

ภาคผนวกที่ 3

เอกสารชั้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

ที่ อก ๐๓๒๒/ ๑๗๕๖๕



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๘ ธ.ค. ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เข้าเทิร์นไทยคอนซัลติ้ง จำกัด

อ้างถึง คำขอต่ออายุของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๐ พฤศจิกายน ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เข้าเทิร์นไทยคอนซัลติ้ง จำกัด จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เข้าเทิร์นไทยคอนซัลติ้ง จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียน  
ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๑๗๖ สถานที่ตั้ง เลขที่ ๕๙/๔๕ หมู่ที่ ๕ ตำบลศรีสุนทร อำเภอถลาง  
จังหวัดภูเก็ต ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เข้าเทิร์นไทยคอนซัลติ้ง จำกัด ต่ออายุหนังสือ  
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายพิมุข สอนมี

ทะเบียนเลขที่ ว-๑๗๖-ค-๐๐๐๑

๒) นายศิริพงศ์ พะสริ

ทะเบียนเลขที่ ว-๑๗๖-ค-๐๐๐๒

๓) นางเพ็ญนภา จันทรเพ็ญ

ทะเบียนเลขที่ ว-๑๗๖-ค-๐๐๐๓

๔) นางสาวพรวิษา จินรัตน์

ทะเบียนเลขที่ ว-๑๗๖-ค-๐๐๐๔

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นางสาวกรรณิกา แก้วสามเขียว

ทะเบียนเลขที่ ว-๑๗๖-จ-๐๐๐๑

๒) นางสาวศิริรัตน์ นิเทศนพกุล

ทะเบียนเลขที่ ว-๑๗๖-จ-๐๐๐๒

๓) นางสาวจุฑาทิพย์ ชูถึง

ทะเบียนเลขที่ ว-๑๗๖-จ-๐๐๐๓

๔) นางสาวปรีชญา หมุกแก้ว

ทะเบียนเลขที่ ว-๑๗๖-จ-๐๐๐๔

๕) นางสาวบุษยา ประกอบแสง

ทะเบียนเลขที่ ว-๑๗๖-จ-๐๐๐๕

๖) นางสาวจุฑาภรณ์ จุฑามาศย์

๗) นางสาวกรรณนิการ์ ประทุมเพชร

๘) นางสาวสุธาสินี ละเมาะ

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนไว้ให้เค



หนังสือฉบับนี้จะหมดอายุในวันที่ ๑ ธันวาคม ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

h.

(นายเนตรศวร์ ตริ  
ผู้อำนวยการศูนย์วิจัยและเตือนภัย  
ปฏิบัติราชการแทนอธิบดีกรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคใต้  
โทร. ๐ ๗๔๓๒ ๕๐๒๙, ๐ ๗๔๘๙ ๐๖๓๔ ต่อ ๕๒๐๑  
ไปรษณีย์อิเล็กทรอนิกส์ sirw@diw.mail.go.th

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกสาร  
บริษัท เช่าเทิร์นไทยคอนสตรัคติ้ง จำกัด เลขทะเบียน ว-๑๗๖  
ที่ อก ๐๓๒๒/ ลงวันที่

ขอข่ายสารมลพิษที่ได้รับการขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๙ รายการ  
น้ำเสีย จำนวน 9 รายการ

| ลำดับที่ | สารมลพิษ                  | วิธีวิเคราะห์                               |
|----------|---------------------------|---------------------------------------------|
| 1        | Biochemical Oxygen Demand | 5-Day BOD Test, Azide Modification Method   |
| 2        | Chemical Oxygen Demand    | Closed Reflux, Titrimetric Method           |
| 3        | Oil & Grease              | Liquid-Liquid, Partition-Gravimetric Method |
| 4        | pH                        | Electrometric Method                        |
| 5        | Sulfide                   | Iodometric Method                           |
| 6        | Temperature               | Laboratory and Field Method                 |
| 7        | Total Dissolved Solids    | Dried at 180 °C                             |
| 8        | Total Kjeldahl Nitrogen   | Macro-Kjeldahl, Titrimetric Method          |
| 9        | Total Suspended Solids    | Dried at 103-105 °C                         |

#### เอกสารอ้างอิง

APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 24<sup>th</sup> ed.  
Washington, DC: APHA, 2023.

นางสาว  
(นางสาวบุ  
นักวิทยาศาสตร์



#### ภาคผนวกที่ 4

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เอกสารสอบเทียบอุปกรณ์เครื่องมือห้องปฏิบัติการ



PREMIER SYSTEM ENGINEERING CO., LTD.

123 Moo 8 Kanjanavanit Rd., Banpru, Hatyai, Songkhla 90250

E-mail : pse-cal@sriranggroup.com ,Fax. : (074)222912 Tel. : 084-2148162, 084-2148165, 074-222900-9



NSC-TISI-TIS 17025  
CALIBRATION 0024

## CALIBRATION CERTIFICATE

CERTIFICATE No. : V25-0477

CSR No. : 250252

Page : 1 of 3

Customer : Southern Thai Consulting Co., Ltd.  
59/45 Moo5 Srisoontorn, Talang, Phuket  
83110

Equipment : pH Meter

Manufacturer : SI Analytics

Model : lab 845

Serial No. : 21021943

ID. No. : -

Resolution : 0.01 pH

Instrument Condition : Good Condition

Location of Calibration : Customer Laboratory

Ambient Temperature :  $(25 \pm 3)^{\circ}\text{C}$

Relative Humidity :  $(55 \pm 15) \%$

Date of Received : 1-Mar-2025

Date of Calibration : 1-Mar-2025

Date of Issued : 4-Mar-2025

APPROVED BY :

Calibrated By : Mr. Alongkorn Chewaisarakul  
( Calibration Technician )

( / ) MR. PIYAPONG RATTANAKAN / Calibration Manager  
( ) MR. BUNPOT SUWANNARAT / Technical Manager

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The uncertainties are for a confidence probability of approximately 95 % .





CERTIFICATE NO. : V25-0477

CSR No. : 250252

Page : 2 of 3

Equipment : pH Meter  
Manufacturer : SI Analytics  
Model : lab 845  
Serial No. : 21021943  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

## REFERENCE STANDARD INSTRUMENT :

| Instrument Type                   | Nominal Value/Model | Serial No. | Cert. No.       |            | Traceability |
|-----------------------------------|---------------------|------------|-----------------|------------|--------------|
| pH Calibration Standard           | 4.00                | 1027602    | 1027602         | 15-09-2025 | CPA Chem     |
| pH Calibration Standard           | 6.98                | 1027603    | 1027603         | 15-09-2025 | CPA Chem     |
| pH Calibration Standard           | 10.01               | 1027604    | 1027604         | 15-09-2025 | CPA Chem     |
| Temperature/Electrical Calibrator | MC2-TE              | 10548      | CAL0252-25P0013 | 26-01-2026 | RKT          |

## CALIBRATION METHOD :

In-house method : CA.WI.11.117 based on direct measurement by using standard voltage calibrator

In-house method : CA.WI.11.117 based on direct measurement by using certified reference material (CRM)

## TRACEABILITY :

This Calibration Certificate is traceable to national standards which realize the unit of measurement according to the International System of Unit ( SI ) through :

CPA Chem : CPA chem Ltd. (ANAB Cert No. AR-1835)

RKT : Rockertek (Thailand) Co.,Ltd. , (NSC-TIS-TIS 17025 CALIBRATION 0069)

## CALIBRATION RESULTS :

Function : Electrical Measurement

| Applied Voltage<br>(mV) | pH meter Reading<br>(mV) | Correction<br>(mV) | Uncertainty<br>( ± mV ) | Coverage Factor<br>( k ) |
|-------------------------|--------------------------|--------------------|-------------------------|--------------------------|
| 177.48                  | 178                      | -0.52              | 0.60                    | 2.00                     |
| 0.00                    | 1                        | -1.00              | 0.59                    | 2.00                     |
| -177.48                 | -177                     | -0.48              | 0.60                    | 2.00                     |

Function : Chemical Measurement

| Standard Buffer Solutions<br>(pH) | pH meter Reading<br>(pH) | Correction<br>(pH) | Uncertainty<br>( ± pH ) | Coverage Factor<br>( k ) |
|-----------------------------------|--------------------------|--------------------|-------------------------|--------------------------|
| 4.007                             | 4.01                     | -0.003             | 0.013                   | 2.09                     |
| 6.976                             | 6.98                     | -0.004             |                         |                          |
| 10.010                            | 9.96                     | 0.050              |                         |                          |

Calibration curve - % off set - mV

The uncertainties are for a confidence probability of approximately 95 % .

The above results are valid exclusively for calibration sample as mentioned in the report.

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

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CERTIFICATE No. : V25-0477

CSR No. : 250252

Page : 2 of 2

Equipment : pH Meter  
Manufacturer : SI Analytics  
Model : lab 845  
Serial No. : 21021943  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

**REFERENCE STANDARD INSTRUMENT :**

| Instrument Type                 | Model | Serial No. | Cert. No.     | Due Date   | Traceability |
|---------------------------------|-------|------------|---------------|------------|--------------|
| Digital Thermometer with Sensor | 376   | 220608721  | SDTH-002/1124 | 14-11-2025 | PSE          |

**CALIBRATION METHOD :**

In-house method : CA.WI.11.180 comparison with standard thermometer

**TRACEABILITY :**

This Calibration Certificate is traceable to national standards which realize the unit of measurement according to the International System of Unit ( SI ) through :

PSE : Premier System Engineering Co., Ltd. ,(NSC-TISI-TIS 17025 CALIBRATION 0024)

**CALIBRATION RESULTS : ( Cont.)**

( / ) Without Adjustment

( ) After Adjustment

| Cal Point | Standard Temperature | UUC Reading | Correction | Uncertainty |
|-----------|----------------------|-------------|------------|-------------|
| (°C)      | (°C)                 | (°C)        | (°C)       | (±°C)       |
| 25        | 25.00                | 25.0        | 0.00       | 0.25        |

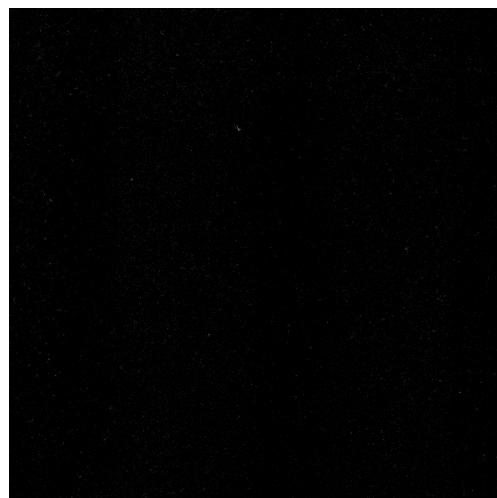
UUC : Unit Under Calibration

The uncertainties are for a confidence probability of approximately 95 % .

The above results are valid exclusively for calibration sample as mentioned in the report.

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

--End--







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## CALIBRATION CERTIFICATE

CERTIFICATE No. : T25-0653

CSR No. : 250252

Page : 1 of 4

Customer : Southern Thai Consulting Co., Ltd.  
59/45 Moo5 Srisoontorn, Talang, Phuket  
83110

Equipment : Hot Air Oven

Manufacturer : Binder

Model : FD56

Serial No. : 20210000003365

ID. No. : -

Resolution : 1 °C

Instrument Condition : Good Condition

Location of Calibration : Customer Laboratory

Ambient Temperature : (30 ± 15) °C

Relative Humidity : (60 ± 20) %

Date of Received : 1-Mar-2025

Date of Calibration : 1-Mar-2025

Date of Issued : 4-Mar-2025

APPROVED BY :

Calibrated By : Mr. Attapol Juntasurat  
( Calibration Engineer )

APPROVED SIGNATORY

( / ) MR. PIYAPONG RATTANAKAN / Calibration Manager  
( ) MR. BUNPOT SUWANNARAT / Technical Manager

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CERTIFICATE No. : T25-0653

CSR No. : 250252

Page : 2 of 4

Equipment : Hot Air Oven  
Manufacturer : Binder  
Model : FD56  
Serial No. : 20210000003365  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

REFERENCE STANDARD INSTRUMENT :

| Instrument Type                 | Model   | Serial No.  | Cert. No.   | Due Date   | Traceability |
|---------------------------------|---------|-------------|-------------|------------|--------------|
| Digital Thermometer with Sensor | 34970 A | MY 44042662 | DAT003/0824 | 01-08-2025 | PSE          |

CALIBRATION METHOD :

In-house method : CA.WI.11.160 based on ASTM E145 : 94 (re-approved 2021)

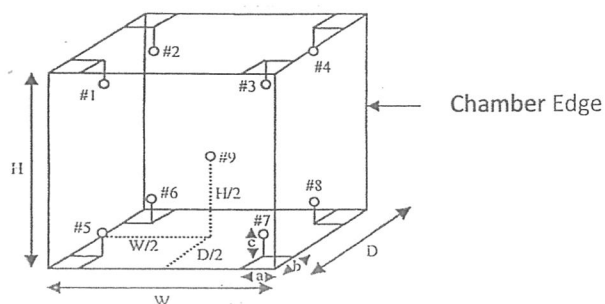
TRACEABILITY :

This Calibration Certificate is traceable to national standards which realize the unit of measurement according to the International System of Unit ( SI ) through :

PSE : Premier System Engineering Co., Ltd. ,(NSC-TISI-TIS 17025 CALIBRATION 0024)

CALIBRATION RESULTS :

Sensor Installation Diagram



Dimension of the chamber :  $W \times H \times D = 40 \times 40 \times 33$  cm  
Sensor Installation :  $a \times b \times c = 5 \times 5 \times 5$  cm

The uncertainties are for a confidence probability of approximately 95 % .  
The above results are valid exclusively for calibration sample as mentioned in the report.  
This result of calibration was found accurate as shown on date and place of calibration only.





CERTIFICATE NO. : T25-0653

CSR No. : 250252

Page : 3 of 4

Equipment : Hot Air Oven  
Manufacture : Binder  
Model : FD56  
Serial No. : 20210000003365  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

## CALIBRATION RESULTS : ( Cont.)

( / ) Without Adjustment

( ) After Adjustment

## Temperature Measurement Accuracy Test

The measurement results of the hot air oven and associates are reported in the manner as shown below

| Cal Point<br>(°C) | Measured Standard Temperature (°C) at Spread Locations |         |         |         |         |         |         |         |         | Uncertainty<br>( ± °C ) |
|-------------------|--------------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|-------------------------|
|                   | #1                                                     | #2      | #3      | #4      | #5      | #6      | #7      | #8      | Ref. 9  |                         |
| 104               | 103.823                                                | 104.225 | 103.823 | 104.015 | 103.778 | 104.033 | 104.085 | 103.758 | 103.776 | 0.67                    |

## Hot Air Oven Performance Result

The performance of the hot air oven are reported as shown below

| Cal Point<br>(°C) | UUC<br>Setting<br>(°C) | UUC<br>Reading<br>(°C) | Chamber<br>Stability<br>( ± °C ) | Chamber<br>Uniformity<br>( ± °C ) | Overall<br>Variation<br>( ± °C ) |
|-------------------|------------------------|------------------------|----------------------------------|-----------------------------------|----------------------------------|
| 104               | 104                    | 104                    | 0.11                             |                                   |                                  |

UUC : Unit Under Calibration

The uncertainties are for a confidence probability of approximately 95 % .

The above results are valid exclusively for calibration sample as mentioned in the report

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

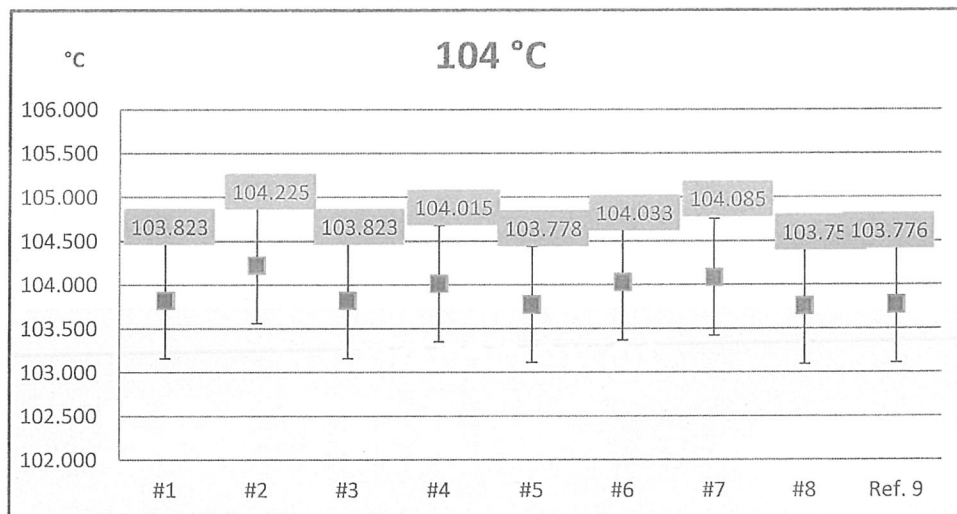


CERTIFICATE NO. : T25-0653

CSR No. : 250252

Page : 4 of 4

## Report Graph



The above results are valid exclusively for calibration sample as mentioned in the report.

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

-- End --



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## CALIBRATION CERTIFICATE

CERTIFICATE No. : T25-0654

CSR No. : 250252

Page : 1 of 3

Customer : Southern Thai Consulting Co., Ltd.  
59/45 Moo5 Srisoontorn, Talang, Phuket  
83110

Equipment : COD Reactor

Manufacturer : Lovibond

Model : RD125

Serial No. : 0423/00542

ID. No. : -

Resolution : -

Instrument Condition : Good Condition

Location of Calibration : Customer Laboratory

Ambient Temperature :  $(30 \pm 15) ^\circ\text{C}$

Relative Humidity :  $(60 \pm 20) \%$

Date of Received : 1-Mar-2025

Date of Calibration : 1-Mar-2025

Date of Issued : 3-Mar-2025

APPROVED BY

Calibrated By : Mr. Attapol Juntasurat  
( Calibration Engineer )

APPROVED SIGNATORY

( / ) MR. PIYAPONG RATTANAKAN / Calibration Manager  
( ) MR. BUNPOT SUWANNARAT / Technical Manager

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The uncertainties are for a confidence probability of approximately 95 % .



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CERTIFICATE No. : T25-0654

CSR No. : 250252

Page : 2 of 3

Equipment : COD Reactor  
Manufacturer : Lovibond  
Model : RD125  
Serial No. : 0423/00542  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

**REFERENCE STANDARD INSTRUMENT :**

| Instrument Type                 | Model   | Serial No.  | Cert. No.   | Due Date   | Traceability |
|---------------------------------|---------|-------------|-------------|------------|--------------|
| Digital Thermometer with Sensor | 34970 A | MY 44042662 | DAT003/0824 | 02-08-2025 | PSE          |

**CALIBRATION METHOD :**

In-house method : CA.WI.11.160 based on ASTM E145 : 1994 (re-approved 2011)

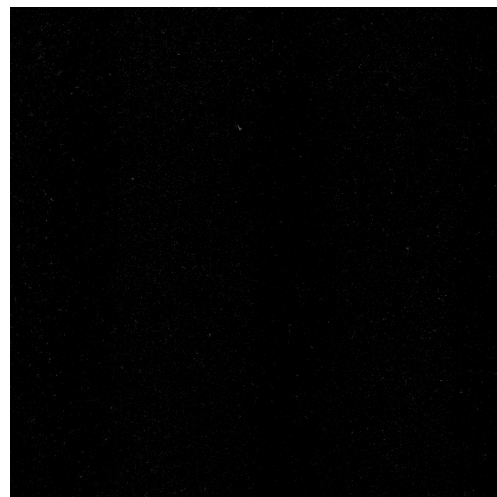
**TRACEABILITY :**

This Calibration Certificate is traceable to national standards which realize the unit of measurement according to the International System of Unit (SI) through :

PSE : Premier System Engineering Co., Ltd. ,(NSC-TISI-TIS 17025 CALIBRATION 0024)

**CALIBRATION RESULTS :**

Sensor Installation Diagram



The uncertainties are for a confidence probability of approximately 95 % .

The above results are valid exclusively for calibration sample as mentioned in the report.

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

d080723





CERTIFICATE NO. : T25-0654

CSR No. : 250252

Page : 3 of 3

Equipment : COD Reactor  
Manufacture : Lovibond  
Model : RD125  
Serial No. : 0423/00542  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

## CALIBRATION RESULTS : ( Cont.)

( / ) Without Adjustment

( ) After Adjustment

## Temperature Measurement Accuracy Test

The measurement results of the COD Reactor and associates are reported in the manner as shown below

| Cal Point | Measured Standard Temperature (°C) at Spread Locations |         |         |         |         |         |         |         |         | Uncertainty |
|-----------|--------------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|-------------|
| (°C)      | #1                                                     | #2      | #3      | #4      | #5      | #6      | #7      | #8      | #9      | ( ± °C )    |
| 150       | 151.299                                                | 147.200 | 147.791 | 148.604 | 150.268 | 149.030 | 149.150 | 148.082 | 151.746 | 0.18        |

| Cal Point | Measured Standard Temperature (°C) at Spread Locations |         |         |         |         |         |         |         |         | Uncertainty |
|-----------|--------------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|-------------|
| (°C)      | #10                                                    | #11     | #12     | #13     | #14     | #15     | #16     | #17     | #18     | ( ± °C )    |
| 150       | 151.831                                                | 148.283 | 146.341 | 150.289 | 150.245 | 150.111 | 150.150 | 149.029 | 151.111 | 0.18        |

| Cal Point | Measured Standard Temperature (°C) at Spread Locations |         |         |         |         |         | Uncertainty |
|-----------|--------------------------------------------------------|---------|---------|---------|---------|---------|-------------|
| (°C)      | #19                                                    | #20     | #21     | #22     | #23     | #24     | ( ± °C )    |
| 150       | 149.287                                                | 150.834 | 148.796 | 149.018 | 151.437 | 151.266 | 0.18        |

UUC : Unit Under Calibration

The uncertainties are for a confidence probability of approximately 95 % .

The above results are valid exclusively for calibration sample as mentioned in the report.

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

-- End --

d080723



PREMIER SYSTEM ENGINEERING CO., LTD.

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E-mail : pse-cal@sriranggroup.com ,Fax. : (074)222912 Tel. : 084-2148162, 084-2148165, 074-222900-9



## CALIBRATION CERTIFICATE

CERTIFICATE No. : M25-0359

CSR No. : 250252

Page : 1 of 3

Customer : Southern Thai Consulting Co., Ltd.  
59/45 Moo5 Srisoontorn, Talang, Phuket  
83110

Equipment : Electronic Balance

Manufacturer : Sartorius

Model : PRACTUM224-1S

Serial No. : 0035106544

ID. No. : -

Capacity : 220 g

Resolution : 0.0001 g

Instrument Condition : Good Condition

Location of Calibration : Customer Laboratory

Ambient Temperature :  $(30 \pm 10)$  °C

Relative Humidity :  $(50 \pm 20)$  %

Barometric Pressure :  $(1010 \pm 10)$  hPa

Date of Received : 1-Mar-2025

Date of Calibration : 1-Mar-2025

Date of Issued : 4-Mar-2025

APPROVED BY :

APPROVED SIGNATORY

Calibrated By : Mr. Bowornnan Langlea  
( Mechanical Supervisor )

( / ) MR. PIYAPONG RATTANAKAN / Calibration Manager  
( ) MR. BUNPOT SUWANNARAT / Technical Manager

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The uncertainties are for a confidence probability of approximately 95 % .



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PSE.CA.AP.11.021-161124 R.05





CERTIFICATE No. : M25-0359

CSR No. : 250252

Page : 2 of 3

Equipment : Electronic Balance  
Manufacturer : Sartorius  
Model : PRACTUM224-1S  
Serial No. : 0035106544  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

REFERENCE STANDARD INSTRUMENT :

| Instrument Type     | Norminal Value | Serial No. | Cert. No. | Due Date   | Traceability |
|---------------------|----------------|------------|-----------|------------|--------------|
| Standard Weight Set | 1 mg ~ 500 g   | -          | M2412021S | 02-12-2025 | TCS          |

CALIBRATION METHOD :

In-house method : CA.WI.11.015 based on UKAS LAB 14 : 2022

TRACEABILITY :

This Calibration Certificate is traceable to national standards which realize the unit of measurment according to the International System of Unit ( SI ) through :

TCS : Thai Calibration Services Co.,Ltd. , (NSC-TISI-TIS 17025 CALIBRATION 0189)

CALIBRATION RESULTS :

( / ) Without Adjustment ( ) After Adjustment

DETERMINATION OF THE STANDARD DEVIATION OF WEIGHT MACHINE (N=10)

| Nominal Value ( g ) | Standard Deviation ( g ) |
|---------------------|--------------------------|
| 200                 | 0.00013                  |

EFFECT OF OFF CENTER LOADING AT 100 g

| Position |         |          |          |          | Maximum Difference ( g ) |
|----------|---------|----------|----------|----------|--------------------------|
| 1        | 2       | 3        | 4        | 5        |                          |
| 99.9999  | 99.9997 | 100.0001 | 100.0002 | 100.0001 | 0.0003                   |

The uncertainties are for a confidence probability of approximately 95 % .



CERTIFICATE NO. : M25-0359

CSR No. : 250252

Page : 3 of 3

Equipment : Electronic Balance  
Manufacturer : Sartorius  
Model : PRACTUM224-1S  
Serial No. : 0035106544  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

## CALIBRATION RESULTS : ( Cont.)

( / ) Without Adjustment

( ) After Adjustment

EFFECT OF TARE AT 100 g

| Nominal Value<br>( g ) | UUC* Reading<br>( g ) | Correction<br>( g ) |
|------------------------|-----------------------|---------------------|
| 20                     | 20.0002               | -0.00020            |
| 40                     | 40.0001               | -0.00012            |
| 60                     | 60.0001               | -0.00007            |
| 80                     | 80.0001               | -0.00007            |
| 100                    | 100.0001              | -0.00001            |

## ERROR OF INDICATION FROM NOMINAL VALUE

| Nominal Value<br>( g ) | UUC* Reading<br>( g ) | Correction<br>( g ) | Uncertainty<br>( $\pm$ g ) | Coverage Factor<br>( k ) |
|------------------------|-----------------------|---------------------|----------------------------|--------------------------|
| * Unload               | 0.0000                | 0.00000             | 0.00031                    | 2.28                     |
| 0.01                   | 0.0100                | 0.00000             | 0.00031                    | 2.28                     |
| 0.05                   | 0.0500                | 0.00000             | 0.00031                    | 2.28                     |
| 0.1                    | 0.1001                | -0.00009            | 0.00031                    | 2.28                     |
| 0.5                    | 0.5001                | -0.00010            | 0.00032                    | 2.28                     |
| 1                      | 1.0001                | -0.00011            | 0.00032                    | 2.28                     |
| 2                      | 1.9997                | 0.00030             | 0.00032                    | 2.28                     |
| 5                      | 4.9998                | 0.00021             | 0.00032                    | 2.28                     |
| 10                     | 10.0000               | 0.00001             | 0.00032                    | 2.28                     |
| 20                     | 20.0001               | -0.00010            | 0.00031                    | 2.25                     |
| 40                     | 40.0000               | -0.00002            | 0.00032                    | 2.23                     |
| 60                     | 60.0001               | -0.00007            | 0.00032                    | 2.20                     |
| 80                     | 80.0000               | 0.00003             | 0.00033                    | 2.18                     |
| 100                    | 99.9999               | 0.00019             | 0.00033                    | 2.18                     |
| 120                    | 120.0000              | 0.00008             | 0.00034                    | 2.14                     |
| 140                    | 139.9999              | 0.00017             | 0.00036                    | 2.11                     |
| 160                    | 159.9999              | 0.00022             | 0.00037                    | 2.10                     |
| 180                    | 180.0000              | 0.00011             | 0.00039                    | 2.07                     |
| 200                    | 200.0001              | 0.00001             | 0.00039                    | 2.07                     |

UUC : Unit Under Calibration

The table as per (\*) marked are not NSC-ONSC accreditation scope.

The uncertainties are for a confidence probability of approximately 95 % .

The above results are valid exclusively for calibration sample as mentioned in the report

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

-- End --



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NSC-TISI-TIS 17025  
CALIBRATION 0024

## CALIBRATION CERTIFICATE

CERTIFICATE No. : M25-0360

CSR No. : 250252

Page : 1 of 3

Customer : Southern Thai Consulting Co., Ltd.  
59/45 Moo5 Srisoontorn, Talang, Phuket  
83110

Equipment : Electronic Balance

Manufacturer : Sartorius

Model : PRACTUM2101-1S

Serial No. : 0033508410

ID. No. : -

Capacity : 2100 g

Resolution : 0.1 g

Instrument Condition : Good Condition

Location of Calibration : Customer Laboratory

Ambient Temperature :  $(30 \pm 10) ^\circ\text{C}$

Relative Humidity :  $(50 \pm 20) \%$

Barometric Pressure :  $(1010 \pm 10)$  hPa

Date of Received : 1-Mar-2025

Date of Calibration : 1-Mar-2025

Date of Issued : 4-Mar-2025

APPROVED BY :

APPROVED SIGNATORY

Calibrated By : Mr. Bowornnan Langlea  
( Mechanical Supervisor )

( ) MR. PIYAPONG RATTANAKAN / Calibration Manager  
( ) MR. BUNPOT SUWANNARAT / Technical Manager

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The uncertainties are for a confidence probability of approximately 95 % .



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CERTIFICATE No. : M25-0360

CSR No. : 250252

Page : 2 of 3

Equipment : Electronic Balance  
Manufacturer : Sartorius  
Model : PRACTUM2101-1S  
Serial No. : 0033508410  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

## REFERENCE STANDARD INSTRUMENT :

| Instrument Type     | Norminal Value | Serial No. | Cert. No. | Due Date   | Traceability |
|---------------------|----------------|------------|-----------|------------|--------------|
| Standard Weight Set | 1 mg ~ 500 g   | -          | M2412021S | 02-12-2025 | TCS          |

## CALIBRATION METHOD :

In-house method : CA.WI.11.015 based on UKAS LAB 14 : 2022

## TRACEABILITY :

This Calibration Certificate is traceable to national standards which realize the unit of measurment

according to the International System of Unit ( SI ) through :

TCS : Thai Calibration Services Co.,Ltd. , (NSC-TISI-TIS 17025 CALIBRATION 0189)

## CALIBRATION RESULTS :

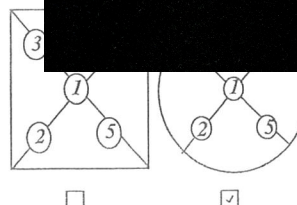
( / ) Without Adjustment ( ) After Adjustment

## DETERMINATION OF THE STANDARD DEVIATION OF WEIGHT MACHINE (N=10)

| Nominal Value ( g ) | Standard Deviation ( g ) |
|---------------------|--------------------------|
| 500                 | 0.12                     |

EFFECT OF OFF CENTER LOADING AT 200 g

| Position |       |       |       |       | Maximum Difference ( g ) |
|----------|-------|-------|-------|-------|--------------------------|
| 1        | 2     | 3     | 4     | 5     |                          |
| 199.6    | 200.4 | 197.4 | 195.9 | 202.0 | 3.7                      |



The uncertainties are for a confidence probability of approximately 95 % .





CERTIFICATE NO. : M25-0360

CSR No. : 250252

Page : 3 of 3

Equipment : Electronic Balance  
Manufacturer : Sartorius  
Model : PRACTUM2101-1S  
Serial No. : 0033508410  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

**CALIBRATION RESULTS : ( Cont.)**

( / ) Without Adjustment ( ) After Adjustment

EFFECT OF TARE AT 200 g

| Nominal Value<br>( g ) | UUC* Reading<br>( g ) | Correction<br>( g ) |
|------------------------|-----------------------|---------------------|
| 40                     | 40.3                  | -0.30               |
| 80                     | 81.1                  | -1.10               |
| 120                    | 120.9                 | -0.90               |
| 160                    | 159.9                 | 0.10                |
| 200                    | 200.1                 | -0.10               |

**ERROR OF INDICATION FROM NOMINAL VALUE**

| Nominal Value<br>( g ) | UUC* Reading<br>( g ) | Correction<br>( g ) | Uncertainty<br>( $\pm$ g ) | Coverage Factor<br>( k ) |
|------------------------|-----------------------|---------------------|----------------------------|--------------------------|
| * Unload               | 0.0                   | 0.00                | 0.28                       | 2.25                     |
| 1                      | 1.0                   | 0.00                | 0.28                       | 2.25                     |
| 2                      | 2.0                   | 0.00                | 0.28                       | 2.25                     |
| 5                      | 5.0                   | 0.00                | 0.28                       | 2.25                     |
| 10                     | 10.0                  | 0.00                | 0.28                       | 2.25                     |
| 50                     | 49.8                  | 0.20                | 0.28                       | 2.25                     |
| 100                    | 99.8                  | 0.20                | 0.28                       | 2.25                     |
| 150                    | 149.8                 | 0.20                | 0.28                       | 2.25                     |
| 200                    | 199.6                 | 0.40                | 0.28                       | 2.25                     |
| 250                    | 249.5                 | 0.50                | 0.28                       | 2.25                     |
| 300                    | 299.5                 | 0.50                | 0.28                       | 2.25                     |
| 350                    | 349.4                 | 0.60                | 0.28                       | 2.25                     |
| 400                    | 398.7                 | 1.30                | 0.28                       | 2.25                     |
| 450                    | 448.5                 | 1.50                | 0.28                       | 2.25                     |
| 500                    | 499.0                 | 1.00                | 0.28                       | 2.25                     |

UUC : Unit Under Calibration

The table as per (\*) marked are not NSC-ONSC accreditation scope.

The uncertainties are for a confidence probability of approximately 95 % .

The above results are valid exclusively for calibration sample as mentioned in the report

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

-- End --



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NSC-TISI-TIS 17025  
CALIBRATION 0024

## CALIBRATION CERTIFICATE

CERTIFICATE No. : T25-0655

CSR No. : 250252

Page : 1 of 4

Customer : Southern Thai Consulting Co., Ltd.  
59/45 Moo5 Srisoontorn, Talang, Phuket  
83110

Equipment : Refrigerator

Manufacturer : SANDEN INTERCOOL

Model : SEA-0405

Serial No. : SEA0405-191200194

ID. No. : -

Resolution : 1 °C

Instrument Condition : Good Condition

Location of Calibration : Customer Laboratory

Ambient Temperature :  $(30 \pm 15) ^\circ\text{C}$

Relative Humidity :  $(60 \pm 20) \%$

Date of Received : 1-Mar-2025

Date of Calibration : 1-Mar-2025

Date of Issued : 4-Mar-2025

APPROVED BY :

Calibrated By : Mr. Attapol Juntasurat  
( Calibration Engineer )

APPROVED SIGNATORY

( / ) MR. PIYAPONG RATTANAKAN / Calibration Manager  
( ) MR. BUNPOT SUWANNARAT / Technical Manager

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The uncertainties are for a confidence probability of approximately 95 % .



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CERTIFICATE No. : T25-0655

CSR No. : 250252

Page : 2 of 4

Equipment : Refrigerator  
Manufacturer : SANDEN INTERCOOL  
Model : SEA-0405  
Serial No. : SEA0405-191200194  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

REFERENCE STANDARD INSTRUMENT :

| Instrument Type                 | Model   | Serial No.  | Cert. No.   | Due Date   | Traceability |
|---------------------------------|---------|-------------|-------------|------------|--------------|
| Digital Thermometer with Sensor | 34970 A | MY 44042662 | DAT003/0824 | 01-08-2025 | PSE          |

CALIBRATION METHOD :

In-house method : CA.WI.11.160 based on ASTM E145 : 94 (re-approved 2021)

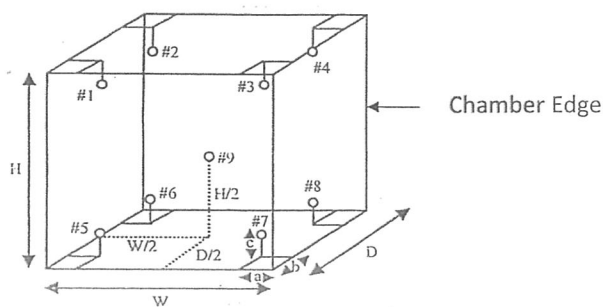
TRACEABILITY :

This Calibration Certificate is traceable to national standards which realize the unit of measurement according to the International System of Unit (SI) through :

PSE : Premier System Engineering Co., Ltd. ,(NSC-TISI-TIS 17025 CALIBRATION 0024)

CALIBRATION RESULTS :

Sensor Installation Diagram



Dimension of the chamber :  $W \times H \times D = 53 \times 130 \times 43$  cm  
Sensor Installation :  $a \times b \times c = 5 \times 5 \times 5$  cm

The uncertainties are for a confidence probability of approximately 95 % .  
The above results are valid exclusively for calibration sample as mentioned in the report.  
This result of calibration was found accurate as shown on date and place of calibration only.



CERTIFICATE NO. : T25-0655

CSR No. : 250252

Page : 3 of 4

Equipment : Refrigerator  
Manufacture : SANDEN INTERCOOL  
Model : SEA-0405  
Serial No. : SEA0405-191200194  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

## CALIBRATION RESULTS : ( Cont.)

( / ) Without Adjustment

( ) After Adjustment

## Temperature Measurement Accuracy Test

The measurement results of the refrigerator and associates are reported in the manner as shown below

| Cal Point<br>(°C) | Measured Standard Temperature (°C) at Spread Locations |       |       |       |       |       |       |       |        | Uncertainty<br>( ± °C ) |
|-------------------|--------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|--------|-------------------------|
|                   | #1                                                     | #2    | #3    | #4    | #5    | #6    | #7    | #8    | Ref. 9 |                         |
| 4                 | 4.970                                                  | 4.632 | 4.119 | 3.822 | 4.508 | 4.076 | 4.555 | 4.308 | 4.126  | 1.4                     |

## Refrigerator Performance Result

The performance of the refrigerator are reported as shown below

| Cal Point<br>(°C) | UUC<br>Setting<br>(°C) | UUC<br>Reading<br>(°C) | Chamber<br>Stability<br>( ± °C ) | Chamber<br>Uniformity<br>( ± °C ) | Overall<br>Variation |
|-------------------|------------------------|------------------------|----------------------------------|-----------------------------------|----------------------|
| 4                 | 4                      | 4                      | 0.98                             | 1.6                               |                      |

UUC : Unit Under Calibration

The uncertainties are for a confidence probability of approximately 95 % .

The above results are valid exclusively for calibration sample as mentioned in the report.

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

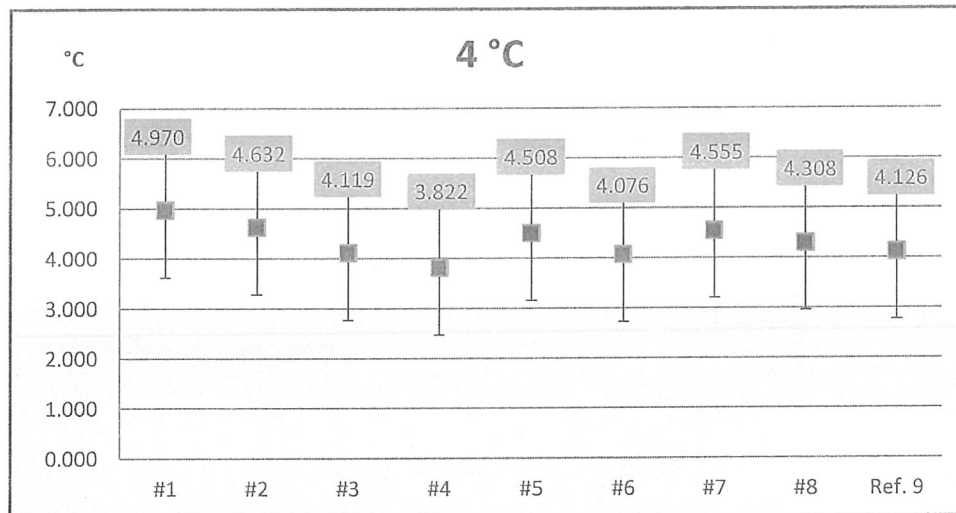


CERTIFICATE NO. : T25-0655

CSR No. : 250252

Page : 4 of 4

## Report Graph



The above results are valid exclusively for calibration sample as mentioned in the report.

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

-- End --



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NSC-TISI-TIS 17025  
CALIBRATION 0024

## CALIBRATION CERTIFICATE

CERTIFICATE No. : T25-0656

CSR No. : 250252

Page : 1 of 4

Customer : Southern Thai Consulting Co., Ltd.  
59/45 Moo5 Srisoontorn, Talang, Phuket  
83110

Equipment : Incubator

Manufacturer : ACCUPLUS

Model : I250

Serial No. : 0408-0415-0034

ID. No. : -

Resolution : 0.1 °C

Instrument Condition : Good Condition

Location of Calibration : Customer Laboratory

Ambient Temperature : (30 ± 15) °C

Relative Humidity : (60 ± 20) %

Date of Received : 1-Mar-2025

Date of Calibration : 1-Mar-2025

Date of Issued : 4-Mar-2025

APPROVED BY :

Calibrated By : Mr. Attapol Juntasurat  
( Calibration Engineer )

APPROVED SIGNATORY

( / ) MR. PIYAPONG RATTANAKAN / Calibration Manager  
( ) MR. BUNPOT SUWANNARAT / Technical Manager

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The uncertainties are for a confidence probability of approximately 95 % .



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CERTIFICATE No. : T25-0656

CSR No. : 250252

Page : 2 of 4

Equipment : Incubator  
Manufacturer : ACCUPLUS  
Model : I250  
Serial No. : 0408-0415-0034  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

REFERENCE STANDARD INSTRUMENT :

| Instrument Type                 | Model   | Serial No.  | Cert. No.   | Due Date   | Traceability |
|---------------------------------|---------|-------------|-------------|------------|--------------|
| Digital Thermometer with Sensor | 34970 A | MY 44042662 | DAT003/0824 | 01-08-2025 | PSE          |

CALIBRATION METHOD :

In-house method : CA.WI.11.160 based on ASTM E145 : 94 (re-approved 2021)

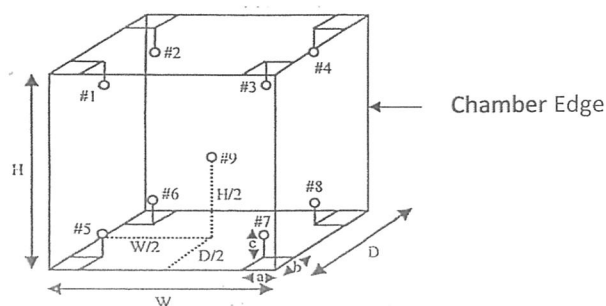
TRACEABILITY :

This Calibration Certificate is traceable to national standards which realize the unit of measurement according to the International System of Unit (SI) through :

PSE : Premier System Engineering Co., Ltd. ,(NSC-TISI-TIS 17025 CALIBRATION 0024)

CALIBRATION RESULTS :

Sensor Installation Diagram



Dimension of the chamber :  $W \times H \times D = 78 \times 100 \times 45$  cm  
Sensor Installation :  $a \times b \times c = 5 \times 5 \times 5$  cm

The uncertainties are for a confidence probability of approximately 95 % .  
The above results are valid exclusively for calibration sample as mentioned in the report.  
This result of calibration was found accurate as shown on date and place of calibration only.



CERTIFICATE NO. : T25-0656

CSR No. : 250252

Page : 3 of 4

Equipment : Incubator  
Manufacture : ACCUPLUS  
Model : I250  
Serial No. : 0408-0415-0034  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

## CALIBRATION RESULTS : ( Cont.)

( / ) Without Adjustment

( ) After Adjustment

## Temperature Measurement Accuracy Test

The measurement results of the incubator and associates are reported in the manner as shown below

| Cal Point<br>(°C) | Measured Standard Temperature (°C) at Spread Locations |        |        |        |        |        |        |        |        | Uncertainty<br>( ± °C ) |
|-------------------|--------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|-------------------------|
|                   | #1                                                     | #2     | #3     | #4     | #5     | #6     | #7     | #8     | Ref. 9 |                         |
| 20                | 20.204                                                 | 20.344 | 20.218 | 20.310 | 19.964 | 20.077 | 20.086 | 19.786 | 20.102 | 0.36                    |

## Incubator Performance Result

The performance of the incubator are reported as shown below

| Cal Point<br>(°C) | UUC<br>Setting<br>(°C) | UUC<br>Reading<br>(°C) | Chamber<br>Stability<br>( ± °C ) | Chamber<br>Uniformity<br>( ± °C ) | Overall<br>Variation<br>( ± °C ) |
|-------------------|------------------------|------------------------|----------------------------------|-----------------------------------|----------------------------------|
| 20                | 20                     | 20                     | 0.16                             | 0.                                |                                  |

UUC : Unit Under Calibration

The uncertainties are for a confidence probability of approximately 95 % .

The above results are valid exclusively for calibration sample as mentioned in the report.

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



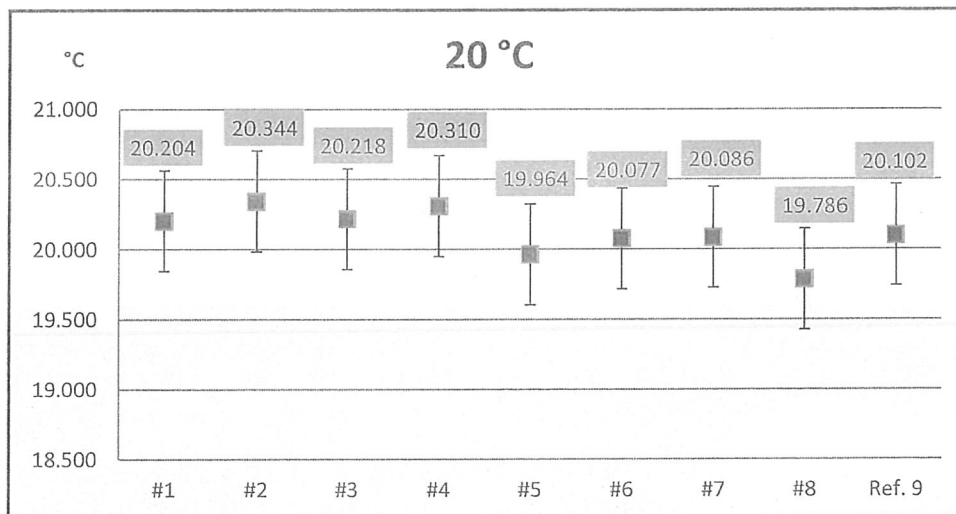


CERTIFICATE NO. : T25-0656

CSR No. : 250252

Page : 4 of 4

### Report Graph



The above results are valid exclusively for calibration sample as mentioned in the report.

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

-- End --



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NSC-TISI-TIS 17025  
CALIBRATION 0024

## CALIBRATION CERTIFICATE

CERTIFICATE No. : T25-0657

CSR No. : 250252

Page : 1 of 4

Customer : Southern Thai Consulting Co., Ltd.  
59/45 Moo5 Srisoontorn, Talang, Phuket  
83110

Equipment : Water Bath

Manufacturer : Memmert

Model : WNB 22

Serial No. : L522.1030

ID. No. : -

Resolution : 0.1 °C

Instrument Condition : Good Condition

Location of Calibration : Customer Laboratory

Ambient Temperature :  $(30 \pm 10) ^\circ\text{C}$

Relative Humidity :  $(50 \pm 20) \%$

Date of Received : 1-Mar-2025

Date of Calibration : 1-Mar-2025

Date of Issued : 4-Mar-2025

APPROVED BY :

Calibrated By : Mr. Attapol Juntasurat  
( Calibration Engineer )

APPROVED SIGNATORY

( / ) MR. PIYAPONG RATTANAKAN / Calibration Manager  
( ) MR. BUNPOT SUWANNARAT / Technical Manager

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The uncertainties are for a confidence probability of approximately 95 % .





CERTIFICATE No. : T25-0657

CSR No. : 250252

Page : 2 of 4

Equipment : Water Bath  
Manufacturer : Memmert  
Model : WNB 22  
Serial No. : L522.1030  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Calibration : 1-Mar-2025

REFERENCE STANDARD INSTRUMENT :

| Instrument Type                 | Model   | Serial No.  | Cert. No.    | Due Date   | Traceability |
|---------------------------------|---------|-------------|--------------|------------|--------------|
| Digital Thermometer with Sensor | 34970 A | MY 44042662 | DAT003W/0824 | 02-08-2025 | PSE          |

CALIBRATION METHOD :

In-house method : CA.WI.11.161 based on ASTM E715 : 80 (re-approved 2022)

TRACEABILITY :

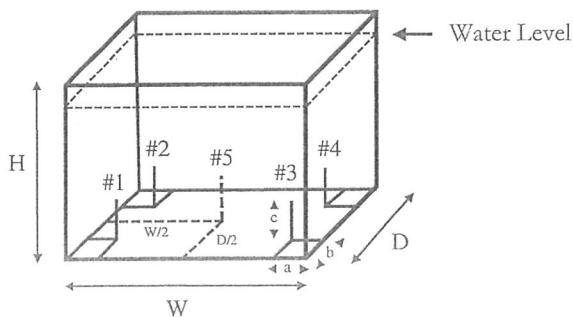
This Calibration Certificate is traceable to national standards which realize the unit of measurement according to the International System of Unit ( SI ) through :

PSE : Premier System Engineering Co., Ltd. ,(NSC-TISI-TIS 17025 CALIBRATION 0024)

CALIBRATION RESULTS :

( / ) Without Adjustment ( ) After Adjustment

Sensor Installation Diagram



Dimension of the chamber :  $W \times H \times D = 35 \times 29 \times 22$  cm  
Sensor Installation :  $a \times b \times c = 5 \times 5 \times 5$  cm

The uncertainties are for a confidence probability of approximately 95 % .

The above results are valid exclusively for calibration sample as mentioned in the report.

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



CERTIFICATE NO. : T25-0657

CSR No. : 250252

Page : 3 of 4

Equipment : Water Bath  
Manufacture : Memmert  
Model : WNB 22  
Serial No. : L522.1030  
ID. No. : -  
Date of Received : 1-Mar-2025  
Date of Received : 1-Mar-2025

## CALIBRATION RESULTS : ( Cont.)

( / ) Without Adjustment

( ) After Adjustment

## Temperature Measurement Accuracy Test

The measurement results of the water bath and associates are reported in the manner as shown below

| Cal Point<br>(°C) | Measured Standard Temperature (°C) at Spread Locations |       |       |       |       | Uncertainty<br>( ± °C ) |
|-------------------|--------------------------------------------------------|-------|-------|-------|-------|-------------------------|
|                   | #1                                                     | #2    | #3    | #4    | #5    |                         |
| 85                | 84.58                                                  | 84.80 | 84.57 | 84.60 | 84.77 | 0.35                    |
| 95                | 94.85                                                  | 95.05 | 94.85 | 95.08 | 95.15 | 0.44                    |

## Water Bath Performance Result

The performance of the water bath are reported as shown below

| Cal Point<br>(°C) | UUC<br>Setting<br>(°C) | UUC<br>Reading<br>(°C) | Water Bath<br>Stability<br>( ± °C ) | Water Bath<br>Uniformity<br>( ± °C ) | Overall<br>Variation |
|-------------------|------------------------|------------------------|-------------------------------------|--------------------------------------|----------------------|
| 85                | 85.0                   | 85.0                   | 0.11                                | 0.26                                 |                      |
| 95                | 95.0                   | 95.0                   | 0.25                                | 0.37                                 |                      |

UUC : Unit Under Calibration

The uncertainty is not combine uniformity of the water bath

The uncertainties are for a confidence probability of approximately 95 % .

The above results are valid exclusively for calibration sample as mentioned in the report.

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

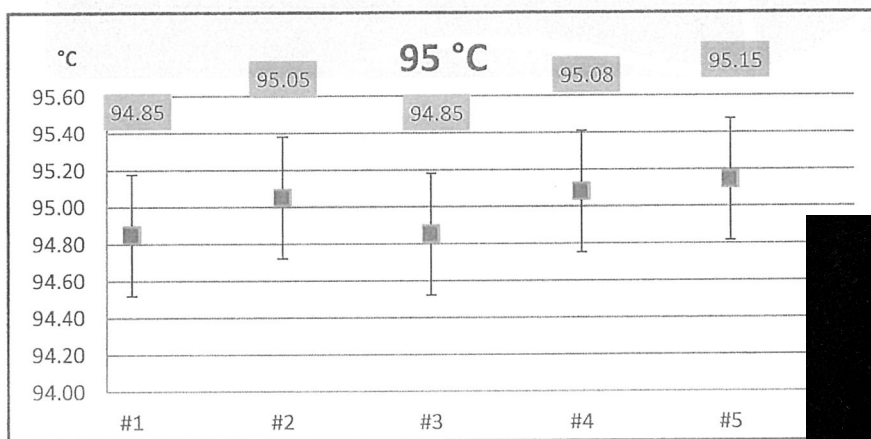
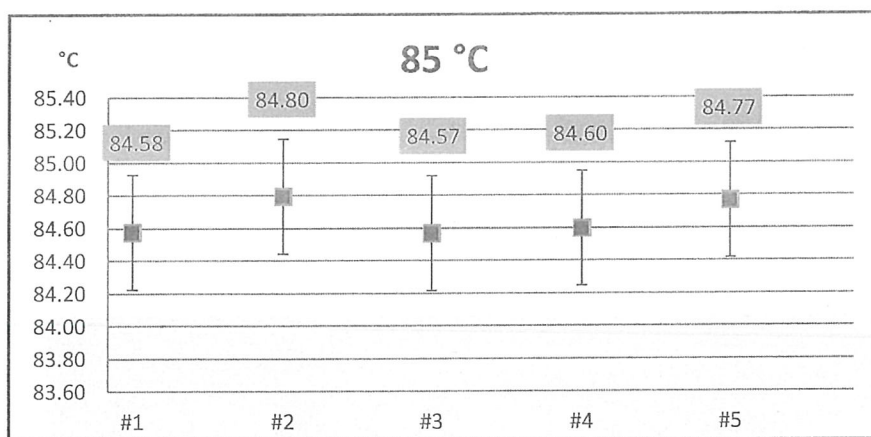


CERTIFICATE NO. : T25-0657

CSR No. : 250252

Page : 4 of 4

## Report Graph



The above results are valid exclusively for calibration sample as mentioned in the report.

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

-- End --



# Certificate of Calibration

Number of Page(s)

1 of 3

**Certificate No.** BSCC-UV-081/25  
**Equipment** UV/Vis Spectrophotometer  
**Model** UV-1800  
**Manufacturer** SHIMADZU  
**Serial No.** A11635305233 CD  
**ID No.** UV-03  
**Date of receipt** 5 March 2025  
**Date of calibration** 5 March 2025  
**Date of issue** 7 March 2025

**Customer name** Southern Thai Consulting Co.,Ltd.

**Address** 59/45 Moo 5, Srisoontorn, Talang, Phuket 83110

**Temperature** (24.2-26.8) °C (On site)  
**Humidity** (54.6-64.0) %RH (On site)

**Equipment condition** Good Operation

**Calibration Location** Laboratory

**Calibration Procedure** In-house method WI-UV-702-01 based on ASTM E275-01

**Traceability** Wavelength Accuracy is traceable to certificate No. 118114 and 118119  
Photometric Accuracy is traceable to certificate No. 118970 and 119006  
Stray Light is traceable to certificate No. 118111  
The above certificate are traceable to SI unit through Starna Scientific Ltd.  
(UKAS accredited calibration laboratory NO. 0659)

**Calibrated by** Mr.Sarunkorn Pukaothong

Approved by



**Mr.Pannaphong Phanmekakul**  
Technical Manager

Adapted item(s) as mention in this report / certificate.  
Results are prohibited and also shall not be reproduced  
except in full, without written approval of the Bara Scientific Co., Ltd.

# Certificate of Calibration

Certificate No. **BSCC-UV-081/25**

Number of Page(s) **2 of 3**

## Calibration Results:

### 1.Wavelength Accuracy

| Certified Wavelength (nm) | UUC (nm) | Error (nm) | Uncertainty ( $\pm$ nm) |
|---------------------------|----------|------------|-------------------------|
| 360.89                    | 360.81   | -0.08      | 0.18                    |
| 418.53                    | 418.50   | -0.03      | 0.18                    |
| 513.39                    | 513.39   | 0.00       | 0.18                    |
| 572.99                    | 573.12   | 0.13       | 0.18                    |
| 879.41                    | 879.40   | -0.01      | 0.18                    |

### 2.Photometric Accuracy (UV)

| Wavelength (nm) | Certified Absorbance (A) | UUC (A) | Error (A) | Uncertainty ( $\pm$ A) |
|-----------------|--------------------------|---------|-----------|------------------------|
| 235             | CNR                      | CNR     | CNR       | CNR                    |
|                 | CNR                      | CNR     | CNR       | CNR                    |
| 257             | 0.0000                   | 0.0001  | 0.0001    | 0.0075                 |
|                 | 0.8616                   | 0.8587  | -0.0029   | 0.0075                 |
| 313             | CNR                      | CNR     | CNR       | CNR                    |
|                 | CNR                      | CNR     | CNR       | CNR                    |
| 350             | 0.0000                   | 0.0001  | 0.0001    | 0.0075                 |
|                 | 0.6393                   | 0.6393  | 0.0000    | 0.0075                 |

\*CNR = Customer not request

The above results are valid exclusively for the purpose of  
Advertising the report / Certificate and put in full, without

certificate.  
be reproduced

# Certificate of Calibration

Certificate No. **BSCC-UV-081/25**

Number of Page(s) **3 of 3**

## Calibration Results:

### 3. Photometric Accuracy (Visible)

| Wavelength (nm) | Certified Absorbance (A) | UUC (A) | Error (A) | Uncertainty ( $\pm A$ ) |
|-----------------|--------------------------|---------|-----------|-------------------------|
| 420.0           | CNR                      | CNR     | CNR       | CNR                     |
|                 | CNR                      | CNR     | CNR       | CNR                     |
|                 | CNR                      | CNR     | CNR       | CNR                     |
|                 | CNR                      | CNR     | CNR       | CNR                     |
| 440.0           | CNR                      | CNR     | CNR       | CNR                     |
|                 | CNR                      | CNR     | CNR       | CNR                     |
|                 | CNR                      | CNR     | CNR       | CNR                     |
|                 | CNR                      | CNR     | CNR       | CNR                     |
| 465.0           | 0.0000                   | 0.0000  | 0.0000    | 0.0042                  |
|                 | 0.5188                   | 0.5186  | -0.0002   | 0.0042                  |
|                 | 0.6627                   | 0.6627  | 0.0000    | 0.0042                  |
|                 | 0.9424                   | 0.9425  | 0.0001    | 0.0042                  |
| 546.1           | 0.0000                   | 0.0000  | 0.0000    | 0.0042                  |
|                 | 0.5199                   | 0.5199  | 0.0000    | 0.0042                  |
|                 | 0.6989                   | 0.6988  | -0.0001   | 0.0042                  |
|                 | 0.9972                   | 0.9974  | 0.0002    | 0.0042                  |
| 590.0           | CNR                      | CNR     | CNR       | CNR                     |
|                 | CNR                      | CNR     | CNR       | CNR                     |
|                 | CNR                      | CNR     | CNR       | CNR                     |
|                 | CNR                      | CNR     | CNR       | CNR                     |
| 635.0           | 0.0000                   | 0.0000  | 0.0000    | 0.0002                  |
|                 | 0.5611                   | 0.5614  | 0.0003    | 0.0003                  |
|                 | 0.7637                   | 0.7636  | -0.0001   | 0.0001                  |
|                 | 1.0942                   | 1.0944  | 0.0002    | 0.0002                  |

\*CNR = Customer not request

### 4. Stray Light\*

| Standard cut-off wavelength (nm) | Unit Under Calibration |                  |
|----------------------------------|------------------------|------------------|
|                                  | Wavelength (nm)        | Transmission (%) |
| 201.15 $\pm$ 0.11nm              | 200.90                 | 0.9820           |

The Stray light transmission reference is less than 1.0%T and Stray light absorption is less than 0.05%T

\*Stray Light not NSC-ONSC Accredited.

The measurement uncertainty is base on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%.

\*\*\*End of Certificate\*\*\*

The above results are valid exclusively for the calibrated item(s) as mention in this report / certificate.  
Advertising the report / Certificate and publicity of the results are prohibited and also shall not be reproduced except in full, without written approval of the Bara Scientific Co., Ltd.



CERT.No.: HS-W037F

Certificate of Calibration

Calibration Date : 18 Jun 25

Model : YSI Pro20i

Submitted by : SOUTHERN THAI CONSULTING CO.,LTD.

S/N : 23D101243

59/45 Moo 5 T.Srisoontorn, A.Talang Phuket 83110

Probe : -

S/N : -

ID NO. : -

Avg Room Temp 25 °C

Air Temp ref : S/N. F8065C26

Avg Water Temp 25 °C

Barometric ref : S/N. F8065C26

Air Pressure : 760.00 mmHg

Water Temp ref : -

Salinity : 0 ppt

ID NO. HS001

Technician : Kittipong M.

### Calibration Details

| Calibration Point     | 100% air sat.<br>(@25 °C, DO = 8.26 mg/l) | (status) | (status) |
|-----------------------|-------------------------------------------|----------|----------|
| Measurement 1 (mg/l)  | 8.26                                      | (PASS)   | -        |
| Measurement 2 (mg/l)  | 8.26                                      | (PASS)   | -        |
| Measurement 3 (mg/l)  | 8.25                                      | (PASS)   | -        |
| Measurement 4 (mg/l)  | 8.25                                      | (PASS)   | -        |
| Measurement 5 (mg/l)  | 8.24                                      | (PASS)   | -        |
| Measurement 6 (mg/l)  | 8.24                                      | (PASS)   | -        |
| Measurement 7 (mg/l)  | 8.24                                      | (PASS)   | -        |
| Measurement 8 (mg/l)  | 8.25                                      | (PASS)   | -        |
| Measurement 9 (mg/l)  | 8.27                                      | (PASS)   | -        |
| Measurement 10 (mg/l) | 8.29                                      | (PASS)   | -        |

|                  |      |      |   |
|------------------|------|------|---|
| Mean Measurement | 8.25 | mg/l | - |
| Inaccuracy       | 0.01 | mg/l | - |

Overall Status (PASS)

### Manufacturer Specification

Accuracy = +/- 0.2 mg/l

- 1) This certificate is issued based on the date and place of test only.
- 2) The calibration procedure followed in a
- 3) This result shall not be used for advert



Technician Signature

(Kittipong Maekwong)



Laboratory Manager

(Supreecha Sumaritam)