

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

Mr

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Certificate of Calibration

Certificate No.

BSCC-UV-437/23

Number of Page(s)

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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	
350	0.0000	0.0000	0.0000	
	0.6376	0.6362	-0.0014	

*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)
200.98 \pm 0.11nm	201.00	0.9400

The Stray light transmission reference is less than 1.0%T and Stray light absorbance is more than 0.0010A

*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*****

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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 ± 15) °C

Relative Humidity : (60 ± 20) %

Date of Received : 16-Nov-2023

Date of Calibration : 16-Nov-2023

Date of Issued : 20-Nov-2023

APPROVED

Calibrated By : Mr. Athiwat Supacheewa
(Temperature Supervisor)

(/) MR. PIYAPONG RATTANAKAN / Calibration Manager
() MR. METHA CHUAIBUN / Quality 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. : 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)

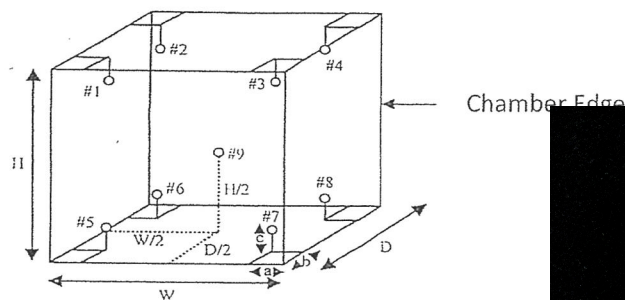
TRACEABILITY :

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 : $W \times H \times D = 55 \times 164 \times 43$
Sensor Installation : $a \times b \times c = 5 \times 5 \times 5$

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 (°C)	Measured Standard Temperature (°C) at Spread Locations									Uncertainty (± °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

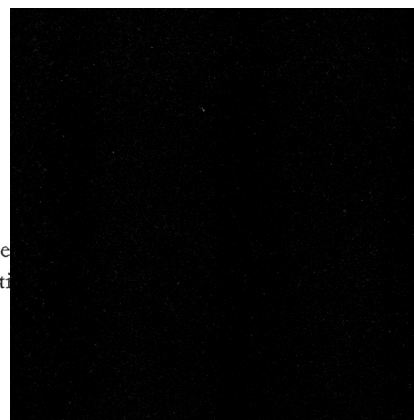
Cal Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Chamber Stability (± °C)	Chamber Uniformity (± °C)	Overall Variation (± °C)
4	4.0	4.0	0.97	1.35	2.48

UUC : Unit Under Calibration

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

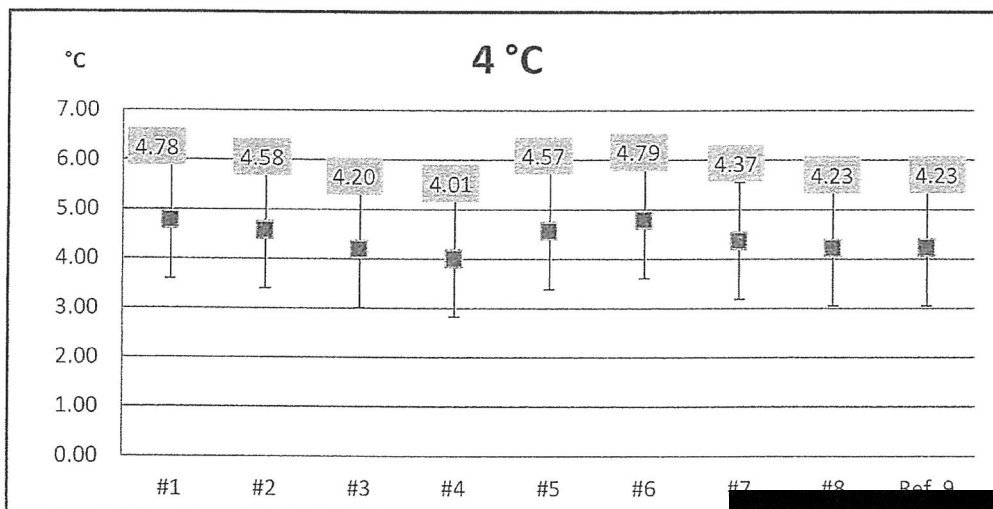
The above results are valid exclusively for calibration sample as mentioned in the re

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





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.

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. : T23-3236

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

APPROVED BY

Calibrated By : Mr. Athiwat Supacheewa
(Temperature Supervisor)

() MR. PIYAPONG RATTANAKAN / Calibration Manager
() MR. METHA CHUAIBUN / Quality 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. : 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)

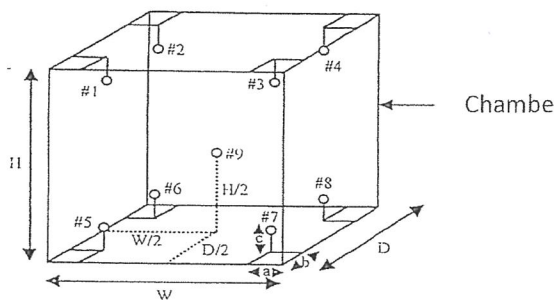
TRACEABILITY :

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 : $W \times H \times D = 56 \times 168 \times 60$
Sensor Installation : $a \times b \times c = 5 \times 5 \times 5$



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 (°C)	Measured Standard Temperature (°C) at Spread Locations									Uncertainty (± °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 (°C)	UUC Setting (°C)	UUC Reading (°C)	Chamber Stability (± °C)	Chamber Uniformity (± °C)	Overall Variation (± °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 o

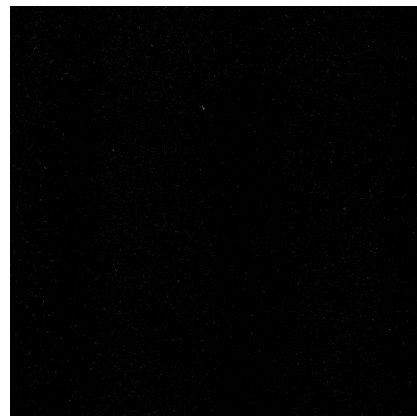
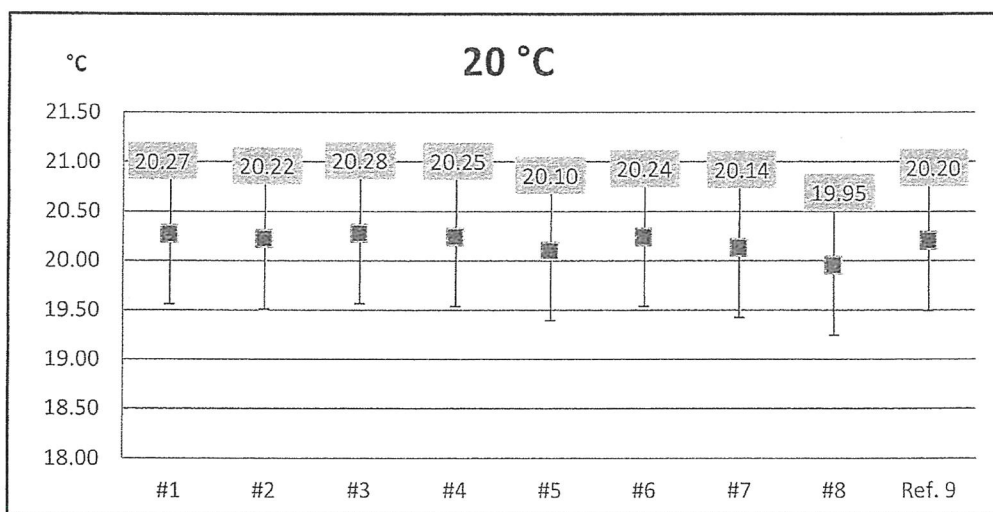


CERTIFICATE NO. : T23-3236

CSR No. : 231381

Page : 4 of 4

Report Graph



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

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-- 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

APPROVED BY :

Calibrated By : Mr. Athiwat Supacheewa
(Temperature Supervisor)

APPROVED BY :
(/) MR. PIYAPON / Quality Manager
() MR. METHA CHUAIBUN / Quality 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. : 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 (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Correction (°C)	Uncertainty (±°C)
4	5.202	4.0	1.202	0.58
25	26.042	25.0	1.042	

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 ± 10) °C

Relative Humidity : (50 ± 20) %

Barometric Pressure : (1010 ± 10) hPa

Date of Received : 16-Nov-2023

Date of Calibration : 16-Nov-2023

Date of Issued : 20-Nov-2023

APPROVED BY

Calibrated By : Mr. Piyapol Rongsawat
(Calibration Technician)

(/) MR. [REDACTED] / Manager
() MR. MEJHA CHAIBON / Quality 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. : 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

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 (g)	UUC* Reading (g)	Correction (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 (g)	UUC* Reading (g)	Correction (g)	Uncertainty (\pm g)	Coverage Factor (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.

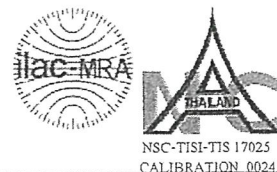
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CALIBRATION CERTIFICATE

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 μ S/cm, 1 μ 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-2023

APPROVE

Calibrated By : Mr. Alongkorn Chewaisarakul
(Calibration Technician)

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

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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 (μ S/cm)	UUC Reading (μ S/cm)	Correction (μ S/cm)	Uncertainty ($\pm \mu$ S/cm)	Coverage Factor (k)
* 84.0	82.7	1.28	1.2	2.01
1413.0	1410	3.4	19	2.00

Standard Buffer Solutions (mS/cm)	UUC Reading (mS/cm)	Correction (mS/cm)	Uncertainty (\pm mS/cm)	
12.88	12.94	-0.06	0.18	

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 --



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. : 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 ± 10) hPa

Date of Received : 24-May-2024

Date of Calibration : 24-May-2024

Date of Issued : 27-May-2024

APPROVED BY : 

APPROVED SIGNATORY

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

Calibrated By : Mr. Piyapol Rongsawat
(Calibration Technician)

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The uncertainties are for a confidence probability of approximate



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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)

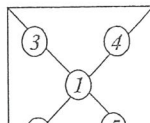
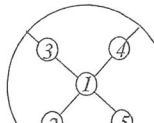
CALIBRATION RESULTS :

(/) 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 (g)	UUC* Reading (g)	Correction (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 (g)	UUC* Reading (g)	Correction (g)	Uncertainty (\pm g)	Coverage Factor (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

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. : 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 :

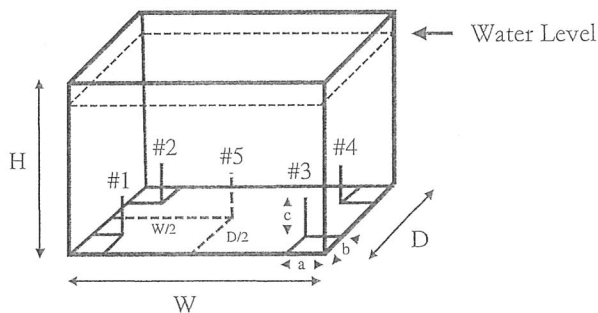
This Calibration Certificate is traceable to national standards which realize the unit of measurement according to the International System of Unit (SI) through :

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 x 29 x 22 cm
Sensor Installation : $a \times b \times c$ = 5 x 5 x 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 (°C)	Measured Standard Temperature (°C) at Spread Locations					Uncertainty (± °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 (°C)	UUC Setting (°C)	UUC Reading (°C)	Water Bath Stability (± °C)	Water Bath Uniformity (± °C)	Overall Variation (± °C)
95	95.0	95.0	0.100	0.26	0.45

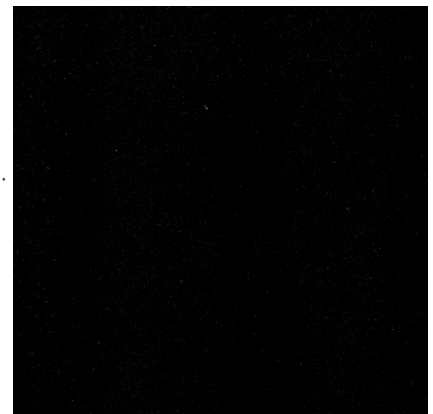
UUC : Unit Under Calibration

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.



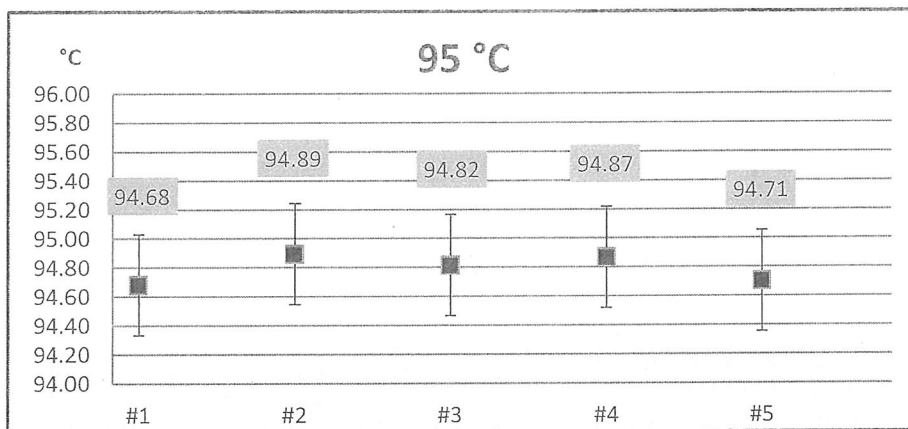


CERTIFICATE NO. : T24-1545

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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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

APPROVED BY :

Calibrated By : Mr. Attapol Juntasurat
(Calibration Engineer)

AP
(/) MR. PIYAPON
() MR. BUNPOT

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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 (°C)	STD Humidity (%RH)	UUC* Reading (%RH)	Correction (%RH)	Uncertainty (±%RH)
25	60.41	59.0	1.41	1.8

Function : Temperature Measurement

(/) Without Adjustment

() After Adjustment

Cal Point (°C)	STD Temperature (°C)	UUC* Reading (°C)	Correction (°C)	U
25	24.94	24.7	0.24	

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

APPROVED BY :

Calibrated By : Mr. Attapol Juntasurat
(Calibration Engineer)

APPROVED SIGNATORY

(/) MR. PIYAPO
() MR. BUNPO

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

Function : Temperature Measurement

(/) Without Adjustment

() After Adjustment

Cal Point (°C)	STD Temperature (°C)	UUC* Reading (°C)	Correction (°C)	Uncertainty
25	24.94	24.8	0.14	

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 ± 10) hPa

Date of Received : 20-May-2024

Date of Calibration : 20-May-2024

Date of Issued : 23-May-2024

APPROVED BY :

Calibrated By : Mr. Piyapol Rongsawat
(Calibration Technician)

APPR
(/) MR. PIYAPONC
() MR. BUNPOT S

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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 (\pm mg)	MPE 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 and material density for weight of 8,000 kg/m³

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. : 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

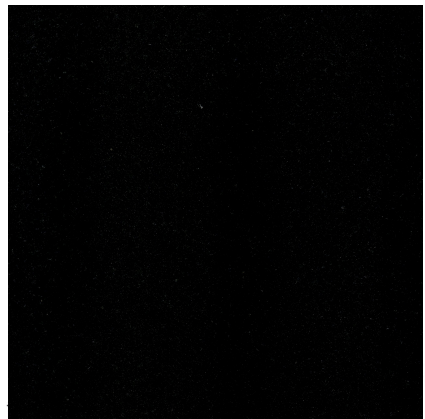
Date of Calibration : 5-Jul-2024

Date of Issued : 8-Jul-2024

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. : 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)

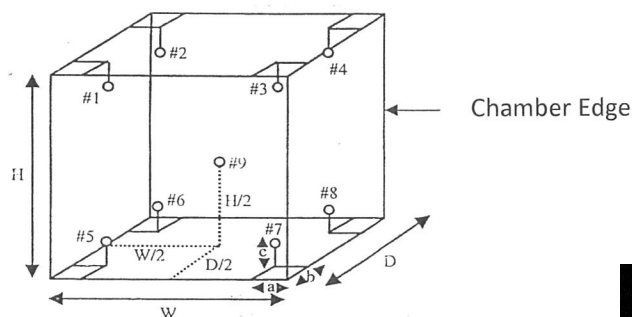
TRACEABILITY :

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 (°C)	Measured Standard Temperature (°C) at Spread Locations									Uncertainty (± °C)
	#1	#2	#3	#4	#5	#6	#7	#8	Ref. 9	
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 (°C)	UUC Setting (°C)	UUC Reading (°C)	Chamber Stability (± °C)	Chamber Uniformity (± °C)	Overall Variation (± °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

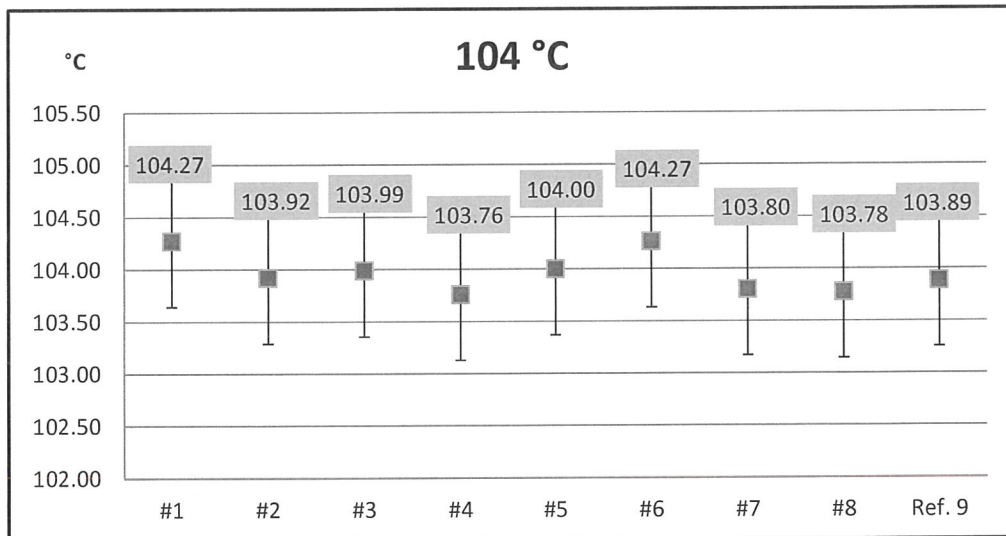


CERTIFICATE NO. : T24-1743

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 on

-- End --



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. : 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

APPROVED BY :

AP

(/) MR. PIYAPORN
() MR. BUNPOT

Calibrated By : Mr. Alongkorn Chewaisarakul
(Calibration Technician)

This certificate may not be reproduced other than in full except with
written approval of PREMIER SYSTEM ENGINEERING CO., LTD.
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 (mV)	pH meter Reading (mV)	Correction (mV)	Uncertainty (± mV)	Coverage Factor (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 (pH)	pH meter Reading (pH)	Correction (pH)	Uncertainty (± pH)	Coverage Factor (k)
4.007	3.95	0.057	0.01	
6.865	6.98	-0.115	0.01	
10.010	9.93	0.080	0.05	

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 (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Correction (°C)	Uncertainty (±°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 of

-- End --

