



Calibration Report

Certificate Number : SPR23010184-2

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Standard pH Solution	PH016.L5	Lot No.800640	61236172	07 Mar 2023
Standard pH Solution	PH107.L5	Lot No.800638	61243095	07 Mar 2023
Standard pH Solution	PH020.L5	Lot No.800639	61203372	07 Mar 2023
Super Thermometer with PRT	1575/3850-40-392	58087/100288	PSL-T 0383/65	26 Feb 2023

Traceability

This certification is traceable to the International System of Unit maintained at :

C.P.A. Chem - ANAB#AT-1836 (ISO/IEC 17025:2017) and ANAB#AR-1835 (ISO/IEC 17034:2016)

TISTR - Thailand Institute of Scientific and Technological Research



Result of Calibration

Certificate No. : SPR23010184-2

Page : 3 of 3

pH Measurement @ 25 °C

Unit : pH

Standard Solution	UUC Reading	Error	Uncertainty (±)
4.008	3.99	-0.018	0.012
6.984	6.99	0.006	0.015
10.011	10.00	-0.011	0.013

Temperature Measurement

Unit : °C

Standard Value	UUC Reading	Error	Uncertainty (±)
20.003	20.2	0.197	0.070
25.002	25.2	0.198	0.070
30.003	30.2	0.197	0.070

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR23010184-2

Page : 1 of 3

Customer : SP Environmental Development Co., Ltd

69/1 Moo 1 , Boh Kwang Thong, Boh Thong District, Chon Buri
20270, Thailand

Equipment Name : pH Meter

Manufacturer : Eutech

Model : pH 150

Serial Number : 3119958

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Received Date : 16 Jan 2023

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

Calibration Date : 17 Jan 2023

Location of Calibration : In-Lab

Recommend Due Date : 17 Jan 2024

Calibration Procedure : SP-CPC-04-01,

Date of Issue : 18 Jan 2023

SP-CPT-04-05

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Chatchai Kittisopha

Approved by :

Calibration Officer

(Ms.Bussakorn Chaikaew)

Authorized Signatory



Calibration Report

Certificate Number : SPR23010184-2

Page : 2 of 3

Reference Standards

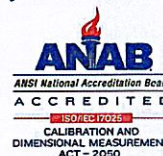
Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Standard pH Solution	PH016.L5	Lot No.800640	61236172	07 Mar 2023
Standard pH Solution	PH107.L5	Lot No.800638	61243095	07 Mar 2023
Standard pH Solution	PH020.L5	Lot No.800639	61203372	07 Mar 2023
Super Thermometer with PRT	1575/3850-40-392	58087/100288	PSL-T 0383/65	26 Feb 2023

Traceability

This certification is traceable to the International System of Unit maintained at :

C.P.A. Chem - ANAB#AT-1836 (ISO/IEC 17025:2017) and ANAB#AR-1835 (ISO/IEC 17034:2016)

TISTR - Thailand Institute of Scientific and Technological Research



Result of Calibration

Certificate No. : SPR23010184-2

Page : 3 of 3

pH Measurement @ 25 °C

Unit : pH

Standard Solution	UUC Reading	Error	Uncertainty (±)
4.008	3.99	-0.018	0.012
6.984	6.99	0.006	0.015
10.011	10.00	-0.011	0.013

Temperature Measurement

Unit : °C

Standard Value	UUC Reading	Error	Uncertainty (±)
20.003	20.2	0.197	0.070
25.002	25.2	0.198	0.070
30.003	30.2	0.197	0.070

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR22120400-3

Page : 1 of 3

Customer : SP Environmental Development Co., Ltd

69/1 Moo 1 , Boh Kwang Thong, Boh Thong District, Chon Buri
20270, Thailand

Equipment Name : pH Meter

Manufacturer : Eutech Instruments

Model : PH700

Serial Number : 2828878

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$

Received Date : 27 Dec 2022

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

Calibration Date : 09 Jan 2023

Location of Calibration : On-Site

Recommend Due Date : N/A

Calibration Procedure : SP-CPC-04-01,
SP-CPT-04-05

Date of Issue : 10 Jan 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

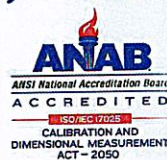
Calibrated by : Mr. Keerati Bunyawat

Approved by :

Calibration Officer

(Mr. Worapong Sinthusopa)

Authorized Signatory



Calibration Report

Certificate Number : SPR22120400-3

Page : 2 of 3

Reference Standards

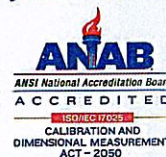
Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Standard pH Solution	PH016.L5	Lot No.800640	61236172	07 Mar 2023
Standard pH Solution	PH107.L5	Lot No.800638	61243095	07 Mar 2023
Standard pH Solution	PH020.L5	Lot No.800639	61203372	07 Mar 2023
Super Thermometer with PRT	1575/3850-40-392	58087/100288	PSL-T 0383/65	26 Feb 2023

Traceability

This certification is traceable to the International System of Unit maintained at :

C.P.A. Chem - ANAB#AT-1836 (ISO/IEC 17025:2017) and ANAB#AR-1835 (ISO/IEC 17034:2016)

TISTR - Thailand Institute of Scientific and Technological Research



Result of Calibration

Certificate No. : SPR22120400-3

Page : 3 of 3

pH Measurement @ 25 °C

Unit : pH

Standard Solution	UUC Reading	Error	Uncertainty (±)
4.01	4.02	0.01	0.012
7.01	7.00	-0.01	0.012
10.01	10.01	0.00	0.015

Temperature Measurement

Unit : °C

Standard Value	UUC Reading	Error	Uncertainty (±)
20.0	20.0	0.0	0.070
25.0	24.9	-0.1	0.070
30.0	29.9	-0.1	0.070

Note:

The result of calibration was found accurate as show on date and place of calibration only.

This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR23010184-1

Page : 1 of 4

Customer : SP Environmental Development Co., Ltd

69/1 Moo 1 , Boh Kwang Thong, Boh Thong District, Chon Buri
20270, Thailand

Equipment Name : Thermoreactor

Manufacturer : Lovibond

Model : RD125

Serial Number : 0117/001634

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Received Date : 16 Jan 2023

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

Calibration Date : 17 Jan 2023

Location of Calibration : In-Lab

Recommend Due Date : 17 Jan 2024

Calibration Procedure : SP-CPT-04-01

Date of Issue : 18 Jan 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

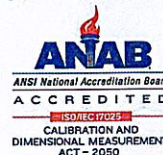
Calibrated by : Mr. Navaporn Uengseng

Approved by :

Calibration Officer

(Ms. Bussakorn Chaikaew)

Authorized Signatory



Calibration Report

Certificate Number : SPR23010184-1

Page : 2 of 4

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Data Acquisition/Switch Unit	34970A	MY44074688	SPR22120061-10	12 Jan 2024

Traceability

This certification is traceable to the International System of Unit maintained at :
SP Metrology - SP Metrology system (Thailand) Co.Ltd.



Result of Calibration

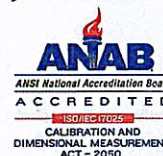
Certificate No. : SPR23010184-1

Page : 3 of 4

Temperature Measurement

Unit : °C

Pole No.	UUC Setting	Standard Reading	Error	Uncertainty (±)
1	150	149.81	0.19	0.26
2	150	150.57	-0.57	0.26
3	150	150.45	-0.45	0.26
4	150	150.16	-0.16	0.26
5	150	150.21	-0.21	0.26
6	150	150.77	-0.77	0.26
7	150	150.66	-0.66	0.26
8	150	150.67	-0.67	0.26
9	150	149.87	0.13	0.26
10	150	150.71	-0.71	0.26
11	150	150.68	-0.68	0.26
12	150	150.68	-0.68	0.26
13	150	150.59	-0.59	0.26
14	150	150.74	-0.74	0.26
15	150	150.72	-0.72	0.26
16	150	150.91	-0.91	0.26
17	150	149.77	0.23	0.26
18	150	150.71	-0.71	0.26
19	150	150.41	-0.41	0.26
20	150	150.75	-0.75	0.26
21	150	150.10	-0.10	0.26
22	150	150.55	-0.55	0.26
23	150	150.11	-0.11	0.26
24	150	150.28	-0.28	0.26



Result of Calibration

Certificate No. : SPR23010184-1

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Figure 1. Position is Poles

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24

Note:

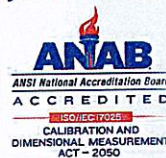
The result of calibration was found accurate as show on date and place of calibration only.

This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95%.

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR22120400-2

Page : 1 of 3

Customer : SP Environmental Development Co., Ltd

69/1 Moo 1 , Boh Kwang Thong, Boh Thong District, Chon Buri
20270, Thailand

Equipment Name : Electronic Balance

Manufacturer : Bel Engineering

Model : MA214A

Serial Number : CHA2000931

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$

Received Date : 27 Dec 2022

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

Calibration Date : 09 Jan 2023

Location of Calibration : On-Site

Recommend Due Date : N/A

Calibration Procedure : SP-CPM-04-01

Date of Issue : 10 Jan 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

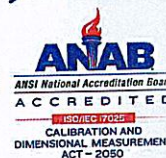
Calibrated by : Mr.Sarawut Khitmai

Approved by :

Calibration Officer

(Mr.Worapong Sinthusopa)

Authorized Signatory



Calibration Report

Certificate Number : SPR22120400-2

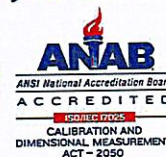
Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Standard Weight Set	Class E2	B746971965	C02221902	16 Sep 2023

Traceability

This certification is traceable to the International System of Unit maintained at :
SPC - SPC Calibration Center Co.,Ltd.



Certificate of Calibration

Certificate Number : SPR23020322-2

Page : 1 of 3

Customer : SP Environmental Development Co., Ltd

69/1 Moo 1 , Boh Kwang Thong, Boh Thong District, Chon Buri 20270,
Thailand

Equipment Name : Refrigerator

Manufacturer : Koldtech

Model : MR600L-1D-R

Serial Number : 01771

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$

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

Location of Calibration : On-Site

Calibration Procedure : SP-CPT-04-01

Received Date : 17 Feb 2023

Calibration Date : 20 Feb 2023

Recommend Due Date : 20 Feb 2024

Date of Issue : 21 Feb 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

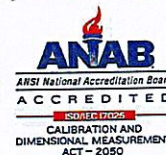
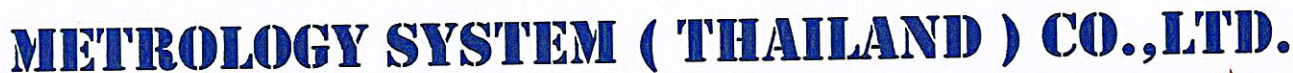
Calibrated by : Mr. Navaporn Uengseng

Calibration Officer

Approved by :

(Mr. Nirut Loha)

Authorized Signatory



Calibration Report

Certificate Number : SPR23020322-2

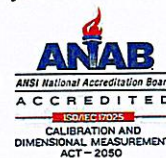
Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Data Acquisition/Switch Unit	34970A	MY44074688	SPR22120061-10	12 Jan 2024

Traceability

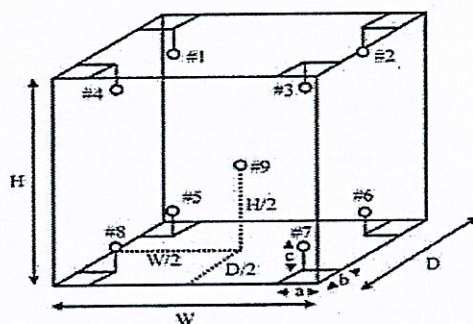
This certification is traceable to the International System of Unit maintained at :
SP Metrology - SP Metrology system (Thailand) Co.Ltd.



Result of Calibration

Certificate No. : SPR23020322-2

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Temperature Accuracy in the Measurement Zone.

Unit : °C

UUC Setting	Measured Temperature (°C) @ Probe No. (Probe No. 9 is REF.)									Uncertainty (±)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
4.0	4.41	4.48	4.44	4.49	4.46	4.49	4.46	4.46	4.47	0.19

Temperature Uniformity, Stability, Overall Variation

Unit : °C

UUC Setting	UUC Reading	Temperature Stability	Temperature Uniformity	Overall Variation
4.0	4.0	0.09	0.20	0.26

Note:

The result of calibration was found accurate as show on date and place of calibration only.

This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95 %

- End of Certificate -

CERTIFICATE OF CALIBRATION

Certificate No.: G0-3101008/23

Page 1 of total 2 pages

Customer

SP ENVIRONMENTAL DEVELOPMENT CO., LTD.
69/1 Moo 1, Boh Kwang Thong,
Boh Thong District, Chon Buri 20270, Thailand

Equipment

Volumetric Pipette

Manufacturer

witeg

Model

-

Serial No.

-

ID No.

P1-3

Description

Capacity : 1 mL

Environmental Conditions

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

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

Atmospheric Pressure: 1013 hPa

Calibration Location

Jayhawks Laboratory (CL&GL)

Received Date

31 January 2023

Calibration Date

31 January 2023

Date of Issue

2 February 2023

Checked by



Approved by



Act as Technical Manager

Representative of Managing Director

(Dr. Ekachai Puttitwong)

() (Krisyosl K.)	() (Sakda Y.)
() (Patiphan K.)	(✓) (Onnapa P.)
() (Pongsak H.)	() (Nitiphong K.)
() (Kanung C.)	() (Nonthachai K.)
() (Pramong P.)	() (Noppol P.)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: G0-3101008/23

Page 2 of total 2 pages
Reference Method:

- The calibration method used was CP-174 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Model	Serial No.	Certificate No.	Due Date	Traceability
Analytical Balance	XPR206CDR	C009071943	I0-2302003/22	Feb. 22, 2023	THC
Liquid in Glass Thermometer	Total	9560	I0-0403006/22	Mar. 4, 2023	
Data Logger	EC850	20081204	I0-0601002/23	Jan. 8, 2024	
Barometer	MHB-382SD	AJ.96940	I0-2812001/22	Dec. 27, 2023	

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

Nominal Volume (mL)	Measured Volume (mL)	Uncertainty (± mL)	Coverage Factor, <i>k</i>
1	0.9987	0.00050	2.25

Note : 1 mL = 1 cm³

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor as above, providing a level of confidence approximately 95%.

- End of Certificate -

CERTIFICATE OF CALIBRATION

Certificate No.: G0-3101011/23

Page 1 of total 2 pages

Customer SP ENVIRONMENTAL DEVELOPMENT CO., LTD.
69/1 Moo 1, Boh Kwang Thong,
Boh Thong District, Chon Buri 20270, Thailand

Equipment	Volumetric Pipette	Model	-
Manufacturer	witeg	ID No.	P5-6
Serial No.	-		
Description	Capacity : 5 mL		

Environmental Conditions Ambient Temperature: $(20 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 10) \%$
Atmospheric Pressure: 1013 hPa

Calibration Location Jayhawks Laboratory (CL&GL)

Received Date 31 January 2023

Calibration Date 31 January 2023

Date of Issue 2 February 2023

Checked by

Act as Technical Manager

Approved by

Representative of Managing Director

() (Krisyosl K.)	() (Sakda Y.)
() (Patiphan K.)	(✓) (Onnapa P.)
() (Pongsak H.)	() (Nitiphong K.)
() (Kanung C.)	() (Nonthachai K.)
() (Pramong P.)	() (Noppol P.)

(Dr. Ekachai Puttitwong)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: G0-3101011/23

Page 2 of total 2 pages
Reference Method:

- The calibration method used was CP-174 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Model	Serial No.	Certificate No.	Due Date	Traceability
Analytical Balance	XPR206CDR	C009071943	I0-2302003/22	Feb. 22, 2023	THC
Liquid in Glass Thermometer	Total	9560	I0-0403006/22	Mar. 4, 2023	
Data Logger	EC850	20081204	I0-0601002/23	Jan. 8, 2024	
Barometer	MHB-382SD	AJ.96940	I0-2812001/22	Dec. 27, 2023	

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

Nominal Volume (mL)	Measured Volume (mL)	Uncertainty (± mL)	Coverage Factor, <i>k</i>
5	4.9990	0.00085	2.00

Note : 1 mL = 1 cm³

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor as above, providing a level of confidence approximately 95%.

- End of Certificate -

CERTIFICATE OF CALIBRATION

Certificate No.: G0-3101014/23

Page 1 of total 2 pages

Customer SP ENVIRONMENTAL DEVELOPMENT CO., LTD.
69/1 Moo 1, Boh Kwang Thong,
Boh Thong District, Chon Buri 20270, Thailand

Equipment	Volumetric Pipette	Model	-
Manufacturer	witeg	ID No.	P10-9
Serial No.	-		
Description	Capacity : 10 mL		

Environmental Conditions Ambient Temperature: $(20 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 10) \%$
Atmospheric Pressure: 1013 hPa

Calibration Location Jayhawks Laboratory (CL&GL)

Received Date 31 January 2023

Calibration Date 31 January 2023

Date of Issue 2 February 2023

Checked by



Act as Technical Manager

Approved by



Representative of Managing Director

(Dr. Ekachai Puttitwong)

<input type="checkbox"/> (Krisyosl K.)	<input type="checkbox"/> (Sakda Y.)
<input type="checkbox"/> (Patiphan K.)	<input checked="" type="checkbox"/> (Onnapa P.)
<input type="checkbox"/> (Pongsak H.)	<input type="checkbox"/> (Nitiphong K.)
<input type="checkbox"/> (Kanung C.)	<input type="checkbox"/> (Nonthachai K.)
<input type="checkbox"/> (Pramong P.)	<input type="checkbox"/> (Noppol P.)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: G0-3101014/23

Page 2 of total 2 pages
Reference Method:

- The calibration method used was CP-174 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Model	Serial No.	Certificate No.	Due Date	Traceability
Analytical Balance	XPR206CDR	C009071943	I0-2302003/22	Feb. 22, 2023	THC
Liquid in Glass Thermometer	Total	9560	I0-0403006/22	Mar. 4, 2023	
Data Logger	EC850	20081204	I0-0601002/23	Jan. 8, 2024	
Barometer	MHB-382SD	AJ.96940	I0-2812001/22	Dec. 27, 2023	

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

Nominal Volume (mL)	Measured Volume (mL)	Uncertainty (± mL)	Coverage Factor, <i>k</i>
10	9.9976	0.0013	2.00

Note : 1 mL = 1 cm³

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor as above, providing a level of confidence approximately 95%.

- End of Certificate -

CERTIFICATE OF CALIBRATION

Certificate No.: G0-3101007/23

Page 1 **of total** 2 **pages**

Customer SP ENVIRONMENTAL DEVELOPMENT CO., LTD.
69/1 Moo 1, Boh Kwang Thong,
Boh Thong District, Chon Buri 20270, Thailand

Equipment	Volumetric Pipette		
Manufacturer	witeg	Model	-
Serial No.	-	ID No.	P15-2
Description	Capacity : 15 mL		

Environmental Conditions Ambient Temperature: $(20 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 10) \%$
Atmospheric Pressure: 1013 hPa

Calibration Location Jayhawks Laboratory (CL&GL)

Received Date 31 January 2023

Calibration Date 31 January 2023

Date of Issue 2 February 2023

Checked by



Act as Technical Manager

Approved by



Representative of Managing Director

() (Krisyosl K.)	() (Sakda Y.)
() (Patiphan K.)	(✓) (Onnapa P.)
() (Pongsak H.)	() (Nitiphong K.)
() (Kanung C.)	() (Nonthachai K.)
() (Pramong P.)	() (Noppol P.)

(Dr. Ekachai Puttitwong)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: G0-3101007/23

Page 2 of total 2 pages
Reference Method:

- The calibration method used was CP-174 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Model	Serial No.	Certificate No.	Due Date	Traceability
Analytical Balance	XPR206CDR	C009071943	I0-2302003/22	Feb. 22, 2023	THC
Liquid in Glass Thermometer	Total	9560	I0-0403006/22	Mar. 4, 2023	
Data Logger	EC850	20081204	I0-0601002/23	Jan. 8, 2024	
Barometer	MHB-382SD	AJ.96940	I0-2812001/22	Dec. 27, 2023	

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

Nominal Volume (mL)	Measured Volume (mL)	Uncertainty (± mL)	Coverage Factor, <i>k</i>
15	14.9925	0.0020	2.00

Note : 1 mL = 1 cm³

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor as above, providing a level of confidence approximately 95%.

- End of Certificate -

CERTIFICATE OF CALIBRATION

Certificate No.: G0-3101006/23

Page 1 of total 2 pages

Customer SP ENVIRONMENTAL DEVELOPMENT CO., LTD.
69/1 Moo 1, Boh Kwang Thong,
Boh Thong District, Chon Buri 20270, Thailand

Equipment	Volumetric Pipette		
Manufacturer	witeg	Model	-
Serial No.	-	ID No.	P20-1
Description	Capacity : 20 mL		

Environmental Conditions Ambient Temperature: $(20 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 10) \%$
Atmospheric Pressure: 1013 hPa

Calibration Location Jayhawks Laboratory (CL&GL)

Received Date 31 January 2023

Calibration Date 31 January 2023

Date of Issue 2 February 2023

Checked by



Act as Technical Manager

Approved by



Representative of Managing Director

() (Krisyosl K.)	() (Sakda Y.)
() (Patiphan K.)	(✓) (Onnapa P.)
() (Pongsak H.)	() (Nitiphong K.)
() (Kanung C.)	() (Nonthachai K.)
() (Pramong P.)	() (Noppol P.)

(Dr. Ekachai Puttitwong)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: G0-3101006/23

Page 2 of total 2 pages
Reference Method:

- The calibration method used was CP-174 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Model	Serial No.	Certificate No.	Due Date	Traceability
Analytical Balance	XPR206CDR	C009071943	I0-2302003/22	Feb. 22, 2023	THC
Liquid in Glass Thermometer	Total	9560	I0-0403006/22	Mar. 4, 2023	
Data Logger	EC850	20081204	I0-0601002/23	Jan. 8, 2024	
Barometer	MHB-382SD	AJ.96940	I0-2812001/22	Dec. 27, 2023	

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

Nominal Volume (mL)	Measured Volume (mL)	Uncertainty (± mL)	Coverage Factor, <i>k</i>
20	19.9903	0.0025	2.00

Note : 1 mL = 1 cm³

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor as above, providing a level of confidence approximately 95%.

- End of Certificate -

CERTIFICATE OF CALIBRATION

Certificate No.: G0-3101015/23

Page 1 of total 2 pages

Customer SP ENVIRONMENTAL DEVELOPMENT CO., LTD.
69/1 Moo 1, Boh Kwang Thong,
Boh Thong District, Chon Buri 20270, Thailand

Equipment	Volumetric Pipette	Model	-
Manufacturer	witeg	ID No.	P25-10
Serial No.	-		
Description	Capacity : 25 mL		

Environmental Conditions Ambient Temperature: $(20 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 10) \%$
Atmospheric Pressure: 1012 hPa

Calibration Location Jayhawks Laboratory (CL&GL)

Received Date 31 January 2023

Calibration Date 31 January 2023

Date of Issue 2 February 2023

Checked by



Act as Technical Manager

Approved by



Representative of Managing Director

() (Krisyosl K.)	() (Sakda Y.)
() (Patiphan K.)	(✓) (Onnapa P.)
() (Pongsak H.)	() (Nitiphong K.)
() (Kanung C.)	() (Nonthachai K.)
() (Pramong P.)	() (Noppol P.)

(Dr. Ekachai Puttitwong)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: G0-3101015/23

Page 2 of total 2 pages
Reference Method:

- The calibration method used was CP-174 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Model	Serial No.	Certificate No.	Due Date	Traceability
Analytical Balance	XPR206CDR	C009071943	I0-2302003/22	Feb. 22, 2023	THC
Liquid in Glass Thermometer	Total	9560	I0-0403006/22	Mar. 4, 2023	
Data Logger	EC850	20081204	I0-0601002/23	Jan. 8, 2024	
Barometer	MHB-382SD	AJ.96940	I0-2812001/22	Dec. 27, 2023	

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

Nominal Volume (mL)	Measured Volume (mL)	Uncertainty (± mL)	Coverage Factor, <i>k</i>
25	24.9638	0.0031	2.00

 Note : 1 mL = 1 cm³

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor as above, providing a level of confidence approximately 95%.

- End of Certificate -

CERTIFICATE OF CALIBRATION

Certificate No.: G0-3101012/23

Page 1 **of total** 2 **pages**

Customer SP ENVIRONMENTAL DEVELOPMENT CO., LTD.
69/1 Moo 1, Boh Kwang Thong,
Boh Thong District, Chon Buri 20270, Thailand

Equipment	Volumetric Pipette		
Manufacturer	witeg	Model	-
Serial No.	-	ID No.	P50-7
Description	Capacity : 50 mL		

Environmental Conditions Ambient Temperature: $(20 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 10) \%$
Atmospheric Pressure: 1013 hPa

Calibration Location Jayhawks Laboratory (CL&GL)

Received Date 31 January 2023

Calibration Date 31 January 2023

Date of Issue 2 February 2023

Checked by



Act as Technical Manager

Approved by



Representative of Managing Director

() (Krisyosl K.)	() (Sakda Y.)
() (Patiphan K.)	(✓) (Onnapa P.)
() (Pongsak H.)	() (Nitiphong K.)
() (Kanung C.)	() (Nonthachai K.)
() (Pramong P.)	() (Noppol P.)

(Dr. Ekachai Puttitwong)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: G0-3101012/23

Page 2 of total 2 pages
Reference Method:

- The calibration method used was CP-174 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Model	Serial No.	Certificate No.	Due Date	Traceability
Analytical Balance	XPR206CDR	C009071943	I0-2302003/22	Feb. 22, 2023	THC
Liquid in Glass Thermometer	Total	9560	I0-0403006/22	Mar. 4, 2023	
Data Logger	EC850	20081204	I0-0601002/23	Jan. 8, 2024	
Barometer	MHB-382SD	AJ.96940	I0-2812001/22	Dec. 27, 2023	

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

Nominal Volume (mL)	Measured Volume (mL)	Uncertainty (± mL)	Coverage Factor, <i>k</i>
50	49.9569	0.0060	2.00

Note : 1 mL = 1 cm³

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor as above, providing a level of confidence approximately 95%.

- End of Certificate -

Calibrated by Kittipong
REV.02 02/24/21



QUALITY CALIBRATION CO.,LTD.

235 Petchkasem 63/2 Road, Laksong, Bangkae, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584
www.qcalibration.com



PAGE : 1 OF 2

CERTIFICATE No : 23T0983
REFERENCE No : 68063-1

Certificate of Calibration

EQUIPMENT : REFRIGERATOR
MANUFACTURER : ACCUPLUS
MODEL : I250
SERIAL No : 0410-1022-0029
ID No : N/A
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : SP ENVIRONMENTAL DEVELOPMENT CO., LTD.
69/1 MOO 1, BOH KWANG THONG, BOH THONG
DISTRICT, CHON BURI 20270, THAILAND

CALIBRATED BY : CHAICHARN CH.

CALIBRATION DATE : 22-Feb-23

APPROVED BY : PONGVAK J.

ISSUED DATE : 22-Feb-23

RECEIVED DATE : 31-Jan-23

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF
QUALITY CALIBRATION CO., LTD.

F-G010 REV : 02



QUALITY CALIBRATION CO.,LTD.

235 Petchkasem 63/2 Road, Laksong, Bangkae, Bangkok 10160

Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

CERTIFICATE No : 23T0983

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : REFRIGERATOR
MANUFACTURER : ACCUPLUS
MODEL : I250
ID No : N/A
RECEIVED DATE : 31-Jan-23
AMBIENT TEMPERATURE : 28 °C ± 1 °C

S/N : 0410-1022-0029
CALIBRATION DATE : 22-Feb-23
RELATIVE HUMIDITY : 51 %RH ± 10 %RH

CONDITION OF THIS RESULTS OF CALIBRATION

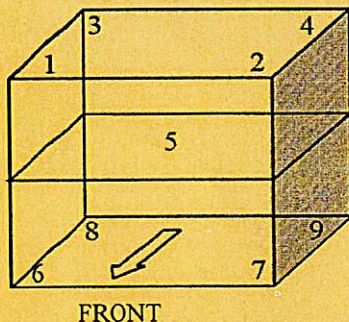
1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS G-20 BY COMPARISON WITH CALIBRATED THERMOCOUPLE TYPE K UNDER NO LOAD CONDITION. THE THERMOCOUPLES WERE PLACED ON NINE POINTS AND LOCATED ONE THERMOCOUPLE IN EACH OF THE EIGHT CORNERS OF THE CHAMBER AND WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE NINTH THERMOCOUPLE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE CHAMBER. THE UNIFORMITY WAS MEASURED BETWEEN REFERENCE PROBE AND OTHER PROBES AT THE SAME TIME.

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) DATA LOGGER WITH TC TYPE K	HYDRA 2635A	7903007	22T7512	05-Jul-23

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO.,LTD.

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT



GENERAL INFORMATION

Overall Ambient Temperature around the Chamber (°C) variation : 0
Overall Line Voltage (V) variation : 2
Instrument Condition : Normal

CHAMBER PERFORMANCE

Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
20.0	20.0	0.57	0.48	1.32

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations									Uncertainty (±°C)
		#1	#2	#3	#4	Ref. 5	#6	#7	#8	#9	
20.0	20.0	19.76	19.74	19.73	19.69	19.44	19.54	19.49	19.57	19.48	0.79

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE CHAMBER.

NOTE 2 : LOCATION 5 WAS REFERENCE LOCATION.

NOTE 3 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k =2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



Certificate of Calibration

Certificate Number : SPR22120400-4

Page : 1 of 3

Customer : SP Environmental Development Co., Ltd

69/1 Moo 1 , Boh Kwang Thong, Boh Thong District, Chon Buri
20270, Thailand

Equipment Name : DO Meter

Manufacturer : Eutech Instruments

Model : DO2700

Serial Number : 2942701

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Received Date : 27 Dec 2022

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

Calibration Date : 10 Jan 2023

Location of Calibration : In-Lab

Recommend Due Date : N/A

Calibration Procedure : In-House Method

Date of Issue : 11 Jan 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs. All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Chatchai Kittisopha

Approved by :

Calibration Officer

(Mr.Worapong Sinthusopa)

Authorized Signatory



Calibration Report

Certificate Number : SPR22120400-4

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Zero Oxygen Solution	HI7040L	Lot. S0066/21	01B24	31 Jan 2027
Electronic Balance	N/A	14246789	SPR22110015-7	10 Nov 2023
Standard Weight Set	N/A	SS6K3324-16	SPR22110015-8	10 Nov 2023
Pressure calibrator	718 30G	2314118	22P847	15 Mar 2023

Traceability

This certification is traceable to the International System of Unit maintained at :

HANNA - Hanna Instruments (Thailand) Ltd.

SP Metrology - SP Metrology system (Thailand) Co.Ltd.

TPA - Technology Promotion Association (Thailand-Japan)



Result of Calibration

Certificate No.: SPR22120400-4

Page : 3 of 3

Function : Barometric Pressure

Range : 400 to 1000 mmHg

Resolution : 1 mmHg

Standard Value	UUC. Reading	Error	Uncertainty (± mgHg)
760.0	765	5.0	1.2

Function : Dissolved Oxygen Permanance Test

Range : 0 to 20 mg/L

Resolution : 0.01 mg/L

Standard Value	UUC. Reading	Error	Uncertainty (± mg/L)
0.00	0.20	0.20	0.064
8.26	8.00	-0.26	0.064

Range : 0 to 100 %

Resolution : 0.1 %

Standard Value	UUC. Reading	Error	Uncertainty (± %)
0.0	0.2	0.2	1.5
100.0	99.9	-0.1	1.5

Note:

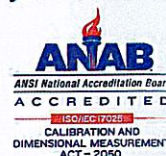
The result of calibration was found accurate as show on date and place of calibration only.

This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR22120400-2

Page : 1 of 3

Customer : SP Environmental Development Co., Ltd

69/1 Moo 1 , Boh Kwang Thong, Boh Thong District, Chon Buri
20270, Thailand

Equipment Name : Electronic Balance

Manufacturer : Bel Engineering

Model : MA214A

Serial Number : CHA2000931

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$

Received Date : 27 Dec 2022

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

Calibration Date : 09 Jan 2023

Location of Calibration : On-Site

Recommend Due Date : N/A

Calibration Procedure : SP-CPM-04-01

Date of Issue : 10 Jan 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Sarawut Khitmai

Approved by :

Calibration Officer

(Mr.Worapong Sinthusopa)

Authorized Signatory



Calibration Report

Certificate Number : SPR22120400-2

Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Standard Weight Set	Class E2	B746971965	C02221902	16 Sep 2023

Traceability

This certification is traceable to the International System of Unit maintained at :
SPC - SPC Calibration Center Co;Ltd.



Result of Calibration

Certificate No. : SPR22120400-2

Page : 3 of 3

Range capacity : 0 to 220 g

Resolution: 0.0001 g

Repeatability (n = 10 number of measurement)

Standard Weight (g)	Standard Deviation
200	0.0000

Departure of indication from nominal Value

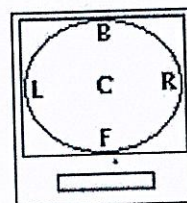
Unit : g

Nominal Value	UUC Reading	Error	Uncertainty (±)
No Load	0.0000	0.0000	0.000058
20.0	20.0000	0.0000	0.000064
40.0	40.0000	0.0000	0.000080
60.0	60.0000	0.0000	0.00011
80.0	80.0000	0.0000	0.00016
100.0	100.0000	0.0000	0.00016
120.0	120.0000	0.0000	0.00020
140.0	140.0000	0.0000	0.00020
160.0	160.0000	0.0000	0.00030
180.0	180.0000	0.0000	0.00030
200.0	200.0000	0.0000	0.00030

Off - Center Loading

Center	50.0000 g
Front	50.0000 g
Back	50.0000 g
Left	50.0000 g
Right	50.0000 g
Maximum difference	0.0000 g

A mass of 50 g was placed to various positions on the pan. The weighing machine reading error obtained is given in table.



Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95%

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR23020322-2

Page : 1 of 3

Customer : SP Environmental Development Co., Ltd

69/1 Moo 1 , Boh Kwang Thong, Boh Thong District, Chon Buri 20270,
Thailand

Equipment Name : Refrigerator

Manufacturer : Koldtech

Model : MR600L-1D-R

Serial Number : 01771

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$

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

Location of Calibration : On-Site

Calibration Procedure : SP-CPT-04-01

Received Date : 17 Feb 2023

Calibration Date : 20 Feb 2023

Recommend Due Date : 20 Feb 2024

Date of Issue : 21 Feb 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

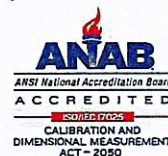
Calibrated by : Mr. Navaporn Uengseng

Calibration Officer

Approved by :

(Mr. Nirut Loha)

Authorized Signatory



Calibration Report

Certificate Number : SPR23020322-2

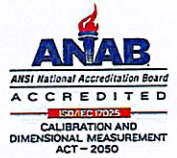
Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Data Acquisition/Switch Unit	34970A	MY44074688	SPR22120061-10	12 Jan 2024

Traceability

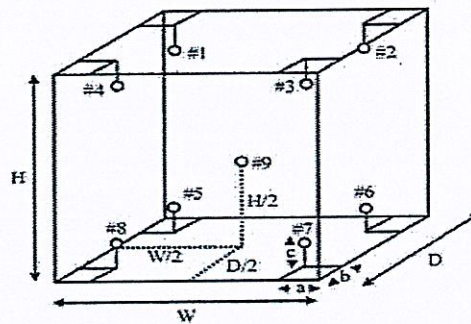
This certification is traceable to the International System of Unit maintained at :
SP Metrology - SP Metrology system (Thailand) Co.Ltd.



Result of Calibration

Certificate No. : SPR23020322-2

Page : 3 of 3



Temperature Accuracy in the Measurement Zone.

Unit : °C

UUC Setting	Measured Temperature (°C) @ Probe No. (Probe No. 9 is REF.)									Uncertainty (±)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
4.0	4.41	4.48	4.44	4.49	4.46	4.49	4.46	4.46	4.47	0.19

Temperature Uniformity, Stability, Overall Variation

Unit : °C

UUC Setting	UUC Reading	Temperature Stability	Temperature Uniformity	Overall Variation
4.0	4.0	0.09	0.20	0.26

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95 %

- End of Certificate -

CERTIFICATE OF CALIBRATION

Page 1 of total 2 pages

Certificate No.: G0-3101016/23

Customer SP ENVIRONMENTAL DEVELOPMENT CO., LTD.
69/1 Moo 1, Boh Kwang Thong,
Boh Thong District, Chon Buri 20270, Thailand

Equipment	Burette	Model	-
Manufacturer	witeg	ID No.	B25-1
Serial No.	-		
Description	Capacity : 25 mL, Resolution : 0.05 mL		

Environmental Conditions Ambient Temperature: $(20 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 10) \%$
Atmospheric Pressure: 1012 hPa

Calibration Location Jayhawks Laboratory (CL&GL)

Received Date 31 January 2023

Calibration Date 31 January 2023

Date of Issue 2 February 2023

Checked by

Act as Technical Manager

Approved by

Representative of Managing Director

(Dr. Ekachai Puttitwong)

() (Krisyosl K.)	() (Sakda Y.)
() (Patiphan K.)	(✓) (Onnapa P.)
() (Pongsak H.)	() (Nitiphong K.)
() (Kanung C.)	() (Nonthachai K.)
() (Pramong P.)	() (Noppol P.)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: G0-3101016/23

Page 2 of total 2 pages
Reference Method:

- The calibration method used was CP-173 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Model	Serial No.	Certificate No.	Due Date	Traceability
Analytical Balance	XPR206CDR	C009071943	I0-2302003/22	Feb. 22, 2023	THC
Liquid in Glass Thermometer	Total	9560	I0-0403006/22	Mar. 4, 2023	
Data Logger	EC850	20081204	I0-0601002/23	Jan. 8, 2024	
Barometer	MHB-382SD	AJ.96940	I0-2812001/22	Dec. 27, 2023	

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

Nominal Volume (mL)	Measured Volume (mL)	Uncertainty (± mL)	Coverage Factor, <i>k</i>
25	25.0076	0.0031	2.00

Note : 1 mL = 1 cm³

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor as above, providing a level of confidence approximately 95%.

- End of Certificate -

CERTIFICATE OF CALIBRATION

Certificate No.: G0-3101017/23

Page 1 of total 2 pages

Customer SP ENVIRONMENTAL DEVELOPMENT CO., LTD.
69/1 Moo 1, Boh Kwang Thong,
Boh Thong District, Chon Buri 20270, Thailand

Equipment	Cylinder	Model	-
Manufacturer	witeg	ID No.	C1000-3
Serial No.	-		
Description	Capacity : 1000 mL, Resolution : 10 mL		

Environmental Conditions Ambient Temperature: $(20 \pm 2) ^\circ\text{C}$
Relative Humidity: $(50 \pm 10) \%$
Atmospheric Pressure: 1010 hPa

Calibration Location Jayhawks Laboratory (CL&GL)

Received Date 31 January 2023

Calibration Date 31 January 2023

Date of Issue 2 February 2023

Checked by



Act as Technical Manager

Approved by



Representative of Managing Director

(Dr. Ekachai Puttitwong)

() (Krisyosl K.)	() (Sakda Y.)
() (Patiphan K.)	(✓) (Onnapa P.)
() (Pongsak H.)	() (Nitiphong K.)
() (Kanung C.)	() (Nonthachai K.)
() (Pramong P.)	() (Noppol P.)

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

Certificate No.: G0-3101017/23

Page 2 of total 2 pages

Reference Method:

- The calibration method used was CP-008 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

Type	Model	Serial No.	Certificate No.	Due Date	Traceability
Precision Balance	XPR5003S	C016309237	I0-2302004/22	Feb. 22, 2023	THC
Liquid in Glass Thermometer	Total	9560	I0-0403006/22	Mar. 4, 2023	
Data Logger	EC850	20081204	I0-0601002/23	Jan. 8, 2024	
Barometer	MHB-382SD	AJ.96940	I0-2812001/22	Dec. 27, 2023	

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

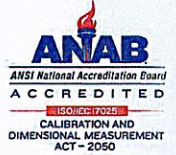
Nominal Volume (mL)	Measured Volume (mL)	Uncertainty (± mL)	Coverage Factor, <i>k</i>
1000	999.746	0.13	2.00

Note : 1 mL = 1 cm³

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor as above, providing a level of confidence approximately 95%.

- End of Certificate -

Calibrated by Kittipong
REV.02 02/24/21



Certificate of Calibration

Certificate Number : SPR22120400-2

Page : 1 of 3

Customer : SP Environmental Development Co., Ltd

69/1 Moo 1 , Boh Kwang Thong, Boh Thong District, Chon Buri
20270, Thailand

Equipment Name : Electronic Balance

Manufacturer : Bel Engineering

Model : MA214A

Serial Number : CHA2000931

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$

Received Date : 27 Dec 2022

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

Calibration Date : 09 Jan 2023

Location of Calibration : On-Site

Recommend Due Date : N/A

Calibration Procedure : SP-CPM-04-01

Date of Issue : 10 Jan 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr.Sarawut Khitmai

Approved by :

Calibration Officer

(Mr.Worapong Sinthusopa)

Authorized Signatory



Calibration Report

Certificate Number : SPR22120400-2

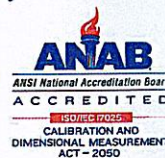
Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Standard Weight Set	Class E2	B746971965	C02221902	16 Sep 2023

Traceability

This certification is traceable to the International System of Unit maintained at :
SPC - SPC Calibration Center Co;Ltd.



Result of Calibration

Certificate No. : SPR22120400-2

Page : 3 of 3

Range capacity : 0 to 220 g

Resolution: 0.0001 g

Repeatability (n = 10 number of measurement)

Standard Weight (g)	Standard Deviation
200	0.0000

Departure of indication from nominal Value

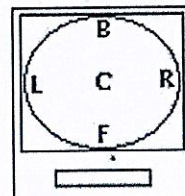
Unit : g

Nominal Value	UUC Reading	Error	Uncertainty (±)
No Load	0.0000	0.0000	0.000058
20.0	20.0000	0.0000	0.000064
40.0	40.0000	0.0000	0.000080
60.0	60.0000	0.0000	0.00011
80.0	80.0000	0.0000	0.00016
100.0	100.0000	0.0000	0.00016
120.0	120.0000	0.0000	0.00020
140.0	140.0000	0.0000	0.00020
160.0	160.0000	0.0000	0.00030
180.0	180.0000	0.0000	0.00030
200.0	200.0000	0.0000	0.00030

Off - Center Loading

Center	50.0000 g
Front	50.0000 g
Back	50.0000 g
Left	50.0000 g
Right	50.0000 g
Maximum difference	0.0000 g

A mass of 50 g was placed to various positions on the pan. The weighing machine reading error obtained is given in table.



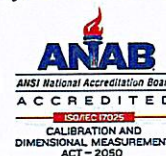
Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95%

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR23020322-1

Page : 1 of 3

Customer : SP Environmental Development Co., Ltd

69/1 Moo 1 , Boh Kwang Thong, Boh Thong District, Chon Buri 20270,
Thailand

Equipment Name : Drying Oven

Manufacturer : Beijing Sci-Tech Development

Model : SOV 70B

Serial Number : KWF2018011001

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $25\text{ }^{\circ}\text{C} \pm 10\text{ }^{\circ}\text{C}$

Received Date : 17 Feb 2023

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

Calibration Date : 20 Feb 2023

Location of Calibration : On-Site

Recommend Due Date : 20 Feb 2024

Calibration Procedure : SP-CPT-04-01

Date of Issue : 21 Feb 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

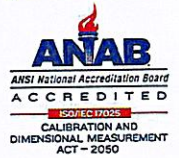
Calibrated by : Mr. Navaporn Uengseng

Approved by :

Calibration Officer

(Mr. Nirut Loha)

Authorized Signatory



Calibration Report

Certificate Number : SPR23020322-1

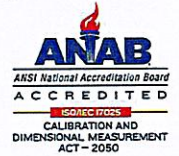
Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Data Acquisition/Switch Unit	34970A	MY44074688	SPR22120061-10	12 Jan 2024

Traceability

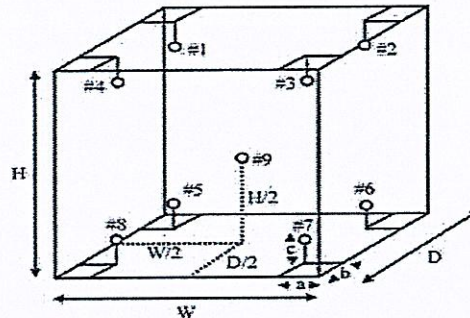
This certification is traceable to the International System of Unit maintained at :
SP Metrology - SP Metrology system (Thailand) Co.Ltd.



Result of Calibration

Certificate No. : SPR23020322-1

Page : 3 of 3



Temperature Accuracy in the Measurement Zone.

Unit : °C

UUC Setting	Measured Temperature (°C) @ Probe No. (Probe No. 9 is REF.)									Uncertainty (±)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
104.0	103.90	103.78	103.93	104.01	103.83	103.93	103.76	103.90	103.84	0.26
150.0	149.23	149.21	148.86	149.44	148.69	148.73	148.93	148.82	149.14	0.26
180.0	179.42	180.29	180.21	179.76	179.22	180.21	180.11	179.24	179.49	0.26

Temperature Uniformity, Stability, Overall Variation

Unit : °C

UUC Setting	UUC Reading	Temperature Stability	Temperature Uniformity	Overall Variation
104.0	104.0	0.09	0.33	0.43
150.0	150.0	0.11	0.66	0.98
180.0	180.0	0.10	1.00	1.26

Note:

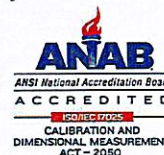
The result of calibration was found accurate as show on date and place of calibration only.

This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95 %

- End of Certificate -



Certificate of Calibration

Certificate Number : SPR23020322-2

Page : 1 of 3

Customer : SP Environmental Development Co., Ltd

69/1 Moo 1 , Boh Kwang Thong, Boh Thong District, Chon Buri 20270,
Thailand

Equipment Name : Refrigerator

Manufacturer : Koldtech

Model : MR600L-1D-R

Serial Number : 01771

ID. Number : N/A

Environmental Conditions

Ambient Temperature : $25\text{ }^{\circ}\text{C} \pm 10\text{ }^{\circ}\text{C}$

Received Date : 17 Feb 2023

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

Calibration Date : 20 Feb 2023

Location of Calibration : On-Site

Recommend Due Date : 20 Feb 2024

Calibration Procedure : SP-CPT-04-01

Date of Issue : 21 Feb 2023

Method of Calibration

This certifies that the above instrument was calibrated in compliance with the calibration system requirement of ISO/IEC 17025:2017 in accordance with reference procedure. Standards used to perform this calibration are certified by to NIST or equivalent, National metrology institute, Natural physical constants, consensus standards. The result reported herein apply only to the calibration of the item described above as received. Our decision rule is to contact the customer if the item pass and fail calibration when the results include the uncertainties and the customer must determine if the results meets their needs.

All calibrations are performed within manufacture's specifications. The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by : Mr. Navaporn Uengseng

Approved by :

Calibration Officer

(Mr. Nirut Loha)

Authorized Signatory



Calibration Report

Certificate Number : SPR23020322-2

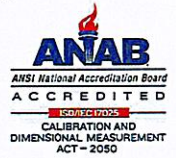
Page : 2 of 3

Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Data Acquisition/Switch Unit	34970A	MY44074688	SPR22120061-10	12 Jan 2024

Traceability

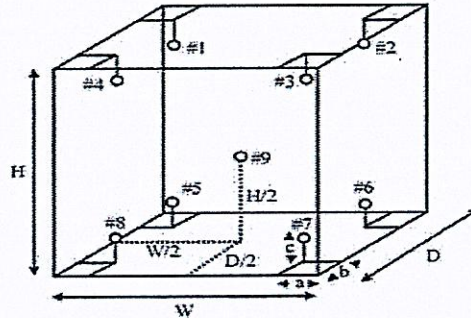
This certification is traceable to the International System of Unit maintained at :
SP Metrology - SP Metrology system (Thailand) Co.Ltd.



Result of Calibration

Certificate No. : SPR23020322-2

Page : 3 of 3



Temperature Accuracy in the Measurement Zone.

Unit : °C

UUC Setting	Measured Temperature (°C) @ Probe No. (Probe No. 9 is REF.)									Uncertainty (±)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
4.0	4.41	4.48	4.44	4.49	4.46	4.49	4.46	4.46	4.47	0.19

Temperature Uniformity, Stability, Overall Variation

Unit : °C

UUC Setting	UUC Reading	Temperature Stability	Temperature Uniformity	Overall Variation
4.0	4.0	0.09	0.20	0.26

Note:

The result of calibration was found accurate as show on date and place of calibration only.
This Certificate is not certified for any commercial transaction.

Measurement Uncertainty

The reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2$, providing a level of confidence approximately 95 %

- End of Certificate -