

ภาคผนวกที่ 3

เอกสารขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

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) นางเพ็ญภา 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

ทะเบียนเลขที่ ว-๑๗๖-จ-๐๐๐๖

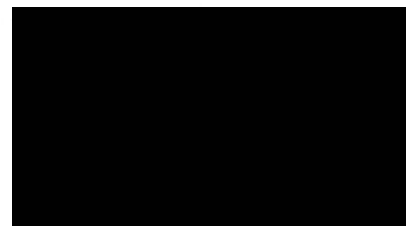
๗) นางสาวกรรณนิการ์ ประทุมเพชร

ทะเบียนเลขที่ ว-๑๗๖-จ-๐๐๐๗

๘) นางสาวสุธาสินี ละเมาะ

ทะเบียนเลขที่ ว-๑๗๖-จ-๐๐๐๘

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย ตามสิ่งที่ส่งมาด้วย

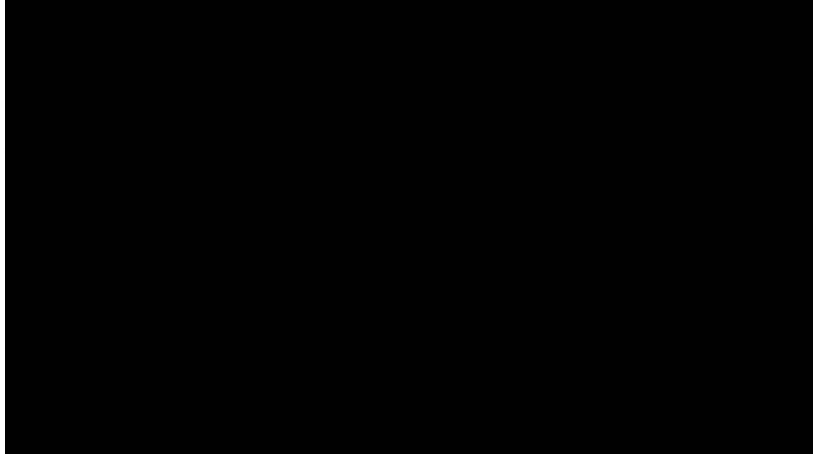


หนังสือ....



หนังสือฉบับนี้จะหมดอายุในวันที่ ๑ ธันวาคม ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกซน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกซน ทั้งนี้สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ



ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคใต้

โทร. ๐ ๗๔๓๒ ๕๐๒๙, ๐ ๗๔๘๙ ๐๖๓๔ ต่อ ๕๒๐๑

ไปรษณีย์อิเล็กทรอนิกส์ sirw@diw.mail.go.th

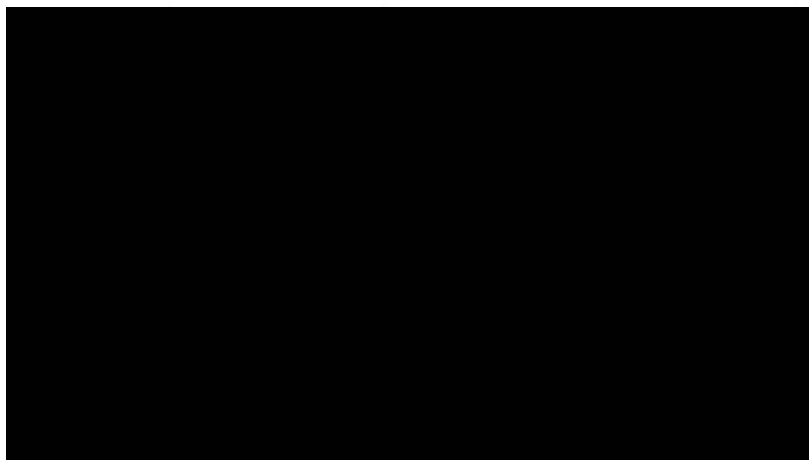
เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เช่าเทิร์นไทยคอนสตรัคติ้ง จำกัด เลขทะเบียน ว-๑๗๖  
ที่ อก ๐๓๒๒/ ลงวันที่

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.



#### ภาคผนวกที่ 4

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เอกสารสอบเทียบอุปกรณ์เครื่องมือห้องปฏิบัติการ

# Certificate of Calibration

Number of Page(s)

1 of 3

**Certificate No.** BSCC-UV-437/23  
**Equipment** UV/Vis Spectrophotometer  
**Model** UV-1800  
**Manufacturer** SHIMADZU  
**Serial No.** A11635305233CD  
**ID No.** UV-03  
**Date of receipt** 6 November 2023  
**Date of calibration** 6 November 2023  
**Date of issue** 10 November 2023

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

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

**Temperature** (26.9-27.2) °C (On site)  
**Humidity** (60.1-63.1) %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. 99394 and 99395  
Photometric Accuracy is traceable to certificate No. 99380 and 99387  
Stray Light is traceable to certificate No. 99385  
The above certificate are traceable to SI unit through Sarna Scientific Ltd.  
(UKAS accredited calibration laboratory NO. 0659)

**Calibrated by** Mr.Sarunkorn Pukaothong

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.

# Certificate of Calibration

Certificate No.

BSCC-UV-437/23

Number of Page(s)

2 of 3

## Calibration Results:

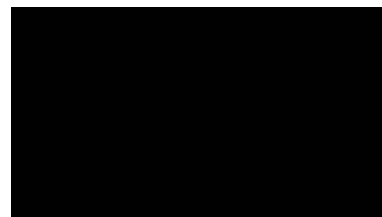
### 1.Wavelength Accuracy

| Certified Wavelength (nm) | UUC (nm) | Error (nm) | Uncertainty ( $\pm$ nm) |
|---------------------------|----------|------------|-------------------------|
| 360.89                    | 360.79   | -0.10      | 0.18                    |
| 418.53                    | 418.50   | -0.03      | 0.18                    |
| 513.39                    | 513.40   | 0.01       | 0.18                    |
| 572.99                    | 573.10   | 0.11       | 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                   | 0.0000  | 0.0000    | 0.0075                 |
|                 | 0.8579                   | 0.8547  | -0.0032   | 0.0075                 |
| 313             | CNR                      | CNR     | CNR       | CNR                    |
|                 | CNR                      | CNR     | CNR       | CNR                    |
| 350             | 0.0000                   | 0.0000  | 0.0000    | 0.0075                 |
|                 | 0.6376                   | 0.6362  | -0.0014   | 0.0075                 |

\*CNR = Customer not request



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# Certificate of Calibration

Certificate No. **BSCC-UV-437/23** 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                  |
|                 | 0.4894                   | 0.4891  | -0.0003   | 0.0042                  |
|                 | 0.6798                   | 0.6795  | -0.0003   | 0.0042                  |
|                 | 0.9691                   | 0.9681  | -0.0010   | 0.0042                  |
| 546.1           | 0.0000                   | 0.0000  | 0.0000    | 0.0042                  |
|                 | 0.5042                   | 0.5026  | -0.0016   | 0.0042                  |
|                 | 0.6899                   | 0.6882  | -0.0017   | 0.0042                  |
|                 | 0.9822                   | 0.9801  | -0.0021   | 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    | 0.0042                  |
|                 | 0.5181                   | 0.5163  | -0.0018   | 0.0042                  |
|                 | 0.6878                   | 0.6860  | -0.0018   | 0.0042                  |
|                 | 0.9751                   | 0.9725  | -0.0026   | 0.0042                  |

\*CNR = Customer not request

### 4. Stray Light\*

| Standard cut-off wavelength (nm) | Unit Under Calibration(UUC) |                   |                |
|----------------------------------|-----------------------------|-------------------|----------------|
|                                  | Wavelength (nm)             | Transmission (%T) | Absorbance (A) |
| 200.98 $\pm$ 0.11nm              | 201.00                      | 0.9400            | 2.0269         |

The Stray light transmission reference is less than 1.0%T and Stray light absorbance reference is greater than 2.00A

\*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.



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. : T23-3234

CSR No. : 231381

Page : 1 of 4

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

Equipment : Refrigerator

Manufacturer : Senden Intercool

Model : SEA-0405

Serial No. : SEA0405-191200194

ID. No. : -

Resolution : 0.1 °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 : 16-Nov-2023

Date of Calibration : 16-Nov-2023

Date of Issued : 20-Nov-2023

Calibrated By : Mr. Athiwat Supacheewa  
(Temperature Supervisor)

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



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CERTIFICATE No. : T23-3234

CSR No. : 231381

Page : 2 of 4

Equipment : Refrigerator  
Manufacturer : Senden Intercool  
Model : SEA-0405  
Serial No. : SEA0405-191200194  
ID. No. : -  
Date of Received : 16-Nov-2023  
Date of Calibration : 16-Nov-2023

REFERENCE STANDARD INSTRUMENT :

| Instrument Type                 | Model   | Serial No.  | Cert. No.   | Due Date   | Traceability |
|---------------------------------|---------|-------------|-------------|------------|--------------|
| Digital Thermometer with Sensor | 34970 A | MY 44042662 | DAT003/0823 | 01-08-2024 | PSE          |

CALIBRATION METHOD :

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

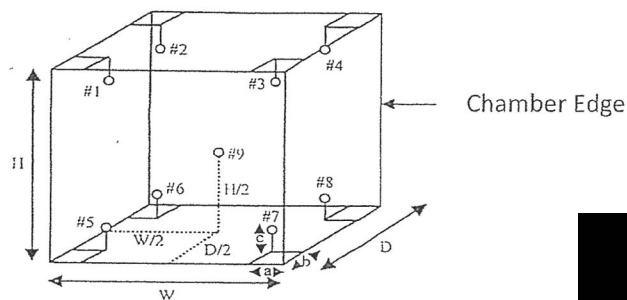
TRACEABILITY :

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



Dimension of the chamber :  $W \times H \times D = 55 \times 164 \times 43$  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. : T23-3234

CSR No. : 231381

Page : 3 of 4

Equipment : Refrigerator  
Manufacture : Senden Intercool  
Model : SEA-0405  
Serial No. : SEA0405-191200194  
ID. No. : -  
Date of Received : 16-Nov-2023  
Date of Calibration : 16-Nov-2023

## CALIBRATION RESULTS : ( Cont.)

( / ) Without Adjustment

( ) After Adjustment

## Temperature Measurement Accuracy Test

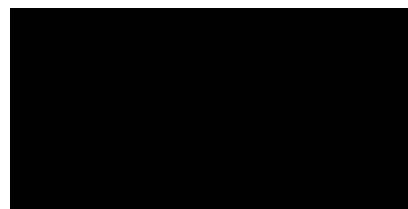
The measurement results of the refrigerator and associates are reported in the manner as shown below

| 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                 | 4.78                                                   | 4.58 | 4.20 | 4.01 | 4.57 | 4.79 | 4.37 | 4.23 | 4.23   | 1.2                     |

## 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<br>( ± °C ) |
|-------------------|------------------------|------------------------|----------------------------------|-----------------------------------|----------------------------------|
| 4                 | 4.0                    | 4.0                    | 0.97                             | 1.35                              | 2.48                             |



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.

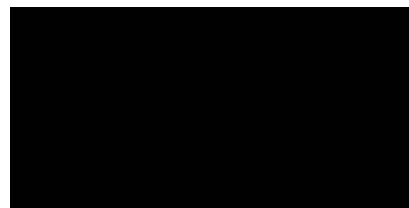
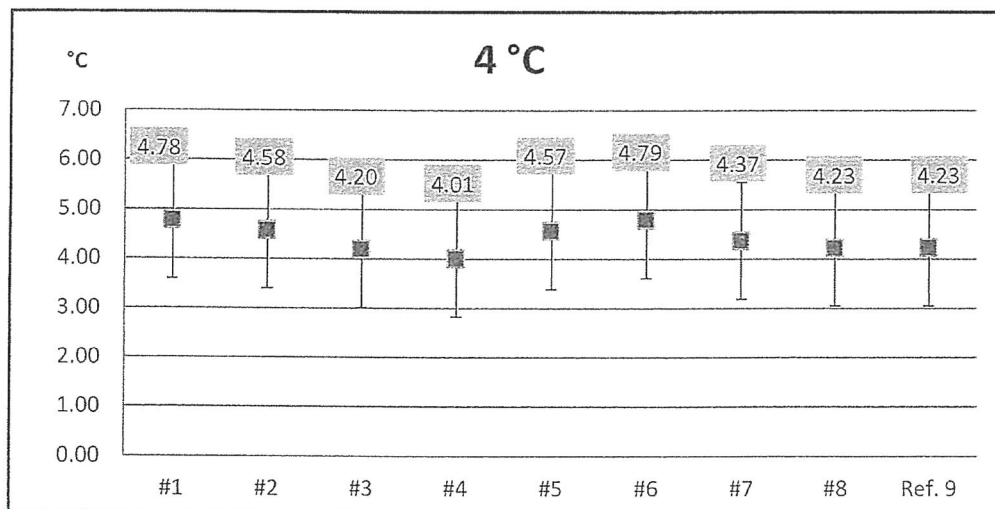


CERTIFICATE NO. : T23-3234

CSR No. : 231381

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 --



PREMIER SYSTEM ENGINEERING CO., LTD.

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NSC-TISI-TIS 17025  
CALIBRATION 0024

## CALIBRATION CERTIFICATE

CERTIFICATE No. : T23-3236

CSR No. : 231381

Page : 1 of 4

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

Equipment : Incubator

Manufacturer : ACCUPLUS

Model : EC8500

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

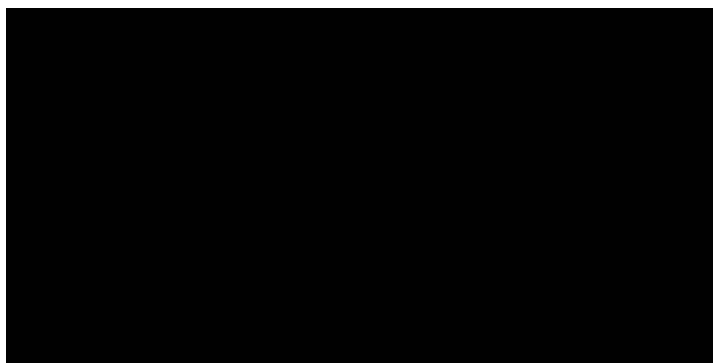
Relative Humidity : (60 ± 20) %

Date of Received : 16-Nov-2023

Date of Calibration : 16-Nov-2023

Date of Issued : 20-Nov-2023

Calibrated By : Mr. Athiwat Supacheewa  
( Temperature Supervisor )



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



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d080723



CERTIFICATE No. : T23-3236

CSR No. : 231381

Page : 2 of 4

Equipment : Incubator  
Manufacturer : ACCUPLUS  
Model : EC8500  
Serial No. : 0408-0415-0034  
ID. No. : -  
Date of Received : 16-Nov-2023  
Date of Calibration : 16-Nov-2023

REFERENCE STANDARD INSTRUMENT :

| Instrument Type                 | Model   | Serial No.  | Cert. No.   | Due Date   | Traceability |
|---------------------------------|---------|-------------|-------------|------------|--------------|
| Digital Thermometer with Sensor | 34970 A | MY 44042662 | DAT003/0823 | 01-08-2024 | PSE          |

CALIBRATION METHOD :

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

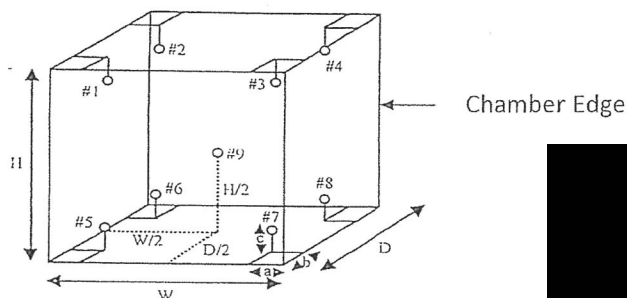
TRACEABILITY :

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



Dimension of the chamber :  $W \times H \times D = 56 \times 168 \times 60$  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. : T23-3236

CSR No. : 231381

Page : 3 of 4

Equipment : Incubator  
Manufacture : ACCUPLUS  
Model : EC8500  
Serial No. : 0408-0415-0034  
ID. No. : -  
Date of Received : 16-Nov-2023  
Date of Calibration : 16-Nov-2023

## CALIBRATION RESULTS : ( Cont.)

( / ) Without Adjustment

( ) After Adjustment

## Temperature Measurement Accuracy Test

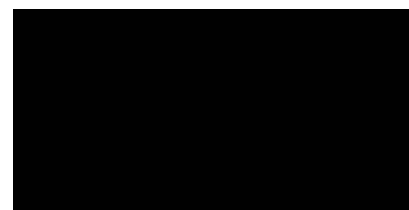
The measurement results of the incubator and associates are reported in the manner as shown below

| 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                | 20.27                                                  | 20.22 | 20.28 | 20.25 | 20.10 | 20.24 | 20.14 | 19.95 | 20.20  | 0.71                  |

## 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                | 20.0                   | 20.0                   | 0.16                           | 0.37                            | 0.58                           |



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.

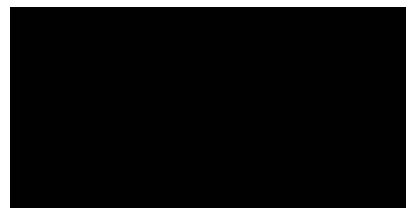
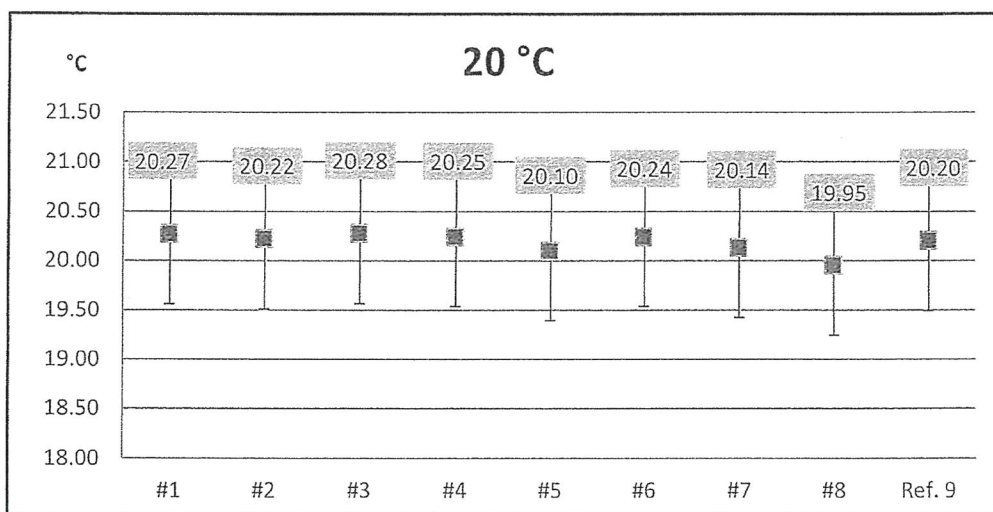


CERTIFICATE NO. : T23-3236

CSR No. : 231381

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. : T23-3490

CSR No. : 231425

Page : 1 of 2

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

Equipment : Liquid in Glass Thermometer

Manufacture : PRECISION

Model : -

Serial No. : 5319

ID. No. : -

Range : -10 ~ 420 °C °C

Resolution : 1 °C

Instrument Condition : Good Condition

Location of Calibration : PSE Laboratory

Ambient Temperature : (25 ± 3) °C

Relative Humidity : (55 ± 15) %

Received Date : 20-Nov-2023

Calibration Date : 24-Nov-2023

Date of Issue : 27-Nov-2023

AP

Calibrated By : Mr. Athiwat Supacheewa  
(Temperature Supervisor)

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



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CERTIFICATE No. : T23-3490

CSR No. : 231425

Page : 2 of 2

Equipment : Liquid in Glass Thermometer  
Manufacture : PRECISION  
Model : -  
Serial No. : 5319  
ID. No. : -  
Received Date : 20-Nov-2023  
Calibration Date : 24-Nov-2023

REFERENCE STANDARD INSTRUMENT :

| Instrument Type                 | Model | Serial No. | Cert. No. | Due Date   | Traceability |
|---------------------------------|-------|------------|-----------|------------|--------------|
| Digital Thermometer With Sensor | 1529  | B17472     | 23I257    | 02-03-2024 | TPA          |

CALIBRATION METHOD :

In-house method : CA.WI.11.043 (ASTM E77-14)

TRACEABILITY :

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

TPA : Technology Promotion Association (Thailand-Japan), (NSC-TISI-TIS 17025 CALIBRATION 0008)

CALIBRATION RESULTS :

( / ) Without Adjustment ( ) After Adjustment  
Immersion : Total Type of Liquid : Alcohol  
Ice Point Reading : -1.50 °C

| Cal Point<br>(°C) | Standard<br>Temperature<br>(°C) | UUC* Reading<br>(°C) | Correction<br>(°C) | Uncertainty<br>(±°C) |
|-------------------|---------------------------------|----------------------|--------------------|----------------------|
| 4                 | 5.202                           | 4.0                  | 1.202              | 0.58                 |
| 25                | 26.042                          | 25.0                 | 1.042              | 0.58                 |

Readability of UUC : 0.5 °C

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. : M23-1727

CSR No. : 231381

Page : 1 of 3

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

Equipment : Analytical Balance

Manufacturer : SARTORIUS

Model : PRACTUM224-IS

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 : 16-Nov-2023

Date of Calibration : 16-Nov-2023

Date of Issued : 20-Nov-2023

Calibrated By : Mr. Piyapol Rongsawat  
( Calibration Technician )

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



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CERTIFICATE No. : M23-1727

CSR No. : 231381

Page: 2 of 3

Equipment : Analytical Balance  
Manufacturer : SARTORIUS  
Model : PRACTUM224-IS  
Serial No. : 0035106544  
ID. No. : -  
Date of Received : 16-Nov-2023  
Date of Calibration : 16-Nov-2023

## REFERENCE STANDARD INSTRUMENT :

| Instrument Type     | Norminal Value | Serial No. | Cert. No.   | Due Date   | Traceability |
|---------------------|----------------|------------|-------------|------------|--------------|
| Standard Weight Set | 100 mg ~ 500g  | -          | C02230001,2 | 03-01-2024 | DKSH         |

## CALIBRATION METHOD :

In-house method : CA.WI.11.015 based on UKAS LAB 14 : 2019

## TRACEABILITY :

This Calibration Certificate is traceable to national standards which realize the unit of measurment according to the International System of Unit ( SI ) through :  
DKSH : DKSH Technology Limited. (NSC-TISI-TIS 17025 CALIBRATION 0087)

## CALIBRATION RESULTS :

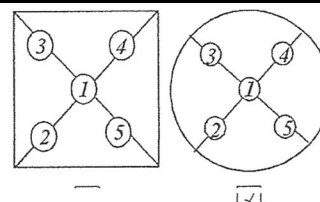
( / ) Without Adjustment ( ) After Adjustment

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

| Nominal Value ( g ) | Standard Deviation ( g ) |
|---------------------|--------------------------|
| 200                 | 0.00008                  |

EFFECT OF OFF CENTER LOADING AT 100 g

| Position |          |          |          |         | Maximum Difference ( g ) |
|----------|----------|----------|----------|---------|--------------------------|
| 1        | 2        | 3        | 4        | 5       |                          |
| 100.0000 | 100.0001 | 100.0001 | 100.0001 | 99.9999 | 0.0001                   |



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



CERTIFICATE NO. : M23-1727

CSR No. : 231381

Page : 3 of 3

Equipment : Analytical Balance  
Manufacturer : SARTORIUS  
Model : PRACTUM224-IS  
Serial No. : 0035106544  
ID. No. : -  
Date of Received : 16-Nov-2023  
Date of Calibration : 16-Nov-2023

## 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                     | 20.0000               | -0.00002            |
| 40                     | 40.0000               | -0.00003            |
| 60                     | 60.0000               | 0.00000             |
| 80                     | 79.9999               | 0.00009             |
| 100                    | 99.9998               | 0.00018             |

## 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             | 0.00020                    | 2.20                     |
| 0.01                   | 0.0100                | 0.00000             | 0.00020                    | 2.20                     |
| 0.05                   | 0.0500                | 0.00000             | 0.00020                    | 2.20                     |
| 0.1                    | 0.1000                | 0.00000             | 0.00020                    | 2.20                     |
| 0.5                    | 0.5000                | 0.00000             | 0.00020                    | 2.20                     |
| 1                      | 1.0000                | -0.00001            | 0.00020                    | 2.20                     |
| 2                      | 2.0000                | -0.00002            | 0.00020                    | 2.20                     |
| 5                      | 5.0000                | -0.00002            | 0.00020                    | 2.20                     |
| 10                     | 10.0000               | 0.00001             | 0.00020                    | 2.18                     |
| 20                     | 20.0000               | -0.00002            | 0.00020                    | 2.18                     |
| 40                     | 40.0000               | -0.00003            | 0.00020                    | 2.14                     |
| 60                     | 60.0000               | 0.00000             | 0.00021                    | 2.12                     |
| 80                     | 79.9999               | 0.00009             | 0.00023                    | 2.08                     |
| 100                    | 100.0000              | -0.00002            | 0.00023                    | 2.08                     |
| 120                    | 120.0000              | -0.00003            | 0.00026                    | 2.05                     |
| 140                    | 140.0000              | -0.00005            | 0.00027                    | 2.04                     |
| 160                    | 160.0001              | -0.00012            | 0.00028                    | 2.03                     |
| 180                    | 180.0001              | -0.00014            | 0.00031                    | 2.02                     |
| 200                    | 200.0000              | -0.00010            | 0.00032                    | 2.02                     |

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. : V23-1972

CSR No. : 231381

Page : 1 of 2

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

Equipment : Conductivity

Manufacturer : APERA

Model : EC 8500

Serial No. : EC85001323271005

ID. No. : -

Resolution : 0.1 $\mu$ S/cm, 1 $\mu$ S/cm, 0.01mS/cm

Instrument Condition : Good Condition

Location of Calibration : Customer Laboratory

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

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

Date of Received : 16-Nov-2023

Date of Calibration : 16-Nov-2023

Date of Issued : 20-Nov-

Calibrated By : Mr. Alongkorn Chewaisarakul  
( Calibration Technician )

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



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CERTIFICATE NO. : V23-1972

CSR No. : 231381

Page : 2 of 2

Equipment : Conductivity  
Manufacturer : APERA  
Model : EC 8500  
Serial No. : EC85001323271005  
ID. No. : -  
Date of Received : 16-Nov-2023  
Date of Calibration : 16-Nov-2023

## REFERENCE STANDARD INSTRUMENT :

| Instrument Type       | Nominal Value/Model | Lot No. | Batch. No. | Due Date   | Traceability |
|-----------------------|---------------------|---------|------------|------------|--------------|
| Conductivity Standard | 84 uS/cm            | 879340  | 879340     | 14-03-2024 | CPA Chem     |
| Conductivity Standard | 1413.0uS/cm         | 879342  | 879342     | 13-03-2024 | CPA Chem     |
| Conductivity Standard | 12.88 mS/cm         | 879343  | 879343     | 14-03-2024 | CPA Chem     |

## CALIBRATION METHOD :

In-house method : CA.WI.11.181 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)

## CALIBRATION RESULTS :

( / ) Without Adjustment

( ) After Adjustment

Function : Chemical Measurement

| Standard Buffer Solutions<br>( $\mu$ S/cm ) | UUC Reading<br>( $\mu$ S/cm ) | Correction<br>( $\mu$ S/cm ) | Uncertainty<br>( $\pm \mu$ S/cm ) | Coverage Factor<br>( k ) |
|---------------------------------------------|-------------------------------|------------------------------|-----------------------------------|--------------------------|
| * 84.0                                      | 82.7                          | 1.28                         | 1.2                               | 2.01                     |
| 1413.0                                      | 1410                          | 3.4                          | 19                                | 2.00                     |

| Standard Buffer Solutions<br>( mS/cm ) | UUC Reading<br>( mS/cm ) | Correction<br>( mS/cm ) | Uncertainty<br>( $\pm$ mS/cm ) | Coverage Factor<br>( k ) |
|----------------------------------------|--------------------------|-------------------------|--------------------------------|--------------------------|
| 12.88                                  | 12.94                    | -0.06                   | 0.18                           | 2.00                     |

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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## CALIBRATION CERTIFICATE

CERTIFICATE No. : M24-0704

CSR No. : 240617

Page : 1 of 3

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

Equipment : Analytical Balance

Manufacturer : SATORIUS

Model : BCA224I-1S

Serial No. : 39506504

ID. No. : -

Capacity : 220 g

Resolution : 0.0001 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 : 24-May-2024

Date of Calibration : 24-May-2024

Date of Issued : 27-May-2024

Calibrated By : Mr. Piyapol Rongsawat  
( Calibration Technician )

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



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CERTIFICATE No. : M24-0704

CSR No. : 240617

Page : 2 of 3

Equipment : Analytical Balance  
Manufacturer : SATORIUS  
Model : BCA224I-1S  
Serial No. : 39506504  
ID. No. : -  
Date of Received : 24-May-2024  
Date of Calibration : 24-May-2024

## REFERENCE STANDARD INSTRUMENT :

| Instrument Type     | Norminal Value | Serial No. | Cert. No. | Due Date   | Traceability |
|---------------------|----------------|------------|-----------|------------|--------------|
| Standard Weight Set | 1 mg ~ 500 g   | -          | M2311155S | 29-11-2024 | 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 :

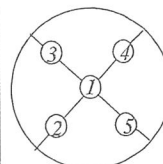
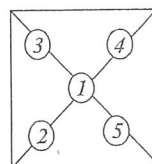
( / ) Without Adjustment ( ) After Adjustment

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

| Nominal Value ( g ) | Standard Deviation ( g ) |
|---------------------|--------------------------|
| 200                 | 0.00005                  |

EFFECT OF OFF CENTER LOADING AT 100 g

| Position |          |          |          |          | Maximum Difference ( g ) |
|----------|----------|----------|----------|----------|--------------------------|
| 1        | 2        | 3        | 4        | 5        |                          |
| 100.0001 | 100.0003 | 100.0003 | 100.0002 | 100.0001 | 0.00020                  |



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



CERTIFICATE NO. : M24-0704

CSR No. : 240617

Page : 3 of 3

Equipment : Analytical Balance  
Manufacturer : SATORIUS  
Model : BCA224I-1S  
Serial No. : 39506504  
ID. No. : -  
Date of Received : 24-May-2024  
Date of Calibration : 24-May-2024

## 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                     | 20.0000               | -0.00002            |
| 40                     | 40.0000               | -0.00003            |
| 60                     | 60.0000               | 0.00000             |
| 80                     | 79.9999               | 0.00009             |
| 100                    | 100.0000              | -0.00002            |

## 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             | 0.00014                    | 2.11                     |
| 0.1                    | 0.1000                | 0.00000             | 0.00014                    | 2.11                     |
| 0.5                    | 0.5000                | 0.00000             | 0.00014                    | 2.11                     |
| 1                      | 1.0000                | -0.00001            | 0.00014                    | 2.11                     |
| 2                      | 2.0000                | -0.00002            | 0.00014                    | 2.11                     |
| 5                      | 5.0001                | -0.00012            | 0.00014                    | 2.11                     |
| 10                     | 10.0001               | -0.00009            | 0.00014                    | 2.11                     |
| 20                     | 20.0000               | -0.00002            | 0.00014                    | 2.10                     |
| 40                     | 40.0000               | -0.00003            | 0.00015                    | 2.07                     |
| 60                     | 60.0001               | -0.00010            | 0.00016                    | 2.05                     |
| 80                     | 80.0002               | -0.00021            | 0.00018                    | 2.03                     |
| 100                    | 100.0001              | -0.00012            | 0.00019                    | 2.03                     |
| 120                    | 120.0000              | -0.00003            | 0.00026                    | 2.02                     |
| 140                    | 140.0001              | -0.00015            | 0.00026                    | 2.01                     |
| 160                    | 160.0000              | -0.00002            | 0.00026                    | 2.01                     |
| 180                    | 180.0001              | -0.00014            | 0.00028                    | 2.01                     |
| 200                    | 200.0000              | -0.00010            | 0.00029                    | 2.00                     |

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. : T24-1545

CSR No. : 240617

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. : L519.1143

ID. No. : -

Resolution : 0.1 °C

Instrument Condition : Good Condition

Location of Calibration : Customer Laboratory

Ambient Temperature : (30 ± 10) °C

Relative Humidity : (50 ± 20) %

Date of Received : 24-May-2024

Date of Calibration : 24-May-2024

Date of Issued : 27-May-2024

Calibrated By : Mr. Attapol Juntasurat  
( Calibration Engineer )

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The uncertainties are for a confidence probability of approximately 95 %



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CERTIFICATE No. : T24-1545

CSR No. : 240617

Page : 2 of 4

Equipment : Water Bath  
Manufacturer : Memmert  
Model : WNB 22  
Serial No. : L519.1143  
ID. No. : -  
Date of Received : 24-May-2024  
Date of Calibration : 24-May-2024

REFERENCE STANDARD INSTRUMENT :

| Instrument Type                 | Model   | Serial No.  | Cert. No.    | Due Date   | Traceability |
|---------------------------------|---------|-------------|--------------|------------|--------------|
| Digital Thermometer with Sensor | 34970 A | MY 44042662 | DAT003W/0822 | 01-08-2024 | PSE          |

CALIBRATION METHOD :

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

TRACEABILITY :

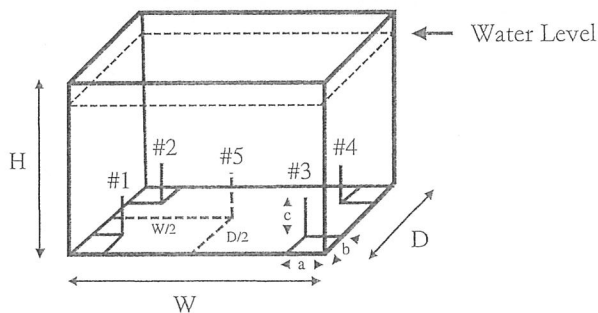
This Calibration Certificate is traceable to national standards which realize the unit of measurement according to the International System of Unit ( SI ) through :

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

CALIBRATION RESULTS :

( / ) Without Adjustment ( ) After Adjustment

Sensor Installation Diagram

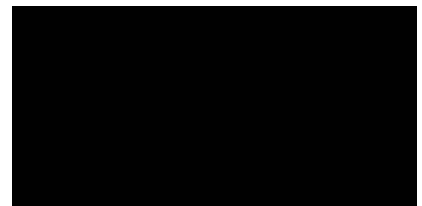


Dimension of the chamber :  $W \times H \times D = 35 \times 29 \times 22$  cm  
Sensor Installation :  $a \times b \times c = 5 \times 5 \times 5$  cm

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. : T24-1545

CSR No. : 240617

Page : 3 of 4

Equipment : Water Bath  
Manufacture : Memmert  
Model : WNB 22  
Serial No. : L519.1143  
ID. No. : -  
Date of Received : 24-May-2024  
Date of Received : 24-May-2024

## 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    |                         |
| 95                | 94.68                                                  | 94.89 | 94.82 | 94.87 | 94.71 | 0.35                    |

95.03      95.14      95.17      95.22      95.06  
94.33      94.54      94.47      94.49      94.56

## 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<br>( ± °C ) |
|-------------------|------------------------|------------------------|-------------------------------------|--------------------------------------|----------------------------------|
| 95                | 95.0                   | 95.0                   | 0.100                               | 0.26                                 | 0.45                             |

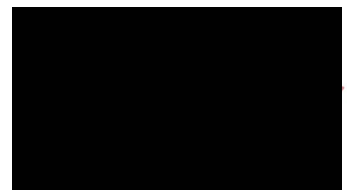
UUC : Unit Under Calibration

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.



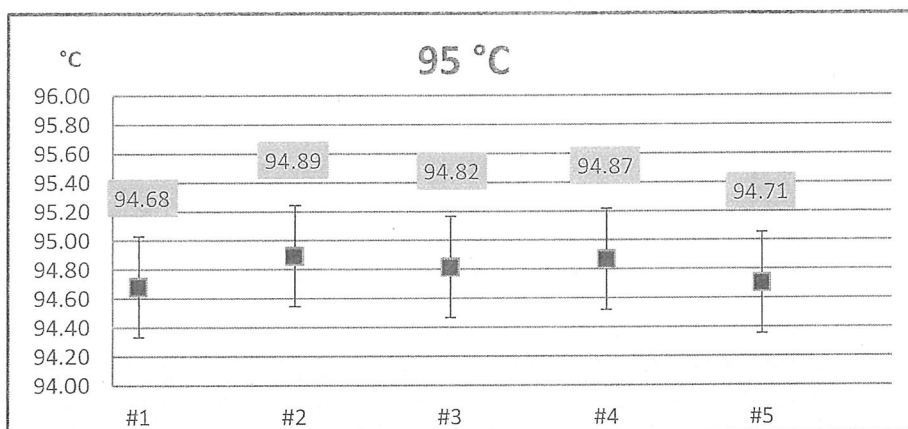


CERTIFICATE NO. : T24-1545

CSR No. : 240617

Page : 4 of 4

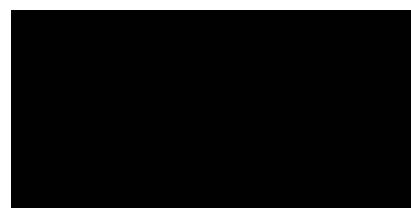
### Report Graph



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



## CALIBRATION CERTIFICATE

CERTIFICATE No. : T24-1541

CSR No. : 240613

Page : 1 of 2

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

Equipment : Digital Thermo Hygrometer

Manufacturer : DIGICON

Model : TH-03A

Serial No. : 395038423

ID. No. : -

Resolution : 0.1 °C 1 %RH

Instrument Condition : Good Condition

Location of Calibration : PSE Laboratory

Ambient Temperature : (25 ± 3) °C

Relative Humidity : (55 ± 15) %

Date of Received : 20-May-2024

Date of Calibration : 21-May-2024

Date of Issue : 24-May-2024

Calibrated By : Mr. Attapol Juntasurat  
( Calibration Engineer )

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



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CERTIFICATE No. : T24-1541

CSR No. : 240613

Page : 2 of 2

Equipment : Digital Thermo Hygrometer  
Manufacturer : DIGICON  
Model : TH-03A  
Serial No. : 395038423  
ID. No. : -  
Date of Received : 20-May-2024  
Date of Calibration : 21-May-2024

## REFERENCE STANDARD INSTRUMENT :

| Instrument Type                | Model     | Serial No. | Cert. No.  | Due Date   | Traceability |
|--------------------------------|-----------|------------|------------|------------|--------------|
| Relative Hygrometer            | DewMaster | 53740      | TH-0117-23 | 03/12/2024 | NIMT         |
| Digital Thermometer with probe | DewMaster | 53740      | TT-0134-23 | 11/12/2024 | NIMT         |

## CALIBRATION METHOD :

In-house method : CA.WI.11.174 by comparison with standard thermometer comparison with relative humidity standard

## TRACEABILITY :

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

NIMT : National Institute of Metrology (Thailand) Ministry of Science and Technology (NSC-TISI-TIS 17025 CALIBRATION 0144)

## CALIBRATION RESULTS :

Function : Humidity Measurement

( / ) Without Adjustment ( ) After Adjustment

| Reference<br>(°C) | STD Humidity<br>(%RH) | UUC* Reading<br>(%RH) | Correction<br>(%RH) | Uncertainty<br>(±%RH) |
|-------------------|-----------------------|-----------------------|---------------------|-----------------------|
| 25                | 60.41                 | 59.0                  | 1.41                | 1.8                   |

Function : Temperature Measurement

( / ) Without Adjustment ( ) After Adjustment

| Cal Point<br>(°C) | STD Temperature<br>(°C) | UUC* Reading<br>(°C) | Correction<br>(°C) | Uncertainty<br>(±°C) |
|-------------------|-------------------------|----------------------|--------------------|----------------------|
| 25                | 24.94                   | 24.7                 | 0.24               | 0.62                 |

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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NSC-TISI-TIS 17025  
CALIBRATION 0024

## CALIBRATION CERTIFICATE

CERTIFICATE No. : T24-1542

CSR No. : 240613

Page : 1 of 2

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

Equipment : Digital Thermo Hygrometer

Manufacturer : ThermoPro

Model : TP-50

Serial No. : 11039

ID. No. : -

Resolution : 0.1 °C 1 %RH

Instrument Condition : Good Condition

Location of Calibration : PSE Laboratory

Ambient Temperature : (25 ± 3) °C

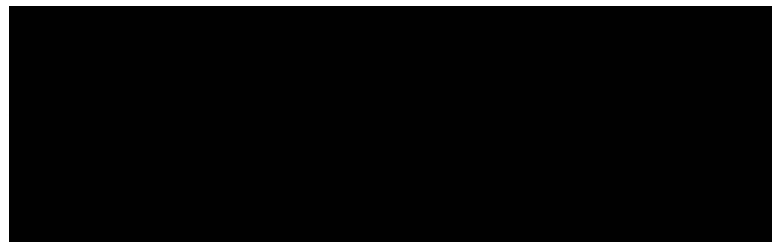
Relative Humidity : (55 ± 15) %

Date of Received : 20-May-2024

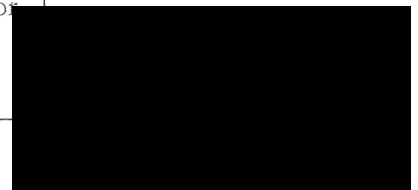
Date of Calibration : 21-May-2024

Date of Issue : 24-May-2024

Calibrated By : Mr. Attapol Juntasurat  
( Calibration Engineer )



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



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CERTIFICATE No. : T24-1542

CSR No. : 240613

Page : 2 of 2

Equipment : Digital Thermo Hygrometer  
Manufacturer : ThermoPro  
Model : TP-50  
Serial No. : 11039  
ID. No. : -  
Date of Received : 20-May-2024  
Date of Calibration : 21-May-2024

## REFERENCE STANDARD INSTRUMENT :

| Instrument Type                | Model     | Serial No. | Cert. No.  | Due Date   | Traceability |
|--------------------------------|-----------|------------|------------|------------|--------------|
| Relative Hygrometer            | DewMaster | 53740      | TH-0117-23 | 03/12/2024 | NIMT         |
| Digital Thermometer with probe | DewMaster | 53740      | TT-0134-23 | 11/12/2024 | NIMT         |

## CALIBRATION METHOD :

In-house method : CA.WI.11.174 by comparison with standard thermometer comparison with relative humidity standard

## TRACEABILITY :

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

NIMT : National Institute of Metrology (Thailand) Ministry of Science and Technology (NSC-TISI-TIS 17025 CALIBRATION 0144)

## CALIBRATION RESULTS :

Function : Humidity Measurement

( / ) Without Adjustment

( ) After Adjustment

| Reference<br>(°C) | STD Humidity<br>(%RH) | UUC* Reading<br>(%RH) | Correction<br>(%RH) | Uncertainty<br>(±%RH) |
|-------------------|-----------------------|-----------------------|---------------------|-----------------------|
| 25                | 60.41                 | 61.0                  | -0.59               | 1.8                   |

Function : Temperature Measurement

( / ) Without Adjustment

( ) After Adjustment

| Cal Point<br>(°C) | STD Temperature<br>(°C) | UUC* Reading<br>(°C) | Correction<br>(°C) | Uncertainty<br>(±°C) |
|-------------------|-------------------------|----------------------|--------------------|----------------------|
| 25                | 24.94                   | 24.8                 | 0.14               | 0.62                 |

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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NSC-TISI-TIS 17025  
CALIBRATION 0024

## CALIBRATION CERTIFICATE

CERTIFICATE No. : M24-0703

CSR No. : 240613

Page : 1 of 2

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

Equipment : Weight Set

Manufacturer : Mettler Toledo

Norminal Value : 1g - 200g

Serial No. : -

ID. No. : PK-LB-48014

Instrument Condition : Good Condition

Location of Calibration : PSE Laboratory

Ambient Temperature :  $(20 \pm 2) ^\circ\text{C}$

Relative Humidity :  $(50 \pm 10) \%$

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

Date of Received : 20-May-2024

Date of Calibration : 20-May-2024

Date of Issued : 23-May-2024

Calibrated By : Mr. Piyapol Rongsawat  
( Calibration Technician )

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CERTIFICATE No. : M24-0703

CSR No. : 240613

Page : 2 of 2

Equipment : Weight Set  
Manufacturer : Mettler Toledo  
Nominal Value : 1g - 200g  
Serial No. : -  
ID. No. : PK-LB-48014  
Date of Received : 20-May-2024  
Date of Calibration : 20-May-2024

## REFERENCE STANDARD INSTRUMENT :

| Instrument Type     | Nominal Value/Model | Serial No. | Cert. No. | Due Date   | Traceability |
|---------------------|---------------------|------------|-----------|------------|--------------|
| Standard Weight Set | 1 mg ~ 1 kg         | 31930467   | M2403147S | 19-03-2025 | TCS          |

## CALIBRATION METHOD :

In-house method : CA.WI.11.052 based on OIML R 111-1 : 2004

## TRACEABILITY :

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

| Nominal Value | Marking | Conventional Mass | Uncertainty<br>( $\pm$ mg ) | MPE<br>Class F1 |
|---------------|---------|-------------------|-----------------------------|-----------------|
| 1 g           | none    | 1 g + 0.00 mg     | 0.03                        | $\pm$ 0.10 mg   |
| 2 g           | none    | 2 g + 0.02 mg     | 0.04                        | $\pm$ 0.12 mg   |
| 2 g           | .       | 2 g + 0.02 mg     | 0.04                        | $\pm$ 0.12 mg   |
| 5 g           | none    | 5 g + 0.02 mg     | 0.05                        | $\pm$ 0.16 mg   |
| 10 g          | none    | 10 g + 0.10 mg    | 0.06                        | $\pm$ 0.20 mg   |
| 20 g          | none    | 20 g + 0.07 mg    | 0.08                        | $\pm$ 0.25 mg   |
| 20 g          | .       | 20 g + 0.03 mg    | 0.08                        | $\pm$ 0.25 mg   |
| 50 g          | none    | 50 g + 0.08 mg    | 0.10                        | $\pm$ 0.3 mg    |
| 100 g         | none    | 100 g - 0.12 mg   | 0.16                        | $\pm$ 0.5 mg    |
| 200 g         | none    | 200 g + 0.38 mg   | 0.30                        | $\pm$ 1.0 mg    |

MPE : Maximum permissible errors for weights

The calibration was calibrated by comparison with standard weights at an average air density of 1.2 kg/m<sup>3</sup> and material density for weight of 8,000 kg/m<sup>3</sup>

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. : T24-1743

CSR No. : 240790

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. : 20220000017352

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 : 5-Jul-2024

Date of Calibration : 5-Jul-2024

Date of Issued : 8-Jul-

Calibrated By : Mr. Attapol Juntasurat  
( Calibration Engineer )

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



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CERTIFICATE No. : T24-1743

CSR No. : 240790

Page : 2 of 4

Equipment : Hot Air Oven  
Manufacturer : Binder  
Model : FD56  
Serial No. : 20220000017352  
ID. No. : -  
Date of Received : 5-Jul-2024  
Date of Calibration : 5-Jul-2024

REFERENCE STANDARD INSTRUMENT :

| Instrument Type                 | Model   | Serial No.  | Cert. No.   | Due Date   | Traceability |
|---------------------------------|---------|-------------|-------------|------------|--------------|
| Digital Thermometer with Sensor | 34970 A | MY 44042662 | DAT003/0823 | 01-08-2024 | PSE          |

CALIBRATION METHOD :

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

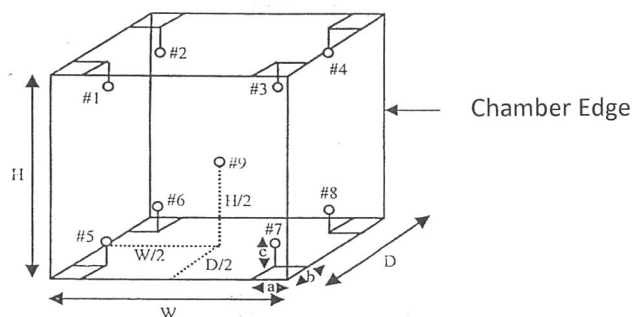
TRACEABILITY :

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

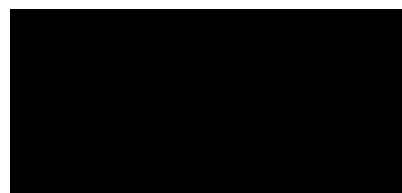
PSE : Premier System Engineering Co., Ltd. (NSC-TISI-TIS 17025 CALIBRATION 0024)

CALIBRATION RESULTS :

Sensor Installation Diagram



Dimension of the chamber :  $W \times H \times D = 40 \times 44 \times 34$  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. : T24-1743

CSR No. : 240790

Page : 3 of 4

Equipment : Hot Air Oven  
Manufacture : Binder  
Model : FD56  
Serial No. : 20220000017352  
ID. No. : -  
Date of Received : 5-Jul-2024  
Date of Calibration : 5-Jul-2024

**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 | Measured Standard Temperature (°C) at Spread Locations |        |        |        |        |        |        |        |        | Uncertainty |
|-----------|--------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|-------------|
| (°C)      | #1                                                     | #2     | #3     | #4     | #5     | #6     | #7     | #8     | Ref. 9 | ( ± °C )    |
| 104       | 104.27                                                 | 103.92 | 103.99 | 103.76 | 104.00 | 104.27 | 103.80 | 103.78 | 103.89 | 0.63        |

**Hot Air Oven Performance Result**

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

| Cal Point | UUC<br>Setting | UUC<br>Reading | Chamber<br>Stability | Chamber<br>Uniformity | Overall<br>Variation |
|-----------|----------------|----------------|----------------------|-----------------------|----------------------|
| (°C)      | (°C)           | (°C)           | ( ± °C )             | ( ± °C )              | ( ± °C )             |
| 104       | 104            | 104            | 0.11                 | 0.43                  | 0.60                 |

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.

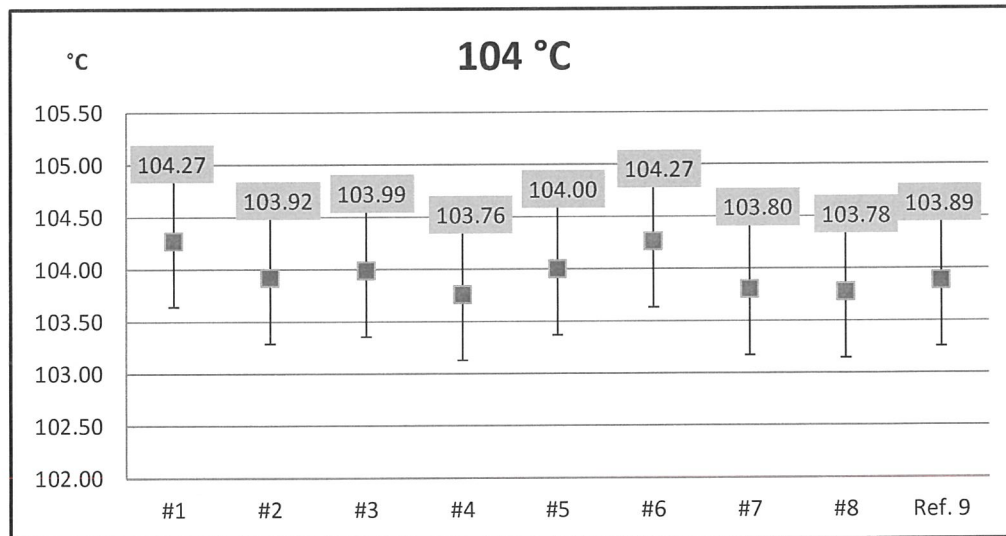


CERTIFICATE NO. : T24-1743

CSR No. : 240790

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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## CALIBRATION CERTIFICATE

CERTIFICATE No. : V24-1309

CSR No. : 240790

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 : 5-Jul-2024

Date of Calibration : 5-Jul-2024

Date of Issued : 8-Jul-2024

Calibrated By : Mr. Alongkorn Chewaisarakul  
( Calibration Technician )

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



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CERTIFICATE NO. : V24-1309

CSR No. : 240790

Page : 2 of 3

Equipment : pH Meter  
Manufacturer : SI Analytics  
Model : lab 845  
Serial No. : 21021943  
ID. No. : -  
Date of Received : 5-Jul-2024  
Date of Calibration : 5-Jul-2024

## REFERENCE STANDARD INSTRUMENT :

| Instrument Type                   | Nominal Value/Model | Serial No. | Cert. No.       | Due Date   | Traceability |
|-----------------------------------|---------------------|------------|-----------------|------------|--------------|
| pH Calibration Standard           | 4.00                | 1001753    | 1001753         | 07-06-2025 | CPA Chem     |
| pH Calibration Standard           | 6.87                | 930376     | 930376          | 24-09-2025 | CPA Chem     |
| pH Calibration Standard           | 10.01               | 1001755    | 1001755         | 16-06-2025 | CPA Chem     |
| Temperature/Electrical Calibrator | MC2-TE              | 10548      | CAL0252-24P0028 | 06-02-2025 | 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)

TPA : Technology Promotion Association (Thailand-Japan), (NSC-TISI-TIS 17025 CALIBRATION 0008)

## 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                    | 0                        | 0.00               | 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                             | 3.95                     | 0.057              | 0.016                   | 2.28                     |
| 6.865                             | 6.98                     | -0.115             | 0.019                   | 2.01                     |
| 10.010                            | 9.93                     | 0.080              | 0.058                   | 2.00                     |

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.



CERTIFICATE No. : V24-1309

CSR No. : 240790

Page : 3 of 3

Equipment : pH Meter  
Manufacture : SI Analytics  
Model : lab 845  
Serial No. : 21021943  
ID. No. : -  
Received Date : 5-Jul-2024  
Calibration Date : 5-Jul-2024

**REFERENCE STANDARD INSTRUMENT :**

| Instrument Type                 | Model | Serial No. | Cert. No. | Due Date   | Traceability |
|---------------------------------|-------|------------|-----------|------------|--------------|
| Digital Thermometer with Sensor | 375   | 170209021  | Q24020409 | 27-02-2025 | CLC          |

**CALIBRATION METHOD :**

In-house method : CA.WI.11.008

**TRACEABILITY :**

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

CLC : Calibration Laboratory Co.,Ltd. (NSC-TISI-TIS 17025 CALIBRATION 0059)

**CALIBRATION RESULTS : ( Cont.)**

( / ) Without Adjustment ( ) After Adjustment

| Setting Point<br>(°C) | Standard<br>Temperature<br>(°C) | UUC*<br>Reading<br>(°C) | Correction<br>(°C) | Uncertainty<br>(±°C) |
|-----------------------|---------------------------------|-------------------------|--------------------|----------------------|
| * 25                  | 24.96                           | 24.8                    | 0.16               | 0.19                 |

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 --

