

บริษัท น้ำตาลวังขนาย จำกัด  
รายงานผลการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อมและ  
มาตรการติดตามตรวจสอบคุณภาพสิ่งแวดล้อม  
โครงการโรงงานน้ำตาลวังขนาย บริษัท น้ำตาลวังขนาย จำกัด (ระยะดำเนินการ)

---

## ภาคผนวกที่ 4

### ใบรับรองการสอบเทียบเครื่องมือ

---

จัดทำโดย



บริษัท ปิ่นทองกรุ๊ป แมนเนจเม้นท์ แอนด์ คอนซัลแตนท์ จำกัด  
เลขที่ 27 ถนนพระราม 2 แขวงท่าข้าม  
เขตบางขุนเทียน กรุงเทพมหานคร 10150

## Certificate of Calibration

**Certificate No. :** 65-200249-1

**Page : 1 of 2**

**Submitted by :** P.M.C. Environment and Technology Co., Ltd.  
27 Pinthong Group Building, Rama 2 Road, Tha Kham, Bang Khun Thian, Bangkok 10150

**Equipment :** Electronic Balance  
Manufacturer : Sartorius Model : CPA225D  
Serial No. : 23208183  
Capacity : 220 g Resolution : 0.00001g/100g, 0.0001g/220g

**Environment :** On site calibration was carried out at the Laboratory,

P.M.C. Environment and Technology Co., Ltd.

Ambient Temperature : (26.1 to 26.8) °C

Relative Humidity : (43.0 to 44.4) %

Air Pressure : 1005.0 mbar

**Date of Received :** 08 August 2022

**Date of Calibration :** 08 August 2022

**Date of Issue :** 17 August 2022

**Calibrated by :** Akaradath Thippichai

**Calibration Method :** In-house method CAL-M2001 based on UKAS Publication ref : LAB 14  
Edition 5, July 2015

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

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E261-E2624	C02213103	18 Nov 2022	National Institute of Metrology (Thailand), (NIMT)

Approved by :

Laboratory Manager

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 Calibratech Co.,Ltd.



## Certificate of Calibration

**Certificate No. : 65-200249-1**

**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 $\pm$ (g)
0.05	0.00001	0.000021
0.1	0.00001	0.000019
0.5	-0.00001	0.000025
1	0.00000	0.000030
5	-0.00001	0.000043
10	0.00001	0.000053
20	0.00004	0.000071
50	0.00008	0.00011
100	0.00012	0.00021
200	0.0003	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  $k = 2.37$ , providing a level of confidence of approximately 95%

Eccentric error

Load test : 50 g

A B C D E

-0.00002 0.00009 0.00007 0.00001 0.00000 g



Repeatability

Load test : 200 g

Stdev. : 0.000000 g

- o0o -





## Certificate of Calibration

**Certificate No. :** 65-210370-1

**Page : 1 of 2**

**Submitted by :** P.M.C. Environment And Technology Co.,Ltd.

27 Pinthong Group Building, Rama 2 Road, Tha Kham, Bang Khun Thian, Bangkok 10150

**Equipment :** Weight

Manufacturer : N/A

Material : Stainless Steel

Weight size : 1 g

ID No. : SIG1585-13

Assumed density of weight : 7950 kg / m<sup>3</sup>

Assumed Air density : 1.2 kg / m<sup>3</sup>

**Environment :** Ambient Temperature : ( 20 ± 2 ) °C

Relative Humidity : ( 50 ± 10 ) %

Air Pressure : 1006.1 mbar

**Date of Received :** 06 August 2022

**Date of Calibration :** 22 August 2022

**Date of Issue :** 22 August 2022

**Calibrated by :** Wuttichai Swatphong

**Calibration Method :** In-house method CAL-M2101 based on OIML R 111-1 : 2004(E)

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

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E221-E2210	MM-0042-22	21 Mar 2025	National Institute of Metrology (Thailand), (NIMT)

Approved by



Laboratory Manager

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 Calibratech Co.,Ltd.



## Certificate of Calibration

**Certificate No. :** 65-210370-1

**Page :** 2 of 2

**Result of Calibration :** Without Adjustment

**UUC Condition As-Received :** Good

No.	Nominal Value	Id.Mark	Conventional mass Value	Measuring Uncertainty
1	1 g	none	1 g +0.012 mg	$\pm$ 0.023 mg

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%

- o0o -

CAL



## Certificate of Calibration

**Certificate No. :** 65-210370-2

**Page : 1 of 2**

**Submitted by :** P.M.C. Environment And Technology Co.,Ltd.

27 Pinthong Group Building, Rama 2 Road, Tha Kham, Bang Khun Thian, Bangkok 10150

**Equipment :** Weight

Manufacturer : N/A

Material : Stainless Steel

Weight size : 100 g

ID No. : S100G2782-13

Assumed density of weight : 7950 kg / m<sup>3</sup>

Assumed Air density : 1.2 kg / m<sup>3</sup>

**Environment :** Ambient Temperature : ( 20 ± 2 ) °C

Relative Humidity : ( 50 ± 10 ) %

Air Pressure : 1006.0 mbar

**Date of Received :** 06 August 2022

**Date of Calibration :** 22 August 2022

**Date of Issue :** 22 August 2022

**Calibrated by :** Wuttichai Swatphong

**Calibration Method :** In-house method CAL-M2101 based on OIML R 111-1 : 2004(E)

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

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E221-E2210	MM-0042-22	21 Mar 2025	National Institute of Metrology (Thailand), (NIMT)

Approved by :



Laboratory Manager

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 Calibratech Co.,Ltd.





## Certificate of Calibration

**Certificate No. :** 65-210370-2

**Page : 2 of 2**

**Result of Calibration :** Without Adjustment

**UUC Condition As-Received :** Good

No.	Nominal Value	Id.Mark	Conventional mass Value	Measuring Uncertainty
1	100 g	none	100 g +0.22 mg	$\pm$ 0.11 mg

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%

- o0o -

CAL



## Certificate of Calibration

**Certificate No. :** 65-210370-3

**Page : 1 of 2**

**Submitted by :** P.M.C. Environment And Technology Co.,Ltd.  
27 Pinthong Group Building, Rama 2 Road, Tha Kham, Bang Khun Thian, Bangkok 10150

**Equipment :** Weight  
Manufacturer : N/A Material : Stainless Steel  
Weight size : 200 g  
ID No. : 63-210392-3  
Assumed density of weight : 7950 kg / m<sup>3</sup>  
Assumed Air density : 1.2 kg / m<sup>3</sup>

**Environment :** Ambient Temperature : ( 20 ± 2 ) ° C  
Relative Humidity : ( 50 ± 10 ) %  
Air Pressure : 1006.0 mbar

**Date of Received :** 06 August 2022

**Date of Calibration :** 22 August 2022

**Date of Issue :** 22 August 2022

**Calibrated by :** Wuttichai Swatphong

**Calibration Method :** In-house method CAL-M2101 based on OIML R 111-1 : 2004(E)

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

Standard Weights

ID No.	Cert. No.	Due Date	Traceability
E221-E2210	MM-0042-22	21 Mar 2025	National Institute of Metrology (Thailand), (NIMT)

Approved by



Laboratory Manager

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 Calibratech Co.,Ltd.





## Certificate of Calibration

Certificate No. : 65-210370-3

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

No.	Nominal Value	Id.Mark	Conventional mass Value	Measuring Uncertainty
1	200 g	none	200 g +0.22 mg	$\pm$ 0.17 mg

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%

- o0o -

CAL



## Certificate of Calibration

**Certificate No. :** 65-400414-1

**Page : 1 of 2**

**Submitted by :** P.M.C. Environment and Technology Co., Ltd.

27 Pinthong Group Building, Rama 2 Road, Tha Kham, Bang Khun Thian, Bangkok 10150

**Equipment :** Air Chamber (Oven)

Manufacturer : Memmert

Model : UN30

Range : N/A °C

Resolution : 0.1 °C

Serial No. : B115.2008

ID No. : N/A

**Environment :** On site calibration was carried out at the Laboratory,

P.M.C. Environment and Technology Co., Ltd.

Ambient Temperature : (25.5 to 26.5) °C

Relative Humidity : (40 to 45) %

Line Voltage : (231.0 to 231.5) V

**Date of Received :** 08 August 2022

**Date of Calibration :** 08 August 2022

**Date of Issue :** 11 August 2022

**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 & 400030	65-400272-1	24 Nov 2022	National Institute of Metrology Thailand (NIMT)

Approved by

Supervisor

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 Calibratech Co.,Ltd.



www.calibratech.co.th

## Certificate of Calibration

Certificate No. : 65-400414-2

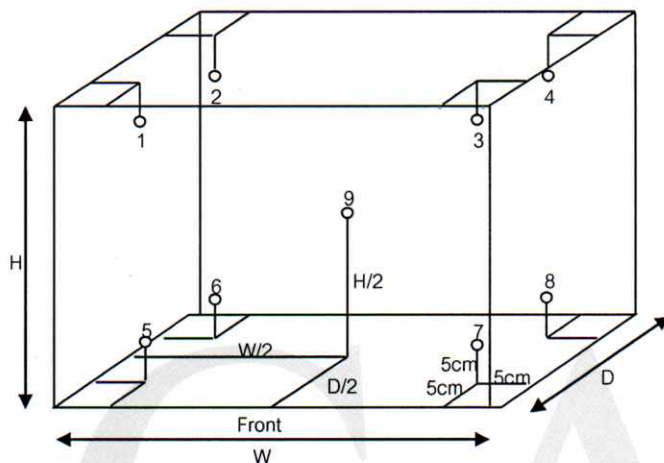
Page : 2 of 2

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 = 0.32 m

D = 0.17 m

H = 0.24 m

Capacity = 0.01 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	
104.0	107.5	107.5	104.3	104.6	104.4	104.7	103.0	103.1	103.4	104.2	104.0	0.83

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
104.0	107.5	107.5	1.2	0.3	2.2

**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%

- o0o -





## Certificate of Calibration

**Certificate No. :** 65-400414-2

**Page : 1 of 2**

**Submitted by :** P.M.C. Environment and Technology Co., Ltd.  
27 Pinthong Group Building, Rama 2 Road, Tha Kham, Bang Khun Thian, Bangkok 10150

**Equipment :** Air Chamber (Oven)  
Manufacturer : Memmert Model : UNB 100  
Range : N/A °C Resolution : 0.5 °C  
Serial No. : C112.0664 ID No. : N/A

**Environment :** On site calibration was carried out at the Laboratory,  
P.M.C. Environment and Technology Co., Ltd.

Ambient Temperature : (25.5 to 26.5) °C

Relative Humidity : (40 to 45) %

Line Voltage : (231.0 to 231.5) V

**Date of Received :** 08 August 2022

**Date of Calibration :** 08 August 2022

**Date of Issue :** 11 August 2022

**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 & 400032	65-400274-1	25 Nov 2022	National Institute of Metrology Thailand (NIMT)

Approved by

Supervisor

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 Calibratech Co.,Ltd.



## Certificate of Calibration

**Certificate No. : 65-400414-1**

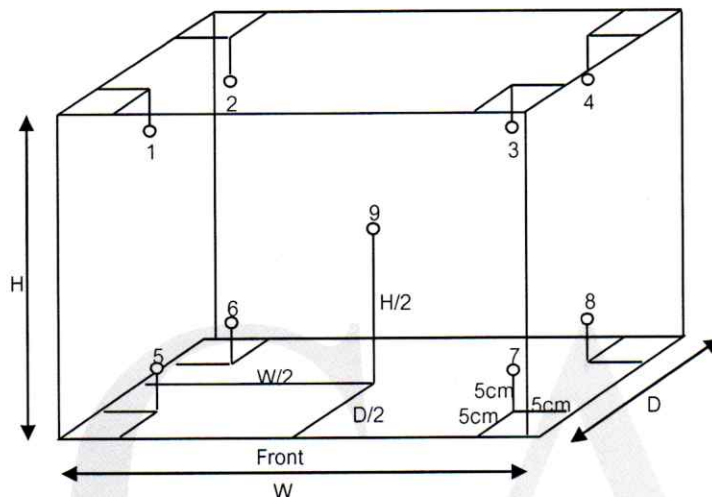
**Page : 2 of 2**

**Result of Calibration :** Without Adjustment

**UUC Condition As-Received :** Good

**Function :** Temperature measurement

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



Inside of Chamber

W = 0.40 m

D = 0.25 m

H = 0.32 m

Capacity = 0.03 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	
180.0	182.0	182.0	181.0	181.0	180.5	180.9	179.3	179.0	179.2	179.2	179.6	0.95

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
180.0	182.0	182.0	1.7	0.3	2.5

**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%

- o0o -





## Certificate of Calibration

**Certificate No. :** 65-400195-1

**Page : 1 of 2**

**Submitted by :** Pinthong Group Management and Consultants Co., Ltd.  
81/109 Pinthong Group Building, Moo 1, Rama 2 Road,  
Thakham, Bangkhunthian, Bangkok 10150

**Equipment :** COD Reactor

Manufacturer : Hanna

Model : HI839800

Range : N/A °C

Resolution : 0.1 °C

Serial No. : 05500012101

ID No. : N/A

**Environment :** Ambient Temperature :  $(23 \pm 2)$  °C

Relative Humidity :  $(50 \pm 15)$  %

**Date of Received :** 05 April 2022

**Date of Calibration :** 19 April 2022

**Date of Issue :** 19 April 2022

**Calibration Method :** This instrument was calibrated by In-house method direct measurement with  
Standard Digital Thermometer with TC Type T probe

The temperature scale used was based on ITS-90

**Reference Standard Instruments :**

Standard Digital Thermometer with RTD probe

<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceability</u>
400029 & 400030	64-400587-1	23 May 2022	National Institute of Metrology Thailand (NIMT)
400029 & 400032	64-400589-1	25 May 2022	National Institute of Metrology Thailand (NIMT)

Approved by

Supervisor

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 Calibratech Co.,Ltd.





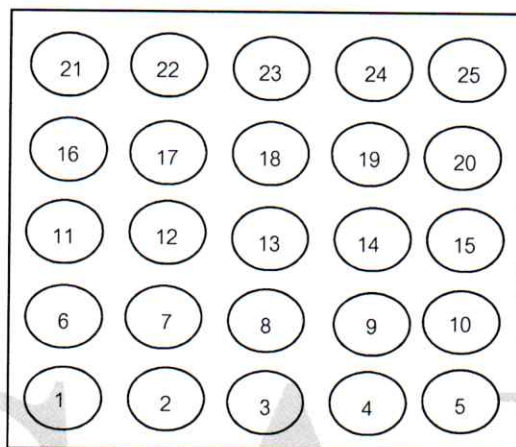
## Certificate of Calibration

**Certificate No. :** 65-400195-1

**Page :** 2 of 2

**Result of Calibration :** Without Adjustment

**Function :** Temperature measurement



Controller

Test Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Standard Reading at Position (°C)									
			1	2	3	4	5	6	7	8	9	10
150.0	150.0	150.0	149.8	149.7	149.4	149.9	149.5	149.4	150.8	150.7	150.9	149.7
Test Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Standard Reading at Position (°C)									
			11	12	13	14	15	16	17	18	19	20
150.0	150.0	150.0	149.4	150.2	151.2	150.8	148.9	148.9	150.5	151.1	150.7	150.4

Test Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Standard Reading at Position (°C)					Uncertainty (± °C)
			21	22	23	24	25	
150.0	150.0	150.0	148.8	151.1	149.8	150.3	150.0	0.82

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%

- o0o -



www.calibratech.co.th

## Certificate of Calibration

Page : 1 of 2

**Certificate No. :** 65-400182-1

**Submitted by :** Pinthong Group Management and Consultants Co., Ltd.  
81/109 Pinthong Group Building, Moo 1, Rama 2 Road,  
Thakham, Bangkhunthian, Bangkok 10150

**Equipment :** Air Chamber (Incubator)  
Manufacturer : M-LAB Model : BIC-140  
Range : N/A °C Resolution : 0.1 °C  
Serial No. : 1021 ID No: : N/A

**Environment :** On site calibration was carried out at the Laboratory  
Pinthong Group Management and Consultants Co., Ltd.

Ambient Temperature : (25.5 to 26.5) °C  
Relative Humidity : (45 to 50) %  
Line Voltage : (231.0 to 231.5) V

**Date of Received :** 05 April 2022

**Date of Calibration :** 05 April 2022

**Date of Issue :** 09 April 2022

**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 & 400032	64-400589-1	25 May 2022	National Institute of Metrology Thailand (NIMT)

Approved by

Supervisor

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 Calibratech Co.,Ltd.





## Certificate of Calibration

Certificate No. :65-400182-1

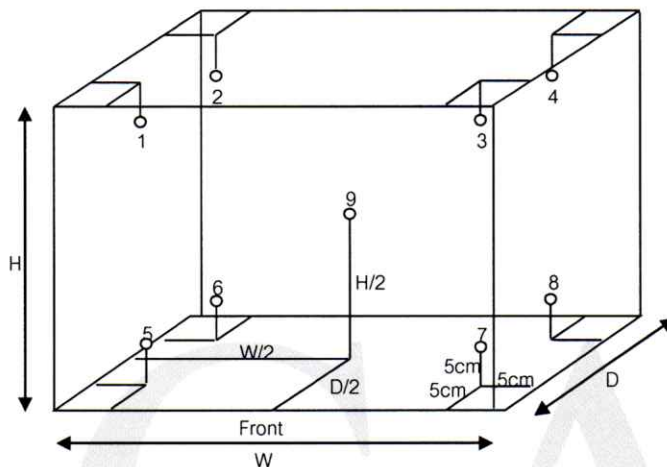
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

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



Inside of Chamber

W = 0.38 m

D = 0.32 m

H = 1.14 m

Capacity = 0.14 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	19.8	19.6	20.0	19.6	20.2	20.2	20.2	20.2	20.3	0.55

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
20.0	20.0	20.0	0.8	0.1	0.8

**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%

- o0o -





## Certificate of Calibration

**Certificate No. :** 65-420059-2

**Page : 1 of 2**

**Submitted by :** P.M.C. Environment and Technology Co., Ltd.  
27 Pinthong Group Building, Rama 2 Road, Tha Kham, Bang Khun Thian, Bangkok 10150

**Equipment :** pH Meter with electrode  
pH meter  
Manufacturer : Mettler Toledo Model : SevenCompact S220  
Range : N/A pH Resolution : 0.01 pH  
Serial No. : C130221482 ID No. : N/A  
Electrode  
Model : InLab Expert Pro-ISM Serial No. : 2142330

**Environment :** On site calibration was carried out at the Laboratory,  
P.M.C. Environment and Technology Co., Ltd.  
Ambient Temperature : (23.0 to 24.5)° C  
Relative Humidity : (52 to 58) %

**Date of Received :** 08 August 2022

**Date of Calibration :** 08 August 2022

**Date of Issue :** 11 August 2022

**Calibrated by :** Bunjerd Masri

**Calibration Method :** In-house method CAL-M4201 direct measurement by using standard voltage calibrator and using certified reference material (CRM)

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

### 1. Multiproduct Calibrator

ID No.	Cert. No.	Due Date	Traceability
400005	SG-E-00473/64	27 Aug 2023	National Institute of Metrology Thailand (NIMT)

### 2. Standard Buffer Solution

pH	Cert. No.	Lot No.	Exp. Date	Traceability
4.008	61235182	833447	19 Aug 2024	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
6.985	61255708	833449	19 Aug 2023	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
10.008	61244986	833448	19 Aug 2023	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025

Approved by

Supervisor

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 Calibratech Co.,Ltd.



## Certificate of Calibration

**Certificate No. : 65-420059-2**

**Page : 2 of 2**

**Result of Calibration :**

**UUC Condition As-Received :** Good

**Function :** Electrical measurement

pH meter

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

Adjustment Curve at nominal pH	Applied Voltage ( mV )	Nominal Value ( pH )	UUC Reading		Correction ( mV )	Uncertainty ( ± mV )
			( pH )	( mV )		
4, 7, 10	177.4800	4	4.00	177.5	0.0	0.12
	0.0000	7	7.00	0.1	-0.1	0.086
	-177.4800	10	10.00	-177.4	-0.1	0.12

**Function :** pH meter with electrode

Performing a three - buffer standard curve using buffer nominal pH (4,7,10)

Adjustment Curve at nominal pH	Standard Buffer ( pH )	UUC Reading ( pH )	Correction ( pH )	Uncertainty ( ± pH )
4, 7, 10	4.008	4.01	0.00	0.010
	6.985	7.00	-0.01	0.011
	10.008	10.01	0.00	0.014

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%

- 000 -





## Certificate of Calibration

**Certificate No. :** 65-400415-1 **Page : 1 of 2**

**Submitted by :** P.M.C. Environment and Technology Co., Ltd.  
27 Pinthong Group Building, Rama 2 Road, Tha Kham, Bang Khun Thian, Bangkok 10150

**Equipment :** Digital Thermometer (Pocket)  
Temperature Indicator  
Manufacturer : Eutech Model : PCTestr 35  
Range : 0.0 to 50.0 °C Resolution : 0.1 °C  
Serial No. : 3083903 ID No. : PMC650627

**Environment :** On site calibration was carried out at the Laboratory,  
P.M.C. Environment and Technology Co., Ltd.  
Ambient Temperature : (23.0 to 24.5) °C  
Relative Humidity : (52 to 58) %  
Line Voltage : (231.0 to 231.5) VAC

**Date of Received :** 08 August 2022  
**Date of Calibration :** 08 August 2022  
**Date of Issue :** 11 August 2022  
**Calibrated by :** Bunjerd Masri

**Calibration Method :** This instrument was calibrated by In-house method comparison technique CAL-M4003 by compared with PRT in the dry-well calibrator 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
400002	TT-0074-22	20 Jun 2024	National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No.	Cert. No.	Due Date	Traceability
400033	22E569	22 Feb 2024	National Institute of Metrology Thailand (NIMT)

Approved by

Supervisor

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 Calibratech Co.,Ltd.





## Certificate of Calibration

**Certificate No. :** 65-400415-1

**Page : 2 of 2**

**Result of Calibration :** Without Adjustment

**UUC Condition As-Received :** Good

**Function :** Temperature measurement

Immersion Depth ( mm. )	Standard Reading ( °C )	UUC Reading ( °C )	Correction ( °C )	Uncertainty ( ± °C )
65	25.004	25.2	-0.2	0.19

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%

- ๐0๐ -



## Certificate of Calibration

**Certificate No. :** 65-400414-3

**Page : 1 of 2**

**Submitted by :** P.M.C. Environment and Technology Co., Ltd.  
27 Pinthong Group Building, Rama 2 Road, Tha Kham, Bang Khun Thian, Bangkok 10150

**Equipment :** Air Chamber (Refrigerator)  
Manufacturer : Sanden Intercool Model : YPR-068S  
Range : N/A °C Resolution : 1 °C  
Serial No. : YPR068201S-1207-00076 ID No. : N/A

**Environment :** On site calibration was carried out at the Laboratory,  
P.M.C. Environment and Technology Co., Ltd.

Ambient Temperature : (27.5 to 28.5) °C

Relative Humidity : (55 to 58) %

Line Voltage : (230.0 to 232.5) V

**Date of Received :** 08 August 2022

**Date of Calibration :** 08 August 2022

**Date of Issue :** 11 August 2022

**Calibrated by :** Bunjerd Masri

**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
400046 & 400023	65-400157-1	02 Oct 2022	National Institute of Metrology Thailand (NIMT)

Approved by



Supervisor

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 Calibratech Co.,Ltd.



## Certificate of Calibration

Certificate No. : 65-400414-3

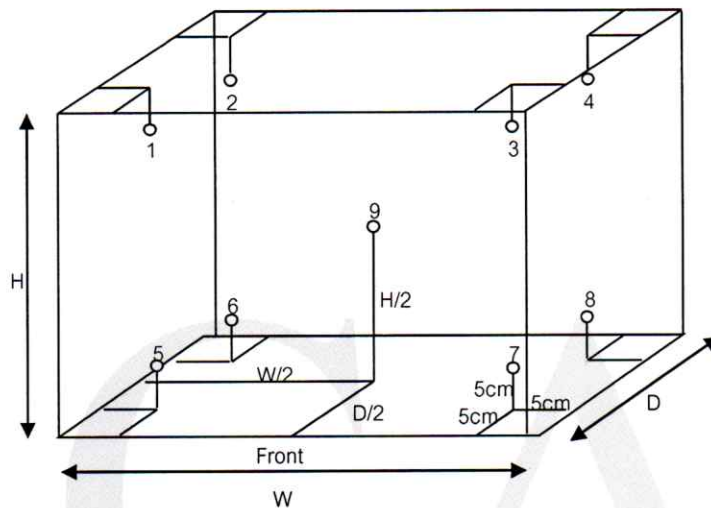
Page : 2 of 2

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 = 0.58 m

D = 0.56 m

H = 1.45 m

Capacity = 0.47 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	
4	4	4	4.6	4.3	4.2	4.5	4.1	4.3	4.3	4.2	3.9	0.83

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
4	4	4	0.9	0.2	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%

- o0o -





## Certificate of Calibration

**Certificate No. :** 65-400213-2

**Page : 1 of 2**

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

**Equipment :** Air Chamber (Incubator)  
Manufacturer : Lovibond Model : FKU 1800  
Range : N/A °C Resolution : 0.1 °C  
Serial No. : 0914643-01 ID No. : LB-Eq-004

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

Ambient Temperature : (28.0 to 29.0) °C

Relative Humidity : (45 to 50) %

Line Voltage : (226.0 to 226.5) V

**Date of Received :** 27 April 2022

**Date of Calibration :** 27 April 2022

**Date of Issue :** 30 April 2022

**Calibrated by :** Permpoon 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 & 400032	64-400589-1	25 May 2022	National Institute of Metrology Thailand (NIMT)

Approved by

Supervisor

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 Calibratech Co.,Ltd.





## Certificate of Calibration

Certificate No. :65-400213-2

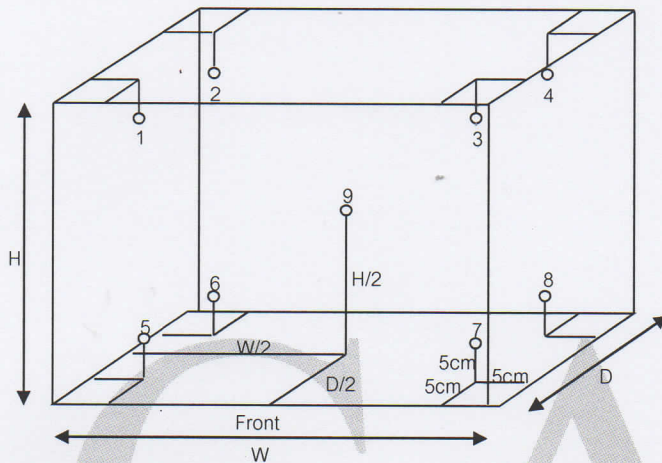
Page : 2 of 2

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	19.3	19.3	20.2	20.1	20.1	20.0	20.0	20.0	20.1	20.0	20.0	0.65

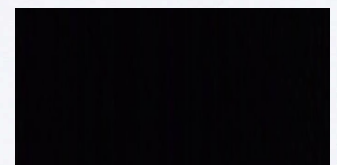
Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
20.0	19.3	19.3	0.3	0.3	0.7

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%

- o0o -





## Certificate of Calibration

**Certificate No. :** 64-400532-1

**Page : 1 of 2**

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

**Equipment :** Water Bath  
Manufacturer : Memmert Model : WNB22  
Range : N/A °C Resolution : 0.1 °C  
Serial No. : L520.0201 ID No. : LB-Eq-041

**Environment :** On site calibration was carried out at the Laboratory, Special Lab Envi and Consultant Co., Ltd.  
Ambient Temperature : (29.0 to 31.0) °C  
Relative Humidity : (55 to 60) %  
Line Voltage : (226.0 to 226.5) V

**Date of Received :** 20 October 2021

**Date of Calibration :** 20 October 2021

**Date of Issue :** 20 October 2021

**Calibrated by :** Permpon 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

ID No.	Cert. No.	Due Date	Traceability
400029 & 400031	64-400433-1	07 Apr 2022	National Institute of Metrology Thailand (NIMT)

Approved by

Supervisor

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 Calibratech Co.,Ltd.





## Certificate of Calibration

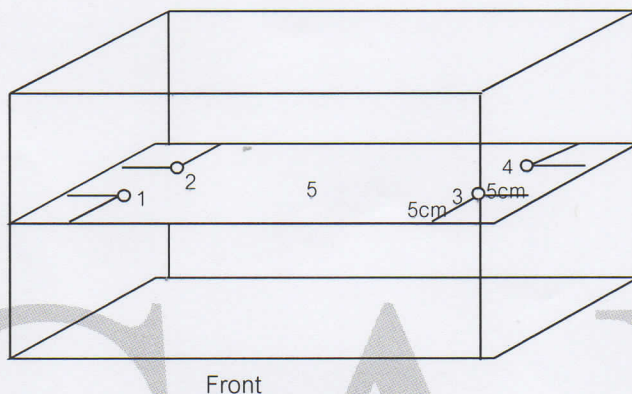
Certificate No. : 64-400532-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement



Test Point ( ° C )	Setting Temperature ( ° C )	Indicating Temperature ( ° C )	Measured Temperature ( ° C ) @ Sensor					Uncertainty ( ± ° C )	Measured Uniformity ( ° C )	Measured Stability ( ° C )
			No.							
			1	2	3	4	5			
62.0	62.0	62.0	61.83	61.81	61.81	61.82	61.83	0.18	0.08	0.04
85.0	85.0	85.0	84.85	84.81	84.84	84.82	84.87	0.18	0.10	0.05
95.0	95.0	95.0	94.86	94.80	94.82	94.80	94.85	0.18	0.10	0.04
100.0	ccc	100.9	100.69	100.74	100.68	100.83	100.69	0.24	0.27	0.14

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%

- o0o -

