

เอกสารแนบ 6

เอกสารสอบเทียบเครื่องมือที่ใช้ในการ
ตรวจวิเคราะห์

CERTIFICATE OF CALIBRATION

Equipment : Dissolved Oxygen and BOD Meter
Meter Model : HI5421-02
Probe Model : HI76438
Manufacturer : Hanna Instruments
Condition As-Received : Used Product
Ambient Temperature : (25 ± 2) °C
Customer name : Okla Testing & Consulting Service Co., Ltd.
Serial No. : 04240005101
Serial No. : KCIN66J5P
Made in : Romania
Reference : RE250379
Relative Humidity : (50 ± 15) % RH

67/35-36, 3RD Floor, Phetkasem 7/1 Road, Wat Tha Pra,
Bangkok Yai, Bangkok 10600 Thailand

Received date : 3 March 2025
Calibrate date : 20 March 2025
Issue date : 24 March 2025

Calibrated Location : Hanna Instruments (Thailand) Ltd.

Calibration Procedure : This calibrator was conducted by using in-house: calibration procedure
CP-11 by using certified reference material (CRM).

Calibrated by :

Approved by :

Authorized Signatory

This certificate was certified only for the instrument we calibrated.

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

** This certificate may not be reproduced other than in full, except with the prior written **
approval of the head of Hanna Instrument (Thailand)

Condition of this calibration result

1. Reference Standard Instruments : This certification is traceable to the international unit of thru Technology Promotion Association (Thailand-Japan).

Instruments	Model	Serial No.	Certificate No.
Thermometer with sensor	HI98509	39643D	24T1281
Digital Thermo-Hygrometer	HT-771SD	AI.07155	25H171

2. Reference Standard Materials : DO calibration standard traceable to Hanna Instrument Ltd.

Buffer Solution	Manufacture	Certified Value	Lot Number	Exp. date
Zero Oxygen Solution	Hanna	0.0 ± 0.1 @25°C	S0028/23	March 2028

Calibration Result

Inspection the accuracy of the Dissolved Oxygen (DO) Meter by using the following certificate reference material value.

Unit Under Calibration	CRM Standard	Actual value Reading	Error value Reading	Uncertainty of Measurement (±)
DO Electrode	DO	0.00 mg/L	0.00 mg/L	N/A
S/N KCIN66J5P	8.3 mg/L	8.26 mg/L	-0.04 mg/L	0.33 mg/L

The report 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 certificate **

CERTIFICATE OF CALIBRATION

Equipment : pH/mV and EC/TDS/Salinity/Resistivity Meter
Meter Model : HI5521-02 **Serial No. :** 04160019101
Probe Model : HI1131B **Serial No. :** 11271C0N
Resolution (pH) : 0.01 **Resolution (mV) :** 0.1
Manufacturer : Hanna Instruments **Made in :** Romania
Condition As-Received : Used Product **Reference :** RE250378
Ambient Temperature : (25 ± 2) °C **Relative Humidity :** (50 ± 15) % RH
Customer name : Okla Testing & Consulting Service Co., Ltd.

67/35-36, 3RD Floor, Phetkasem 7/1 Road, Wat Tha Pra,
Bangkok Yai, Bangkok 10600 Thailand

Received date : 3 March 2025
Calibrate date : 24 March 2025
Issue date : 24 March 2025

Calibrated Location : Hanna Instruments (Thailand) Ltd.

Calibration Procedure : This calibrator was conducted by using in-house: calibration procedure
CP-01, CP-02 by using certified reference material (CRM).

Calibrated by :

Approved by :

Authorized Signatory

This certificate was certified only for the instrument we calibrated.

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

** This certificate may not be reproduced other than in full, except with the prior written **
approval of the head of Hanna Instrument (Thailand)

Condition of this calibration result

1. Reference Standard Instruments : This certification is traceable to the international unit of unit maintained through:

Instruments	Model	Serial No.	Certificate No.	Traceable
Documenting Process Calibrator	Fluke 753	43160061	25E299	Technology Promotion Association (Thailand-Japan)
Thermometer with sensor	HI98509	36943D	24T1281	
Digital Thermo-Hygrometer	HT-771SD	AI.07155	25H171	

2. Reference Standard Materials : pH calibration standard traceable thru CPA chem Ltd.

Buffer Solution	Manufacture	Certified Value	Lot Number	Exp. date
pH 4.0	CPA chem	4.008 ± 0.006@25°C	996963	16 May 2025
pH 7.0	CPA chem	6.987 ± 0.007@25°C	1015026	19 July 2025
pH 10.0	CPA chem	10.010 ± 0.009@25°C	996965	16 May 2025

Calibration Result :

1. Performing standard curve by Simulator at: -177.5, 0.0, 177.5 mV
(Measurement Electrical Potential) After Adjust Result.

Unit Under Calibration	Nominal Value	Standard Voltage Input		Actual Reading		Uncertainty of Measurement (± mV)
		pH	mV	pH	mV	
pH Meter S/N 04160019101	4.01	4.01	177.5	4.01	177.5	0.097
	7.01	7.01	0.0	7.01	0.0	0.058
	10.01	10.01	-177.5	10.01	-177.5	0.097

2. Performing three buffer standard curve by using buffer nominal : pH 4,7,10 After Adjustment.

Unit Under Calibration	Standard pH Buffer Solution	Actual Reading (pH)	Actual Reading (mV)	Uncertainty of Measurement (± pH)
pH Electrode S/N 11271C0N	4.008	4.01	173.8	0.009
	6.987	6.98	4.5	0.010
	10.010	10.01	-170.6	0.014

The report 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 certificate **

CERTIFICATE OF CALIBRATION

Equipment : pH/mV and EC/TDS/Salinity/Resistivity Meter
Meter Model : HI5521-02 **Serial No. :** 04160019101
Probe Model : HI7662-W **Serial No. :** 0615024N
Resolution : 0.1 °C **Temperature Range :** (-20 to 120)°C
Manufacturer : Hanna Instruments **Made in :** Romania
Condition As-Received : Used Product **Reference :** RE250379
Ambient Temperature : (25 ± 2) °C **Relative Humidity :** (50 ± 15) % RH
Customer name : Okla Testing & Consulting Service Co., Ltd.

67/35-36, 3RD Floor, Phetkasem 7/1 Road, Wat Tha Pra,
Bangkok Yai, Bangkok 10600 Thailand

Received date : 3 March 2025
Calibrate date : 5 March 2025
Issue date : 6 March 2025

Calibrated Location : Hanna Instruments (Thailand) Ltd.
Calibration Procedure : This calibrator was conducted by using in-house: calibration procedure
CP-05 by using reference standard instruments.

Calibrated by :

Approved by :

Authorized Signatory



HANNA
Instruments
(Thailand) Limited

This certificate was certified only for the instrument we calibrated.

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

** This certificate may not be reproduced other than in full, except with the prior written **
approval of the head of Hanna Instrument (Thailand)

Condition of this calibration result

Reference Standard Instruments : This certification is traceable to the international unit of unit maintained through:

Instruments	Model	Serial No.	Certificate No.	Traceable
Documenting Process Calibrator with sensor	Fluke 753	43160061	251123	Technology Promotion Association (Thailand-Japan).
Digital Thermo-Hygrometer	HT-771SD	AI.07155	25H171	

Calibration Result :

Function : Temperature measurement

This equipment was connected with Temperature Sensor.

Probe : Stainless steel temperature probe and 1 m (3.3') cable.

Nominal Value (°C)	Standard Setting (°C)	UUC Reading (°C)	Error Value (°C)	Uncertainty (±°C)
20.0	20.00	20.0	0.00	0.18
25.0	25.00	25.0	0.00	0.18
30.0	30.00	30.0	0.00	0.18

The report 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 certificate **

CERTIFICATE OF CALIBRATION

Certificate No. : CDT-116-67

MEASUREMENT ITEM
MANUFACTURER
MODEL/TYPE
SERIAL NUMBER
ID NUMBER
CONDITION AS-RECEIVED
CUSTOMER

: Digital Thermometer with Temperature Sensor

: EUTECH

: ECO SCAN TEMPS

: 816366

: -

: Used item

: OKLA Testing and Consulting Service Co., Ltd.

: 67/35-36 Floor 3, Soi Petchakasem 7/1,

Petchakasem Rd, Watthapra, Bangkokkai, Bangkok 10600.

RECEIVED DATE

MEASUREMENT DATE

ISSUE DATE

: 01 Jul 2024

: 03 Jul 2024

: 04 Jul 2024

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature : 23.0 ± 3.0 °C

Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Page 1 of 2 Pages

Calibration procedure:
The temperature calibration was done by In-House calibration method as WI-CI-001 according to comparison method with standard digital temperature indicator and standard temperature probe. The temperature scale use was based on ITS-90.

Traceability:
The measurement results are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: T1-0047-24, Certificate number: ER-0101-23

Reference Used During Calibration:

1. Standard Temperature Probe
Model: STS-100 A500, Serial No.: 667682-09,
Due date: 26 Mar 2025
2. Digital Temperature Indicator
Model: DTI-1000-A MKII, Serial No.: 671407-00591 Due date: 14 Sep 2024

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'



Approved signatory:



Continuation of Certificate of Calibration Number CDT-116-67

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 30 °C

Function:

Table 3: This equipment was connected with Thermocouple sensor type K.
Dimension: Diameter 3 mm, Length 116 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.047	20.1	0.0	0.26
110	25.043	25.0	0.0	0.26
110	30.034	30.0	0.0	0.26

UUC*: Unit Under Calibration

End of Certificate of Calibration

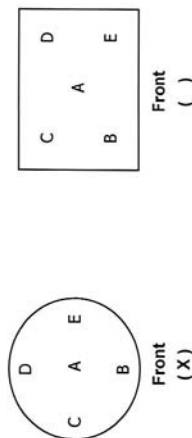


Certificate No. : MM25-1336
Page : 2 of 3

Calibration Result : Without Adjustment
Function : Repeatability
Maximum Capacity : 200 g
Resolution : 0.0001 g

Nominal Weight Value (g)	Instrument Deviation of Reading (g)
200	0.0000

Calibration Result : Without Adjustment
Function : Effect of Off Center Loading



A Mass of 100 Was Placed to various Position on the pan.
The Weight Machine Reading Obtained is Given in The Table

Load (g)	Measuring Positions					Maximum Different (g)
	A (g)	B (g)	C (g)	D (g)	E (g)	
100	100.0001	100.0000	100.0001	100.0003	100.0002	100.0001
						0.0003

Calibration Result : Without Adjustment
Function : Effect of Tare

Nominal Tare Weight (g)	Standard Weight (g)	UUC* Reading (g)	UUC* Deviation (g)
100	Tare	0.0000	0.0000
	At 20 %	20.0000	0.0000
	At 40 %	40.0001	-0.0001
	At 60 %	60.0001	-0.0001
	At 80 %	80.0002	-0.0002
	At 100 %	100.0001	-0.0001

UUC* = Unit Under Calibration

Rev.03/ Feb 2024

FM-MM-002

Certificate No. : MM25-1336
Page : 1 of 3

Certificate of Calibration

Customer : บริษัท โกลา เทคโนโลยี แอนด์คอนโซลติ้ง เซอร์วิส จำกัด
Address : 67/35-36 ถนน 3 รอบพระนคร เขตบางกอกใหญ่ กรุงเทพมหานคร 10600

Description : Electronic Balance
Manufacturer : Sartorius
Model : BSA224S-CW
Serial No. : 35790699
Identification No. : N/A
Calibration Place : On Site Calibration was Carried out at th
Laboratory Environmental, Okla Testing &
Consulting Service Co.,Ltd.

Order No. : 0562/25
Received date : Feb 19, 2025
Calibration date : Feb 19, 2025
Environment Condition :
Temperature : (25 $\pm$ 10) °C
Humidity : (50 $\pm$ 30) %RH
Atm. Pressure : (1010 $\pm$ 10) hPa

Calibration Method : Calibration were conducted using In-house calibration procedure CP-MM-001
According to comparison with Standard Weight Set E1.
The calibration methods based on UKAS - LAB 14 : 2022

Reference Standard Instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
Standard Weight Set	NC-001-0.2K-E1-ASS	0022	PL-512	Oct 10, 2026

The effect that the result relate only to the items calibrated. If was found accurate as shown on date and place of calibration only.

Traceability : This measurement are traceable to the International System of Unit (SI), through
National Institute of Metrology Thailand (NIMT)

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k = 2, providing a level of confidence of not less than 95%

Calibrated by

Approved by

Issue date : Feb 25, 2025

This calibration certificate shall not be reproduced other than in full except with the prior written approval of Intech Metrological Center Co.,Ltd

Rev.03/ Feb 2024

FM-MM-002



Intech Metrological Center Co.Ltd.
39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,
Saimai, Bangkok 10220, Thailand
Tel. (662) 909-8820 (Auto 10 lines) www.imcinsrument.com



Intech Metrological Center Co.Ltd.
39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,
Saimai, Bangkok 10220, Thailand
Tel. (662) 909-8820 (Auto 10 lines) www.imcinsrument.com



Certificate No. : MM25-1336
Page : 3 of 3

Calibration Result : Before Adjustment
Function : Departure of indication from nominal value

Standard Weight Value (g)	UUC* Reading (g)	UUC* Correction (g)	Uncertainty of Measurement (+/- g)
0.00000	0.0000	0.00000	0.000058
0.01000	0.0100	-0.00003	0.000058
0.05000	0.0501	-0.00007	0.000058
0.10000	0.1005	-0.00047	0.000058
0.20000	0.20000	0.00000	0.000059
0.50000	0.5003	-0.00030	0.000059
1.00000	1.0000	0.00000	0.000059
10.00001	10.0005	-0.00049	0.000064
49.99999	50.0008	-0.00081	0.000090
99.99998	100.0014	-0.00142	0.000114
149.99997	150.0021	-0.00210	0.00027
199.99996	200.0023	-0.00234	0.00027

UUC* = Unit Under Calibration

Calibration Result : After Adjustment

Standard Weight Value (g)	UUC* Reading (g)	UUC* Correction (g)	Uncertainty of Measurement (+/- g)
0.00000	0.0000	0.00000	0.000058
0.01000	0.0100	0.00000	0.000058
0.05000	0.0500	0.00000	0.000058
0.10000	0.1001	0.00010	0.000058
0.20000	0.20000	0.00000	0.000059
0.50000	0.5002	0.00020	0.000059
1.00000	1.0000	0.00000	0.000059
10.00001	10.0001	0.00009	0.000064
49.99999	50.0002	0.00025	0.000090
99.99998	100.0001	0.00015	0.00014
149.99997	150.0005	0.00057	0.00027
199.99996	200.0000	0.00007	0.00027

UUC* = Unit Under Calibration

Certificate of Calibration

Certificate No. : MT25-2374
Page : 1 of 2

Customer : บริษัท โกลา เทคส์ อินเตอร์เนชั่นแนล เซอร์วิส จำกัด
Address : 67/35-36 ชั้น 3 ซอยเพชรเกษม 7/1 แขวงวัดบางพลีใหญ่ เขตภาษีเจริญ กรุงเทพมหานคร 10600

Description : Hot Air Oven
Manufacturer : KWF
Model : SOV70B
Serial No. : KWF2021021902
Identification No. : OKLA-LAB-013/170621
Calibration Place : On site calibration was carried out at th Laboratory
Environmental, Okla Testing & Consulting Service Co.,Ltd.

Order No. : 0562/25
Received date : Feb 19, 2025
Calibration date : Feb 19, 2025
Environment Condition :
Temperature : (25+/-10) °C
Humidity : (50+/-30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure CP-MT-006 According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

Reference Standard Instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
Data Acquisition System with Sensor	DAQ970A	MY58029872	MT24-6542	Aug 23, 2025

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k = 2, providing a level of confidence of not less than 95%



Calibrated by : [Redacted]

Approved by : [Redacted]

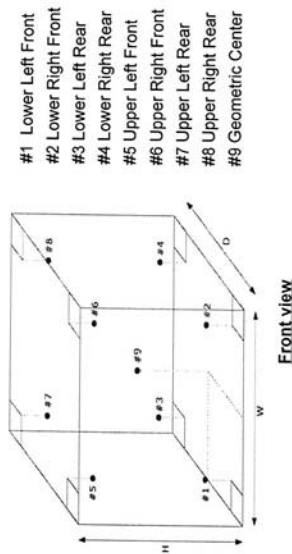
Issue date : Feb 24, 2025

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Function : Temperature measurement
Calibration point : 104, 180 °C
Certificate No. : MT25-2374
Page : 2 of 2
Result : Without adjustment
Resolution : 1 °C

Calibration point (°C)	Temperature of UUC* at each position (°C)									Uncertainty of measurement (+/- °C)
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
104	104.039	104.963	105.217	104.164	104.451	104.033	104.570	105.168	104.635	0.82
180	180.431	181.588	180.850	180.819	180.829	180.240	180.081	180.682	180.685	1.3

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (+/- °C)	Measured uniformity (°C)	Overall variation (°C)
104.0	104.3 to 104.6	0.45	1.1	1.8
180.0	180.4 to 180.6	1.0	1.7	3.2



UUC* = Unit under calibration
Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.
Overall Variation = Difference of temperature value between the maximum and minimum any time.
Stability = One half of the maximum difference of measured temperatures at any one probe.

Certificate of Calibration

Certificate No. : MT25-2372
Page : 1 of 2

Customer : บริษัท โกลลา เทคส์ แอนด์คอนเซ็ปต์ เซอร์วิส จำกัด
Address : 67/35-36 ชั้น 3 ซอยเพชรเกษม 7/1 แขวงวัดบางพลีใหญ่ เขตบางพลี กรุงเทพมหานคร 10600

Description : Incubator
Manufacturer : S-Cool
Model : SM61M
Serial No. : 18021147
Identification No. : OKLA-LAB-011/190
Calibration Place : On site calibration was carried out at th Laboratory Environmental, Okla Testing & Consulting Service Co.,Ltd.

Order No. : 0552/25
Received date : Feb 19, 2025
Calibration date : Feb 19, 2025
Environment Condition :
Temperature : (25+/-10) °C
Humidity : (50+/-30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure CP-MT-006 According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

Reference Standard Instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
Data Acquisition System with Sensor	DAQ970A	MY58029872	MT24-6542	Aug 23, 2025

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor = 2, providing a level of confidence of not less than 95%



Calibrated by :

Approved by :

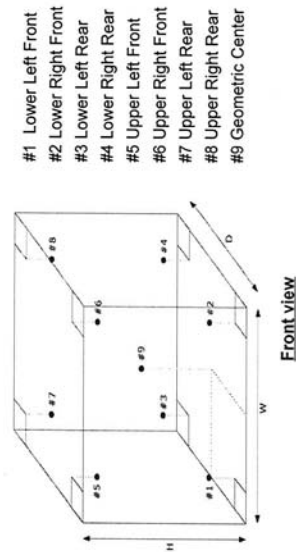
Issue date :

This calibration certificate shall not be reproduced other than in full except with the prior written approval of Inctech Metrological Center Co.,Ltd

Certificate No. : MT25-2372
Page : 2 of 2
Function : Temperature measurement
Calibration point : 20 °C
Result : Without adjustment
Resolution : 0.1 °C

Calibration point (°C)	Temperature of UUC* at each position (°C)									Uncertainty of measurement (+/- °C)
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
20	19.570	19.223	19.044	19.241	19.733	19.622	19.052	19.328	19.518	0.31

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (+/- °C)	Measured uniformity (°C)	Overall variation (°C)
20.0	20.0	0.10	0.56	0.80



UUC* = Unit under calibration
Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.
Overall Variation = Difference of temperature value between the maximum and minimum any time.
Stability = One half of the maximum difference of measured temperatures at any one probe.

Certificate of Calibration

Certificate No. : MT25-2373
Page : 1 of 2

Customer : บริษัท โกลา เทคโนโลยี แอนด์คอนโซล โซลูชั่น จำกัด
Address : 67/35-36 ชั้น 3 ถนนพหลโยธิน แขวงจตุจักร เขตจตุจักร กรุงเทพมหานคร 10600
Description : Freezer (Refrigerator)
Manufacturer : Sanden
Model : SPB-0500
Serial No. : SPB0500-231007454
Identification No. : N/A
Calibration Place : On site calibration was carried out at th Laboratory Environmental, Okla Testing & Consulting Service Co.,Ltd.
Order No. : 0562/25
Received date : Feb 19, 2025
Calibration date : Feb 19, 2025
Environment Condition :
Temperature : (25+/-10) °C
Humidity : (50+/-30) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure CP-MT-006 According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

Reference Standard Instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
Data Acquisition System with Sensor	DAQ970A	MY58029872	MT24-6542	Aug 23, 2025

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k = 2, providing a level of confidence of not less than 95%



Calibrated by : [Redacted]

Approved by : [Redacted]

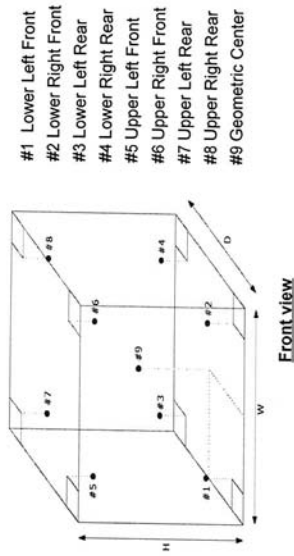
Issue date : Feb 24, 2025

This calibration certificate shall not be reproduced other than in full except with the prior written approval of Inctech Metrological Center Co.,Ltd

Function : Temperature measurement
Calibration point : 4 °C
Certificate No. : MT25-2373
Page : 2 of 2
Result : Without adjustment
Resolution : 0.1 °C

Calibration point (°C)	Temperature of UUC* at each position (°C)									Uncertainty of measurement (+/- °C)
	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	
4	3.611	4.126	3.430	4.142	3.751	4.393	3.436	3.890	4.103	0.41

Setting temperature (°C)	Indicating Temperature (°C)	Measured stability (+/- °C)	Measured uniformity (°C)	Overall variation (°C)
4.0	4.0	0.27	0.94	1.3



UUC* = Unit under calibration
Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.
Overall Variation = Difference of temperature value between the maximum and minimum any time.
Stability = One half of the maximum difference of measured temperatures at any one probe.

CERTIFICATE OF CALIBRATION

Certificate No. : CRT-061-67

Page 1 of 2 Pages

MEASUREMENT ITEM : Digital Thermo Hygrometer
MANUFACTURER : KEPLER Instrument
MODEL/TYPE : KTH-02
SERIAL NUMBER : 234011889
ID NUMBER : -
CONDITION AS-RECEIVED : Used item
CUSTOMER : OKla Testing and consulting services Co., Ltd.
67/35-36, 3rd Fl, Petchkasem soi 7/1, Wat Thapra,
Bangkokkya, Bangkok, Thailand 10600.

Calibration procedure:
The Relative humidity and Air Temperature calibration was done by In-House calibration method as WI-CL-009 and WI-CL-010 according to comparison method with Standard Chilled Mirror hygrometer with Temperature sensor and standard Humidity generator chamber.

Traceability:
The measurements are traceable to the International System of units (SI) through National Institute of Metrology Thailand (NIMT). Certificate number: 1H-0079-23 and through Jiranatee Associates Co., Ltd. Certificate number: CDT-001-67.

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'

RECEIVED DATE : 16 Dec 2024
MEASUREMENT DATE : 19 Dec 2024
ISSUE DATE : 19 Dec 2024

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

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

Calibrated by:

Approved signat:

Calibration Department Manager

Measurement Results:

The results of calibration and associated measurement uncertainties are reported in the table below.

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Table 1: The results of calibration of air temperature are reported in table below.

Calibration Range: 20 °C to 30 °C

Determined (°C)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty ±(°C)
20.00	20.06	20.6	0.5	0.31
25.00	25.04	25.3	0.3	0.31
30.00	30.04	29.6	-0.4	0.31

Table 2: The results of calibration of relative humidity at 23 °C are reported in table below.

Calibration Range: 35%RH to 70%RH

Air Temperature (°C)	Standard Reading (%RH)	UUC Reading (%RH)	Error (%RH)	Uncertainty ±(%RH)
23.04	34.74	36	1	1.0
23.04	44.71	43	-2	1.3
23.00	59.68	58	-2	1.8
23.03	69.61	66	-4	1.8

UUC*: Unit Under Calibration

End of Certificate of Calibration



CERTIFICATE OF CALIBRATION

Certificate No. : CRT-062-67

Page 1 of 2 Pages

MEASUREMENT ITEM : Digital Thermo Hygrometer
MANUFACTURER : KEPLER Instrument
MODEL/TYPE : KTH-02
SERIAL NUMBER : 23401890
ID NUMBER : -
CONDITION AS-RECEIVED : Used item
CUSTOMER : Okla Testing and consulting services Co., Ltd.
67/35-36, 3rd Fl, Petchkasem soi 7/1, Wat Thapra,
Bangkokkai, Bangkok, Thailand 10600.

Calibration procedure:
The Relative humidity and Air Temperature calibration was done by In-House calibration method as WI-CL-009 and WI-CL-010 according to comparison method with Standard Chilled Mirror hygrometer with Temperature sensor and standard Humidity generator chamber.

Traceability:
The measurements are traceable to the International system of units (SI) through National Institute of Metrology Thailand (NIMT). Certificate number: 1H-0079-23 and through Jiranatee Associates Co., Ltd. Certificate number: CDT-001-67.

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'

RECEIVED DATE : 16 Dec 2024
MEASUREMENT DATE : 19 Dec 2024
ISSUE DATE : 19 Dec 2024

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:

Approved signatory:



Continuation of Certificate of Calibration Number: CRT-062-67

Measurement Results:

The results of calibration and associated measurement uncertainties are reported in the table below.

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Table 1: The results of calibration of air temperature are reported in table below.

Calibration Range: 20 °C to 30 °C

Determined (°C)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty ±(°C)
20.00	20.06	20.2	0.1	0.31
25.00	25.04	25.4	0.4	0.31
30.00	30.04	30.3	0.3	0.31

Table 2: The results of calibration of relative humidity at 23 °C are reported in table below.

Calibration Range: 35%RH to 70%RH

Air Temperature (°C)	Standard Reading (%RH)	UUC Reading (%RH)	Error (%RH)	Uncertainty ±(%RH)
23.03	34.75	34	-1	1.0
23.03	44.71	43	-2	1.3
23.05	59.61	58	-2	1.8
23.04	69.59	67	-3	1.8

UUC*: Unit Under Calibration

End of Certificate of Calibration



Certificate of Calibration

Certificate No. : 68-300112-8

Page : 1 of 2

Submitted by

: Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3rd Floor, Petekasem 7/1, Petekasem Rd.,

Watthapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment

: Burette

Manufacturer : ISOLAB

Class : A

Capacity : 25 ml

Graduation : 0.05 ml

ID No. : EM-MBR10002/17

Environment

: Ambient Temperature : (20 ± 3) °C

: Relative Humidity : (50 ± 10) %

: Air Pressure : 1014.5 mbar.

Date of Received

: 05 February 2025

Date of Calibration

: 10 February 2025

Date of Issue

: 10 February 2025

Calibrated by

: Wipa Tovadee

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.

Cert. No.

Due Date

Traceability

241003

67-200410-2

02 Jun 2025

National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 68-300112-8

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Delivery Time : 38.96 sec.

Nominal Volume (ml)	Measuring Volume (ml)
5	5.0000
15	14.9944
25	24.9967

Uncertainty of measurement with in $\pm$ 0.0066 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

-o0o-



Certificate of Calibration

Certificate No. : 68-300113-2

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3rd Floor, Petchkasem 7/1, Petchkasem Rd.,
Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Cylinder

Manufacturer : DURAN Class : A

Capacity : 100 ml Graduation : 1 ml

ID No. : CY100/01

Environment : Ambient Temperature : (20 $\pm$ 3) °CRelative Humidity : (50 $\pm$ 10) %

Air Pressure : 1009.6 mbar.

Date of Received : 05 February 2025

Date of Calibration : 10 February 2025

Date of Issue : 10 February 2025

Calibrated by : Arcerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No. Cert. No. Due Date Traceability

241002 67-200410-1 02 Jun 2025

National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor

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Certificate of Calibration

Certificate No. : 68-300113-2

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
50	50.22
100	100.30

Uncertainty of measurement with in $\pm$ 0.063 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

-o0o-

Certificate of Calibration

Certificate No. : 68-300113-1

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co., Ltd.

67/35-36, 3rd Floor, Petchkasem 7/1, Petchkasem Rd.,
Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Cylinder

Manufacturer : FAVORIT Class : A

Capacity : 50 ml Graduation : 1 ml

ID No. : CY50/01

Environment : Ambient Temperature : (20 $\pm$ 3) °CRelative Humidity : (50 $\pm$ 10) %

Air Pressure : 1009.6 mbar.

Date of Received : 05 February 2025

Date of Calibration : 10 February 2025

Date of Issue : 10 February 2025

Calibrated by : Arcerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No. Cert. No. Due Date Traceability

241002 67-200410-1 02 Jun 2025

National Institute of Metrology (Thailand) (NIMT)

Approved by :

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 68-300113-1

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
50	50.32

Uncertainty of measurement with in $\pm$ 0.054 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

-c00-



Certificate of Calibration

Certificate No. : 68-300113-3

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3rd Floor, Petekkasem 7/1, Petekkasem Rd.,
Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Cylinder

Manufacturer : Borosil Class : A

Capacity : 500 ml Graduation : 5 ml

ID No. : 0334-58

Environment : Ambient Temperature : (20 $\pm$ 3) °CRelative Humidity : (50 $\pm$ 10) %

Air Pressure : 1009.6 mbar.

Date of Received : 05 February 2025

Date of Calibration : 10 February 2025

Date of Issue : 10 February 2025

Calibrated by : Areeat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No. Cert. No. Due Date Traceability

241002 67-200410-1 02 Jun 2025 National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 68-300113-3

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
500	499.63

Uncertainty of measurement with in $\pm$ 0.12 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

-o0o-

Certificate of Calibration

Certificate No. : 68-300113-1

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3rd Floor, Petchkasem 7/1, Petchkasem Rd.,
Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Measuring Pipette

Manufacturer : GLASSCO Class : A

Capacity : 1 ml Graduation : 0.01 ml

ID No. : EM-MER01001/19

Environment : Ambient Temperature : (20 ± 3) °C
Relative Humidity : (50 ± 10) %
Air Pressure : 1009.1 mbar.

Date of Received : 05 February 2025

Date of Calibration : 10 February 2025

Date of Issue : 10 February 2025

Calibrated by : Arcerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert.No.	Due Date	Traceability
241005	67-200410-4	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 68-300113-1

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Delivery Time : 5.22 sec.

Nominal Volume (ml)	Measuring Volume (ml)
0.1	0.1012
0.5	0.4994
1	0.9903

Uncertainty of measurement with in $\pm$ 0.0026 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

-o0o-



Certificate of Calibration

Certificate No. : 68-300113-2

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3rd Floor, Petchkasem 7/1, Petchkasem Rd.,
Wathappra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Measuring Pipette

Manufacturer : GLASSCO Class : A

Capacity : 5 ml Graduation : 0.05 ml

ID No. : EM-MER01001/18

Environment : Ambient Temperature : (20 $\pm$ 3) °CRelative Humidity : (50 $\pm$ 10) %

Air Pressure : 1009.1 mbar.

Date of Received : 05 February 2025

Date of Calibration : 10 February 2025

Date of Issue : 10 February 2025

Calibrated by : Areearat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	67-200410-4	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 68-300113-2

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Delivery Time : 9.60 sec.

Nominal Volume (ml)	Measuring Volume (ml)
0.5	0.5022
2.5	2.4836
5	4.9838

Uncertainty of measurement with in ± 0.0027 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

-o0o-



Certificate of Calibration

Certificate No. : 68-300113-3

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3rd Floor, Petchkasem 7/1, Petchkasem Rd.,
Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Measuring Pipette

Manufacturer : GLASSCO Class : A

Capacity : 10 ml Graduation : 0.1 ml

ID No. : EM-MER01001/17

Environment : Ambient Temperature : (20 ± 3) °CRelative Humidity : (50 ± 10) %

Air Pressure : 1009.1 mbar.

Date of Received : 05 February 2025

Date of Calibration : 10 February 2025

Date of Issue : 10 February 2025

Calibrated by : Arcerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	67-200410-4	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 68-300113-3

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Delivery Time : 11.06 sec.

Nominal Volume (ml)	Measuring Volume (ml)
1	1.0027
5	4.9761
10	9.9770

Uncertainty of measurement with in $\pm$ 0.0039 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

-o0o-



Certificate of Calibration

Certificate No. : 68-300112-6

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3rd Floor, Petchkasem 7/1, Petchkasem Rd.,
Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Volumetric Pipette

Manufacturer : GLASSCO

Class : A

Capacity : 20 ml

ID No. : EM-VPP20201/17

Environment : Ambient Temperature : (20 $\pm$ 3) °CRelative Humidity : (50 $\pm$ 10) %

Air Pressure : 1009.2 mbar.

Date of Received : 05 February 2025

Date of Calibration : 10 February 2025

Date of Issue : 10 February 2025

Calibrated by : Aweerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	67-2004110-4	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 68-300112-6

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Delivery Time : 14.98 sec.

Nominal Volume (ml)	Measuring Volume (ml)
20	19.9818

Uncertainty of measurement with in ± 0.0064 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

-o0o-

Certificate of Calibration

Certificate No. : 68-300113-4

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3rd Floor, Petchkasem 7/1, Petchkasem Rd.,

Waithapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Volumetric Flask

Manufacturer : SCI

Class : A

Capacity : 100 ml

ID No. : EM-VPP02501/17

Environment

Ambient Temperature : (20 ± 3) °CRelative Humidity : (50 ± 10) %

Air Pressure : 1010.3 mbar.

Date of Received : 05 February 2025

Date of Calibration : 10 February 2025

Date of Issue : 10 February 2025

Calibrated by : Arcerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241005	67-2004110-4	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 68-300113-4

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
100	99.981

Uncertainty of measurement with in $\pm$ 0.018 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

-o0o-

Certificate of Calibration

Certificate No. : 68-300113-5

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3rd Floor, Petchkasem 7/1, Petchkasem Rd.,
Watthapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Volumetric Flask
Manufacturer : Borosil
Capacity : 500 ml
ID No. : EM-VP02501/18
Class : A

Environment : Ambient Temperature : (20 ± 3) °C
Relative Humidity : (50 ± 10) %
Air Pressure : 1009.9 mbar.

Date of Received : 05 February 2025

Date of Calibration : 10 February 2025

Date of Issue : 10 February 2025

Calibrated by : Areearat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units
Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241002	67-200410-1	02 Jun 2025	National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Page : 2 of 2

Certificate No. : 68-300113-5

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
500	500.04

Uncertainty of measurement with in $\pm$ 0.075 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

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