	-0.001	0.13	2.00
30.0	30.001	30.0	-0.001	0.13	2.00
45.0	45.001	44.9	-0.101	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 %.

-08-



Cert.No.: 26CH231
Page.: 2 of 3

Condition of this calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	25E2743	25 Aug 2026
2) Ref. Standard Thermometer	4862054	110RC044	25I768	03 July 2026

- This measurement result 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-RM-16194-01-00
:The measurement results are traceable to SI through CPA chem Ltd.,
ANAS-ASQ National Accreditation Board, Accredited No. AN-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	1187328	18 Jan 2028
pH 7.000	Hach Lange GmbH	C03319	17 Oct 2027
pH 10.010	CPA chem	1187332	18 Jan 2027

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 S/N: HA00047	4.00	177.48	177.3	4.01	0.058	2.00
	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	-177.48	-177.2	10.01	0.058	2.00

Calibration Report

Certificate No.: 2502229-001-01
Equipment: CHAMBER (Incubator)
Model: IPP 250 Serial No.: V615.0187
Resolution: 0.1 °C ID No.: UAE.MIC.003/2559
Manufacturer: NEMMET

Date of Calibration: 19 March 2025
Calibration point: 35.0 °C

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Vol)
MIN	15.5	28	220.0
MAX	17.1	35	225.0

Calibration point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No. 9 is REF)									Uncertainty ± (°C)
	#1	#2	#3	#4	#5	#6	#7	#8	#9	
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 ¹ Setting (°C)	UUC ¹ Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
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)"

UUC¹ = 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 %.

F-C5-012 Revision: 01 Date: 23-04-65

Calibration Report

Certificate No.: 2502229-001-01
Equipment: CHAMBER (Incubator)
Model: IPP 250 Serial No.: V615.0187
Resolution: 0.1 °C ID No.: UAE.MIC.003/2559
Manufacturer: NEMMET

Date of Calibration: 19 March 2025

Location: LABORATORY, UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Environment Condition: Ambient Temperature (16.2 ± 1) °C
Relative Humidity (32 ± 4) %
Line Voltage (223 ± 3) Vol

Condition of this results of Calibration:

- This instrument was calibrated by insert 9 standard thermometer into its chamber and calibration according to WITE-014 based on TIAS G-20-L92-08 (E); Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
- The temperature scale used was based on ITS-90.
- All data shown 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	24022A	WY49016653	TE 670473-01	4 May 2025	NATIONAL FOOD INSTITUTE
	RTD	Class 1A-30V RTD 100-100			

3. This certificate is traceable to International System of Units (SI Units).

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.

6. Condition of Calibrated Item: Good

UUC Description:

Time of Record: L Hour 9 Minute At 35.0 °C

Fresh air Damper: ☒ L Open ☐ R Close ☐ Fan ☐ Not Available

7. Result of Calibration: ☒ X Without adjustment ☐ After adjustment

F-C5-012 Revision: 01 Date: 26-04-65

Calibration Certificate

Certificate No.: 2502229-001-01
Client name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Soi Udomauk 41, Sukhumvit Road, Bangkok, Prakhonong, Bangkok 10269

Page 1 of 3

Equipment: CHAMBER (Incubator)

Manufacturer: NEMMET

Model: IPP 250

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. Jeevan Prapawongpang Scientist
Approved by: P. Janghachit (Mr. Prapawongpang) Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 19 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-C5-009 Revision: 01 Date: 23-04-65

Calibration Certificate

Certificate No.: 2502229-001-01
Page: 2 of 3

Calibration Condition:

Equipment: CHAMBER Incubation
UUC¹ Resolution: 0.1 °C
Condition of the Item: Normal & Good
W/ Input Equipment: As Found
Time of record: 1 hour 9 minute / good

Place of Calibration: Udon Thani Laboratory (U21)

UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.

Environment Condition: Ambient Temperature (23.5 ± 1) °C

Relative Humidity (59 ± 3) %

Line Voltage (221 ± 3) Vol

Calibration Results:

Table 1: Reporting of Temperature

Calibration Point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No. 9 is REF)									Measurement Uncertainty ± (°C)
	Std.1	Std.2	Std.3	Std.4	Std.5	Std.6	Std.7	Std.8	Std.9	
41.5	41.81	41.86	41.89	41.70	40.96	41.18	41.12	41.32	41.30	0.20

Table 2: Reporting of Characterization Results

UUC ¹ Setting (°C)	UUC ¹ Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	Max	Min	Average			
41.5	41.8	40.8	41.6	0.06	0.52	0.56

Note:

- UUC¹ = Unit Under Calibration

- The quoted uncertainty includes contributions from Stability and Loading Effect (20% of Temperature Uniformity).

- 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.

For more information, details of the sensor calibration should be reported

From: To: Sensor	Sensor	
	From	To
1	2	3
4	5	6
7	8	9
10	11	12
13	14	15
16	17	18
19	20	21
22	23	24
25	26	27
28	29	30
31	32	33
34	35	36
37	38	39
40	41	42
43	44	45
46	47	48
49	50	51
52	53	54
55	56	57
58	59	60
61	62	63
64	65	66
67	68	69
70	71	72
73	74	75
76	77	78
79	80	81
82	83	84
85	86	87
88	89	90
91	92	93
94	95	96
97	98	99
100	101	102

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

F-C5-009 Revision: 01 Date: 23-04-65



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



Calibration Certificate

Certificate No.: 2502229-004-01
Page: 1 of 2

Equipment: CHAMBER (Incubator)
Manufacturer: NEMERT
Model: IN75
Serial No.: D317.0305
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

Customer Name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Soisamnuvit 41 Sukhumvit Road
Bangchak, Prakhong, Bangkok 10260

Metological (traceability)

1. Calibration Method:

- This instrument was calibrated by inserting 9 standard thermometers into its chamber, in accordance with WITE-014, based on TLAS G-20-1/02-08 (E) Guidelines for Calibration and Checks of Temperature Controlled Enclosures
- The temperature scale used in this laboratory is the International Temperature Scale of 1990 (ITS-90)
- All data shown below are final values, and the initial data may be obtained upon request.

2. Reference Standard Instrument:

Instrument	Model/Type	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	3992A	HYSP005188	TE 670485-01	10 January 2027	NATIONAL FOOD INSTITUTE
	RTD	CHALON 3992 IMPROVED 100			

3. This certificate is traceable to the International System of Units (SI).

4. This certificate is valid only for the instrument that was calibrated.

5. The result of this calibration was found to be accurate only on the date and at the place of calibration shown.

Calibrated by: Mr. Manas Saman

Approved by:

(Mr. Phraphat Tungsri)
Manager, Division of Calibration Laboratory

Date of Issue: 19 March 2025

Responsible for the Technical Management Team

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-05-009 Revision 01 Date: 20-04-05



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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.: D317.0305
Resolution: 0.1 °C
ID No.: UAE.MIC.022/2561
Manufacturer: NEMERT

Date of Calibration: 20 March 2025
Page 2 of 3

Calibration point: 41.5 °C

Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volts)
NOM	28.6	58	220.0
MAX	28.9	59	225.0



Table 1: 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	
41.5	41.50	41.39	41.45	41.40	41.69	41.35	41.29	41.52	41.34	0.27

Table 2: Reporting of Characterization Result

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

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 sensor, 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 be observed at the same time.

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

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

----- End -----

F-05-009 Revision 01 Date: 20-04-05



ศูนย์ทดสอบมาตรฐานผลิตภัณฑ์อุตสาหกรรม
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.: D317.0305
Resolution: 0.1 °C
ID No.: UAE.MIC.022/2561
Manufacturer: NEMERT

Date of Calibration: 20 March 2025
Page 2 of 3

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

Environment Condition:
Ambient Temperature (28.8 ± 1) °C
Relative Humidity (59 ± 3) %
Line Voltage (223 ± 3) Volt

Condition of this results of Calibration:

- This instrument was calibrated by insert 9 standard thermometer into its chamber and calibration according to WITE-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 shown 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	3992A	HYSP005188	TE 670485-01	8 June 2025	NATIONAL FOOD INSTITUTE
	RTD	CHALON 3992 IMPROVED 100			

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: 5 Hour 9 Minute At 41.5 °C
Fresh Air Damper: - Open Position: -
- X Close Fan 100%
- Not Available

7. Result of Calibration: ☒ Without adjustment ☐ After adjustment

F-05-009 Revision 01 Date: 20-04-05



ศูนย์ทดสอบมาตรฐานผลิตภัณฑ์อุตสาหกรรม
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: 3 Soisamnuvit 41, Sukhumvit Road,
Bangchak, Prakhong, Bangkok 10260

Page 3 of 3

Equipment: CHAMBER (Incubator)

Manufacturer: NEMERT

Model: IN75

Serial No.: D317.0305

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. Toshiro Chaisriksak

Approved by:

(Mr. Phraphat Tungsri) (for)

Date of Issue: 25 March 2025

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

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

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

F-05-009 Revision 01 Date: 20-04-05

Calibration Certificate

Certificate No.: 2502259-006-01
Page : 2 of 2

Calibration Condition:

Equipment: CHAMBER (Incubator)
UUC Reading: 35.0 °C
Condition of item: Normal & Good
Time of record: 1 hour / 10 minute / point
Place of Calibration: Microtech Laboratory
UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Environment Conditions: Ambient Temperature: (17.2 ± 1) °C
Relative Humidity: (51.4 ± 4.1) %
Line Voltage: (220 ± 2) V

Calibration Results:

Table 1 : Reporting of Temperature

Calibration point (°C)	Std.#1	Std.#2	Std.#3	Std.#4	Std.#5	Std.#6	Std.#7	Std.#8	Std.#9	Std.#10	Uncertainty (°C)
35.0	34.78	34.88	34.81	34.93	35.27	35.71	35.77	35.17	34.83		0.28

Table 2 : Reporting of Characterization Results

UUC Setting (°C)	Max	UUC Reading (°C)	Min	Average	Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
35.0	35.0	35.0	35.0	35.0	0.034	0.21	0.32

Note:

- UUC* = Unit Under Calibration
- The quoted uncertainty includes contributions from both the Loading Effect (20% of Temperature Uniformity)
- 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, for measured temperatures 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

For more information, details of the sensor calibration should be reported



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

End of Report

F-ES-002 Revised 02/2020 01/10/25

Calibration Certificate

Certificate No.: 2502259-006-01
Page : 1 of 2

Equipment: CHAMBER (Incubator)
Manufacturer: BINDER
Model: KB 400
Serial No.: 2020000015535
ID No.: UAE.MIC.016/2554
Date of Receipt: 11 March 2025
Date of Calibration: 11 March 2025
Customer Name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Soi Luang 11, Sanamwong Road,
Bangkok, Pathumwan, Bangkok 10330

Metrological traceability:

- Calibration Method:
 - This instrument was calibrated by inserting 13 standard thermometers into its chamber. In accordance with WTE-014 based on TLAS G-20-1102-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
 - The temperature scale used in this laboratory is the International Temperature Scale of 1999 (ITS-99).
 - All data shown below are final values, and the initial data may be obtained upon request.
- Reference Standard Instrument:

Instrument	Model/Type	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	DIGI73A RTD	MY9920001	2502259-001-01	25 March 2025	NATIONAL FOOD INSTITUTE

- This certificate is traceable to International System of Units (SI Units)
- This certificate is valid only for the instrument that was calibrated
- The result of this calibration was found to be accurate within the date and at the place of calibration shown.

Calibrated by: Mrakapol Niyomchat
Specialist

Approved by: (Mr) Phrasakhet Tuenjit
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 19 March 2025

This Certificate is drawn in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation system which has assured the measurement capability of the laboratory and its conformity to international standards, and to the units of measurement required at the corresponding metrology standards hierarchy. This certificate may not be reproduced other than in full without the approval of the National Food Institute.

F-ES-002 Revised 02/2020 01/10/25

Calibration Report

Certificate No.: 2502259-006-01

Equipment: CHAMBER (Incubator)
Model: KB 400
Resolution: 0.1 °C
ID No.: UAE.MIC.016/2554
Manufacturer: BINDER
Date of Calibration: 19 March 2025

Page 2 of 3

Calibration point: 35.0 °C

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (VAC)
MIN	17.1	45	220.0
MAX	28.1	55	225.0

Table 1 : Reporting of Temperature

Calibration point (°C)	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Uncertainty ± (°C)
35.0	34.98	35.17	34.96	34.97	35.18	35.01	35.00	35.13	35.00	34.96	35.02	35.17	35.04	0.27

Table 2 : Reporting of Characterization Result

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

Note:

- The quoted uncertainty include " Stability " and " Loading Effect (20% of Temp Uniformity) "
- UUC* = Unit Under Calibration
- Stability = One half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state
- Uniformity = The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time
- Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time
- The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k = 2, providing a level of confidence of approximately 95 %.

End

F-ES-002 Revised 01/2020 01/10/25

Calibration Report

Certificate No.: 2502259-006-01

Equipment: CHAMBER (Incubator)
Model: KB 400
Resolution: 0.1 °C
ID No.: UAE.MIC.016/2554
Manufacturer: BINDER
Date of Calibration: 19 March 2025

Page 2 of 3

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

Environment Conditions: Ambient Temperature: (18 ± 1) °C
Relative Humidity: (50 ± 5) %
Line Voltage: (223 ± 3) VAC

Condition of this results of Calibration:

- This instrument was calibrated by insert 13 standard thermometer into its chamber and calibration according to WTE-014 based on TLAS G-20-1102-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
- The temperature scale used was based on ITS-90
- All data shown below were final values and the initial data may be obtained upon request.

Reference Standard Instrument:

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A RTD	MY945016551	TE-62/047-01	4 May 2025	NATIONAL FOOD INSTITUTE

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

UUC Description:
Time of Record: 1 Hour 9 Minute At: 35.0 °C
Fresh air Damper: ☒ Open Position ☐ Close ☐ Fan ☐ Not Available
7. Result of Calibration: ☒ Without adjustment ☐ After adjustment

F-ES-002 Revised 01/2020 01/10/25



FOUNDATION FOR INDUSTRIAL DEVELOPMENT
มูลนิธิส่งเสริมอุตสาหกรรม
National Institute
Food Industrial Laboratory Service Center



Calibration Certificate

Certificate No: 2609149-001-01
Page: 1 of 2

Equipment: CHAMBER (Hot Air Oven)
Manufacturer: MEMMERT
Model: UF95
Serial No.: 8918 1666
ID No.: UAE.WAO.0210259
Order No.: 260109
Operation No.: 200149-001
Date of Receipt: 7 October 2025
Date of Calibration: 7 October 2025

Customer Name: UNITED ANALYST AND ENGINEERING CONSULTANT CO. LTD.
Address: 150 Uthairat Rd., Sukhumvit Road,
Bangkok, Phra Prung, Bangkok 10260

Method of Calibration:

1. Calibration Method:

- The instrument was calibrated by inserting 6 standard thermometers into its chamber in accordance with W.T.E.014, based on TIAS G-20-162-01 (E). Guidelines for Calibration and Checks of Temperature Controlled Environments
- The temperature scale used in this laboratory is the International Temperature Scale of 1990 (ITS-90).
- All data shown below are final values, and the final data may be obtained upon request.

2. Reference Standard Instrument:

Instrument	Model/Type	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	24972A RTD	MY5700318	2603176-002-01	2 June 2020	NATIONAL FOOD INSTITUTE

3. This certificate is traceable to the International System of Units (SI).

4. This certificate is valid only for the instrument that was calibrated.

5. The result of this calibration was found to be accurate only on the date and at the place of calibration shown.

Calibrated by: Mr. Nithin Charnonuek
Scientist

Approved by:

(Mr. Phetphat Tungsri)
Manager, Division of Calibration Laboratory

Date of Issue: 14 October 2025

Responsible for the Technical Management Team

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.

FOSS Calibration: 02 Dec 01-10-08

FOSS

Customer Service Report

FOSS South East Asia
338 Srinakharinwirot Building, 25th - 26th Floor, Unit No. 3388/30,
Rama IV Road, Bangkok, Bangkok, Thailand 10310

Report No.: 15257

Customer: JAE

Address: Bangkok

Serial: 01905060

Date: Feb 12, 2026

Job No.: 14510

Instrument: DT2620

Start: Travel To Customer (Mrs)
Finish: -

Labour (Mrs)
9.30 - 12.00
1.5

Travel From Customer (Mrs)
-

Job Type					
Application	Special	Installation	Standard	In House	PM
Distributor	Courtesy Visit	Calibrate	Repair	HC Visit	Others
Digital Service	PMMA Approval Check	Investigate			
Internal	Warranty				
Training	Sales Support				

PMA Type	Smartcare	Smartcare Pro	Fosscore
	Smartcare Advance	Fosscore Pro	N/A

Details of Work / Test			
- 01H	- 01H	- 01H	- 01H
- Visual Check	- No Test	- No Test	- No Test
- No Test	- No Test	- No Test	- No Test
- No Test	- No Test	- No Test	- No Test
- Change for test x 1 Set	- 01H	- 01H	- 01H
- Function Check	- 01H	- 01H	- 01H
- Quick work	- 01H	- 01H	- 01H
- 1st Temp / Power	- 01H	- 01H	- 01H
- 1st Run	- 01H	- 01H	- 01H
- 1st Test	- 01H	- 01H	- 01H
- 1st Up/Down	- 01H	- 01H	- 01H
- Check for Wares with Quick Work	- 01H	- 01H	- 01H
Instrument Ready for Use	OK	OK	Not OK

Part No.	Batch	Description	Qty
60039333	59, 01, 1-2-24	For test with 10 g per 12 units	1

I confirm this report is accurate and complete			
Signed FOSS	Signed Customer	Signed Customer	Signed Customer
Name: Anna Nithin Charnonuek	Name: Nithin	Name: Nithin	Name: Nithin
Tel: -	Tel: -	Tel: -	Tel: -
Email: -	Email: -	Email: -	Email: -

*Remark:

FOSS Calibration: 02 Dec 01-10-08



Cert.No.: 26TW50
Page: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments:

This measurement result is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	ID No.	Certificate No.	Due Date
1. Burette	130BU10	25CG126	18 Mar 2027
2. Balance	110RC001	25M1018	02 July 2026

2. Standard Material :-

Material	Manufacturer	Lot No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAS	2203162417	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)
8.20	8.20	0.0084

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

-006-



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES : EQUIPMENT CALIBRATION AND TESTING SERVICES
3344 PATTANAKARN ROAD SOI 15, SUKUMVIT, SUKUMVIT BANGKOK 10260
TEL: 0-2717-3000 FAX: 0-2719-9464

Certificate of Testing

Cert.No.: 26TW50
Page: 1 of 2

Equipment: DO Meter
Manufacturer: YSI
Model: 5100
Serial No.: 11B 101803
ID No.: UAE.WAO.0042554
Received Date: 27 February 2025
Test Date: 02 March 2025
Reference: 2602-0916DSC-1
Submitted by: United Analyst and Engineering Consultant Co. Ltd
3 Sol Udomsuk #1, Sukhumvit Road, Bangkok,
Phrethong, Bangkok 10260

Laboratory Condition: Temperature (25 ± 5) °C
Humidity (50 ± 20) %
In-house method: GP-GHB
by Comparison Technique with Azide Modification Method

Test Procedure:

Tested by: Walak Siriboon

Approved by:

Sathip
Approved Signatory

() Chakrit Waeuwajua
() Ponpen Polpin
(✓) Sathip Maangmal

Issue Date: 03 March 2025

เทคโนโลยีการทดสอบ

เทคโนโลยีการทดสอบ



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	24MM1131	04 July 2025

2. Standard Material :-

Material	Manufacturer	Lot No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAS	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	0.0056

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

-000-

Calibration No.: 25TW29 Brand: YSI Serial No.: 11B 101863 Equipment: DO Meter Model: 5100 ID No.: UAE.WAO.004/2524					
Calibration results Titration Method Standard Deviation Reading Error % Corrected Total Error Adjustment (Total Error ± Adjustment) Result: 8.22 ± 0.0056 8.22 ± 0.0056 0.0056 0.0056 0.0 0.02 0.02					

เอกสารไม่ควบคุม

14/2/2025 08:15:00:44:33



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES
314/4 PATTANAKARN ROAD 501 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2711-3000 FAX. 0-2713-0434

Certificate of Testing

Cert.No.: 25TW20
Page.: 1 of 2

Equipment: DO Meter
Manufacturer: YSI
Model: 5100
Serial No.: 11B 101863
ID No.: UAE.WAO.004/2524
Received Date: 14 February 2025
Test Date: 17 February 2025
Reference: 2502-0473DSC-1
Submitted by: United Analyst and Engineering Consultant Co., Ltd.
9 Sol Udomaek 41, Sukhumvit Road, Bangkok, Phrakhanong, Bangkok 10260
Laboratory Condition: Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure: In-house method : GP-QH9
by Comparison Technique with Azide Modification Method
Tested by: Walelek Skitnean
Approved by:
Approved Signatory
() Chakrit Wornwanjua
() Ponpan Palpin
(✓) Sathip Meengmal
Issue Date: 18 February 2025

เอกสารไม่ควบคุม



Condition of this result:

Product name: Cyanuric Acid
Product code: HI97722-31 Lot number: SC0221/26
Best used before: May 2028
Standard Cuvettes specifications @ 25°C:

Standard cuvette code	Lot number	Standard value (mg/L)	Lot standard deviation (mg/L)
A ZERO	9661	0	0.002
HI97722B	9432	20	0.104

Specifications for validation procedure:

Standard cuvette	Lot number	Validation standard value (mg/L)	Lot acceptable reading (mg/L)
HI97722B	9432	20 ± 1	19 to 21

Method: Adaptation of the turbidimetric method

Result:

Cyanuric Acid Standard (mg/L)	Reading (mg/L)	Error (mg/L)
0	0	0
20 ± 1	20	0

** End of certificate **

เอกสารไม่ควบคุม

CERTIFICATE OF ANALYSIS

Equipment : Cyanuric Acid Portable Photometer
 Meter Model : HI97722C Serial No. : 905060058111
 Manufacturer : Hanna Instruments
 Made in : Romania
 Condition As-Received : Used Product
 Reference : RE260497
 Customer name : United Analyst and Engineering Consultant Co., Ltd.
 3 Soi Udomsuk 41, Sukhumvit Rd., Bangkok
 Phrakhanong, Bangkok 10260
 Received date : 12 March 2026
 Calibrate date : 17 March 2026
 Issue date : 18 March 2026
 Ambient Temperature : (25 ± 2)°C
 Relative Humidity : (50 ± 15) %RH
 Calibrated Location : Hanna Instruments (Thailand) Ltd.

Calibrated by : Mr. Pichit Potthong

Approved by :

(Mr. Anan Suwanchaisakul)

Authorized Signatory



This certificate was certified only for the instrument we calibrated. This result of calibration was found accurate on date and place of calibration only.
 This certificate may not be reproduced other than in full, except with the prior written approval of the head of Hanna Instrument (Thailand) Ltd.

เอกสารไม่ควบคุม

Form EP 01/0002

Condition of this result of analysis

Cal Check Standard Cuvettes Specifications :

Product code: HI97722-11 Lot number: SC0391/24

Standard cuvette	Standard Value (mg/L)	Lot Standard Deviation (mg/L)	Lot number	Best used before
A, ZERO	0	0.001	8366	April 2026
B, HI97722	20	0.207	7872	April 2026

Specifications for validation procedure:

Standard cuvette	Standard Value (mg/L)	Lot Standard Deviation (mg/L)	Lot number	Best used before
B, HI97722	20 ± 1	19 to 21	7872	April 2026

Method of Standardization

This quality is standardized using which is calibrated by adoption of Turbidimetric Method as the following details below :

Result of analysis:

Cyanuric Acid Standard (mg/L)	Reading (mg/L)	Error (mg/L)
0	0	0
20 ± 1	20	0

** End of certificate **

เอกสารไม่ควบคุม

CERTIFICATE OF ANALYSIS

Equipment : Cyanuric Acid Portable Photometer
 Meter Model : HI97722C Serial No. : 905060058111
 Manufacturer : Hanna Instruments
 Made in : Romania
 Condition As-Received : Used Product
 Reference : RE250509
 Customer name : United Analyst and Engineering Consultant Co., Ltd.
 3 Soi Udomsuk 41, Sukhumvit Rd., Bangkok
 Phrakhanong, Bangkok 10260
 Received date : 20 March 2025
 Calibrate date : 24 March 2025
 Issue date : 24 March 2025
 Ambient Temperature : (25 ± 2)°C
 Relative Humidity : (50 ± 15) %RH
 Calibrated Location : Hanna Instruments (Thailand) Ltd.

Calibrated by : ☒ Mr. Pichit Potthong

Approved by :

Mr. Anan Suwanchaisakul

Authorized Signatory



This certificate was certified only for the instrument we calibrated.

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

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

approval of the head of Hanna Instrument (Thailand) Ltd.

เอกสารไม่ควบคุม



Equipment : BOD Incubator
 Condition As-Received : Used Item
 Reference : 2507-014500-2
 Result of Calibration : (°) Without Adjustment
 Function of UUC* : Temperature Source
 Fresh air setting : Not Available

Cert. No.: 25TM1001

Page: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor
20.0	20.0	19.9	0.18	0.60	0.63	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (°C)
	1	2	3	4	5	6	7	8	9 (ref.)	
20.0	20.202	19.900	20.590	20.072	20.111	20.044	20.276	20.173	19.835	0.88

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 %.

-00-

เอกสารไม่ควบคุม



Equipment: BOD Incubator
Condition As-Received: Used Item
Reference: 2507-014BOD-2

Cert. No.: 25TM1001
Page: 2 of 3

Procedure Used :- Calibration were conducted using calibration procedure CP-0702 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 MY59003411 24LM192 TPA 24 Dec 2025

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

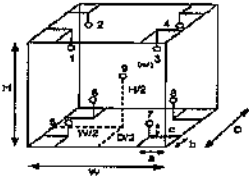
3. This measurement result is traceable to the International System of Unit maintained through:

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

Result of Calibration: () Without Adjustment

Function of UUC: Temperature Source

Fresh air setting: Not Available



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

Environment during calibration		
Parameter	Beginning	Finished
Temp. (°C)	28	28
REL Humid. (%)	54	57
AC Supply (Vok)	224	229

Position	Ref. Std. ID No.
1	25-20RTD-2/1
2	25-20RTD-2/2
3	25-20RTD-2/3
4	20RTD-2/4
5	20RTD-2/5
6	20RTD-2/6
7	20RTD-2/7
8	20RTD-2/8
9 (ref.)	20RTD-2/9

Certificate of Calibration

Cert. No.: 25TM1001
Page: 1 of 3

Equipment: BOD Incubator

Manufacturer: ARCO

Model: UG4-5320

Serial No.: -

ID No.: UAE.WAO.0182559

Submitted by: United Analyst and Engineering Consultant Co., Ltd.
3 Sol Udomsak 41, Sukhumvit Road,
Bangkok, Phrahanong,
Bangkok 10260

Location: Lab Floor 2

Received Order: 07 July 2025

Calibration Date: 07 July 2025

Ambient Temperature: (26 ± 10) °C

Relative Humidity: (50 ± 30) %

AC Line Voltage: (220 ± 22) V

Calibrated by: Man Pattanapongpalboon

Approved by:

() Chokit Weerawijus
() Ewitt Imjai
(✓) Kunchit Promrat

Issue Date: 17 July 2025

The Uncertainty is 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

เอกสารไม่ควบคุม

United Analyst and Engineering Consultant Co., Ltd.

3 Sol Udomsak 41, Sukhumvit Road, Bangkok, Phrahanong, Bangkok 10260

Tel: 0 2552 2528 Fax: 0 2552 2529 E-mail: uae@uaeconsultant.com



Certificate No: 25011-2-8-002-24

Code No: R.002-26

Page: 4 of 4

Equipment: Electronic Balance
Model: N5103DU
Serial No: 000901872
Max Capacity: 81 g / 220 g
Calibration Date: March 12, 2026

Calibration Result: (Continued)

Calibration Range: 0 to 220 g

Calibration Adjustment: Internal Calibration

3. Error of Indication from nominal or conventional mass values: (Range: 0 to 220 g; Resolution: 0.0001 g)					
Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor
Unloaded	0.0000000	0.0000	0.0000	0.02	2.75
50	50.0000730	50.0000	0.0000	0.16	2.00
100	100.0000730	100.0000	0.0000	0.16	2.00
110	110.0000756	110.0000	0.0000	0.17	2.00
120	120.0000189	120.0000	0.0000	0.18	2.00
130	130.0000160	130.0000	0.0000	0.20	2.00
140	140.0000769	140.0000	0.0000	0.21	2.00
150	150.0000790	150.0000	0.0000	0.21	2.00
160	160.0001120	160.0000	0.0000	0.23	2.00
170	170.0001050	170.0000	0.0000	0.24	2.00
200	200.0001430	200.0000	0.0000	0.29	2.00

4. Effect of Tare test			
Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	20.0000	0.0000
	40.000054	40.0000	-0.0001
	60.000070	60.0000	-0.0001
	80.000096	80.0000	-0.0001
	100.000142	100.0000	-0.0002

Remark:

The report, under the signature of the head of the laboratory, is a true and correct copy of the original report.

0-0-End-0-0-0

เอกสารไม่ควบคุม



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PRATIMAKHARN ROAD 501/18, SUKHUMVIT, SUKHUMVIT BANGKOK 10260
TEL: 02-271-3000-29 FAX: 02-271-3444



United Analyst and Engineering Consultant Co., Ltd.

3 Sol Udomsak 41, Sukhumvit Road, Bangkok, Phrahanong, Bangkok 10260

Tel: 0 2552 2528 Fax: 0 2552 2529 E-mail: uae@uaeconsultant.com



Certificate No: 25011-2-8-002-26

Code No: R.002-26

Page: 2 of 4

Equipment: Electronic Balance
Model: N5103DU
Serial No: 000901872
Max Capacity: 81 g / 220 g
Calibration Date: March 12, 2026

Calibration Result: (Continued)

Calibration Range: 0 to 80 g

Calibration Adjustment: Internal Calibration

3. Error of Indication from nominal or conventional mass values: (Range: 0 to 81 g; Resolution: 0.0001 g)					
Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor
Unloaded	0.0000000	0.0000	0.0000	0.015	2.75
0.001	0.0010026	0.0010	0.0000	0.015	2.75
0.005	0.0050025	0.0050	-0.00002	0.015	2.25
0.01	0.0100005	0.0100	-0.00002	0.015	2.25
0.05	0.0500003	0.0500	-0.00001	0.015	2.75
0.10	0.1000039	0.1000	-0.00001	0.015	2.25
0.50	0.5000121	0.5000	-0.00002	0.016	2.15
1	1.0000119	1.0000	-0.00002	0.016	2.12
2	2.0000123	2.0000	-0.00001	0.017	2.09
5	5.0000146	5.0000	-0.00002	0.020	2.03
10	10.000030	10.0000	-0.00002	0.023	2.00
20	20.000038	20.0000	-0.00005	0.033	2.00
50	50.000061	50.0000	-0.00004	0.053	2.00
100	100.000094	100.0000	-0.00004	0.093	2.00
50	50.000037	50.0000	-0.00005	0.054	2.00
60	60.000070	60.0000	-0.00004	0.081	2.00
80	80.000099	80.0000	-0.00003	0.11	2.00

0.04

เอกสารไม่ควบคุม



Certificate No: 260311-2-BL002-26

Code No: BL002-26
 Page: 2 of 4

Equipment: Electronic Balance
 Model: XSR205DU
 Serial No: C009071872
 Max. Capacity: 80 g / 220 g
 Calibration Date: March 12, 2026
 Condition of Equipment: In Good Condition

Condition of Equipment:
 1. Calibration Method: The balance was calibrated by comparison of mass
 2. Reference Standard: NIST SRM 101-100-001 (100.0000 g)
 3. Reference Standard: NIST SRM 101-100-001 (100.0000 g)
 4. Reference Standard: NIST SRM 101-100-001 (100.0000 g)
 5. Reference Standard: NIST SRM 101-100-001 (100.0000 g)
 6. Reference Standard: NIST SRM 101-100-001 (100.0000 g)
 7. Reference Standard: NIST SRM 101-100-001 (100.0000 g)

Instrument: Electronic Balance
 Model: XSR205DU
 Serial No: C009071872
 Max. Capacity: 80 g / 220 g
 Calibration Date: March 12, 2026
 Condition of Equipment: In Good Condition

Repeatability of Reading	Standard Deviation of Reading (g)
100.0000	0.000008
200.0000	0.000005

3. Repeatability of off-center loading
 A mass of 100 g was placed and moved to various positions on the
 The balance reading obtained is given in the table.

1	2	3	4	5	Standard Deviation (g)
100.0000	100.0000	100.0000	100.0000	100.0000	0.0000



Calibration Report

Certificate No.: 2502226-001-01
 Equipment: Electronic Balance
 Model: XSR205DU
 Serial No: C009071872
 Capacity: 80 g / 220 g
 Manufacturer: METTLER TOLEDO
 Resolution: 0.00001 g / 0.0001 g
 ID No.: UAEWAO.012/2563

Date of Calibration: 20 March 2025 Page 4 of 4

Calibration Results: (Continued)

Calibration Range: 0-80 g

Calibration Adjustment: Internal Calibration

3. Departure from Nominal Value: (Range: 0-80 g; Resolution: 0.0001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (g)	Coverage Factor
0	0.00000	0.00002	-0.00002	0.00005	2.00
10	10.00000	10.00001	-0.00001	0.00005	2.00
20	20.00000	20.00001	-0.00001	0.00005	2.00
30	30.00000	30.00001	-0.00001	0.00005	2.00
40	40.00000	40.00001	-0.00001	0.00005	2.00
50	50.00000	50.00001	-0.00001	0.00005	2.00
60	60.00000	60.00001	-0.00001	0.00005	2.00
70	70.00000	70.00001	-0.00001	0.00005	2.00
80	80.00000	80.00001	-0.00001	0.00005	2.00

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

----- End -----

for N. Nipat



Certificate of Calibration

Certificate No: 260311-2-BL002-26

Code No: BL002-26

Page: 1 of 4

Customer Name: United Analyst and Engineering Consultant Co., Ltd.
 Address: 3 Sol Udon Suk 41, Sukhumvit Rd., Bang Chak, Phra Khanong, Bangkok 10260

Equipment: Electronic Balance
 Manufacturer: Mettler Toledo
 Model: XSR205DU
 Serial No: C009071872
 Asset No.: UAEWAO.012/2563

Building: UAE number 3 Floor: 2 Room: 208

Received Date: March 11, 2026

Date of Calibration: March 12, 2026

Calibration Conditions: Temperature: 23.8 °C to 24.1 °C
 Humidity: 50.0 % to 59.0 %
 Pressure: 755.5 mmHg to 755.6 mmHg

Calibrated by: Thanachai Chatsaphol

Approved by: Sawit Chotnok

Signature: *[Signature]*

Issued Date: March 16, 2026

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 conformity to recognized national standards and to the rules of measurement control 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.

เอกสารไม่ควบคุม



Calibration Report

Certificate No.: 2502226-001-01
 Equipment: Electronic Balance
 Model: XSR205DU
 Serial No: C009071872
 Capacity: 80 g / 220 g
 Manufacturer: METTLER TOLEDO
 Resolution: 0.00001 g / 0.0001 g
 ID No.: UAEWAO.012/2563

Date of Calibration: 20 March 2025 Page 3 of 4

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
0	0.00000	0.00002	-0.00002	0.00005	2.00
10	10.00000	10.00001	-0.00001	0.00005	2.00
20	20.00000	20.00001	-0.00001	0.00005	2.00
30	30.00000	30.00001	-0.00001	0.00005	2.00
40	40.00000	40.00001	-0.00001	0.00005	2.00
50	50.00000	50.00001	-0.00001	0.00005	2.00
60	60.00000	60.00001	-0.00001	0.00005	2.00
70	70.00000	70.00001	-0.00001	0.00005	2.00
80	80.00000	80.00001	-0.00001	0.00005	2.00

----- End -----

for N. Nipat

Calibration Report

Certificate No.: 2502226-001-01
Equipment: Electronic Balance
Model: XSR25DU
Serial No.: C009071872
Capacity: 82 g / 200 g
Manufacturer: METTLER TOLEDO
Readability: 0.0001 g / 0.0001 g
ID No.: UAE.WAO.012/2563

Date of Calibration: 28 March 2025 **Page 2 of 4**

Environment Condition: Ambient Temperature: 24.2 ± 0.5 °C Relative Humidity: 61 ± 3.5 %
Place of Calibration: 308 Balance Room, UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.

Condition of Equipment: Good Condition

Condition of This Results of Calibration:

1. Calibration Method: NIS Method WMA-001 In-House Method based on UKAS Lab 14: 2015

2. Reference Standard:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 200g	8506587172	TCS	K04041005	31 April 2025
Instrument	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Thermo-Hydro Meter	508-H8	KPL8TH 007273	Quality Report	Q021-0512	10 February 2026

3. This certificate is traceable to SI UNIT

4. This certificate was verified 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:

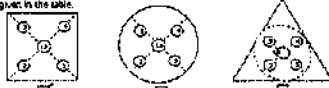
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
10	0.000003
80	0.000003
100	0.000006
200	0.000006

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

UAE-012 Revision 01, Date: 30.04.25

Calibration Certificate

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

Page 3 of 4

Equipment: Electronic Balance

Manufacturer: METTLER TOLEDO

Model: XSR25DU

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: 28 March 2025

Calibrated by: Mr. Yothin Charoensak
 Scientist

Approved by: Mr. N. Singsakul
 (Mr. Phraphat Tuanjit)

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 established 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.

UAE-012 Revision 01, Date: 30.04.25

Certificate No.: 2502226-001-01-05

Code No.: B1001-05

Page: 4 of 4

Equipment: Electronic Balance
Model: XSR25DU
Serial No.: C219585394
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2025
Manufacturer: Mettler Toledo
Readability: 0 to 81 g (0.01 mg), > 80 to 220 g (0.1 mg)
ID No.: UAE.WAO.010/2563

Calibration Result: Conformant
Calibration Range: > 81 to 220 g
Calibration Adjustment: Internal Calibration

3. Error of Indication from nominal or conventional mass values (Range: > 81 to 220 g, Resolution: 0.0001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor
Unloaded	0.0000000	0.0000	0.0000	0.032	2.65
90	90.0000910	90.0004	-0.0003	0.16	2.59
100	100.0000420	100.0005	-0.0005	0.15	2.00
110	110.0000259	110.0004	-0.0003	0.18	2.00
120	120.0000000	120.0004	-0.0003	0.19	2.00
130	130.0000100	130.0005	-0.0004	0.20	2.00
140	140.0000500	140.0004	-0.0003	0.21	2.00
150	150.0000700	150.0005	-0.0004	0.22	2.00
160	160.0001120	160.0004	-0.0003	0.23	2.00
170	170.0001050	170.0005	-0.0003	0.24	2.00
200	200.0001460	200.0005	-0.0003	0.26	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000050	20.0001	0.0000
	40.000054	40.0001	0.0000
	60.000070	60.0000	0.0001
	80.000098	80.0000	0.0001
	100.000109	100.0000	0.0001

Remarks:

This report represents only of measurement and cannot be reproduced without the approval of the company, providing a true and complete of the report only.

o-o-End-o-o

e.c. เอกสารไม่ควบคุม

เอกสารไม่ควบคุม

Certificate No.: 2502226-001-01-06

Code No.: B1001-06

Page: 3 of 4

Equipment: Electronic Balance
Model: XSR25DU
Serial No.: C219585394
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2025
Manufacturer: Mettler Toledo
Readability: 0 to 81 g (0.01 mg), > 80 to 220 g (0.1 mg)
ID No.: UAE.WAO.010/2563

Calibration Result: Conformant
Calibration Range: > 81 to 220 g
Calibration Adjustment: Internal Calibration

5. Error of Indication from nominal or conventional mass values (Range: 0 to 81 g, Resolution: 0.0001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor
Unloaded	0.0000000	0.0000	0.0000	0.032	2.65
0.091	0.0910025	0.0910	0.0000	0.030	2.65
0.065	0.0650023	0.0650	-0.0001	0.032	2.65
0.01	0.0100003	0.0100	-0.0001	0.032	2.65
0.05	0.0500005	0.0500	-0.0001	0.032	2.65
0.50	0.5000003	0.5000	0.0000	0.030	2.65
0.50	0.5000121	0.5000	0.0000	0.030	2.65
1	1.0000119	1.0000	-0.0001	0.032	2.57
2	2.0000125	2.0000	-0.0001	0.033	2.57
5	5.0000106	5.0000	-0.0001	0.033	2.57
10	10.0000336	10.0000	-0.0003	0.034	2.21
20	20.0000218	20.0000	-0.0003	0.041	2.07
50	50.0000041	50.0000	-0.0001	0.055	2.00
40	40.000034	40.0000	-0.0001	0.046	2.00
50	50.000037	50.0000	-0.0001	0.048	2.00
60	60.000070	60.0000	-0.0002	0.054	2.00
80	80.000076	80.0000	-0.0001	0.12	2.00

e.c.

Certificate of Calibration

Certificate No.: 250222-1-BL002-25
 Code No.: BL002-25
 Page: 1 of 3

Customer Name: United Analyst and Engineering Consultant Co., Ltd.
 Address: 3 Soi Udom suk 41, Sukhumvit Rd., Bang Chak, Phra Khanong, Bangkok 10260

Equipment: Electronic Balance
 Manufacturer: Mettler Toledo
 Model: AB204-S/FACT
 Serial No.: 1129361010
 Asset No.: UAE.WAS.002/2552
 Building: UAE No.3 Floor: 3 Room: 107

Received Date: April 2, 2025
 Date of Calibration: April 3, 2025

Calibration Conditions: Temperature start 21.9 °C end 22.1 °C
 Humidity start 60.6 % end 60.1 %
 Pressure start 756.6 mmHg end 755.1 mmHg

Calibrated by: Thanachai Chatpachol

Approved by: Sunth Chotnok

Issued Date: April 7, 2025

- Note: 1) The Uncertainty 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 in 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)

เอกสารไม่ควบคุม

Certificate No.: 250222-1-BL002-25
 Code No.: BL002-25
 Page: 3 of 3

Equipment: Electronic Balance
 Model: AB204-S/FACT
 Serial No.: 1129361010
 Max. Capacity: 220 g
 Calibration Date: April 23, 2025

Calibration Results: (Continued)
 Calibration Range: 0 - 200 g
 Calibration Adjustment: Internal Calibration

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

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unloaded	0.000000	0.0000	0.0000	0.10	2.05
0.01	0.0100025	0.0099	0.0003	0.10	2.05
0.05	0.0500036	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
5	5.0000010	5.0000	0.0000	0.11	2.04
10	10.0000076	10.0000	0.0000	0.14	2.00
20	20.0000036	20.0000	0.0001	0.13	2.00
30	30.0000071	30.0000	0.0001	0.16	2.00
100	100.000109	99.9997	0.0004	0.17	2.00
120	120.000015	119.9998	0.0002	0.21	2.00
150	150.000165	149.9998	0.0003	0.24	2.00
160	160.000175	159.9997	0.0004	0.26	2.00
200	200.000128	199.9998	0.0004	0.30	2.00

6. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000041	19.9999	0.0001
	40.000076	39.9998	0.0002
	60.000066	59.9997	0.0003
	80.000107	79.9999	0.0002
	100.000108	100.0004	-0.0003

Remarks:

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

o-o-End-o-o

เอกสารไม่ควบคุม

Certificate No.: 250422-1-BL002-25
 Code No.: BL002-25
 Page: 2 of 3

Equipment: Electronic Balance
 Model: AB204-S/FACT
 Serial No.: 1129361010
 Max. Capacity: 220 g
 Calibration Date: April 23, 2025
 Condition As-Received: In Condition

Manufacturer: Mettler Toledo
 Readability: 0.0001 g
 ID No.: UAE.WAS.002/2552

Condition of Equipment:

Condition of This Result of Calibration:

1. Calibration Method: This instrument was calibrated by method UAE/CPCAL 006 in house Method based on UKAS Lab 14-2022
 2. Reference Standards:
 Reference Standard: Model Serial No. Calibrated By Certificate No. Traceability Due Date
 Standard Weight Class E2 (0.01mg) 1 mg to 1 kg 11319512 ANARC 25-099559 Mettler Toledo 21-Jan-27
 Standard Weight Class F2 (0.01mg) 1 mg to 200 g 11319512 ANARC 24-013840 Mettler Toledo 04-Feb-26
 Instrument: Model Serial No. Calibrated By Certificate No. Traceability Due Date
 Thermo-Hydro-Baro Meter MMB-10250 ANAC6457 SUCCEIS 3581-0097967 Suction Calorimetry 25-Feb-26
 Thermo-Hydro-Baro Meter MMB-10250 ANAC6457 TPA 25P193 TPA 25-Feb-26

3. This calibration is traceable to SI Unit
 4. This certification was verified only for the instrument we calibrated
 5. This result of calibration was found accurate as shown on date and place of calibration only.
 6. Through the reference standard laboratory of ANARC 25-099559 Calibration 0152

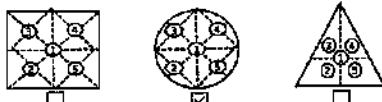
Calibration Result:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
200g	0.000045

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	0.0005

เอกสารไม่ควบคุม

Certificate of Calibration

Certificate No.: 250422-1-BL002-25
 Code No.: BL002-25
 Page: 1 of 3

Customer Name: United Analyst and Engineering Consultant Co., Ltd.
 Address: 3 Soi Udom suk 41, Sukhumvit Rd., Bang Chak, Phra 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 23.0 °C
 Humidity 59.8 % to 68.9 %
 Pressure 756.6 mmHg to 758.2 mmHg

Calibrated by: Sakarin Sirahang

Approved by: Sunth Chotnok

Issued Date: April 25, 2025

Note: 1) The Uncertainty 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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