

## เอกสารแนบ 6

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เอกสารสอบเทียบเครื่องมือที่ใช้ในการ  
ตรวจวิเคราะห์



## Certificate of Calibration

Certificate No. : 68-300307-6

Page : 1 of 2

Submitted by

: Special Lab Envi and Consultant Co., Ltd.

47/91-93 Moo 3, Tambol Tha-Ii, Pakkret, Nonthaburi 11120

Equipment

: Burette

Manufacturer : Witeg

Class : A

Capacity : 25 ml

Graduation : 0.05 ml

ID No. : LB-Gw-001

Environment

: Ambient Temperature : ( 20 ± 3 ) °C

Relative Humidity : ( 50 ± 10 ) %

Air Pressure : 1009.5 mbar.

Date of Received : 19 April 2025

Date of Calibration : 25 April 2025

Date of Issue : 25 April 2025

Calibrated by : Areerat 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. : 241005

Cert. No. : 67-200410-4

Due Date : 02 Jun 2025

Traceability

National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor



## Certificate of Calibration

Certificate No. : 68-300307-6

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 : 40.04 sec.

Nominal Volume ( ml )	Measuring Volume ( ml )
10	10.0003
20	20.0008
25	25.0101

Uncertainty of measurement with in ± 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%

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## Certificate of Calibration

Certificate No. : 68-400236-1

Page : 1 of 2

Submitted by :

Special Lab Envi and Consultant Co., Ltd.

47/91-93 Moo 3, Tambol Tha-I, Pakkred, Nonthaburi 11120

Equipment :

Digital Thermometer with Thermocouple probe Type K  
Temperature Indicator

Manufacturer : Thermo Scientific

Model : TEMP 10K

Range : -250 °C to 1372 °C

Resolution : 0.1 °C

Serial No. : 4008958

ID No. : LB-Eq-013

Environment :

Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Line Voltage : (220 ± 22) VAC

Date of Received : 19 April 2025

Date of Calibration : 22 April to 24 April 2025

Date of Issue : 24 April 2025

Calibrated by : Chotrip Samchusri

**Calibration Method :** This instrument was calibrated by In-house method comparison technique CAL-M4003 by compared with PRT in the liquid bath at the constant controlled temperature.

The temperature scale used was based on ITS-90

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

1. Platinum Resistance Thermometer (PRT)

ID No.	Cert. No.	Due Date	Traceability
400001	TT-0023-24	16 Feb 2026	National Institute of Metrology Thailand (NIMT)
400016	TT-0053-23	15 May 2025	National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No.	Cert. No.	Due Date	Traceability
400003	23E1866	01 Jun 2025	National Institute of Metrology Thailand (NIMT)
400004	23E1866	01 Jun 2025	National Institute of Metrology Thailand (NIMT)

Approved by :

( Permpon Champhu )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 68-400236-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function :

Temperature measurement with Thermocouple probe Type K

Model : Type K Sheath Material : Teflon

Diameter : 2 mm. Length : 1500 mm.

Serial No. : N/A ID No. : SL-39

Immersion Depth ( mm. )	Standard Reading ( °C )	UUC Reading ( °C )	Correction ( °C )	Uncertainty ( ± °C )
130	3.0028	3.5	-0.5	0.18
130	20.0022	20.5	-0.5	0.18
130	104.0020	104.2	-0.2	0.45
130	150.0022	150.3	-0.3	0.58
130	180.0023	178.8	1.2	0.65

Model : AD-1218-230 Sheath Material : Stainless

Diameter : 3.5 mm. Length : 230 mm.

Serial No. : N/A ID No. : SL-40

Immersion Depth ( mm. )	Standard Reading ( °C )	UUC Reading ( °C )	Correction ( °C )	Uncertainty ( ± °C )
124	380.0057	379.5	0.5	1.5
124	399.9903	399.3	0.7	1.6

Remark

UUC : Unit Under Calibration

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  $k = 2$ , providing a level of confidence of approximately 95%

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## Certificate of Calibration

Certificate No. : 68-200127-1

Page : 1 of 2

Submitted by :

Special Lab Envi and Consultant Co., Ltd.

47/91-93 Moo 3, Tambol Tha-It, Pakkret, Nonthaburi 11120

Equipment :

Electronic Balance

Manufacturer : AND Model : GR-200

Serial No. : 14245322 ID No. : LB-Eq-016

Capacity : 210 g Resolution : 0.0001 g

Environment :

On site calibration was carried out at the Laboratory,

Special Lab Envi and Consultant Co., Ltd.

Ambient Temperature : (25.5 to 26.1) °C

Relative Humidity : (56.6 to 57.0) %

Air Pressure : 1008.0 mbar

Date of Received : 19 April 2025

Date of Calibration : 19 April 2025

Date of Issue : 22 April 2025

Calibrated by : Satja Sangkhum

Calibration Method :

In-house method CAL-M2001 based on UKAS Publication ref : LAB 14

Edition 7 - November 2022

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

Standard Weights

ID No. E261-E2624

Cert. No. C02242009

Due Date 07 Nov 2025

Traceability

National Institute of Metrology (Thailand), (NIMT)

Approved by :

Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 68-200127-1

Page : 2 of 2

Result of Calibration :

Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

Nominal Value (g)	Correction (g)	Uncertainty ± (g)
0.001	0.0000	0.00011
0.01	0.0000	0.00011
0.1	0.0000	0.00011
0.5	0.0000	0.00011
2	0.0000	0.00011
5	0.0000	0.00011
10	0.0000	0.00011
50	0.0001	0.00014
100	0.0001	0.00020
200	0.0000	0.00038

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%

Eccentric error

Load test : 50 g

A

B

C

D

E



-0.0005 0.0002 0.0004 0.0002 0.0000 g

Repeatability

Load test : 200 g

Sidev.

: 0.00005 g

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SLECCO

บริษัท สเปซเทค เซ็นเซอร์ เทคโนโลยี จำกัด

ศูนย์บริการการสอบเทียบอุณหภูมิของ Heating block (COD)

หน้าที่: 1 / 1

วันที่รับใช้: 01 / 04 / 2563

1. Heating block (COD)

ผู้ผลิต: SLECCO    รุ่น: DS-1002    Serial No.: 0141    วันที่สอบ: 2563    ภาชนะบรรจุ: LB-Eq-012  
วันที่ผ่านสอบ: 1    ภาชนะบรรจุ: 2563    ภาชนะบรรจุ: 1    ภาชนะบรรจุ: 2563

2. Digital Thermometer with TC Probe

ผู้ผลิต: Denag Scientific    รุ่น: Temp-10k    Serial No.: 4008958    วันที่สอบ: 2563    ภาชนะบรรจุ: LB-Eq-013  
ความละเอียด: 0.1    (°C)    วันที่ผ่านสอบ: 21    ภาชนะบรรจุ: 2563    ภาชนะบรรจุ: 21    ภาชนะบรรจุ: 2015

3. ผลการตรวจสอบ (ช่วงเวลา: 0.40 น. - 14.30 น.)

ตำแหน่ง No.	Set point (°C)	อุณหภูมิที่อ่านได้ก่อนสอบ (°C)		ค่าเฉลี่ยของ อุณหภูมิ	ผลการ ยอมรับ	สรุปผลการตรวจสอบ		ผู้ตรวจสอบ
		ครั้งที่ (A)	ครั้งที่ (B)			ผ่าน	ไม่ผ่าน	
1/3 / 18	150.0	150.5	150.4	150.5	+2	✓		
2		150.4	150.3	150.4	+2	✓		
3		150.0	151.0	151.0	+2	✓		
4		150.1	150.2	150.2	+2	✓		
5		150.4	150.3	150.4	+2	✓		
6		150.2	150.3	150.3	+2	✓		
7		149.9	149.8	149.9	+2	✓		
8		150.1	150.1	150.1	+2	✓		
9		150.4	150.5	150.5	+2	✓		
10		150.2	150.3	150.3	+2	✓		
11		149.3	149.9	149.8	+2	✓		
12		151.0	151.1	151.1	+2	✓		
13		143.9	149.9	149.9	+2	✓		
14		150.8	150.9	150.9	+2	✓		
15		150.5	150.2	150.4	+2	✓		
16		151.0	151.0	151.0	+2	✓		
17		149.9	149.8	149.9	+2	✓		
18		150.3	150.3	150.3	+2	✓		
19		149.9	150.0	150.0	+2	✓		
20		151.2	151.2	151.2	+2	✓		
21		150.2	150.3	150.3	+2	✓		
22		150.0	150.0	150.0	+2	✓		
23		150.5	150.6	150.6	+2	✓		
24		150.8	150.6	150.7	+2	✓		
25		151.2	151.3	151.3	+2	✓		

FM-LB-80;Re00

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CAL

Calibratech Co., Ltd.

7/106-7 Moo 2, Sukhaphrachan 3 Rd., Banggood, Pakkret, Nonthaburi 11120  
Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

NSC-TIS-TIS7025  
CALIBRATION 0030

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0030

Certificate of Calibration

Certificate No. : 68-400223-2

Submitted by : Special Lab Envi and Consultant Co., Ltd.  
47/91 Moo 3 Thambol Tha-it, Pakkret, Nonthaburi 11120

Equipment : Temperature controlled enclosure(Incubator)

Manufacturer : Lovibond

Range : N/A °C

Serial No. : 0914643-01

Model : FKU 1800

Resolution : 0.1 °C

ID No. : LB-Eq-004

Environment : On site calibration was carried out at the Laboratory, Special Lab Envi and Consultant Co., Ltd.

Ambient Temperature : (26.0 to 26.5) °C

Relative Humidity : (45 to 50) %

Line Voltage : (226.0 to 226.5) V

Date of Received : 19 April 2025

Date of Calibration : 19 April 2025

Date of Issue : 25 April 2025

Calibrated by : Permpon Champu

Calibration Method : CAL-M4004, TLAS G-20

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

Standard Digital Thermometer with RTD Probe

ID No. 400046 & 400042

Cert. No. 68-400007-1

Due Date 28 Jul 2025

Traceability

National Institute of Metrology Thailand (NIMT)

Approved by : [Signature]

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-03

## Certificate of Calibration

Certificate No. : 68-400223-2

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

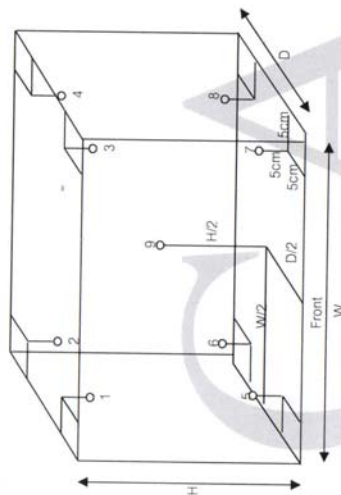
This instrument was setting air ventilation at position 0 (close)

Inside of Chamber

W = 0.55 m

D = 0.73 m

H = 0.50 m

Capacity = 0.20 m<sup>3</sup>

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.									Uncertainty (± °C)
			1	2	3	4	5	6	7	8	9	
20.0	20.0	20.0	20.35	20.26	20.28	20.31	20.21	20.09	20.29	20.17	20.22	0.63
			Measured Uniformity (°C)			Measured Stability (°C)			Overall Variation (°C)			
			20.0			0.22			0.34			0.85

Remark The uncertainty is not combine uniformity of the air chamber

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, providing a level of confidence of approximately 95%

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## Certificate of Calibration

Certificate No. : 68-400223-1

Page : 1 of 2

Submitted by :

Special Lab Envi and Consultant Co., Ltd.

47/91 Moo 3 Thambol Tha-it, Pakkret, Nonthaburi 11120

Equipment :

Temperature controlled enclosure(Incubator)

Manufacturer : Lovibond

Model : FKU 1800

Range : N/A °C

Resolution : 0.1 °C

Serial No. : 0925481-19

ID No. : LB-Eq-005

Environment :

On site calibration was carried out at the Laboratory, Special Lab Envi and Consultant Co., Ltd.

Ambient Temperature : (24.5 to 25.0) °C

Relative Humidity : (40 to 45) %

Line Voltage : (226.0 to 226.5) V

Date of Received : 19 April 2025

Date of Calibration : 19 April 2025

Date of Issue : 25 April 2025

Calibrated by : Pempon Chanpu

Calibration Method : CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

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

Standard Digital Thermometer with RTD Probe

ID No.

Cert. No.

Due Date

Traceability

400046 &amp; 400047 68-400007-2

29 Jul 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. : 68-400223-1

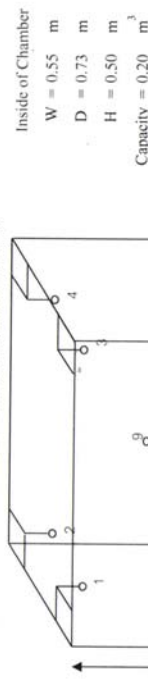
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Test Point ( °C )	Setting Temperature ( °C )	Indicating Temperature ( °C )	Measured Temperature ( °C ) @ Sensor No.									Uncertainty ( ± °C )
			1	2	3	4	5	6	7	8	9	
30.0	30.0	30.0	29.91	29.93	29.97	30.23	30.01	30.03	30.31	30.66	30.14	0.33
35.0	35.0	35.0	34.77	34.83	34.79	35.23	34.92	35.02	35.22	35.63	35.12	0.33
37.0	37.0	37.0	36.70	36.85	36.73	37.32	36.95	37.11	37.23	37.59	37.13	0.35

Test Point ( °C )	Setting Temperature ( °C )	Indicating Temperature ( °C )	Measured Uniformity ( °C )		Measured Stability ( °C )		Overall Variation ( °C )
			0.55		0.06		
			0.55		0.06		
37.0	37.0	37.0	0.54		0.09		1.06

Remark: The uncertainty is not combine uniformity of the air chamber

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  $k = 2$ , providing a level of confidence of approximately 95%

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Supervisor

Approved by : \_\_\_\_\_

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 68-400237-1

Page : 1 of 2

Submitted by :

Special Lab Envi and Consultant Co., Ltd.

47/91-93 Moo 3, Tambol Tha-I, Pakkret, Nonthaburi 11120

Equipment :

Liquid in Glass Thermometer

Manufacturer : SK

Model : N/A

Range : 0 °C to 100 °C

Resolution : 1 °C

Serial No. : N/A

Immersion : Total

ID No. : LB-Eq-021

Environment :

Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Line Voltage : (220 ± 22) VAC

Date of Received : 19 April 2025

Date of Calibration : 23 April 2025

Date of Issue : 23 April 2025

Calibrated by : Chortip Samchusri

**Calibration Method :** This instrument was calibrated by In-house method comparison technique CAL-M4001 based on ASTM E77-07 by compared with PRT in the liquid bath at the constant controlled temperature.

The temperature scale used was based on ITS-90

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

1. Platinum Resistance Thermometer (PRT)

ID No. Cert.No. Due Date

400001 TT-0023-24 16 Feb 2026

Traceability  
National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No. Cert.No. Due Date

400003 23E1866 01 Jun 2025

Traceability  
National Institute of Metrology Thailand (NIMT)

400004 23E1866 01 Jun 2025

Traceability  
National Institute of Metrology Thailand (NIMT)



## Certificate of Calibration

Certificate No. : 68-400237-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function :

Temperature measurement

Ice point check : UUC\* reading 0 °C Standard reading -0.4844 °C

Standard Reading ( °C )	UUC Reading ( °C )	Correction ( °C )	Uncertainty ( ± °C )
24.1969	25	-0.8	0.31
29.0828	30	-0.9	0.31
39.1955	40	-0.8	0.31

Remark

UUC : Unit Under Calibration

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  $k = 2$ , providing a level of confidence of approximately 95%

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## Certificate of Calibration

Certificate No. : 68-400237-2

Page : 1 of 2

Submitted by :

Special Lab Envi and Consultant Co., Ltd.

47/91-93 Moo 3,Tambol Tha-Ii, Pakkret, Nonthaburi 11120

Equipment :

Liquid in Glass Thermometer

Manufacturer : SK

Model : N/A

Range : 0 °C to 100 °C

Resolution : 1 °C

Serial No. : N/A

Immersion : Total

ID No. : LB-Eq-020

Environment :

Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Line Voltage : (220 ± 22) VAC

Date of Received :

19 April 2025

Date of Calibration :

23 April 2025

Date of Issue :

23 April 2025

Calibrated by :

Chortip Sanchusri

**Calibration Method :** This instrument was calibrated by In-house method comparison technique CAL-M4001 based on ASTM E77-07 by compared with PRT in the liquid bath at the constant controlled temperature.

The temperature scale used was based on ITS-90

**Reference Standard Instruments :**

This certification is traceable to the International System of Units

1. Platinum Resistance Thermometer (PRT)

ID No. Cert. No. Due Date Traceability

400001 TT-0023-24 16 Feb 2026 National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No. Cert. No. Due Date Traceability

400003 23E1866 01 Jun 2025 National Institute of Metrology Thailand (NIMT)

400004 23E1866 01 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. : 68-400237-2

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

Ice point check : UUC\* reading 0 °C Standard reading -0.0899 °C

Standard Reading ( °C )	UUC Reading ( °C )	Correction ( °C )	Uncertainty ( ± °C )
24.9944	25	0.0	0.31

Remark

UUC : Unit Under Calibration

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  $k = 2$ , providing a level of confidence of approximately 95%

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## Certificate of Calibration

Certificate No. : 68-400223-4

Page : 1 of 2

Submitted by :

Special Lab Envi and Consultant Co., Ltd.

47/91-93 Moo 3, Tambol Tha-Ii, Pakkret, Nonthaburi 11120

Equipment :

Temperature controlled enclosure (Refrigerator)

Manufacturer : Frozen

Model : CC-2288F

Range : N/A °C

Resolution : 1 °C

Serial No. : CC-2288F-1163-003

ID No. : LB-Eq-046

Environment :

On site calibration was carried out at the Laboratory, Special Lab Envi and Consultant Co., Ltd.

Ambient Temperature : (25.5 to 26.5) °C

Relative Humidity : (50 to 55) %

Line Voltage : (226.0 to 226.5) V

Date of Received : 19 April 2025

Date of Calibration : 19 April 2025

Date of Issue : 26 April 2025

Calibrated by : Permpon Chanpu

Calibration Method : CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

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

Standard Digital Thermometer with Thermocouple probe

ID No.

Cert. No.

Due Date

Traceability

400029 &amp; 400032 67-400584-1

29 Apr 2025

National Institute of Metrology Thailand (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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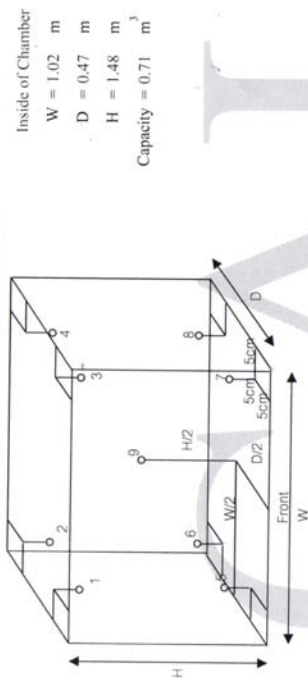


**Result of Calibration :** Without Adjustment

UUC Condition As-Received : Good

**Function :** Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.									Uncertainty (± °C)
			1	2	3	4	5	6	7	8	9	
3	3	3	4.0	3.0	2.8	2.6	4.0	4.0	2.2	2.0	3.0	1.0

**Remark** The uncertainty is not combine uniformity of the air chamber

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  $k = 2$ , providing a level of confidence of approximately 95%

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Submitted by :

Special Lab Envi and Consultant Co., Ltd.

47/91-93 Moo 3 Tambol Tha-I, Pakkret, Nonthaburi 11120

**Equipment :**

Water Bath

Manufacturer : Memmert

Range : N/A °C

Serial No. : L520,0201

**Environment :**

On site calibration was carried out at the Laboratory, Special Lab Envi and Consultant Co., Ltd.

Ambient Temperature : (34.0 to 35.0) °C

Relative Humidity : (50 to 55) %

Line Voltage : (226.0 to 226.5) V

Date of Received : 19 April 2025

Date of Calibration : 19 April 2025

Date of Issue : 26 April 2025

Calibrated by : Permpoon Chanpu

**Calibration Method :** This instrument was calibrated by In-house method CAL-M4006 based on ASTM E715-80

The temperature scale used was based on ITS-90

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

Standard Digital Thermometer with RTD probe

D No.	Cert. No.	Due Date

68-400214-1 25 Oct 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

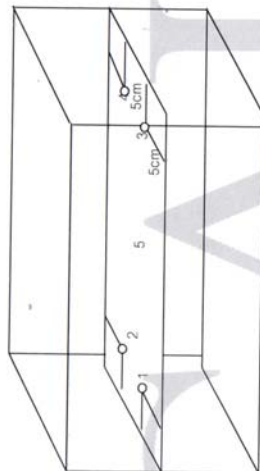
Certificate No. : 68-400223-3

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

Page : 2 of 2



Front

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.					Uncertainty (± °C)	Measured Uniformity (°C)	Measured Stability (°C)
			1	2	3	4	5			
62.0	62.0	62.0	62.03	62.05	62.01	62.04	62.00	0.19	0.12	0.07
85.0	85.0	85.0	84.82	84.76	84.94	84.85	84.86	0.20	0.16	0.08
95.0	95.0	95.0	94.78	94.73	94.88	94.82	94.82	0.19	0.15	0.07
100.0	CCC	101.0	100.58	100.92	100.61	100.57	100.63	0.24	0.40	0.12

Remark The uncertainty is not combine uniformity of the water bath

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  $k = 2$ , providing a level of confidence of approximately 95%.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)

CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES

534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250

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

## Certificate of Testing

Cert.No.: 25TW23  
Page.: 1 of 2

Equipment :

DO Meter

Manufacturer :

Hanna

Model :

HI98193

Serial No. :

09120032101

ID No. :

LB-Eq-014

Received Date :

04 February 2025

Test Date :

05 February 2025

Reference :

2502-0115WN-1

Submitted by :

Special Lab Envi And Consultant Co.,Ltd  
47/91-93 Moo 3 Thambon Tha-it,  
Pakkret, Nonthaburi 11120

Laboratory Condition :

Temperature (  $25 \pm 5$  ) °CHumidity (  $50 \pm 20$  ) %In - house method : CP-GH9  
by Comparison Technique with Azide Modification Method

Test Procedure :

Tested by :

Walailak Sirthean

Approved by :

Approved Signatory

Issue Date :

5 February 2025





Cert.No.: 25TW23  
Page.: 2 of 2

#### Condition of this result of calibration

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

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1. Burette	-	130BU10	23CG1172	22 Mar 2025
2. Balance	14233821	110RC001	24MM1131	04 July 2025
2. Standard Material :-				
Material	Manufacturer	Lot.No.	Assay	
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%	

Result : Dissolved Oxygen Meter Adjustment With Air 100 %  
Dissolved Oxygen Probe No.: KC1N8943T

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.20	8.20	0.0055

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

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TEL.0-2717-3000-29 FAX.0-2719-9484



NSC-TIS-TIS7025  
CALIBRATION 0008

## Certificate of Calibration

Cert.No.: 24CH945  
Page.: 1 of 2

Equipment :	pH Meter
Manufacturer :	Eutech
Model :	pH 700
Serial No. :	2858459
ID No. :	LB-Eq-027
Condition As-Received:	Used Item
Received Date :	05 August 2024
Calibration Date :	06 August 2024
Reference :	2408-0150WN-1
Submitted by :	Special Lab Envi And Consultant Co.,Ltd 47/91-93 Moo 3 Tambon Tha-it, Pakkret, Nonthaburi 11120
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)

Calibrated by :

Approved by :

Approved Signatory

Issue Date :

6 August 2024

The Uncertainties are for a confidence probability of approximately 95%

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



#### Condition of this calibration result

1. Reference Standard Instrument

#### Instrument

1) Document Process Calibrator

- This Certification 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

#### Buffer Solution

#### Manufacturer

#### Lot No.

#### Exp. date

pH 4.008	CPA chem	970851	25 Apr 2026
pH 6.986	CPA chem	970852	25 Apr 2025
pH 9.997	CPA chem	970853	25 Apr 2025

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

#### Calibration Results

#### Function : mV Measurement

#### Performing standard curve by Document Process Calibrator at pH (4.7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement ( $\pm$ mV)	Coverage factor $k$
			mV	pH		
pH Meter S/N.: 2858459	4.00	177.48	177.4	4.01	0.058	2.00
	7.00	0.00	0.0	7.00	0.058	2.00
	10.00	-177.48	-177.5	10.01	0.058	2.00

#### Function : pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement ( $\pm$ )	Coverage factor $k$
pH Electrode S/N.: 3205384	4.008	4.01	179.4	0.0071	2.00
	6.986	6.99	4.0	0.0099	2.00
	9.997	10.01	-169.8	0.0092	2.00

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

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NSC-TIS-TIS17025  
CALIBRATION 0008

## Certificate of Calibration

Cert. No.: 24LM125  
Page.: 1 of 2

Equipment : pH Meter with Sensor

Manufacturer : Eutech

Model : pH 700

Serial No. : 2858459

ID No. : LB-Eq-027

Submitted by : Special Lab Envi And Consultant Co.,Ltd  
47/91-93 Moo 3 Tambon Tha-it,  
Pakkret Nonthaburi 11120

Location : TPA On Site Calibration Laboratory

Received Order : 05 August 2024

Calibrated Date : 06 August 2024

Ambient Temperature : ( 26  $\pm$  10 )  $^{\circ}$ C

Relative Humidity : ( 50  $\pm$  30 ) %

AC Line Voltage : ( 220  $\pm$  22 ) V

Calibrated by :

Approved by :

( )  
( )  
( $\checkmark$ ) at

Issue Date : 06 August 2024

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.





**Equipment :** pH Meter with Sensor  
**Condition As-Received :** Used Item  
**Reference :** 2408-0150WN-2

**Cert No.:** 24LM125  
**Page:** 2 of 2

**Procedure Used :-**

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer ( IPT ) into Temperature Bath.  
The temperature scale used was based on ITS-90.

**Condition of this result of calibration**

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	3240076	241317	TPA	21 Mar 2025
2. This certificate is valid only to the item calibrated on date and place of calibration.				
3. This certification is traceable to the International System of Unit.				

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

**Result of Calibration :-** ( \* ) Without Adjustment

**Function :** Temperature measurement.

This instrument was connected with temperature sensor, S/N.: PH5TEMB01P

Calibration Point ( °C )	Immersion Depth ( mm )	Standard Temperature ( °C )	UUC* Reading ( °C )	Error ( °C )	Uncertainty ( ± °C )	Coverage Factor k
25.0	100	25.002	25.0	-0.002	0.16	2.00

**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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**BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., LTD.**  
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**Certificate No. :** CAL-25-243

**Page :** 1 of 3

**CERTIFICATE OF CALIBRATION**

Equipment	:	Spectrophotometer
Manufacturer	:	Thermo Scientific
Model	:	Genesys 20
Serial No.	:	3SGT041007
ID No.	:	LB-Eq-029
Customer	:	Special Lab Envi And Consultant Co.,Ltd.
	:	47/91-93 Moo 3, Tambol Tait,
	:	Amphur Pakrad, Nonthaburi, 11120
Location	:	Becthai Laboratory
Date of Receipt	:	30 April 2025
Date of Calibration	:	2 May 2025
Date of Issue	:	2 May 2025
Ambient Temperature	:	(25±10) °C
Relative Humidity	:	(60±20) %
Condition As-Received	:	Used Item

Calibrated by

Approved by

Calibration Engineer

Calibration Manager

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

This certificate may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory. Indicated values are valid for the state of the Spectrophotometer at the time of calibration only.

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Certificate No. : CAL-25-243

Page : 2 of 3

## CALIBRATION REPORT

### Conditions of this result of calibration

#### 1. Reference Standard Material :

Material	Model	Serial No.	Cert.No.	Due date
Holmium Glass Filter	RM-HG	12705	117342	13 December 2025
Neutral Density Filter	RM-1N2N3N	8323	117341	13 December 2025

#### 2. Traceability : This certification is traceable to the International System of Unit maintained at:

The Starna Scientific Ltd. Accredited Calibration Laboratory No. 0659.

#### 3. Method of calibration :

The calibration procedure was carried out according to ASTM E275-08 (2022) and ASTM E925-09 (2014).

#### 4. Result of calibration :

( ✓ ) without adjustment

( ) after adjustment

#### 5. Equipment Specifications:

Spectral Bandwidth :	8	nm
Data Interval :	1	nm
Scan Speed :	N/A	nm/min

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Certificate No. : CAL-25-243

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## CALIBRATION REPORT

### Wavelength Calibration

Certified Values of Reference Material	Nominal Value (nm)	UUC*Reading (nm)	Error (nm)	Uncertainty of Measurement (± nm)	k Factor
418.40	418	418	-0.40	0.59	2.00
537.00	537	537	0.00	0.59	2.00
638.00	638	638	0.00	0.59	2.00

### Photometric Calibration for Visible

Wavelength (nm)	Certified Values of Reference Material (A)	UUC* Reading (A)	Error (A)	Uncertainty of Measurement (± A)	k Factor
420.0	Zero	0.000	0.0000	0.0028	2.00
	0.5703	0.573	0.0027	0.0045	2.00
	0.7336	0.739	0.0054	0.0045	2.00
	1.0709	1.074	0.0031	0.0045	2.00
440.0	Zero	0.000	0.0000	0.0028	2.00
	0.5592	0.561	0.0018	0.0045	2.00
	0.716	0.720	0.0040	0.0045	2.00
	1.0454	1.046	0.0006	0.0045	2.00
465.0	Zero	0.000	0.0000	0.0028	2.00
	0.5094	0.511	0.0016	0.0045	2.00
	0.6601	0.663	0.0029	0.0045	2.00
	0.963	0.965	0.0020	0.0045	2.00
546.1 (546.0)	Zero	0.000	0.0000	0.0028	2.00
	0.5206	0.523	0.0024	0.0045	2.00
	0.6677	0.672	0.0043	0.0045	2.00
	0.9763	0.979	0.0027	0.0045	2.00
590.0	Zero	0.000	0.0000	0.0028	2.00
	0.5522	0.553	0.0008	0.0045	2.00
	0.6966	0.698	0.0014	0.0045	2.00
	1.0201	1.020	-0.0001	0.0045	2.00
635.0	Zero	0.000	0.0000	0.0028	2.00
	0.5377	0.542	0.0043	0.0045	2.00
	0.8649	0.870	0.0051	0.0045	2.00
	0.9736	0.977	0.0034	0.0045	2.00

Remark : Each individual filter is measured against the empty filter holder (blank) used to zero the Spectrophotometer.

Note:

UUC\* : Unit Under Calibration

- End of Report -

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