

ภาคผนวก ฉ
เอกสารสอบเทียบเครื่องมือ

รายการรับรองสอบเทียบเครื่องมือวัดที่ประจำห้องปฏิบัติการสำหรับวิเคราะห์ความคุ้มค่าสิ่งแวดล้อม

เครื่องมือวัด/การตรวจวัด	หน่วยวัด/ค่า	หลักฐานการสอบเทียบ	ผู้สอบเทียบ/หน่วยงาน	วันที่สอบเทียบ	วันที่หมดอายุ
1 pH Meter	pH	Calibration Certificate	Technology Promotion Association (Thailand-Japan)	14 Jan 27	
2 UV-Vis Spectrophotometer	Optical Density (Residual Chlorine)	Calibration Certificate	DOF Services Co., Ltd.	18 May 26	17 May 27
3 Analytical Balance (Repeatability 0.1 mg)	Mass (g)	Calibration Certificate	DOF Services Co., Ltd.	3 Apr 26	2 Apr 27
4 Titermeter 0.1 ml	Volume (ml)	Calibration Certificate	DOF Services Co., Ltd.	12 Feb 26	11 Feb 27
5 Analytical Balance (Repeatability 0.01 mg)	Mass (g)	Calibration Certificate	DOF Services Co., Ltd.	12 Mar 26	11 Mar 27
6 Heat Air Oven	Temperature (°C)	Calibration Certificate	National Food Institute, Ministry of Industry, Thailand	11 Mar 26	10 Mar 27
7 BOD Incubator	Temperature (°C)	Calibration Certificate	National Food Institute, Ministry of Industry, Thailand	12 Mar 26	12 Mar 27

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

ใบนี้จัดทำขึ้นโดยห้องปฏิบัติการสอบเทียบมาตรฐาน ISO/IEC 17025:2017 โดย DSS, LTD.2025 โดย TSI



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.: 26CH64
Page.: 1 of 3

Equipment : pH Meter
Manufacturer : EcoSense
Model : pH100A
Serial No. : JC03335
ID No. : UAE.EFM.062/2562(ENV.pH.02/62)
Condition As-Received: Used Item
Received Date : 14 January 2026
Calibration Date : 15 January 2026
Reference : 2601-0395WSC-1
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road,
Bangchak, Phrakhanong, Bangkok 10260

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

Calibrated by : Warakorn Lemgatrakul

Approved by : 
Approved Signatory

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

Issue Date : 16 January 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.

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Cert.No.: 26CH64
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 CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835
: The measurement results are traceable to SI through Hach Lange GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-RM-15184-01-00

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	1150491	30 Oct 2027
pH 7.000	Hach Lange GmbH	C03319	17 Oct 2027
pH 10.010	CPA chem	1136355	16 Aug 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	0.58	2.00
S/N: JC03335	7.00	0.00	0	0.58	2.00
	7.00	0.00	0	0.58	2.00
	10.00	-177.48	-177	0.58	2.00

Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4.7)(7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor k
pH Electrode	4.008	4.01	169	0.0044	2.00
S/N: 240904SIA605377	7.000	7.00	-6	0.0095	2.00
	7.000	6.99	-6	0.0092	2.00
	10.010	10.01	-181	0.0095	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : -
- Serial No. : 240904SIA605377
Dimension of probe
- Length : 110 mm.
- Diameter : 12 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
15.0	15.002	15.1	0.098	0.13	2.00
30.0	30.003	30.1	0.097	0.13	2.00
45.0	45.001	45.0	-0.001	0.13	2.00

Remark - UUC* = Unit Under Calibration

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

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เอกสารไม่ควบคุม

DQE Services Co.,Ltd.

32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Bangkok 10230

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

DQE Services

NSC-TIS-115 1125 CALIBRATION DATA

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)

Calibration Engineer

Approved by :

(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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FM-708-02 R01 1/11/2021

DQE Services Co.,Ltd.

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

DQE Services

NSC-TIS-115 1125 CALIBRATION DATA

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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DQE Services

NSC-TIS-115 1125 CALIBRATION DATA

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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DQE Services

NSC-TIS-115 1125 CALIBRATION DATA

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

NSC-TIS-1718-17025

CALIBRATION 0416

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

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

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.uaeconsultant.com E-mail: uae@uaeconsultant.com

NSC-TIS-1718-17025

CALIBRATION 0416

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:

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)

UAE

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NSC-TIS-1718-17025

CALIBRATION 0416

Certificate No.: 260318-1-BL008-26

Code No.: BL008-26

Page: 2 of 3

Equipment: Electronic Balance

Manufacturer: Mettler Toledo

Model: XSR204

Readability: 0.0001 g

Serial No.: C117635043

ID No.: UAE.WAS.012/2564

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 : 2002

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 8749109122 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-38250 AK.46457 SUCCESS SG-H.00992/68 Success Gateway 26-Nov-26

Thermo-Hygro-Baro Meter MHB-38250 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.

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

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UAE

United Analyst and Engineering Consultant Co., Ltd.

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NSC-TIS-1718-17025

CALIBRATION 0416

Certificate No.: 260318-1-BL008-26

Code No.: BL008-26

Page: 3 of 3

Equipment: Electronic Balance

Manufacturer: Mettler Toledo

Model: XSR204

Readability: 0.0001 g

Serial No.: C117635043

ID No.: UAE.WAS.012/2564

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%

เอกสารไม่ควบคุม

Date: Feb 12, 2026
Job No.: 14590
Instrument: DT2520Customer: UAE
Address: Bangkok
Serial: 91905060

Start	Travel To Customer (Hrs)	Labour (Hrs)	Travel From Customer (Hrs)
Finish	13.30	15.00	1.5

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

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

Details of Work / Test
- PM
- Visual Check
+ No Leak
+ No Damage
- Change PM kit x 1 Set
- Function Check
+ Quick mode
+ Set Temp / timer
+ Pan
- heating
- Lift UP/down
- Clean x20 holes with dried hand
Instrument Ready for Use
OK
Not OK*

Part No.	Batch	Description	Q'ty
60079730	29.09.2025	Fold PM kit, Digestor 20 part, 12 unit	1

Signed FOSS	Signed Customer
Name: Anna / Patana / Sukkarn	Name: ปัทมา
Tel:	Tel:
Email:	Email:

*Remark: เอกสารไม่ครบชุด
Please scan QR codeEquipment: Electronic Balance
Model: XSR205DU
Serial No.: C009071872
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026
Condition As-Received: In ConditionManufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg > 80 to 200 (g): 0.1 mg
ID No.: UAE.WAO.012/2563Condition 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	03-Mar-27
Standard Weight Class E2 (OIML)	1 mg to 1 kg	B749109122	AMARC	25-009359	Mettler-Toledo	21-Jan-27

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHB-382SD	AK46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hygro-Baro Meter	MHB-382SD	AK46457	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	2	3	4	5	Maximum Difference (g)
(g)	(g)	(g)	(g)	(g)	
100.0000	100.0000	100.0000	100.0000	100.0000	0.0000

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, Phar Khanong, Bangkok 10260Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: XSR205DU
Serial No.: C009071872
Asset No.: UAE.WAO.012/2563
Building : UAE number 3 Floor : 2 Room : 208Received 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 mmHgCalibrated by: Thanachat Chatpahol
Approved by: Suwit Chotnok Signature: e.uit
Issued Date: March 16, 2026Note : 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)Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C009071872
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg > 80 to 200 (g): 0.1 mg
ID No.: UAE.WAO.012/2563Calibration 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: 0.00001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.000000	0.000000	0.015	2.25
0.001	0.0010020	0.001000	0.000000	0.015	2.23
0.005	0.0050025	0.005002	-0.000002	0.015	2.23
0.01	0.0100005	0.010002	-0.000002	0.015	2.23
0.05	0.0500003	0.050001	-0.000001	0.015	2.21
0.10	0.1000083	0.100002	-0.000001	0.015	2.20
0.50	0.5000121	0.500003	-0.000002	0.016	2.15
1	1.0000119	1.000001	0.000000	0.016	2.12
2	2.0000125	2.000003	-0.000001	0.017	2.09
5	5.0000146	5.000003	-0.000002	0.020	2.05
10	10.0000330	10.000005	-0.000002	0.023	2.00
20	20.0000028	20.000008	-0.000005	0.033	2.00
30	30.0000061	30.000010	-0.000004	0.051	2.00
40	40.0000054	40.000009	-0.000004	0.063	2.00
50	50.0000037	50.000008	-0.000005	0.064	2.00
60	60.0000070	60.000011	-0.000004	0.081	2.00
80	80.0000098	80.000011	-0.000001	0.11	2.00

Certificate No.: 260311-2-BL002-26
Code No.: BL002-26
Page: 4 of 4

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C09071872
Max. Capacity: 81 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.012/2563

Calibration Result: (Continued)
Calibration Range: > 80 to 200 (g)
Calibration Adjustment: Internal Calibration

4. Error of indication from nominal or conventional mass value: (Range: > 80 to 200 (g); Resolution: 0.0001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty ($\pm$ 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	140.0000960	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

5. 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
	100.00042	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%

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Calibration Certificate

Certificate No.: 2602300-001-01
Page : 1 of 2

Equipment: CHAMBER (Hot Air Oven)
Manufacturer: MEMMERT
Model: UF55
Serial No.: B212.0411
ID No.: UAE.WAO.005/2556
Order No.: 2602300
Operation No.: 2602300-001
Date of Receipt: 11 March 2026
Date of Calibration: 11 March 2026
Customer Name: UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Address: 3 Soi Udomsuk 41, Sukhumvit Road, Bangkok, Phrakhanong, Bangkok 10260

Metrological traceability:

- 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.
- Reference Standard Instrument:

Instrument	Model/Type	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A RTD	MY59002902 CH#201-209/ RTD#201-209	2502797-002-01	3 May 2026	NATIONAL FOOD INSTITUTE
- This certificate is traceable to the International System of Units (SI).
- This certificate is valid only for the instrument that was calibrated.
- 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
Date of Issue: 18 March 2026

Approved by (Mr. Pheraphat Tuanjit)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

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

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

เอกสารไม่ควบคุม



Calibration Certificate

Certificate No.: 2602300-001-01
Page : 2 of 2

Calibration Condition:

Equipment: CHAMBER (Hot Air Oven)
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 (29.8 $\pm$ 1.0) °C
Relative Humidity (47.8 $\pm$ 4) %
Line Voltage (222 $\pm$ 3) V.

Calibration Results:

Table1 : Reporting of Temperature

Calibration Point (°C)	Std.#1	Std.#2	Std.#3	Std.#4	Std.#5	Std.#6	Std.#7	Std.#8	Std.#9	Measurement Uncertainty (°C)
104.0	104.22	103.87	103.90	104.17	103.56	103.58	104.22	104.17	104.00	0.53
120.0	120.21	119.76	119.86	120.18	119.53	119.58	120.24	120.20	119.96	0.73
180.0	180.27	179.37	179.73	180.31	178.91	179.13	180.35	180.25	179.84	0.90

Table 2 : Reporting of Characterization Results

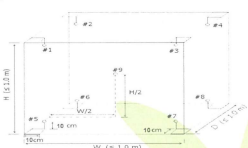
UUC* Setting (°C)	Max	UUC* Reading (°C) Min	Average	Stability $\pm$ (°C)	Uniformity (°C)	Overall Variation (°C)
104.0	104.0	104.0	104.0	0.05	0.44	0.75
120.0	120.0	120.0	120.0	0.06	0.43	0.79
180.0	180.0	180.0	180.0	0.07	0.93	1.56

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	40 x 40 x 33	
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-009 Revision: 02 Date: 01-10-68

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, Bangkok, Phrakhanong, Bangkok 10260

Metrological traceability:

- 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.
- Reference Standard Instrument:

Instrument	Model/Type	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A RTD	MY59002902 CH#101-109/ RTD#101-109	2502797-002-01	3 May 2026	NATIONAL FOOD INSTITUTE
- This certificate is traceable to the International System of Units (SI).
- This certificate is valid only for the instrument that was calibrated.
- 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
Date of Issue: 27 March 2026

Approved by (Mr. Pheraphat Tuanjit)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

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

F-CS-011 Revision: 02 Date: 01-10-68

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 (47.8 ± 4) %

Line Voltage (222 ± 3) V.

Calibration Results:

Table1 : 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) Min	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.

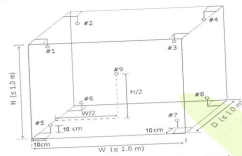
- Uniformity = The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time.

- 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 %.

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