

ภาคผนวก ง
เอกสารสอบเทียบเครื่องมือ



List of Instruments Certification for Air & Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient									
1	Orifice Transfer Standard Calibrator	Total Suspended Particulate (TSP)	Tisch Environmental,Inc.	TE-5025A 3540	Jiranatee Associates Co., Ltd.	COF-045-68	30 Oct 25	29 Oct 26	-
2	U-Tube Manometer	Total Suspended Particulate (TSP)	Dwyer	1221-36-W/M -	Technology Promotion Association (Thailand-Japan)	25P3505	9 Sep 25	8 Sep 26	-
3	Aneroid Barometer	Total Suspended Particulate (TSP)	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	26P666	10 Feb 26	9 Feb 27	-
4	Dial Thermo-Hygrometer	Total Suspended Particulate (TSP)	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	26H713	17 Apr 26	16 Apr 27	-
Workplace									
1	Primary Flow Calibrator	Calibrate personal pump	TSI,Inc	4146 41461922007	Innovative Instrument Co., Ltd.	25-AFM-186	25 Aug 25	24 Aug 26	-
2	Aneroid Barometer	Total Dust	Barigo, Germany	-	Technology Promotion Association (Thailand-Japan)	26P876	27 Feb 26	26 Feb 27	-
3	Digital Thermo - Hygrometer	Total Dust	Digicon	TH-02A 435031145	Technology Promotion Association (Thailand-Japan)	25H1369	8 Jul 25	7 Jul 26	-

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	-

รายการเครื่องมือหลักประจำห้องปฏิบัติการวิเคราะห์ สำหรับตรวจวิเคราะห์คุณภาพสิ่งแวดล้อม

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*	Remark
Laboratory Instrument/Equipments.(คุณภาพอากาศ)									
1	Analytical Balance (Repeatability 0.1 mg)	ฝุ่นละอองรวม	Mettler-Toledo	AB204-S/FACT / 1129361010	United Analyst and Engineering Consultant Co., Ltd.	260318-1-BL007-26	3 Apr 26	2 Apr 27	-
2	Analytical Balance (Repeatability 0.1 mg)		Mettler-Toledo	MS204TS/00 C252436235	United Analyst and Engineering Consultant Co., Ltd.	260311-3-BL004-26	13 Mar 26	12 Mar 27	-
3	Analytical Balance (Repeatability 0.001 mg)	ฝุ่นทุกขนาด	Mettler-Toledo	XP6 / B322373893	United Analyst and Engineering Consultant Co., Ltd.	260311-2-BL003-26	13 Mar 26	12 Mar 27	-
Laboratory Instrument/Equipments.(คุณภาพน้ำ)									
1	pH Meter	ความเป็นกรดและด่าง	Mettler-Toledo	Seven Easy pH / 1231155210	National Food Institute, Ministry of Industry, Thailand	2601956-001-01	23 Feb 26	22 Feb 27	-
2	BOD Incubator	บีโอดี	Arco	UC4-1320 / (UAE.WAO.015/2561)	Technology Promotion Association (Thailand-Japan)	26TM196	3 Feb 26	2 Feb 27	-
3	BOD Incubator		Arco	UR-1320 / (UAE.WAO.018/2551)	National Food Institute, Ministry of Industry, Thailand	2602300-002-02	12 Mar 26	11 Mar 27	-
4	Analytical Balance (Repeatability 0.01 mg)	สารแขวนลอย	Mettler-Toledo	XSR205DU / C009071872	United Analyst and Engineering Consultant Co., Ltd.	260311-2-BL002-26	12 Mar 26	11 Mar 27	-
5	Hot Air Oven	น้ำมันและไขมัน	Memmert	UF55 / B212.0411	National Food Institute, Ministry of Industry, Thailand	2602300-001-01	11 Mar 26	10 Mar 27	-
6	Analytical Balance (Readability 0.1 mg)		Mettler-Toledo	XSR204 / C117635043	United Analyst and Engineering Consultant CO.,Ltd	260318-1-BL008-26	3 Apr 26	2 Apr 27	-
7	UV-VIS Spectrophotometer	ไนเตรท คำนวณเป็นไนโตรเจน	Agilent Technologies	Cary60 / MY15410009	DQE Services Co.,Ltd.	SP26-013	18 May 26	17 May 27	-
8	UV-VIS Spectrophotometer		Hitachi	U-5100/ 23A4-008	DQE Services Co.,Ltd.	SP26-014	18 May 26	17 May 27	-

Due Date of Calibration* : Schedule the program once a year at least once a year.

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, Phar 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 22.1 °C to 21.4 °C
Humidity 65.5 % to 51.9 %
Pressure 757.8 mmHg to 756.0 mmHg

Calibrated by: Thanachat Chatpahol

Approved by: Suwit Chotnok

Signature:

Issued Date: April 3, 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.: 260318-1-BL007-26

Code No.: BL007-26

Page: 3 of 3

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: AB204-S/FACT
Readability: 0.0001 g
Serial No.: 1129361010
ID No.: UAE.WAS.002/2552
Max. Capacity: 220 g
Calibration Date: April 3, 2026

Calibration Result: (Continued)

Calibration Range: 0 - 200 g

Calibration Adjustment: External Calibration

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

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty ($\pm$ mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.14	2.25
0.01	0.0100005	0.0099	0.0001	0.14	2.25
0.05	0.0500003	0.0500	0.0000	0.14	2.25
0.1	0.1000083	0.0999	0.0001	0.15	2.25
0.5	0.5000121	0.5000	0.0000	0.15	2.25
1.0	1.0000119	0.9999	0.0001	0.15	2.25
10.0	10.000033	10.0000	0.0000	0.15	2.23
40.0	40.000054	40.0001	0.0000	0.16	2.16
50.0	50.000037	50.0001	0.0000	0.16	2.15
80.0	80.000098	80.0002	-0.0001	0.18	2.07
100.0	100.000042	100.0003	-0.0003	0.19	2.06
120.0	120.000068	120.0001	0.0000	0.20	2.04
150.0	150.000079	150.0001	0.0000	0.23	2.00
160.0	160.000112	160.0003	-0.0002	0.24	2.00
200.0	200.000146	200.0004	-0.0002	0.27	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	0.0000
	60.000070	60.0000	0.0001
	80.000098	80.0000	0.0001
	100.000042	100.0000	0.0000

Remark:-

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

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เอกสารไม่ควบคุม

Certificate No.: 260318-1-BL007-26

Code No.: BL007-26

Page: 2 of 3

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: AB204-S/FACT
Readability: 0.0001 g
Serial No.: 1129361010
ID No.: UAE.WAS.002/2552
Max. Capacity: 220 g
Calibration Date: April 3, 2026
Condition As-Received: In Condition

Condition of Equipment:

Condition of This Result of Calibration:

1. Calibration Method: This instrument was calibrated by method UAE.CP.CAL.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 (OIML)	1 mg to 1 kg	C510641605	METTLER TOLEDO GmbH	C510641605	METTLER TOLEDO GmbH	3-Mar-27

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHB-382SD	AK.46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hygro-Baro Meter	MHB-382SD	AK.46457	TPA	25P4464	TPA	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

Calibration Result:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
200*	0.00008

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)
100.0001	99.9997	99.9997	100.0004	100.0006	0.0005

เอกสารไม่ควบคุม

Certificate of Calibration

Certificate No.: 260311-3-BL004-26

Code No.: BL004-26

Page: 1 of 3

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

Equipment: Electronic Balance

Manufacturer: Mettler Toledo

Model: MS204TS/00

Serial No.: C252436235

Asset No.: UAE.AIR.023/2566

Building: UAE number 3

Floor: 2

Room: 206

Received Date: March 11, 2026

Date of Calibration: March 13, 2026

Calibration Conditions: Temperature start 19.6 °C end 18.1 °C
Humidity start 59.8 % end 56.5 %
Pressure start 758.6 mmHg end 756.4 mmHg

Calibrated by: Thanachat Chatpahol

Approved by: Suwit Chotnok

Signature:

Issued Date: March 17, 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.: 260311-3-BL004-26
Code No.: BL004-26
Page: 2 of 3

Equipment: Electronic Balance
Model: MS204TS/00
Serial No.: C252436235
Max. Capacity: 220 (g)
Calibration Date: March 13, 2026
Condition As-Received: In Condition

Manufacturer: Mettler Toledo
Readability: 0.0001 (g)
ID No.: UAE.AIR.023/2566

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 UKAS Lab 14 : 2022

Reference Standard:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (OIML)	1 mg to 1 kg	C510641605	METTLER TOLEDO GmbH	C510641605	METTLER TOLEDO GmbH	3-Mar-27
Standard Weight Class E2 (OIML)	1 mg to 1 kg	B749109122	AMARC	25-009359	AMARC	21-Jan-27

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHB-3825D	AK.46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hygro-Baro Meter	MHB-3825D	AK.46457	TPA	25P4644	TPA	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, TSI accreditation number 0152

Calibration Result:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
200*	0.000089

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)
99.9998	99.9998	99.9996	99.9995	99.9996	0.0003

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เอกสารไม่ควบคุม

Certificate No.: 260311-3-BL004-26
Code No.: BL004-26
Page: 3 of 3

Equipment: Electronic Balance
Model: MS204TS/00
Serial No.: C252436235
Max. Capacity: 220 (g)
Calibration Date: March 13, 2026

Manufacturer: Mettler Toledo
Readability: 0.0001 (g)
ID No.: UAE.AIR.023/2566

Calibration Result: (Continued)
Calibration Range: 0 to 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 ($\pm$ mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.15	2.28
0	0.1000083	0.0999	0.0001	0.15	2.28
1	1.0000119	0.9999	0.0001	0.15	2.28
3	3.0000244	2.9999	0.0001	0.16	2.28
5	5.0000146	4.9999	0.0001	0.16	2.28
10	10.0000330	10.0000	0.0000	0.15	2.25
20	20.0000280	19.9999	0.0001	0.16	2.25
40	40.0000540	39.9999	0.0002	0.16	2.18
60	60.0000700	59.9996	0.0005	0.17	2.14
80	80.0000980	79.9999	0.0002	0.18	2.09
100	100.0000420	99.9997	0.0003	0.19	2.07
120	120.0000680	119.9996	0.0005	0.21	2.05
160	160.0001120	159.9996	0.0005	0.25	2.00
200	200.0001460	199.9998	0.0004	0.28	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	19.9998	0.0002
	40.000054	39.9999	0.0002
	60.000070	59.9997	0.0004
	80.000098	79.9998	0.0003
	100.000109	100.0001	0.0000

Remark: Test weight by filter pan at 1g = 1.0000 g, 3g = 2.9998 g, 5g = 4.9998 g

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

Certificate of Calibration

Certificate No.: 260311-2-BL003-26
Code No.: BL003-26
Page: 1 of 3

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

Equipment: Electronic Balance

Manufacturer: Mettler Toledo

Model: XP6

Serial No.: B322373893

Asset No.: UAE.AIR.019/2556

Building: UAE number 3 Floor: 2 Room: 206

Received Date: March 11, 2026

Date of Calibration: March 13, 2026

Calibration Conditions: Temperature 18.1 °C to 19.9 °C
Humidity 56.5 % to 60.1 %
Pressure 756.6 mmHg to 756.4 mmHg

Calibrated by: Thanachat Chatpahol

Approved by: Suwit Chotnok

Signature: e.vj

Issued Date: March 17, 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-BL003-26
Code No.: BL003-26
Page: 2 of 3

Equipment: Electronic Balance
Model: XP6
Serial No.: B322373893
Max. Capacity: 6.1 g
Calibration Date: March 13, 2026
Condition As-Received: In Condition

Manufacturer: Mettler Toledo
Readability: 0.000001g, 1µg
ID No.: UAE.AIR.019/2556

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 UKAS Lab 14 : 2022

Reference Standard:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (OIML)	1 mg to 1 kg	C510641605	METTLER TOLEDO GmbH	C510641605	METTLER TOLEDO GmbH	3-Mar-27
Standard Weight Class E2 (OIML)	1 mg to 1 kg	B749109122	AMARC	25-009359	AMARC	21-Jan-27

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHB-3825D	AK.46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hygro-Baro Meter	MHB-3825D	AK.46457	TPA	25P4644	TPA	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, TSI Accreditation number 0152

Calibration Result:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
6	0.000002

2. Eccentric or off-center loading

A mass of 2 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)
2.0000	2.0000	2.0000	2.0000	2.0000	0.0000

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เอกสารไม่ควบคุม

Certificate No.: 260311-2-BL003-26
Code No.: BL003-26
Page: 3 of 3

Equipment: Electronic Balance
Model: XP6
Serial No.: B322373893
Max. Capacity: 6.1 g
Calibration Date: March 13, 2026
Manufacturer: Mettler Toledo
Readability: 0.00001g, 1ug
ID No.: UAE.AIR.019/2556

Calibration Result: (Continued)
Calibration Range: 0 to 6 (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	0.000000	0.000000	0.0030	2.65
0.001	0.0010020	0.001001	0.000001	0.0035	2.13
0.010	0.0100005	0.010000	0.000000	0.0035	2.13
0.050	0.0500003	0.049999	0.000002	0.0040	2.06
0.100	0.1000083	0.100008	0.000001	0.0047	2.03
0.15	0.1500086	0.150006	0.000002	0.0074	2.00
0.17	0.1700114	0.170010	0.000001	0.0096	2.00
0.20	0.2000008	0.200007	-0.000006	0.0053	2.00
1.50	1.5000240	1.500020	0.000004	0.015	2.00
3.00	3.0000244	3.000015	0.000009	0.018	2.00
4.50	4.5000342	4.500021	0.000014	0.026	2.00
6.00	6.0000265	6.000001	0.000025	0.022	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
3	0.600020	0.600018	0.000002
	1.200013	1.200020	-0.000007
	1.800033	1.800038	-0.000005
	2.400014	2.400013	0.000001
	3.000024	3.000016	0.000008

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

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เอกสารไม่ควบคุม

Calibration Certificate

Certificate No.: 2601956-001-01
Page: 1 of 2

Equipment: pH Meter
Manufacturer: METTLER TOLEDO
Model: SevenEasy pH
Serial No.: 1231155210
ID No.: UAE.WAT.010/2553
Order No.: 2601956
Operation No.: 2601956-001
Date of Receipt: 20 February 2026
Date of Calibration: 23 February 2026
Customer name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhonong, Bangkok 10260

Metrological traceability:

1. Calibration Method: W-CC-002 : In house method based on direct measurement by using standard voltage calibrator and certified reference material (CRM)
2. Reference Standards / Certified Reference Material

Instruments	Serial / ID No.	Manufacturer	Certificate No.	Due Date	
2.1 DC Voltage Calibrator	2709007	Fluke	25E1753	22 May 2026	
2.2 Digital Thermometer	2709007	Fluke	2600328-002-01	25 October 2026	
2.3 Thermo-Hygro Meter	NFLBTH 014/23	testo	2503232-014-01	10 June 2026	
Certified Reference Material		Lot No.	Manufacturer	Ref N	Expire Date
2.4 pH buffer 4.008 (Primary pH buffer Solution)	1016435	CPAchem	PH218.L5		25 July 2026
2.5 pH buffer 6.865 (Primary pH buffer Solution)	1016432	CPAchem	PH217.L5		25 July 2026
2.6 pH buffer 10.01 (Primary pH buffer Solution)	1088003	CPAchem	PH220.L5		18 March 2026
2.7 pH buffer 7.00 (Standard pH buffer Solution)	C03282	HACH LANGE GmbH	S11M004		11 June 2027

3. This certification is traceable to The International System of Unit (SI Unit)
3.1 Instruments No.2.1 through NSC-ONSC Laboratory Accreditation of Calibration No.0008 (TPA)
3.2 Instruments No.2.2 and 2.3 through NSC-ONSC Laboratory Accreditation of Calibration No.0061 (NFI)
3.3 Certified Reference Material No.2.4 to 2.6 traceable to CPAchem Ltd is accredited to ISO 17034 (ANSI accredited No. AR-1835)
3.4 Certified Reference Material No.2.7 traceable to Hach Lange GmbH is accredited to DIN EN ISO 17034 (DAkkS accredited No.D-RM-15164-01-00)
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.

Calibrated by: Mr.Manas Somsak Specialist
Approved by: (Mr.Pheraphat Tuanjit)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team
Date of Issue: 2 March 2026

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

F-CS-009 Revision: 02 Date: 01-10-68

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

Calibration Certificate

Certificate No.: 2601956-001-01
Page: 2 of 2

Calibration Condition:

Place of Calibration: Chemical Calibration Laboratory, National Food Institute
Environment Condition: Ambient Temperature (24.0 ± 0.2) °C Relative Humidity: (49.8 ± 2) %
Calibration Item Condition: Used Item Type: Bench top
Range: 0 - 14 pH Resolution: 0.01 pH, 1 mV

Calibration results:

1. Calibration of pH Meter (Manual Temperature Compensation at 25 °C)

Nominal pH	DC Voltage Standard (mV)	Average Indicator Reading mV	pH	Uncertainty (±mV)	Coverage Factor (k)
0	414.119	414	-0.01	0.58	2.00
2	295.813	296	1.99	0.58	2.00
4	177.463	178	4.00	0.58	2.00
6	59.159	59	6.00	0.58	2.00
7	0.000	0	7.00	0.58	2.00
8	-59.159	-59	8.00	0.58	2.00
10	-177.462	-177	10.00	0.58	2.00
12	-295.813	-296	12.00	0.58	2.00
14	-414.119	-414	14.00	0.58	2.00

2. Calibration of pH Meter with Electrode (Manual Temperature Compensation at 25 °C)

Equipment: pH Electrode Manufacturer: METTLER TOLEDO Model: InLab Solids
Serial No.: C507554932 ID.No.: N/A Type: Combined Electrode

Performance of Electrode system (Three-Point Calibration at pH 4, 7 and 9)

Certified Value @25 °C (pH)	Average Indicator Reading pH	Relative Slope (%)	Uncertainty (± pH)	Coverage Factor (k)
4.008	4.01	184	0.0071	2.00
7.000	7.00	8	0.0086	2.00
10.010	10.01	-166	0.0085	2.00
6.876	6.88	15	0.0071	2.00

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

----- End of Report -----

F-CS-009 Revision: 02 Date: 01-10-68

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

Calibration Certificate

Certificate No.: 2601956-002-01
Page: 1 of 2

Equipment: Digital Thermometer with RTD (pH Meter)
Manufacturer: METTLER TOLEDO
Model: SevenEasy pH
Serial No.: 1231155210
ID No.: UAE.WAT.010/2553
Order No.: 2601956
Operation No.: 2601956-002
Date of Receipt: 20 February 2026
Date of Calibration: 23 February 2026
Customer Name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road,
Bangchack, Prakhonong, Bangkok 10260

Metrological traceability:

1. Calibration Method:
- NFI Method W-TE-025 : based on comparison with a standard thermometer.
- TM-CG01-TT01-V04: CALIBRATION OF DIGITAL THERMOMETER WITH TEMPERATURE SENSORS.
- The temperature scale used in this laboratory is the International Temperature Scale of 1990 (ITS-90).

2. Reference Standard Instrument:

Instrument	Model / Type	Serial No. / ID No.	Certificate No.	Due Date	Through
HANDHELD THERMOMETER	1523	2118154	PSL-T 0926/68	26-Jun-26	TISTR
Platinum Resistance Thermometer (PRT)	5627A	877332			

Support Equipment : - Low Temperature Bath (AMETEC RTC-187), Model: RTC-187C, S/N: 670930-00018

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 Somsak Specialist
Approved by: (Mr.Pheraphat Tuanjit)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team
Date of Issue: 2 March 2026

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

F-CS-009 Revision: 02 Date: 01-10-68

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

Calibration Certificate

Certificate No.: 2601956-002-01
Page : 2 of 2

Calibration Condition :
Equipment: Digital Thermometer with RTD
UUC* Resolution: 0.1 °C
Condition of the item: Normal & Good
Without adjustment / AS FOUND

Place of Calibration: Chemical Calibration Laboratory
National Food Institute
Environment Conditions: Ambient Temperature (23.1 ± 0.3) °C
Relative Humidity (49.8 ± 2) %
Line Voltage (220 ± 10) V.

Calibration results:

- Temperature Measurement Results

Calibration Point (°C)	Standard Thermometer Value (°C)	UUC* Reading Value (°C)	UUC* Correction Value (°C)	Measurement Uncertainty (± °C)
20	20.002	20.1	-0.1	0.098
25	25.001	25.1	-0.1	0.098
30	30.003	30.1	-0.1	0.098

Note

- UUC* : Unit Under Calibration
- The probe was immersed in a liquid bath or a dry bath to a minimum depth of 120 mm.
- Description of probe, model : N/A S/N : N/A
- Dimension of probe : Diameter 4 mm. Length 120 mm. Sheath material: Plastic

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-CS-009 Revision: 02 Date: 01-10-68

2008 อาคารศูนย์บริการ 36 หมู่ 5 ตำบลบางพลีใหญ่ อำเภอบางพลี จังหวัดสมุทรปราการ
2008 Soi 36, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
Tel : +66(0) 2422 8588 Fax : +66(0) 2422 8545



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

- Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY57013711	25LM117	TPA	17 Jul 2026

- This certificate is valid only to the item calibrated on date and place of calibration.
- This measurement result is traceable to the International System of Unit maintained through :

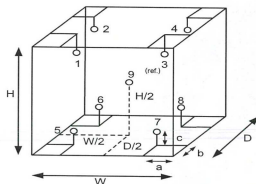
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Not Available

Environment during calibration		
	Beginning	Finished
Temp. (°C)	26	25
REL.Humid. (%)	48	49
AC Supply (Volt)	221	220



Probe Installation Details :

Dimension of Chamber :

a = 10 cm	D = 0.62 m
b = 10 cm	W = 1.2 m
c = 10 cm	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.: 26TM196
Page : 1 of 3

Equipment : BOD Incubator
Manufacturer : Arco
Model : UC4-1320
Serial No. : 13URC4S013201
ID No. : UAE.WAO.015/2561

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 2026
Calibration Date : 03 February 2026
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Krisda Malee

Approved by :

Approved Signatory

- () Chakrit Waewwanjua
- () Suwit Imjai
- (✓) Kunchit Promprat

Issue Date : 17 February 2026

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม



Equipment : BOD Incubator
Condition As-Received : Used Item
Reference : 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)
	Position									
	1	2	3	4	5	6	7	8	9 (ref.)	
20.0	20.079	19.917	20.065	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

เอกสารไม่ควบคุม

Calibration Certificate

Substitute for Certificate No.: 2602300-002-01

Certificate No.: 2602300-002-02

Page : 1 of 2

Equipment: **CHAMBER (Incubator)**

Manufacturer: ARCO

Model: UR-1320

Serial No.: N/A

ID No.: UAE.WAO.018/2551

Order No.: 2602300

Operation No.: 2602300-002

Date of Receipt: 11 March 2026

Date of Calibration: 12 March 2026

Customer Name: UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.

Address: 3 Soi Udomsuk 41, Sukhumvit Road,

Bangchak, Phrakhanong, Bangkok 10260

Metrological traceability:

1. Calibration Method:

- This instrument was calibrated by inserting 9 standard thermometers into its chamber, in accordance with W-TE-014.
- based on TLAS G-20-102-08 (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	34972A RTD	MY59002902 CH101-109/ RTD101-109	2502797-002-01	3 May 2026	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. Manas Somsak Specialist**

Approved by:

(Mr. Phraphat Tuntit)

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

Date of Issue: 27 March 2026

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

F-CS-911 Revision 02 Date: 01-10-68

เอกสารไม่ควบคุม



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UAE United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel: 0 2763 2828 Fax 0 2763 2800 www.uaconsultant.com E-mail: uae@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 Udom suk 41, Sukhumvit Rd., Bang Chak, Phat 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:

Suwit Chotnok

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

Calibration Certificate

Certificate No.: 2602300-002-02

Page : 2 of 2

Calibration Condition:

Equipment: **CHAMBER (Incubator)**

UUC* Resolution: 0.1 °C

Condition of the item: Normal & Good

Without adjustment / As Found

- Time of record 1 hour 9 minute / point

Place of Calibration: Laboratory

UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.

Environment Conditions: Ambient Temperature (27.3 ± 1) °C

Relative Humidity (47.6 ± 4) %

Line Voltage (222 ± 3) V.

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	
20.0	20.19	20.19	19.89	19.83	19.87	19.97	19.78	20.01	20.06	0.71

Table 2 : Reporting of Characterization Results

UUC* Setting (°C)	Max	UUC* Reading (°C)	Average	Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
20.0	20.2	20.0	20.1	0.58	0.28	1.41

Note

- UUC* : Unit Under Calibration

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

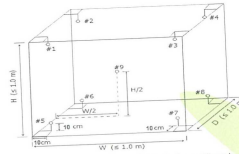
- Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

- 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 installation should be reported.

Fresh air Damper	Open	Position
X	Close	100% Fan speed
-	Not Available	
Dimension of inside chamber and sensor installation location (cm)		
W x H x D	120 x 130 x 60	
a x b x c	10 x 10 x 10	



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 -----

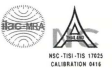
F-CS-911 Revision 02 Date: 01-10-68

เอกสารไม่ควบคุม



2008 36 ถนนสุขุมวิท แขวงคลองตันใต้ เขตวัฒนา กรุงเทพมหานคร 10700
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Certificate No.: 260311-2-BL002-26

Code No.: BL002-26

Page : 2 of 4

Equipment: Electronic Balance

Model: XSR205DU

Serial No.: C009071872

Max. Capacity: 81 g / 220 g

Calibration Date: March 12, 2026

Condition As-Received: In Condition

Manufacturer: Mettler Toledo

Readability: 0 to 81 (g): 0.01 mg > 80 to 200 (g): 0.1 mg

ID No.: UAE.WAO.012/2563

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 UKAS Lab 14 : 2022

2. Reference Standards:

Reference Standard:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (OIML)	1 mg to 1 kg	C510641605	METTLER TOLEDO GmbH	C510641605	Mettler-Toledo GmbH	03-Mar-27
Standard Weight Class E2 (OIML)	1 mg to 1 kg	B749109122	AMARC	25-009359	Mettler-Toledo	21-Jan-27

Instrument

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hydro-Baro Meter	MHB-382SD	AK-46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hydro-Baro Meter	MHB-382SD	AK-46457	TPA	25P4464	TPA	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 SC5 0032

7. Through the reference standard laboratory of AMARC 25-009359, TSI 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 (g)	2 (g)	3 (g)	4 (g)	5 (g)	Maximum Difference (g)
100.0000	100.0000	100.0000	100.0000	100.0000	0.0000

Suwit Chotnok

เอกสารไม่ควบคุม

Certificate of Calibration

Certificate No.: 260318-1-BL008-26
Code No.: BL008-26
Page: 1 of 3

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

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: XSR204
Serial No.: C117635043
Asset No.: UAE.WAS.012/2564

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 22.3 °C
Humidity start 56.7 % end 61.7 %
Pressure start 755.1 mmHg end 754.8 mmHg

Calibrated by: Thanachat Chatpahol

Approved by: Suwit Chotnok

Signature: *Suwit Chotnok*

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)

เอกสารไม่ควบคุม

Certificate No.: 260318-1-BL008-26
Code No.: BL008-26
Page: 3 of 3

Equipment: Electronic Balance
Model: XSR204
Serial No.: C117635043
Max. Capacity: 220 g
Calibration Date: April 3, 2026

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	0.11	2.09
1	1.0000119	1.0001	-0.0001	0.11	2.09
5	5.0000148	5.0001	-0.0001	0.11	2.09
10	10.0000330	10.0001	-0.0001	0.11	2.09
20	20.0000280	20.0001	-0.0001	0.12	2.08
40	40.0000540	40.0002	-0.0001	0.13	2.05
50	50.0000370	50.0001	-0.0001	0.13	2.05
60	60.0000700	60.0002	-0.0001	0.14	2.04
80	80.0000980	80.0003	-0.0002	0.16	2.00
100	100.0000420	100.0003	-0.0003	0.16	2.00
120	120.0000680	120.0004	-0.0003	0.19	2.00
160	160.0001120	160.0004	-0.0003	0.23	2.00
200	200.0001460	200.0005	-0.0004	0.26	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	20.0001	-0.0001
	40.000054	40.0001	0.0000
	60.000070	60.0002	-0.0001
	80.000098	80.0002	-0.0001
	100.000042	100.0003	-0.0002

Remark: -

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.: 260318-1-BL008-26
Code No.: BL008-26
Page: 2 of 3

Equipment: Electronic Balance
Model: XSR204
Serial No.: C117635043
Max. Capacity: 220 g
Calibration Date: April 3, 2026
Condition As-Received: In Condition

Manufacturer: Mettler Toledo
Readability: 0.0001 g
ID No.: UAE.WAS.012/2564

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 UKAS Lab 14: 2022
2. Reference Standards:

Reference Standard:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (OIML)	1 mg to 1 kg	B749109122	METTLER TOLEDO GmbH	CS10641605	METTLER TOLEDO GmbH	3-Mar-27

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHB 382SD	AK.46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hygro-Baro Meter	MHB 382SD	AK.46457	TPA	25P4664	TPA	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 CS10641605, SAS accreditation number SC5 0032

Calibration Result:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
200*	0.000055

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.

The balance readings obtained are given in the table.

1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	Maximum Difference (g)
100.0003	100.0004	100.0001	100.0003	100.0006	0.0003

Suwit Chotnok

เอกสารไม่ควบคุม

Certificate No.: 260318-1-BL008-26
Code No.: BL008-26
Page: 3 of 3

Equipment: Electronic Balance
Model: XSR204
Serial No.: C117635043
Max. Capacity: 220 g
Calibration Date: April 3, 2026

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	0.11	2.09
1	1.0000119	1.0001	-0.0001	0.11	2.09
5	5.0000148	5.0001	-0.0001	0.11	2.09
10	10.0000330	10.0001	-0.0001	0.11	2.09
20	20.0000280	20.0001	-0.0001	0.12	2.08
40	40.0000540	40.0002	-0.0001	0.13	2.05
50	50.0000370	50.0001	-0.0001	0.13	2.05
60	60.0000700	60.0002	-0.0001	0.14	2.04
80	80.0000980	80.0003	-0.0002	0.16	2.00
100	100.0000420	100.0003	-0.0003	0.16	2.00
120	120.0000680	120.0004	-0.0003	0.19	2.00
160	160.0001120	160.0004	-0.0003	0.23	2.00
200	200.0001460	200.0005	-0.0004	0.26	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	20.0001	-0.0001
	40.000054	40.0001	0.0000
	60.000070	60.0002	-0.0001
	80.000098	80.0002	-0.0001
	100.000042	100.0003	-0.0002

Remark: -

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

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

CERTIFICATE OF CALIBRATION

Certificate No.: SP26-013 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 : Agilent Technologies

Model : Cary 60

Serial No.: MY15410009

ID No.: UAE.WAT.020/2558

Received Date : 18 May 2026

Calibration Date : 18 May 2026

Issue Date : 21 May 2026

Condition Instrument : Good

Calibrated by : *Mr. Pacit Mathavorn*
(Mr.Pacit Mathavorn)
Calibration Engineer

Approved by : *Ms. Chonticha Sangngern*
(Ms.Chonticha Sangngern)
Quality Manager

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

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

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DQE Services Co.,Ltd.

DQE Services

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

NIST-101-115 17025
CALIBRATION 0404

REPORT OF CALIBRATION

Certificate No. : SP26-013

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 Starna Scientific Limited

Spectral Band Width of UUC : 1.5 nm.

Scan Speed of UUC : 60 nm/min

Scan Interval of UUC : 0.15 nm.

Resolution of UUC : Photometric 0.000 Abs.

Wavelength 0.1 nm.

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FM-708-02 R01 1/11/2021

DQE Services Co.,Ltd.

DQE Services

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

NIST-101-115 17025
CALIBRATION 0404

REPORT OF CALIBRATION

Certificate No. : SP26-013

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	0.0001	-0.0001	0.0028	2.00
	0.5772	0.5731	0.0041	0.0031	2.00
	1.0478	1.0427	0.0051	0.0029	2.00
	2.1879	2.1782	0.0097	0.0075	2.00
440	0.0000	0.0000	0.0000	0.0028	2.00
	0.5581	0.5574	0.0007	0.0034	2.00
	1.0224	1.0210	0.0014	0.0035	2.00
	2.1227	2.1159	0.0068	0.0083	2.00
465	0.0000	0.0000	0.0000	0.0028	2.00
	0.5225	0.5184	0.0041	0.0029	2.00
	0.9628	0.9603	0.0025	0.0028	2.00
	1.9744	1.9698	0.0046	0.0073	2.00
546.1	0.0000	0.0000	0.0000	0.0028	2.00
	0.5174	0.5150	0.0024	0.0031	2.00
	0.9990	0.9964	0.0026	0.0033	2.00
	1.9953	1.9884	0.0069	0.0085	2.00
590	0.0000	0.0000	0.0000	0.0028	2.00
	0.5508	0.5491	0.0017	0.0030	2.00
	1.0801	1.0781	0.0020	0.0029	2.00
	2.0356	2.0274	0.0082	0.0078	2.00
635	0.0000	0.0000	0.0000	0.0028	2.00
	0.5579	0.5570	0.0009	0.0031	2.00
	1.0512	1.0491	0.0021	0.0029	2.00
	1.9257	1.9201	0.0056	0.0079	2.00

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FM-708-02 R01 1/11/2021

DQE Services Co.,Ltd.

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NIST-101-115 17025
CALIBRATION 0404

REPORT OF CALIBRATION

Certificate No. : SP26-013

Page 4 of 5

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
235	0.0000	0.0000	0.0000	0.0050	2.00
	0.7455	0.7457	-0.0002	0.0056	2.00
257	0.0000	0.0000	0.0000	0.0050	2.00
	0.8656	0.8669	-0.0013	0.0059	2.00
313	0.0000	0.0000	0.0000	0.0050	2.00
	0.2910	0.2907	0.0003	0.0051	2.00
350	0.0000	0.0000	0.0000	0.0050	2.00
	0.6414	0.6414	0.0000	0.0055	2.00

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FM-708-02 R01 1/11/2021

DQE Services Co.,Ltd.

DQE Services

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NIST-101-115 17025
CALIBRATION 0404

REPORT OF CALIBRATION

Certificate No. : SP26-013

Page 5 of 5

Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor k
241.70	241.6	0.10	0.18	2.00
279.44	279.2	0.24	0.18	2.00
287.71	287.6	0.11	0.18	2.00
334.02	333.5	0.52	0.18	2.00
360.89	360.2	0.69	0.18	2.00
418.53	417.8	0.73	0.18	2.00
445.82	445.2	0.62	0.18	2.00
453.67	453.0	0.67	0.18	2.00
459.99	459.6	0.39	0.18	2.00
536.52	536.4	0.12	0.18	2.00
638.00	638.2	-0.20	0.18	2.00
431.22	430.5	0.72	0.18	2.00
472.66	472.2	0.46	0.18	2.00
513.39	513.3	0.09	0.18	2.00
528.90	528.7	0.20	0.18	2.00
572.99	573.6	-0.61	0.18	2.00
585.19	585.7	-0.51	0.20	2.00
684.50	684.5	0.00	0.18	2.00
741.02	741.2	-0.18	0.20	2.00
748.56	749.0	-0.44	0.18	2.00
807.02	806.8	0.22	0.18	2.00
879.41	879.4	0.01	0.18	2.00

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FM-708-02 R01 1/11/2021

Remark : - UUC = Unit Under Calibration

- N/A = Not Available

- The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k ,
which for a normal distribution corresponds to a coverage probability of approximately 95%

- * Indicates not TISI accredited

- End of Certificate -

DQEServices32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com



NSC-TIS-175 1723
CALIBRATION DATA

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, Bangchak, Phrakhanong, 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 : 18 May 2026

Calibration Date : 18 May 2026

Issue Date : 21 May 2026

Condition Instrument : Good

Calibrated by : 

Approved by : 

(Mr.Pacit Mathavorn)

(Ms.Chonticha Sangngern)

Calibration Engineer

Quality Manager

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

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

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NSC-TIS-175 1723
CALIBRATION DATA

REPORT OF CALIBRATION

Certificate No. : SP26-014

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 Starna Scientific Limited

Spectral Band Width of UUC : 5.0 nm.

Scan Speed of UUC : 40

Scan Interval of UUC : 0.1 nm.

Resolution of UUC : Photometric 0.001 Abs.

Wavelength 0.1 nm.

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FM-708-02 R01 1/11/2021

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NSC-TIS-175 1723
CALIBRATION DATA

REPORT OF CALIBRATION

Certificate No. : SP26-014

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
	0.5772	0.574	0.0032	0.0031	2.00
	1.0478	1.043	0.0048	0.0029	2.00
	2.1879	2.182	0.0059	0.0082	2.00
440	0.0000	0.000	0.0000	0.0028	2.00
	0.5581	0.556	0.0021	0.0034	2.00
	1.0224	1.020	0.0024	0.0035	2.00
	2.1227	2.121	0.0017	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	1.974	0.0004	0.0070	2.00
546.1	0.0000	0.000	0.0000	0.0028	2.00
	0.5174	0.514	0.0034	0.0031	2.00
	0.9990	0.996	0.0030	0.0033	2.00
	1.9953	1.995	0.0003	0.0087	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	1.078	0.0021	0.0029	2.00
	2.0356	2.028	0.0076	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	1.923	0.0027	0.0083	2.00

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FM-708-02 R01 1/11/2021

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NSC-TIS-175 1723
CALIBRATION DATA

REPORT OF CALIBRATION

Certificate No. : SP26-014

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
	0.7455	0.744	0.0015	0.0056	2.00
257	0.0000	0.000	0.0000	0.0050	2.00
	0.8656	0.863	0.0026	0.0059	2.00
313	0.0000	0.000	0.0000	0.0050	2.00
	0.2910	0.290	0.0010	0.0051	2.00
350	0.0000	0.000	0.0000	0.0050	2.00
	0.6414	0.640	0.0014	0.0055	2.00

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FM-708-02 R01 1/11/2021

REPORT OF CALIBRATION

Certificate No. : SP26-014

Page 5 of 5

Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor <i>k</i>
241.00	240.3	0.70	0.18	2.00
279.30	278.9	0.40	0.18	2.00
288.90	288.2	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
528.59	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
684.70	684.2	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 result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k .

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

- * Indicates non TISI accredited

- End of Certificate -

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FM-708-02 R01 1/11/2021

CERTIFICATE OF CALIBRATION

Certificate No. : COF-045-68

Page 1 of 2 Pages

MEASUREMENT ITEM : Top Load Orifice
MANUFACTURER : TISCH
MODEL/TYPE : TE-5025A
SERIAL NUMBER : 3540
ID NUMBER : UAE EFM.176/2561
CONDITION AS-RECEIVED : Used item
CUSTOMER : United Analyst and Engineering Consultant Co., Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong,
Bangkok 10260

RECEIVED DATE : 20 Oct 2025
MEASUREMENT DATE : 30 Oct 2025
ISSUE DATE : 30 Oct 2025

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH
Atmospheric Pressure : 1010 ± 10 hPa

CALIBRATION CONDITION:

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are 23.2 °C and 48.3 %RH.

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibration procedure:
The Orifice gas flow device was calibrated against Standard Rotary Displacement Meter (Roots Meter) Model G65/IMC/W2-4p. The WI-CL-004 was used as a calibration guideline.

Traceability:
This certificate provides a traceability of the measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: NMW-0016-25.

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

MEASUREMENT RESULTS:

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

Table 1: The results of Q Standard calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_{meter} mmHg	$\Delta p_{Orifice}$ inH ₂ O	γ	Standard Flow [Q_s] m^3/min
1	0.701	758.426	23.16	22.28	57.504	1.637	1.282	0.653
2	1.002	758.497	23.31	22.57	61.950	3.314	1.824	0.926
3	1.115	758.592	23.34	22.66	41.295	4.360	2.092	1.061
4	1.163	758.673	23.42	22.87	30.200	4.879	2.213	1.122
5	1.413	758.682	23.67	23.13	29.302	7.272	2.700	1.364

Slope (m): 1.99178
Intercept (b): -0.01980
Correlation coefficient (r): 0.99989
Uncertainty (k=2): 0.015 m^3/min

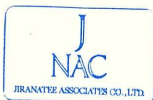
Table 2: The results of Q actual calibration data

Plate	Flow rate m^3/min	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	Δp_{meter} mmHg	$\Delta p_{Orifice}$ inH ₂ O	γ	Standard Flow [Q_s] m^3/min
1	0.701	758.426	23.16	22.28	57.504	1.637	0.800	0.650
2	1.002	758.497	23.31	22.57	61.950	3.314	1.138	0.922
3	1.115	758.592	23.34	22.66	41.295	4.360	1.305	1.057
4	1.163	758.673	23.42	22.87	30.200	4.879	1.381	1.118
5	1.413	758.682	23.67	23.13	29.302	7.272	1.687	1.361

Slope (m): 1.24752
Intercept (b): -0.01234
Correlation coefficient (r): 0.99989
Uncertainty (k=2): 0.015 m^3/min

End of Certificate of Calibration

Calibrated by:
☐ Mr. Sorawit Thachalad
☒ Miss Jittraporn Lertsomphol



Approved signatory: Mr. Parinya Booncharoen
Calibration Department Manager

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

Certificate of Calibration

Certificate No.: 25P3505
Page: 1 of 2

Equipment : U-Tube Manometer
Manufacturer: Dwyer
Model : 1221-36-W/M
Serial No.: -
ID No.: UAE.EFM.020/2560

Condition As-Received: Used Item
Received Date: 03 September 2025
Calibration Date: 09 September 2025

Reference: 2509-0144WSC
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: 1010 mbar

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.

Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong,
Bangkok 10280.

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

Condition of this result of calibration

1. Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Calibrator	PC106P	1189	MP-0218-24	24 Sep 2025

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

3. Scale and conversion factor is $1 \text{ kPa} = 4.0146293 \text{ inH}_2\text{O}$

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

5. This instrument was calibrated by applied pressure to high-port (+) side and low-port (-) side open to atmospheric pressure.

6. This instrument was installed in vertical orientation and top of the pressure port was used as the reference level.

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

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

-National Institute of Metrology (Thailand), NSC-ONSC Accredited No. Calibration 0144

Calibrated by: Suksan Khankaew
Issue Date: 10 September 2025

Approved Signatory:
[] Phalinee Prabpaipal
[] Sura Suwannasri
[✓] Attapol Panurach

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Cert.No.: 25P3505
Page: 2 of 2

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

Range: 0 inH₂O to 36 inH₂O
Scale Interval: 0.1 inH₂O (The Second Estimate)

Applied Pressure	High-port side	Low-port side	Δp	Error
0.00	0.00	0.00	0.00	0.00
2.00	0.95	-1.05	2.00	0.00
4.00	1.95	-2.05	4.00	0.00
6.00	2.95	-3.05	6.00	0.00
8.00	3.95	-4.05	8.00	0.00
10.00	4.95	-5.05	10.00	0.00
12.00	5.95	-6.05	12.00	0.00
14.00	7.00	-7.05	14.05	0.05
16.00	8.00	-8.05	16.05	0.05
18.00	9.00	-9.10	18.10	0.10
20.00	10.00	-10.10	20.10	0.10
22.00	11.05	-11.10	22.15	0.15
24.00	12.05	-12.10	24.15	0.15
26.00	13.05	-13.10	26.15	0.15
28.00	14.05	-14.10	28.15	0.15
30.00	15.05	-15.05	30.10	0.10
32.00	16.10	-16.05	32.15	0.15
34.00	17.10	-17.05	34.15	0.15
35.70	18.00	-17.90	35.90	0.20

The uncertainty of measurement was $\pm 0.11 \text{ inH}_2\text{O}$

* ΔP = High-port side - Low-port side

* UUC = Unit Under Calibration

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

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Certificate of Calibration

Certificate No. : 26P666
Page : 1 of 2

Equipment : Aneroid Barometer

Manufacturer : Barigo

Model : -

Serial No. : -

ID No. : UAE.ANV.121/2550

Condition As-Received: Used Item

Received Date: 03 February 2026

Calibration Date: 10 February 2026

Reference: 2602-0052WSC

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

Ambient Temperature: (23 ± 2) °C

Relative Humidity: (50 ± 15) %

Atmospheric Pressure: 1009 mbar

This certificate may not be reproduced other than in full,
except with the prior written approval of the head of
Calibration Services and environmental analysis department.

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

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

Condition of this result of calibration

1. Reference standards instruments :

Instrument

Model

Serial No.

Certificate No.

Due Date

1) Standard Barometer

DPI142

1422505046

MP-0053-25

05 Apr 2026

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

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

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

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

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

-National Institute of Metrology Thailand (NIMT)

Calibrated by : Nopparat Phongam
Issue Date : 12 February 2026

Approved Signatory : Attapol P.

[] Phalinee Prabpalpal

[] Sura Suwannasri

[x] Attapol Panurach

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B 0223559



Cert.No.: 26P666
Page: 2 of 2

Result of calibration:- Without adjustment

Range : 960 hPa to 1070 hPa

Function:- Absolute Pressure Measurement

Scale Interval : 1 hPa (The Fifth Estimate)

Increasing Pressure

Applied Pressure (hPa)	956.50	968.10	978.63	988.95	999.51	1004.64	1009.50	1019.53	1030.10	1067.43
UUC* Indication (hPa)	960.0	970.0	980.0	990.0	1000.0	1005.0	1010.0	1020.0	1030.0	1060.0
Error (hPa)	3.50	1.90	1.37	1.05	0.49	0.36	0.50	0.47	-0.10	-7.43

Decreasing Pressure

Applied Pressure (hPa)	1067.44	1029.98	1019.15	1009.01	1004.37	999.16	988.57	978.38	967.70	956.34
UUC* Indication (hPa)	1060.0	1030.0	1020.0	1010.0	1005.0	1000.0	990.0	980.0	970.0	960.0
Error (hPa)	-7.44	0.02	0.85	0.99	0.63	0.84	1.43	1.62	2.30	3.66

The uncertainty of measurement was ± 0.33 hPa

* UUC = Unit Under Calibration

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

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Certificate of Calibration

Certificate No. : 26H713
Page : 1 of 2

Equipment : Dial Thermo-Hygrometer

Manufacturer : Barigo

Model : -

Serial No. : -

ID No. : UAE.ANV.132/2550

Condition As-Received: Used Item

Received Date: 10 April 2026

Calibration Date: 17 April 2026

Reference: 2604-0315WSC

Ambient Temperature: (25 ± 3) °C

Relative Humidity: (50 ± 20) %

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except with the prior written approval of the head of
Corporate Services 3: Equipment Calibration and Testing Services.

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

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

Procedure used: Calibration were conducted using in-house calibration procedure CP-H02 according to comparison
with standard chilled mirror sensor for humidity measurement function and comparison with standard
temperature probe for temperature measurement function into humidity / temperature chamber.

Condition of this result of calibration

1. Reference standards instruments :

Instrument

Model

Serial No.

Certificate No.

Due Date

1) Chilled-Mirror Hygrometer

Dew Master

41292

23277

06 May 2026

2) Handheld Thermometer With Sensor

1523

5717096

2511200

21 Nov 2026

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

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

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

Calibrated by : Kraipop Onrat
Issue Date : 23 April 2026

Approved Signatory : Viporn

[] Chakrit Waewwanjua

[] Pornthippa Tameyakul

[x] Viporn Tantiyawutti

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Cert. No.: 26H713
Page: 2 of 2

Result of Calibration:- Before Adjustment
Function: Humidity Measurement.

Reference Temperature	Standard Humidity	UUC* Reading	UUC* Correction	Uncertainty of Measurement
(°C)	(%R.H.)	(%R.H.)	(%R.H.)	(±%R.H.)
25.0	40.1	42	-1.9	1.6
25.0	60.0	59	1.0	1.7
25.0	80.0	75	5.0	1.9

Result of Calibration:- After Adjustment
Function: Humidity Measurement.

Reference Temperature	Standard Humidity	UUC* Reading	UUC* Correction	Uncertainty of Measurement
(°C)	(%R.H.)	(%R.H.)	(%R.H.)	(±%R.H.)
25.0	40.1	43	-2.9	1.6
25.0	60.0	60	0.0	1.7
25.0	80.0	76	4.0	1.9

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

Standard Temperature	UUC* Reading	UUC* Correction	Uncertainty of Measurement
(°C)	(°C)	(°C)	(±°C)
20.012	20.5	-0.488	0.65
25.028	25.0	0.028	0.65
30.005	29.5	0.505	0.65
35.019	34.5	0.519	0.65
40.040	39.5	0.540	0.65

UUC* : Unit Under Calibration

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

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Certificate of Calibration

Customer :
Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,
Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong,
Bangkok 10260

Unit Under Calibration Details
Measurement Item : Air Flow Meter
Manufacturer : TSI
Model : 4146
Serial Number : 41461922007
ID : UAE.EFM.223/2562
Location of Calibration : LAB 4 AIR VELOCITY METER
Calibration Environment and Details
Temperature : 23 °C ± 3 °C
Humidity : 55 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 18 August 2025
Calibration Date : 25 August 2025
Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator

Certificate No : 25-AFM-186
Request No : Req-2025-1900

Sensor Model : -
Sensor Serial Number : -
Instrument Status : Used

Reference Standard	Model	Serial Number	Traceble	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	5 May 2026
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	6 May 2026
Temperature meter	GT 11	12000077	Qreborn	15 October 2025
Pressure meter	CPG2400	41000KDU/651882	TPA	21 October 2025

Traceability :
This certificate is traceable to SI Unit through Sensidyne A2LA Accreditation No. 3943.01 and MIT NSC-TISI-TIS Accreditation No. 0052
Note :
The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibration By :

Mr. Noppadon Luangart
Service Calibration Engineer

Approved By :

Mr. Pacit Mathavorn
Calibration Engineer Supervisor
Issue Date : 25 August 2025

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The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.
FM-708-AFM-01 Rev.06 Issue date 21/2/25

Verification Certificate of Calibration

Unit Under Calibration Details
Measurement Item : Air Flow Meter
Manufacturer : TSI
Model : 4146
Serial Number : 41461922007
ID : UAE.EFM.223/2562

Refer to Certificate No : 25-AFM-186
Sensor Model : -
Sensor Serial Number : -
Instrument Status : Used

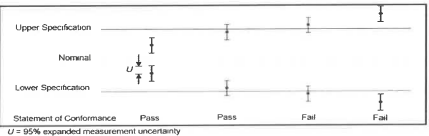
Reference Standard	Model	Serial Number	Traceble	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	5 May 2026
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	6 May 2026
Temperature meter	GT 11	12000077	Qreborn	15 October 2025
Pressure meter	CPG2400	41000KDU/651882	TPA	21 October 2025

Tolerance 2 % of Reading or 0.05 LPM whichever is greater (Manufacturer's Specifications)

Result of Calibration : Without Adjustment					
STD Reading	UUC Reading	Error	Allowable Range	Uncertainty	Pass / Fail
Flow (l/min)	Flow (l/min)	Flow (l/min)	Flow (l/min)		
0.021	0.020	-0.001	0.005	0.0016	Pass
0.051	0.050	-0.001	0.005	0.0040	Pass
0.101	0.100	-0.001	0.005	0.0036	Pass
0.200	0.200	0.000	0.005	0.0072	Pass
0.495	0.500	0.005	0.010	0.0095	Pass
0.992	1.000	0.008	0.020	0.019	Pass
1.688	1.700	0.012	0.034	0.032	Pass
1.984	2.000	0.016	0.040	0.038	Pass
2.981	3.000	0.019	0.060	0.057	Pass
3.987	4.000	0.013	0.080	0.076	Pass
4.986	5.000	0.014	0.100	0.095	Pass

Decision Rule for Statements of Conformity
The standard decision rule employed for the statements of conformity to each calibration result will be applied using ILAC-G8:09/2019; Guidelines on the Reporting of Compliance with Specification as following Figure Graphical representation of a Binary Statement for Simple Acceptance Rule, and statements
Pass = The measurement result were within the limit.
Fail = The measurement result were outside the limit.

Upper Specification
Nominal
Lower Specification



Statement of Conformance
Pass Pass Fail Fail
 $U = 95\%$ expanded measurement uncertainty

End of Verification

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Certificate No : 25-AFM-186
Request No : Req-2025-1900

Result of Calibration : Without Adjustment

STD Reading			UUC Reading			Error	Uncertainty		
Temperature (°C)	Pressure (kPa)	Flow (l/min)	Temperature (°C)	Pressure (kPa)	Flow (l/min)		(l/min)	(°C)	(kPa)
25.9	100.28	0.021	-	-	0.020	-0.001	0.0016	1.0	0.50
25.9	100.27	0.051	-	-	0.050	-0.001	0.0040	1.0	0.50
25.8	100.26	0.101	-	-	0.100	-0.001	0.0036	1.0	0.50
25.9	100.25	0.200	-	-	0.200	0.000	0.0072	1.0	0.50
26.1	100.25	0.495	-	-	0.500	0.005	0.0095	1.0	0.50
26.6	100.20	0.992	-	-	1.000	0.008	0.019	1.0	0.50
26.6	100.16	1.688	-	-	1.700	0.012	0.032	1.0	0.50
26.7	100.10	1.984	-	-	2.000	0.016	0.038	1.0	0.50
26.9	100.07	2.981	-	-	3.000	0.019	0.057	1.0	0.50
27.3	99.97	3.987	-	-	4.000	0.013	0.076	1.0	0.50
27.5	99.88	4.986	-	-	5.000	0.014	0.095	1.0	0.50

Note
STD : Standard UUC : Unit Under Calibration
- UUC Reference Condition : 21.1 °C, 101.3 kPa, Air
- Flow Rate was corrected for non-standard operating condition by using equation :
$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P_{meas}} \times \frac{T_{meas}}{T_{ref}}$$

where Q = Flow Rate P = Absolute Pressure T = Absolute Temperature
meas = Measurement Condition ref = Standard Condition

* Indicates non accredited
End of Certificate

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The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.
FM-708-AFM-01 Rev.06 Issue date 21/2/25

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CALIBRATION SERVICES AND ENVIRONMENTAL ANALYSIS DEPARTMENT
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL: 0-2717-3000-24 FAX: 0-2719-9484



Certificate of Calibration
Certificate No. : 26P876
Page : 1 of 2

Equipment : Barometer
Manufacturer: Barigo
Model : -
Serial No.: -
ID No.: UAE.ANV.013/2547
Condition As-Received: Used Item
Received Date: 25 February 2026
Calibration Date: 27 February 2026
Reference: 2602-0927WC
Submitted by: United Analyst and Engineering Consultant Co.,Ltd.
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: 1012 mbar
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260
Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to in-house calibration procedure CP-P10, using " DKD-R 6-1 ; Calibration of Pressure Gauges, Edition 03/2014 " as a guidelines.

Condition of this result of calibration
1.Reference standards instruments :
Instrument Model Serial No. Certificate No. Due Date
1) Standard Barometer DP1142 1422505046 MP-0053-25 05 Apr 2026
2.This instrument was installed in vertical orientation and center of the dial was used as the reference level.
3.This result of calibration was made on requested at the point specified by customer.
4.Scale and conversion factor is 1 kPa =7.50062 mmHg
5.This instrument was used clean air as pressure media.
6.This result of calibration was found accurate as shown on date and place of calibration only.
7.This Certification is traceable to the International System of Unit maintained at:-
-National Institute of Metrology Thailand (NIMT)

Calibrated by : Sakchai Aonta
Issue Date : 05 March 2026
Approved Signatory :

[] Phalinnee Prabpaipal
[] Sura Suwannasri
✓ Attapol Panurach

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R 01193404



Cert.No.: 26P876
Page: 2 of 2

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

Range: 720 mmHg to 780 mmHg
Scale Interval: 1 mmHg (The Fifth Estimate)

Applied Pressure (mmHg)	717.96	729.92	739.67	749.99	760.20	770.95	783.21
UUC* Indication (mmHg)	720.0	730.0	740.0	750.0	760.0	770.0	780.0
Error (mmHg)	2.04	0.08	0.33	0.01	-0.20	-0.95	-3.21

Applied Pressure (mmHg)	783.20	770.93	759.92	749.66	739.37	728.71	717.76
UUC* Indication (mmHg)	780.0	770.0	760.0	750.0	740.0	730.0	720.0
Error (mmHg)	-3.20	-0.93	0.08	0.34	0.63	1.29	2.24

The uncertainty of measurement was ± 0.24 mmHg
* UUC = Unit Under Calibration

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

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Athapol P.

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๑ 0926437



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484



Certificate of Calibration

Certificate No.: 25H1369
Page: 1 of 2

Equipment: Digital Thermo-Hygrometer
Manufacturer: Digicon

Model: TH-02A
Serial No.: 435031145

ID No.: UAE.EFM.003/2567

Condition As-Received: Used Item

Received Date: 04 July 2025

Calibration Date: 08 July 2025
to 15 July 2025

Reference: 2507-0215WSC

Ambient Temperature: (25 ± 3) °C

Relative Humidity: (50 ± 20) %

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except with the prior written approval of the head of
Corporate Services 3: Equipment Calibration and Testing Services.

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

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

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

Condition of this result of calibration

1.Reference standards instruments:

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Dew Point Hygrometer	Optidew 401	164756	TH-0005-25	05 Feb 2026
2) Handheld Thermometer With Sensor	1523	5717096	2411241	18 Nov 2025

2.The 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:-

-National Institute of Metrology (Thailand), NSC-ONSC Accredited No. Calibration 0144

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

Calibrated by: Somchai Dumwor
Issue Date: 21 July 2025

Approved Signatory:
[] Chakrit Waewwanjua
[] Pornthippa Tameyakul
[x] Viporn Tantayawutti

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Cert. No.: 25H1369
Page.: 2 of 2

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

Reference Temperature (°C)	Standard Humidity (%R.H.)	UUC* Reading (%R.H.)	Correction (%R.H.)	Uncertainty of Measurement (±%R.H.)
25.0	40.1	39	1.1	1.3
25.0	50.1	48	2.1	1.6
25.0	60.0	57	3.0	1.6
25.0	70.2	67	3.2	1.6

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

Standard Temperature (°C)	UUC* Reading (°C)	Correction (°C)	Uncertainty of Measurement (±°C)
19.953	20.4	-0.447	0.42
25.001	25.4	-0.399	0.42
30.043	30.3	-0.257	0.42
40.023	40.0	0.023	0.42

UUC*: Unit Under Calibration

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

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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 ± 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: Walalak Sirithean

Approved by:
Approved Signatory

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

Issue Date: 29 December 2025

The Uncertainties are for a confidence probability of approximately 95%

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Cert.No.: 25CH1473
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	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

Buffer Solution	Manufacturer	Lot No.	Exp. date
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 ($\pm$ 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



Cert.No.: 25CH1473
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 ($\pm$)	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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