

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	pH Meter	pH	Horiba	LAQUA-PH210 HA1M0036	Technology Promotion Association (Thailand-Japan)	25CH1473	26 Dec 25	25 Dec 26	-



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484



Certificate of Calibration

Cert.No.: 25CH1473

Page.: 1 of 3

Equipment : pH Meter
Manufacturer : Horiba
Model : LAQUA-PH210
Serial No. : HA1M0036
ID No. : UAE.EFM.012/2565(EFM.pH.02/65)
Condition As-Received: Used Item
Received Date : 24 December 2025
Calibration Date : 26 December 2025
Reference : 2512-0643WSC-2
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak,
Phrakhanong, Bangkok 10260

Ambient Temperature : (25 $\pm$ 2.5) °C
Relative Humidity : (50 $\pm$ 15) %
Calibration Procedure : In - house method :
- CP-CH5 by direct measurement with DC voltage
standard and direct measurement with
certified reference material (CRM)
- CP-CH8 by comparison with temperature standard

Calibrated by : Walalak Sirithean

Approved by : 
Approved Signatory

() Chakrit Waewwanjua
() Ponpan Paipim
(✓) Saithip Meangmai

Issue Date : 29 December 2025

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

เอกสารไม่ควบคุม



Cert.No.: 25CH1473

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Condition of this calibration result

1. Reference Standard Instrument

<u>Instrument</u>	<u>Serial No.</u>	<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>
1) Document Process Calibrator	54030049	130RC116	25E2743	25 Aug 2026
2) Ref. Standard Thermometer	4982054	110RC044	25I708	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 Lenge GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-RM-15184-01-00
:The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

<u>Buffer Solution</u>	<u>Manufacturer</u>	<u>Lot No.</u>	<u>Exp. date</u>
pH 4.007	CPA chem	1114384	12 June 2027
pH 6.999	Hach Lenge GmbH	C03273	13 May 2027
pH 10.010	CPA chem	1114385	08 June 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.: HA1M0036	4.00	177.48	177.5	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	-177.4	10.01	0.058	2.00

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Cert.No.: 25CH1473

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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 ($\pm$)	Coverage factor k
pH Electrode S/N.: -	4.007	4.01	165.6	0.0071	2.00
	6.999	7.00	-9.0	0.0095	2.00
	6.999	7.00	-8.5	0.0092	2.00
	10.010	10.02	-175.3	0.0096	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : -

- Serial No. : -

Dimension of probe

- Length : 110 mm.

- Diameter : 16 mm.

- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement ($\pm$ °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	45.1	0.099	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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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 SUSPENDE 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	Auto Clave	LEGIONELLA SP.	ALP Co.,Ltd. (Japan)	CL-40L / 810010	National Food Institute Ministry of Industry (Thailand)	2603377 001 01	4/6/2026	3/6/2027
5	BOD Incubator	BIOCHEMICAL OXYGEN DEMAND	ARCO	UC4-1320 / 13URC4S013201	Technology Promotion Association (Thailand-Japan)	26TM196	3/2/2026	2/2/2027
6	BOD Incubator	BIOCHEMICAL OXYGEN DEMAND	ARCO	UC4-1320 / 1021	Technology Promotion Association (Thailand-Japan)	25TM1001	7/7/2025	6/7/2026
7	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
8	DO/BOD Meter	BIOCHEMICAL OXYGEN DEMAND	YSI	4010-2W / 20260326	Technology Promotion Association (Thailand-Japan)v	25TW213	22/10/2025	21/10/2026
9	Digestion Units	TOTAL KJELDAHL NITROGEN	FOSS Analytical Co.,Ltd (China)	DT2508/2520 / 91905060	FOSS South East Asia	15257	12/2/2026	11/2/2027

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*
10	Incubator	LEGIONELLA SP.	Memmert	IPP260 / V616.0066	National Food Institute, Ministry of Industry, Thailand	2602303-001-01	11/3/2026	10/3/2027
11	Kjeltec Distillation Unit	TOTAL KJELDAHL NITROGEN	FOSS	KT9 / 91905393	FOSS South East Asia	15256	12/2/2026	11/2/2027
12	Kjeltec Distillation Unit	TOTAL KJELDAHL NITROGEN	FOSS	Kjeltec 8100 / 91889052	FOSS South East Asia	13854	24/2/2025	23/2/2026
13	pH Meter	pH	Horiba	LAQUA-PH210 / HA0A0005	technology promotion association (thailand-japan	25CH1433	11/12/2025	10/12/2026
14	pH Meter	pH	Horiba	LAQUA-PH210 / HA0A0006	technology promotion association (thailand-japan	25CH606	27/5/2025	25/5/2026
15	pH Meter	pH	Horiba	LAQUA-PH210 / HA0D0082	technology promotion association (thailand-japan	25CH588	21/5/2025	20/5/2026

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

Certificate of Calibration

Certificate No: 250422-1-BL002-25

Code No: BL002-25

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

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

Building: N/A **Floor:** 1 **Room:** 107

Received Date: April 22, 2025

Date of Calibration: April 23, 2025

Calibration Conditions: Temperature 22.8 °C to 23.4 °C
Humidity 54.6 % to 68.9 %
Pressure 756.6 mmHg to 758.2 mmHg

Calibrated by: Sakkarin Srirahang

Approved by: Suwit Chotnok

Signature

Issued Date: April 25, 2025

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

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

3) This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the United Analyst and Engineering Consultant Co., Ltd. (UAE)

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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.CP.CAL.006 In-House Method based on UAS Lab 14: 2022

2. Reference Standards:

Reference Standard:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (10ML)	1 mg to 1 kg	8749109122	ANARC	25-009359	Mettler-Toledo	21-Jan-27
Standard Weight Class F1 (10ML)	1 mg to 200 g	11119512	ANARC	24-013840	Mettler-Toledo	04-Feb-26
Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	IAHB-3825D	AK46457	SUCCESS	SG-H-00977/67	Success Gateway	21-Nov-25
Thermo-Hygro-Baro Meter	IAHB-3825D	AK46457	TPA	25P795	TPA	25-Feb-26

3. This certification is traceable to SI Unit

4. This certification was certified only for the instrument we calibrated

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

6. Through the reference standard laboratory of ANARC 25-009359 Calibration 0152

Calibration Result:

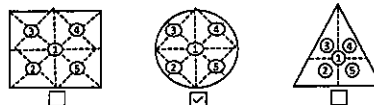
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
200*	0.00045

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

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Certificate No: 250422-1-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 Result: (Continued)

Calibration Range: 0 - 200 g

Calibration Adjustment: Internal Calibration

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

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.10	2.05
0.01	0.0100025	0.0099	0.0001	0.10	2.05
0.05	0.0500056	0.0500	0.0000	0.10	2.05
0.1	0.1000012	0.0999	0.0001	0.10	2.05
0.5	0.5000133	0.5000	0.0000	0.10	2.05
1	1.0000105	1.0000	0.0000	0.10	2.05
10	10.000010	10.0000	0.0000	0.11	2.04
40	40.000076	40.0000	0.0000	0.14	2.00
50	50.000056	50.0000	0.0001	0.13	2.00
80	80.0000107	80.0000	0.0001	0.18	2.00
100	100.000109	99.9999	0.0002	0.17	2.00
120	120.00015	119.9999	0.0003	0.21	2.00
150	150.000165	149.9998	0.0003	0.24	2.00
160	160.000175	159.9997	0.0005	0.26	2.00
200	200.000129	199.9998	0.0004	0.30	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000041	19.9999	0.0001
	40.000076	39.9998	0.0002
	60.000066	59.9997	0.0003
	80.000107	79.9999	0.0002
	100.000168	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%

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Certificate of Calibration

Certificate No: 260318-1-BL007-26

Code No: BL007-26

Page: 1 of 3

Customer Name: United Analyst and Engineering Consultant Co., Ltd.
Address: 3 Soi Udom suk 41, Sukhumvit Rd., Bang Chak, Phai 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:** 1 **Room:** 107

Received Date: April 2, 2026

Date of Calibration: April 3, 2026

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: Thanachat Chatpahal

Approved by: Suwit Chotnok

Signature

Issued Date: April 7, 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 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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Certificate No: 260318-1-BL007-26
Code No: BL007-26
Page: 2 of 3

Equipment: Electronic Balance
Model: AB204 S/FACT
Serial No.: 1129361010
Max. Capacity: 220 g
Calibration Date: April 3, 2026
Condition As-furnished: in Condition

Manufacturer: Mettler Toledo
Readability: 0.0001 g
ID No.: UAE.WAS.002/2352

Condition of Equipment:

Condition of This Result of Calibration:

1. Calibration Method: This instrument was calibrated by method UAE CP-CAL-001 In-house Method based on UKAS Lab 14 : 2012

Reference Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (10 ML)	1 mg to 1 kg	C510641005	M. LEE TO, LEO GIMPH	C510641005	Mettler-Toledo	3 Mar 27

Instrument

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHS-3825D	AC-86037	SUCCESS	SG-H-00992/08	Success Laboratory	26 Nov 26
Thermo-Hygro-Baro Meter	MHS-3825D	AC-86037	TFA	23P0661	TFA	18 Dec 26

3. This certification is traceable to SI Unit

4. This certification was certified only for the instrument we calibrated

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

6. Through the reference standard laboratory of Mettler-Toledo GmbH C510641005, SAS accreditation number SGS 0032

Calibration Results:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
200g	0.00010

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	2	3	4	5	Maximum Difference (g)
(g)	(g)	(g)	(g)	(g)	
100.0025	100.0012	100.0022	100.0029	100.0030	0.0005

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เอกสารไม่ควบคุม

Calibration Certificate

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

Page 1 of 4

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

Calibrated by Mr.Yothin Charoensuk
Scientist
Approved by N. Niyadhat
(Mr.Pharaphat Tuanjit)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team
Date of Issue: 25 March 2025

The uncertainties are for a confidence probability of approximately 95%

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

ICS-003 Revision: 01 Date: 20-04-65

Certificate No: 260318-1-BL007-26
Code No: BL007-26
Page: 3 of 3

Equipment: Electronic Balance
Model: AB204 S/FACT
Serial No.: 1129361010
Max. Capacity: 220 g
Calibration Date: April 3, 2026

Manufacturer: Mettler Toledo
Readability: 0.0001 g
ID No.: UAE.WAS.002/2352

Calibration Results:

(Continued)

Calibration Range: 0 - 200 g

Calibration Adjustment: Internal Calibration

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

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.000000	0.0000	0.0000	0.17	2.37
0.01	0.0100005	0.0099	0.0001	0.17	2.37
0.05	0.0500003	0.0499	0.0001	0.17	2.37
0.1	0.1000003	0.0999	0.0001	0.17	2.37
0.5	0.5000121	0.5000	0.0000	0.17	2.37
1.0	1.0000119	1.0000	0.0000	0.17	2.37
10.0	10.000033	10.0003	-0.0003	0.17	2.37
40.0	40.000054	40.0010	-0.0010	0.18	2.23
50.0	50.000037	50.0013	-0.0012	0.18	2.23
80.0	80.000098	80.0020	-0.0019	0.19	2.11
100.0	100.000042	100.0023	-0.0024	0.20	2.10
120.0	120.000068	120.0028	-0.0027	0.22	2.06
150.0	150.000079	150.0035	-0.0035	0.24	2.04
160.0	160.000112	160.0036	-0.0035	0.25	2.03
200.0	200.000146	200.0049	-0.0047	0.28	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	20.0004	-0.0003
	40.000054	40.0009	-0.0008
	60.000070	60.0013	-0.0012
	80.000098	80.0017	-0.0016
	100.000042	100.0021	-0.0021

Remarks:

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

Calibration Report

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

Date of Calibration: 20 March 2025

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Environment Condition: Ambient Temperature: 21.2 ± 0.6 °C Relative Humidity: 48 ± 3.5 %

Place of Calibration: 208 Balance Room, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Condition of Equipment: Good Condition

Condition of This Result of Calibration:

1. Calibration Method: NFI Method W-HA-001 In-house Method based on UKAS Lab 14 : 2019

2. Reference Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 100g	8505567572	TCS	N24041005	19 April 2025

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Thermo-Hygro Meter	608-H1	NFI.0TH.012/23	Quality Reborn	QR25-0542	10 February 2026

3. This certification is traceable to SI UNIT

4. This certification was certified only for the instrument we calibrated.

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

Calibration Results:

1. Repeatability of Reading:

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

2. Off-Center Error:

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

The balance reading obtained is given in the table.

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

N. Niyadhat

ICS-012 Revision: 01 Date: 20-04-65

Calibration Report

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

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 - 82 g; Resolution: 0.00001 g)

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (g)	Coverage Factor #
Unload	0.00000	0.00000	0.00000	0.0000287	2.00
0.001	0.001003	0.00109	0.00006	0.0000290	2.00
0.005	0.005002	0.00501	-0.00001	0.0000292	2.00
0.01	0.010003	0.01002	-0.00002	0.0000289	2.00
0.05	0.049996	0.05001	-0.00001	0.0000296	2.00
0.1	0.100011	0.10007	-0.00006	0.000011	2.00
0.5	0.500016	0.50004	-0.00002	0.000014	2.00
1	1.000003	1.00005	-0.00005	0.000016	2.00
2	2.000023	2.00006	-0.00004	0.000017	2.00
5	5.000015	5.00006	-0.00005	0.000020	2.00
10	10.000009	10.00005	-0.00005	0.000026	2.00
20	20.000030	20.00007	-0.00004	0.000037	2.00
30	30.000039	30.00009	-0.00005	0.000050	2.00
50	50.000078	50.00008	-0.00001	0.000068	2.00
80	80.000067	80.00013	-0.00006	0.00011	2.00

CS-012 Revised: 01 Date: 20-04-65

Calibration Report

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

Date of Calibration: 20 March 2025 Page 4 of 4

Calibration Results: (Continued)

Calibration Range: >80-200 g

Calibration Adjustment: Internal Calibration

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

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (g)	Coverage Factor #
90	90.00010	90.00007	-0.00001	0.000015	2.00
100	100.00006	100.00001	0.00006	0.000016	2.00
110	110.00007	110.00002	-0.00001	0.000017	2.00
120	120.00009	120.00002	-0.00001	0.000018	2.00
130	130.00010	130.00002	-0.00001	0.000019	2.00
140	140.00013	140.00002	-0.00001	0.000019	2.00
150	150.00009	150.00002	-0.00001	0.000021	2.00
160	160.00010	160.00002	-0.00001	0.000022	2.00
170	170.00012	170.00002	-0.00001	0.000023	2.00
200	200.00013	200.00002	-0.00001	0.000028	2.00

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

CS-012 Revised: 01 Date: 20-04-65

Certificate of Calibration

Certificate No.: 260311-2-BL001-26

Code No.: BL001-26

Page: 1 of 4

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

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: XSR205DU
Serial No.: C210685394
Asset No.: UAE.WAO.010/2565

Building: UAE number 3 Floor: 2 Room: 208

Received Date: March 11, 2026
Date of Calibration: March 12, 2026
Calibration Conditions: Temperature 23.0 °C to 23.6 °C
Humidity 51.5 % to 54.4 %
Pressure 755.7 mmHg to 757.9 mmHg

Calibrated by: Thanachat Chatphol

Approved by: Suwit Chotnokin

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 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)

เอกสารไม่ควบคุม

Certificate No.: 260311-2-BL001-26

Code No.: BL001-26

Page: 2 of 4

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C210685394
Capacity: 82 g / 220 g
Calibration Date: March 12, 2026
Condition As Received: In Condition

Condition of Equipment:

Condition of This Result of Calibration:

- Calibration Method: This instrument was calibrated by method UAE CP CA-006 In House Method based on NIST Lab 14-2002
- Reference Standards:

Reference Standards:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (OIML)	1 mg to 1 kg	C510641605	MTTL FR TOX FIO Rimbh	C510641605	METTLER TOLEDO Group	3 Mar 27
Standard Weight Class E2 (OIML)	1 mg to 1 kg	B749105122	AMARC	25 009359	AMARC	21 Jan 27

Instruments	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo Hygro-Band Meter	MHB 38250	AK46437	SUCCESS	SG-H-00992/68	Success Gateway	26 Nov-26
Thermo Hygro-Band Meter	MHB 38250	AK46437	TPA	25P4464	TPA	18-Dec-26

- This certification is traceable to SI Unit
- This certification is certified only for the instrument as calibrated
- This result of calibration was found accurate as shown on date and place of calibration only.
- Through the reference standard laboratory of Mettler-Toledo GmbH C510641605, SAS accreditation number SES 0012
- Through the reference standard laboratory of AMARC 25-009359, TIS accreditation number B132

Calibration Results:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
80	0.000019
200g	0.000065

- 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)
100.0002	100.0002	100.0003	100.0004	100.0003	0.0001

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Certificate No: 250311-2-BL001-24
Code No: BL001-24
Page: 3 of 4

Equipment: Electronic Balance
Model: XSR205DU
Serial No: C210685394
Max. Capacity: 61 g / 220 g
Calibration Date: March 12, 2026

Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg, > 80 to 200 (g): 0.1 mg
ID No: UAE.WAO.012/2565

Calibration Result: (Continued)
Calibration Range: 0 to 80 (g)
Calibration Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value: (Range: 0 to 81 (g); Resolution: 0.0001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.00000	0.00000	0.032	2.65
0.001	0.0010020	0.00101	0.00009	0.032	2.65
0.005	0.0050025	0.00501	-0.00001	0.032	2.65
0.01	0.0100065	0.01001	-0.00001	0.032	2.65
0.05	0.0500003	0.05001	-0.00001	0.032	2.65
0.10	0.1000083	0.10000	0.00001	0.035	2.65
0.50	0.5000121	0.50001	0.00000	0.033	2.65
1	1.0000119	1.00003	-0.00002	0.032	2.52
2	2.0000125	2.00003	-0.00002	0.033	2.52
5	5.0000146	5.00003	-0.00002	0.033	2.32
10	10.0000330	10.00006	-0.00003	0.034	2.21
20	20.000028	20.00006	-0.00003	0.041	2.07
30	30.000061	30.00017	-0.00011	0.055	2.00
40	40.000054	40.00021	-0.00016	0.066	2.00
50	50.000037	50.00023	-0.00019	0.068	2.00
60	60.000070	60.00029	-0.00022	0.084	2.00
80	80.000098	80.00039	-0.00030	0.12	2.00

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เอกสารไม่ควบคุม

Certificate No: 250311-2-BL001-25
Code No: BL001-26
Page: 4 of 4

Equipment: Electronic Balance
Model: XSR205DU
Serial No: C210685394
Max. Capacity: 61 g / 220 g
Calibration Date: March 12, 2026

Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg, > 80 to 200 (g): 0.1 mg
ID No: UAE.WAO.012/2565

Calibration Result: (Continued)
Calibration Range: > 81 to 200 (g)
Calibration Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value: (Range: > 81 220 (g); Resolution: 0.001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.032	2.65
90	90.0000910	90.0004	-0.0003	0.16	2.00
100	100.000420	100.0003	-0.0003	0.16	2.00
110	110.000750	110.0004	-0.0003	0.18	2.00
120	120.000680	120.0004	-0.0003	0.19	2.00
130	130.0001010	130.0005	-0.0004	0.20	2.00
140	140.000960	140.0004	-0.0003	0.21	2.00
150	150.0000790	150.0005	-0.0004	0.22	2.00
160	160.0001120	160.0004	-0.0003	0.23	2.00
170	170.0001050	170.0003	-0.0002	0.24	2.00
200	200.0001460	200.0001	0.0000	0.26	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	20.0001	0.0000
	40.000034	40.0001	0.0000
	60.000070	60.0000	0.0001
	80.000098	80.0000	0.0001
	100.000109	100.0000	0.0001

Remarks:-

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

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เอกสารไม่ควบคุม

Calibration Certificate

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

Page 1 of 4

Equipment: Electronic Balance
Manufacturer: METTLER TOLEDO
Model: XSR205DU
Serial No.: C009071872
ID No.: UAE.WAO.012/2563
Order No.: 2502226
Operation No.: 2502226-001
Date of Receipt: 19 March 2025
Date of Calibration: 20 March 2025

Calibrated by: Mr.Yothin Charoensuk
Scientist
Approved by: *Mr. N. Nijandatt*
(Mr.Pheraphat Tuanjit)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team
Date of Issue: 25 March 2025

The uncertainties are for a confidence probability of approximately 95%

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

FC-022 Revision: 01 Date: 20-04-65

Calibration Report

Certificate No.: 2502226-001-01
Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C009071872
Capacity: 62 g / 220 g
Manufacturer: METTLER TOLEDO
Readability: 0.0001 g / 0.0001 g
ID No.: UAE.WAO.012/2563

Page 2 of 4

Date of Calibration: 20 March 2025
Environment Condition: Ambient Temperature: 21.2 ± 0.6 °C Relative Humidity: 48 ± 3.5 %
Place of Calibration: 208 Balance Room, UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Condition of Equipment: Good Condition

Condition of This Results of Calibration:

1. Calibration Method: NFI Method W-NA-001 In House Method based on UKAS Lab 14 : 2019

2. Reference Standards:

Reference Standard	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Standard Weight Class E2	1mg to 200g	8505587572	TCS	M4041005	19 April 2025
Instrument	Model	Serial No.	Calibrated By	Certificate No.	Due Date
Thermo-Hygro Meter	608-m1	NFI.BTH 017/23	Quality Reborn	QR25-0542	10 February 2026

3. This certificate is traceable to SI UNIT

4. This certificate was certified only for the instrument we calibrated.

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

Calibration Results:

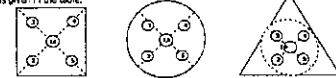
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
40	0.0000052
80	0.0000042
100	0.0000008
200	0.0000000

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	6	(Maximum Difference)
(g)	(g)	(g)	(g)	(g)	(g)	(g)
100.0001	100.0001	100.0001	100.0001	100.0001	100.0002	0.0001

FC-012 Revision: 01 Date: 20-04-65

Calibration Report

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

Date of Calibration: 20 March 2025 Page 3 of 4

Calibration Results: (Continued)

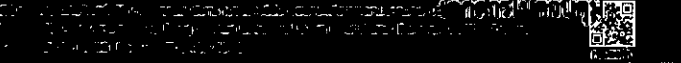
Calibration Range: 0-80 g

Calibration Adjustment: Internal Calibration

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

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (g)	Coverage Factor F
Unloaded	0.00000	0.00000	0.00000	0.0000089	2.00
0.001	0.001003	0.00100	-0.000003	0.0000092	2.00
0.005	0.005002	0.00500	-0.000002	0.0000094	2.00
0.01	0.010003	0.01000	-0.000003	0.0000091	2.00
0.05	0.049996	0.05000	0.000004	0.0000098	2.00
0.1	0.100011	0.10000	-0.000011	0.000011	2.00
0.5	0.500016	0.50000	-0.000016	0.000014	2.00
1	1.000003	1.00001	0.000003	0.000016	2.00
2	2.000023	2.00005	-0.000023	0.000017	2.00
5	5.000015	5.00005	-0.000035	0.000021	2.00
10	10.000009	10.00005	-0.000041	0.000026	2.00
20	20.000030	20.00012	-0.000090	0.000037	2.00
30	30.000039	30.00012	-0.000090	0.000050	2.00
50	50.000078	50.00014	-0.000092	0.000068	2.00
80	80.000067	80.00020	-0.000133	0.00011	2.00

UAE-012 Revision: 01 Date: 20-04-65



Calibration Report

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

Date of Calibration: 20 March 2025 Page 4 of 4

Calibration Results: (Continued)

Calibration Range: >80-200 g

Calibration Adjustment: Internal Calibration

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

Nominal Value (g)	Standard Value (g)	Average Reading (g)	Correction (g)	Uncertainty (g)	Coverage Factor F
90	90.00010	90.0002	-0.0001	0.00015	2.00
100	100.00005	100.0001	-0.0001	0.00016	2.00
110	110.00007	110.0001	-0.0001	0.00017	2.00
120	120.00009	120.0002	-0.0001	0.00018	2.00
130	130.00010	130.0002	-0.0001	0.00019	2.00
140	140.00013	140.0002	-0.0001	0.00019	2.00
150	150.00009	150.0002	-0.0001	0.00021	2.00
160	160.00010	160.0002	-0.0001	0.00022	2.00
170	170.00012	170.0002	-0.0001	0.00023	2.00
200	200.00013	200.0002	-0.0001	0.00028	2.00

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

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UAE-012 Revision: 01 Date: 20-04-65



UAE United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangkok, Phra Khanong, Bangkok 10260
Tel: 02-2763 2828 Fax: 02-2763 2800 www.uaconsultant.com E-mail: ua@uaconsultant.com



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 Soi Udomsuk 41, Sukhumvit Rd., Bang Chak, Phra Khanong, Bangkok 10260

Equipment: Electronic Balance

Manufacturer: Mettler Toledo

Model: XSR205DU

Serial No.: C009071872

Asset No.: UAE.WAO.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: Thanachat Chatpachol

Approved by: Suwit Chotnok

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 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)

UAE United Analyst and Engineering Consultant Co., Ltd.
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Tel: 02-2763 2828 Fax: 02-2763 2800 www.uaconsultant.com E-mail: ua@uaconsultant.com



Certificate No.: 260311-2-BL002-26

Code No.: BL002-26

Page: 2 of 4

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C009071872
Max. Capacity: 82 g / 220 g
Calibration Date: March 12, 2026
Condition As-Received: In Function
Manufacturer: Mettler Toledo
Readability: 0.1 to 1 kg (0.01 mg to 0.1 mg) / 0.01 to 0.1 mg (0.001 mg to 0.01 mg)
ID No.: UAE.WAO.012/2563

Condition of Equipment:

Condition of Calibration:

1. Calibration Method: This instrument was calibrated by method UAE-012 CAL 006. In-house Method based on UAE-012 CAL 006

2. Reference Standards:

Reference Standards: Model Serial No. Calibrated By Certificate No. Traceability Due Date
Standard Weight Class E2 (OIML) 1 mg to 1 kg CS10641605 METTLER TOLEDO GmbH C510641605 Mettler Toledo GmbH 3 Mar 27
Standard Weight Class E2 (OIML) 1 mg to 1 kg B749109122 AMARC 25 079355 Mettler Toledo 21 Jan 27

Instrument Model Serial No. Calibrated By Certificate No. Traceability Due Date
Thermo-Hydro Baro Meter 1519 38250 A-66457 SUCCESS SG-H 00992468 25P4344 Success Green 26 Nov 26
Thermo-Hydro Baro Meter 1519 38250 A-66457 TPA 25P4344 18 Dec 26

3. This certification is traceable to SI Unit

4. This certification was certified only for the instrument we calibrated

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

6. Through the reference standard laboratory of Mettler-Toledo GmbH (C510641605, SAS accreditation number: SCS 0032

7. Through the reference standard laboratory of AMARC 25-009359, ISO accreditation number: 0152

Calibration Result:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
80	0.000008
200	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	2	3	4	5	Maximum Difference (g)
(g)	(g)	(g)	(g)	(g)	
100.0000	100.0000	100.0000	100.0000	100.0000	0.0000

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Certificate No: 260311-2-B-002-26
Code No: BL002-26
Page: 3 of 4

Equipment: Electronic Balance
Model: XSR205DU
Serial No: C009071872
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026

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

3. Error of Indication from nominal or conventional mass value: (Range: 0 to 80 (g); Resolution: 0.0001 (g))

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.015	2.25
0.001	0.0010020	0.0010	0.0000	0.015	2.23
0.005	0.0050025	0.0050	-0.00002	0.015	2.23
0.01	0.0100005	0.0100	-0.00002	0.015	2.23
0.05	0.0500003	0.0500	-0.00001	0.015	2.21
0.10	0.1000083	0.1000	-0.00001	0.015	2.20
0.50	0.5000121	0.5000	-0.00002	0.016	2.15
1	1.0000119	1.0000	0.00000	0.016	2.12
2	2.0000125	2.0000	-0.00001	0.017	2.09
5	5.0000146	5.0000	-0.00002	0.020	2.05
10	10.0000330	10.0001	-0.00002	0.023	2.00
20	20.000028	20.0001	-0.00005	0.033	2.00
30	30.0000461	30.0001	-0.00004	0.051	2.00
40	40.000054	40.0001	-0.00004	0.063	2.00
50	50.000037	50.0001	-0.00005	0.064	2.00
60	60.000070	60.0001	-0.00004	0.061	2.00
80	80.000098	80.0001	-0.00001	0.11	2.00

Equipment: Electronic Balance
Model: XSR205DU
Serial No: C009071872
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026

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

3. Error of Indication from nominal or conventional mass value: (Range: 0 to 80 (g); Resolution: 0.0001 (g))

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.02	2.25
90	90.0000910	90.0000	0.0000	0.16	2.00
100	100.0000420	100.0000	0.0000	0.16	2.00
110	110.0000750	110.0000	0.0000	0.17	2.00
120	120.0000680	120.0000	0.0001	0.18	2.00
130	130.0001010	130.0000	0.0000	0.20	2.00
140	140.0000950	140.0003	0.0001	0.21	2.00
150	150.0000790	150.0003	0.0001	0.21	2.00
160	160.0001120	160.0003	0.0001	0.23	2.00
170	170.0001050	170.0003	-0.0002	0.24	2.00
200	200.0001460	200.0004	-0.0002	0.26	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	40.0002	-0.0001
	60.000070	60.0002	-0.0001
	80.000098	80.0002	-0.0001
	100.000042	100.0003	-0.0002

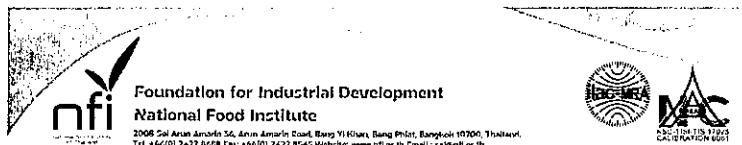
Remarks:

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

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เอกสารไม่ควบคุม



Calibration Certificate

Certificate No.: 260337-001-01
Page: 1 of 2

Equipment: Autoclave
Manufacturer: ALP
Model: CL-40L
Serial No.: 810010
ID No.: UAE-MIC-032/2565
Order No.: 260337-001
Operation No.: 260337-001
Date of Receipt: 4 June 2026
Date of Calibration: 4 June 2026

Customer Name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Address: 3 Sol Udomsuk 41, Sukhumvit Road, Bangkok, Phrakhanong, Bangkok 10260

Metrological traceability:

1. Calibration Method:

- The instrument was calibrated by inserting 3 standard data loggers with RTDs into its autoclave, in accordance with W-TE-018 based on BS 2645-1:2021, Autoclaves for sterilization Part 1: Design, construction, safety and performance - specification.
- 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 RTD (Data Logger)	HiTemp140-PT	T20607	2602163-005-01	7 March 2027	NATIONAL FOOD INSTITUTE
	HiTemp140-PT	T20610	2602163-006-01	7 March 2027	NATIONAL FOOD INSTITUTE
	HiTemp140-PT	T20615	2602163-007-01	7 March 2027	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. Yotini Charoensuk
Scientist

Approved by:

(Mr. Phrasit Tungsri)

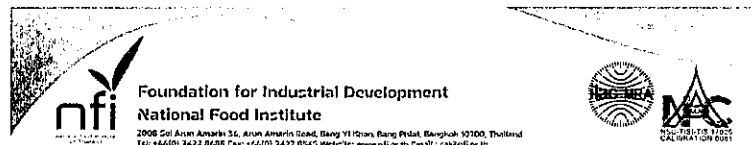
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 9 June 2025

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.

FCS-009 Revision 03 Date: 30-03-08

เอกสารไม่ควบคุม



Calibration Certificate

Certificate No.: 260337-001-01
Page: 2 of 2

Calibration Condition:

Equipment: Autoclave
Resolution: 0.1 °C
Duration of the test: Normal & Good
Without adjustment / As Found
- Setting program function sterilization STERILIZE/NORMAL
- Time of sterilization 15 Minutes at 115.0 and 121.0 °C

Place of Calibration: Metrology Laboratory (301)
UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
Environment Conditions: Ambient Temperature (27.0 ± 1) °C
Relative Humidity (60.8 ± 1) %
Line Voltage (224.6 ± 1) V

Calibration Results:

Table 1: Reporting of Temperature

Calibration Point (°C)	Sid.# 1	Measured Temperature (°C) @ Sensor No.	Sid.# 2 (REF)	Measurement Uncertainty (°C)
115.0	115.41	115.42	115.20	0.64
121.0	121.43	121.44	121.41	0.64

Table 2: Reporting of Characterization Results

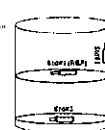
UUC* Setting (°C)	Max	UUC* Reading (°C)	Average	MPa	Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
115.0	115.0	115.0	115.0	0.10	0.13	0.13	0.26
121.0	121.0	121.0	121.0	0.12	0.17	0.12	0.36

Note:

- UUC*: Unc Under Calibration
- The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity)"
- 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 in any sensor and the maximum temperature at the reference location when 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 installation should be reported

Standard installation
Note: The standard installation is shown in the figure below.
Note: The standard installation is shown in the figure below.
Note: The standard installation is shown in the figure below.



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 of Report

FCS-009 Revision 03 Date: 30-03-08

เอกสารไม่ควบคุม



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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534/4 PATTANAKARN ROAD SOI 15, SUANLUANG, SUANLUANG BANGKOK 10250
TEL 0-2717-3000-29 FAX 0-2719-9484



Certificate of Calibration

Cert. No.: 26TM196
Page: 1 of 3

Equipment : BOD Incubator
Manufacturer : Arco
Model : UC4-1320
Serial No. : 13URC4S013201
ID No. : UAE.WAO.015/2581
Submitted by : United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road
Bangchak, Phrakhanong
Bangkok 10260
Location : Lab. Floor 2
Received Order : 02 February 2025
Calibration Date : 03 February 2025
Ambient Temperature : $(28 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$
AC Line Voltage : $(220 \pm 22) \text{ V}$

Calibrated by : Krisda Malee

Approved by :

() Chakrit Waowwanjua
() Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 17 February 2025

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.

เอกสารไม่ควบคุม



Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2602-0003OC-1

Cert. No.: 26TM196
Page : 2 of 3

Procedure Used :-

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

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MYS7013711	25LM117	TPA	17 Jul 2026

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 :

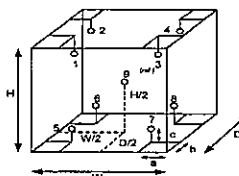
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	25	25
REL Humid. (%)	48	49
AC Supply (Volt)	221	220



Probe installation Details :

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

Dimension of Chamber :

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

Position :	Ref. Std. ID No.:
1	22-18RTD-2/1
2	18RTD-2/2
3	18RTD-2/3
4	18RTD-2/4
5	18RTD-2/5
6	25-18RTD-2/6
7	25-18RTD-2/7
8	21-18RTD-2/10
9 (ref.)	18RTD-2/9

Certificate of Calibration

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

Equipment : BOD Incubator

Manufacturer : ARCO

Model : UC4-1320

Serial No. : -

ID No. : UAE.WAO.018/2559

Submitted by : United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong,
Bangkok 10260
Location : Lab Floor 2

Received Order : 07 July 2025
Calibration Date : 07 July 2025
Ambient Temperature : $(28 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$
AC Line Voltage : $(220 \pm 22) \text{ V}$

Calibrated by : Man Pattanapongpaiboon

Approved by :

() Chakrit Waowwanjua
() Suwit Imjai
(✓) Kunchit Promprat

Issue Date : 17 July 2025

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 2602-0003OC-1
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Not Available

Cert. No.: 26TM196
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	19.9	0.65	0.40	1.4	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
20.0	20.079	19.917	20.085	19.973	19.943	19.959	19.852	19.860	20.006	0.84

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

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity.

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

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เอกสารไม่ควบคุม



Equipment: BOD Incubator
Condition As-Received: Used Item
Reference: 2507-0148OC-2

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

Procedure Used :-

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

Condition of this result of calibration

1. Reference standard (Instrument)-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY59003411	24LM182	TPA	24 Dec 2025

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

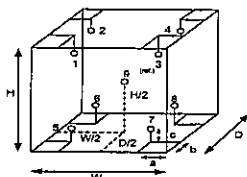
3. This measurement result is traceable to the International System of Unit maintained through :

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		
	Beginning	Finished
Temp. (°C)	28	28
REL.Humid. (%)	54	57
AC Supply (Volt)	224	226

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



Equipment: BOD Incubator
Condition As-Received: Used Item
Reference: 2507-0148OC-2

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

Result of Calibration :-

Function of UUC* : (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	18.9	0.18	0.60	0.83	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	20.390	20.077	20.111	20.044	20.275	20.173	19.835	0.38

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

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was Included stability and excluded uniformity .

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

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TEL 0-2717-3000 FAX 0-2719-9484

Certificate of Testing

Cert.No.: 25TW29
Page: 1 of 2

Equipment : DO Meter
Manufacturer : YSI
Model : 5100
Serial No. : 118 101863
ID No. : UAE.WAO.004/2554
Received Date : 14 February 2025
Test Date : 17 February 2025
Reference : 2502-0473DSC-1
Submitted by : United Analyst and Engineering Consultant Co., Ltd.
3 Sol 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 : Walalak Sinihean

Approved by :

Saitip
Approved Signatory

() Chakrit Waewwanjua
() Ponpan Palpim
(✓) Saitip Meangmai

Issue Date : 18 February 2025



Cert.No.: 25TW29
Page: 2 of 2

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).

Instrument	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	23CG1172	22 Mar 2025
2. Balance	14233821	110RC001	24MM131	04 July 2025

2. Standard Material :-

Material	Manufacturer	Lot No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203192447	99.6%

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

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

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

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เทคโนโลยีการส่งเสริม (T.P.A.) ได้รับการรับรองโดยกรมการมาตรฐาน (T.P.A.) และได้รับการรับรองโดยกรมการมาตรฐาน (T.P.A.)									
Certificate No.: 25TW99 Brand : YSI Serial No. : 118 101863					Equipment : DO Meter Model : 5100 ID No. : UAE.WAO.004/2554				
Calibration results									
Titration Method	Standard Deviation (mg/L)	DO meter Reading (mg/L)	Error (mg/L)	Correction (mg/L)	Total Error (mg/L)	Judgment (± mg/L)	Total Error ± Judgment (mg/L)		
A.22	0.0055	8.22	0.0000	0.0000	0.0	0.02	0.02		
ผู้ตรวจ : นาย วชิรวิทย์ วันที่ : 28/07/2025 ที่ : กรุงเทพมหานคร									

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 TEL. 0-2717-3000 FAX. 0-2719-9484

Certificate of Testing

Cert.No.: 25TW50
 Page.: 1 of 2

Equipment : DO Meter
 Manufacturer : YSI
 Model : 5100
 Serial No. : 118 101863
 ID No. : UAE.WAO.004/2554
 Received Date : 27 February 2026
 Test Date : 02 March 2026
 Reference : 2802-091SDSC-1
 Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
 3 Sol 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 : Walalak Sirithean
 Approved by :
 Approved Signatory
 () Chakrit Waewwanjua
 () Ponpan Palpin
 (✓) Sathip Meangmai
 Issue Date : 03 March 2026

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

Condition of this result of calibration

- 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	25CG1128	18 Mar 2027
2. Balance	110RC001	25MM316	02 July 2028

2. Standard Material :-

Material	Manufacturer	Lot No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.8%

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
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Certificate of Testing

Cert.No.: 25TW213
 Page.: 1 of 2

Equipment : DO Meter
 Manufacturer : YSI
 Model : 4010-2W
 Serial No. : 20260326
 ID No. : UAE.WAO.060/2563
 Received Date : 17 October 2025
 Test Date : 22 October 2025
 Reference : 2510-0505DSC-1
 Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
 3 Sol 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 : Walalak Sirithean
 Approved by :
 Approved Signatory
 () Chakrit Waewwanjua
 () Ponpan Palpin
 (✓) Sathip Meangmai
 Issue Date : 23 October 2025

เอกสารไม่ควบคุม



FOSS

Customer Service Report

Date: Feb 12, 2026
Job No.: 14589
Instrument: KTA Distillator

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

Report No.: 15256
Customer: VAE
Address: Bangkok
Serial: 91905393

Start Finish
Travel To Customer (Hrs) 09:00 09:30
Labour (Hrs) 09:30 13:30
Travel From Customer (Hrs) 13:30 14:00

Application	Special	Standard
Distributor	Courtesy Visit	Installation
Digital Service	PMA Approval Check	Quote
Internal	Warranty	Repair
Training	Sales Support	Investigate

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

Details of Work / Test
- Visual Check
- No Leak
- No Damage
- change PM kit set
- Function Check
- Distillation
- Alarm
- Reservoir
- Steam Pressure

Part No.	Batch	Description	Qty
60100196	17.03.2025	PM kit KTA Distillator	1

Signed FOSS: [Signature]
Name: [Name]
Tel: [Tel]
Email: [Email]
Signed Customer: [Signature]
Name: [Name]
Tel: [Tel]
Email: [Email]

Remarks: [Remarks]
Please scan QR code

FOSS

Customer Service Report

Date: 24 February 2026
Job No.: 11735
Instrument: KTA 00

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

Report No.: 13854
Customer: VAE
Address: Bangkok
Serial: 91887052

Start Finish
Travel To Customer (Hrs) 09:00 09:30
Labour (Hrs) 09:30 13:00
Travel From Customer (Hrs) 13:00 13:30

Application	Special	Standard
Distributor	Courtesy Visit	Installation
Digital Service	PMA Onboarding	Quote
Internal	Warranty	Repair
Investigate	Sales Support	Remote

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

Details of Work / Test
- Visual Check
- No Leak
- No Damage
- change PM kit set
- Function Check
- Distillation
- Alarm
- Reservoir
- Steam Pressure

Part No.	Batch	Description	Qty
60031910	08.01.2025	Foss PM kit KTA00 60031910	1

Signed FOSS: [Signature]
Name: [Name]
Tel: [Tel]
Email: [Email]
Signed Customer: [Signature]
Name: [Name]
Tel: [Tel]
Email: [Email]

Remarks: [Remarks]
Please scan QR code



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Cert. No.: 25CH1433
Page: 2 of 3

Certificate of Calibration

Cert. No.: 25CH1433
Page: 1 of 3

Equipment: pH Meter
Manufacturer: Horiba
Model: LAQUA-PH210
Serial No.: HA0A0005
ID No.: UAE.EFM.004/2563 (EFM, pH, 04/63)
Condition As-Received: Used Item
Received Date: 09 December 2025
Calibration Date: 11 December 2025
Reference: 2512-0243WSC-2
Submitted by: United Analyst and Engineering Consultant Co., Ltd.
3 Sol Udomsak 41, Sukhumvit Road, Bangkok, Phrakhanong, Bangkok 10260

Ambient Temperature: (25 ± 2.5) °C
Relative Humidity: (50 ± 15) %
Calibration Procedure: In-house method:
- CP-CH5 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM)
- CP-CH8 by comparison with temperature standard

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

(✓) Chakrit Waewwanjua
() Ponpan Palpin
() Sathip Meangmal

Issue Date: 12 December 2025

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	4982054	110RC044	25I708	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-RI-15184-01-00
:The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1935

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.007	CPA chem	1114384	12 June 2027
pH 6.999	Hach Lange GmbH	C03273	13 May 2027
pH 10.010	CPA chem	1114385	08 June 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	Coverage factor
	pH	mV	mV	(mV)	k
pH Meter	4.00	177.48	177.4	0.058	2.00
S/N: HA0A0005	7.00	0.00	0.1	0.058	2.00
	7.00	0.00	0.1	0.058	2.00
	10.00	-177.48	-177.2	0.058	2.00

The Uncertainties are for a confidence probability of approximately 95%
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Cert.No.: 25CH1433
Page.: 3 of 3

Calibration Results

Function : pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode S/N: -	4.007	4.01	175.4	0.0085	2.05
	6.999	7.00	-0.3	0.0095	2.00
	6.999	7.01	-0.5	0.0096	2.00
	10.010	10.01	-170.6	0.0092	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : -
- Serial No. : -
Dimension of probe
- Length : 112 mm.
- Diameter : 16 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
15.0	15.002	15.0	-0.002	0.13	2.00
30.0	30.002	30.0	-0.002	0.13	2.00
45.0	45.003	45.0	-0.003	0.13	2.00

Remark : - UUC* = Unit Under Calibration

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

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUKHUANG, SUKHUANG BANGKOK 10250
TEL: 0-2717-3003-29 FAX: 0-2719-6484



Certificate of Calibration

Cert.No.: 25CH608
Page.: 1 of 3

Equipment : pH Meter
Manufacturer : Horiba
Model : LAQUA-PH210
Serial No. : HAQA0006
ID No. : UAE.EFM.006/2563(EFM.pH.06/03)
Condition As-Received : Used Item
Received Date : 28 May 2025
Calibration Date : 27 May 2025
Reference : 2505-0796WSC-1
Submitted by : United Analyst and Engineering Consultant Co., Ltd.
3 Sol Udomsuk 41, Sukhumvit Road,
Bangchak, Phraekhanong, Bangkok 10260

Ambient Temperature : (25 ± 2.6) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In-house method :
- CP-CH5 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM)
- CP-CH6 by comparison with temperature standard

Calibrated by : Warakorn Lengagrakul

Approved by :
Approved Signatory

() Chakrii Waewwanjua
() Ponpan Paipin
(✓) Sathip Meangmai

Issue Date : 28 May 2025

The Uncertainties are for a confidence probability of approximately 95%

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Cert.No.: 25CH606
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	4982054	110RC044	24I757	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 Hech Leng GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-RM-15184-01-00
: The measurement results are traceable to SI through CPA chem Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-RM-15184-01-00

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.007	CPA chem	1066665	18 Jan 2027
pH 7.000	Hech Leng GmbH	C03232	02 Dec 2025
pH 10.010	CPA chem	1066669	18 Jan 2025

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

Calibration Results

Function : mV Measurement

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

Unit Under Calibration	Nominal Value		Standard Voltage Input		Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
	pH	mV	mV	pH	mV	pH		
pH Meter S/N: HAQA0006	4.00	177.48	177.5	4.01	0.058	2.00	0.058	2.00
	7.00	0.00	0.0	7.00	0.056	2.00	0.056	2.00
	7.00	0.00	0.0	7.00	0.058	2.00	0.058	2.00
	10.00	-177.48	-177.4	10.01	0.058	2.00	0.058	2.00

Calibration Results

Function : pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode S/N: Q82M0159	4.007	4.01	181.7	0.0071	2.00
	7.000	7.00	8.4	0.0085	2.00
	7.000	7.00	6.5	0.0092	2.00
	10.010	10.00	-168.7	0.0095	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : 9652-10D
- Serial No. : Q82M0159
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	30.003	30.0	-0.003	0.13	2.00
45.0	45.003	45.0	-0.003	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



Certificate of Calibration

Cert.No.: 25CH588
Page.: 1 of 3

Equipment: pH Meter
Manufacturer: Horiba
Model: LAQUA-PH210
Serial No.: HA0D0082
ID No.: UAE.EFM.072/2564 (EFM pH.05/64)
Condition As-Received: Used Item
Received Date: 20 May 2025
Calibration Date: 21 May 2025
Reference: 2505-0802WSC-3
Submitted by: United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangkok,
Phrakhanong, Bangkok 10260

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

Calibrated by: [Signature]

Approved by:

() Chakrit Waewwanjua
() Ponpan Palpin
(✓) Salhip Meangmal

Issue Date: 23 May 2025

Condition of this calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030048	130RC116	24E2758	25 Aug 2025
2) Ref. Standard Thermometer	4982054	110RC044	24I757	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-16194-01-00
:The measurement results are traceable to SI through CPA chem Ltd.,
ANSI-ASQ National Accreditation Board, Accredited No. AR-1635

Buffer Solution

Manufacturer

Lot No.

Exp. date

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.007	CPA chem	1066685	18 Jan 2027
pH 7.000	Hach Lange GmbH	C03232	02 Dec 2028
pH 10.010	CPA chem	1066689	18 Jan 2028

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
			mV	pH		
pH Meter S/N.: HA0D0082	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

The Uncertainties are for a confidence probability of approximately 95%

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Cert.No.: 25CH588
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 (±)	Coverage factor k
pH Electrode S/N.: Q9AA0036	4.007	4.01	160.4	0.0085	2.05
	7.000	7.00	-13.5	0.0095	2.00
	7.000	7.01	-12.6	0.0096	2.00
	10.010	10.00	-186.0	0.0092	2.00

Function: Temperature Measurement

(°) Without adjustment

This equipment was connected with Temperature Probe:

- Model: 9652-10D
- Serial No.: Q9AA0036

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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