

ภาคผนวก จ
เอกสารรับรองเครื่องมือการตรวจวัด



Certificate of Calibration

Certificate No. : 67-300569-1

Page : 1 of 2

Submitted by

: M Green Group Co., Ltd.

188/46 Wiastesuknakhon 25, Pracha-Uth Rd., Thungkr, Bangkok 10140 Thailand

Equipment:

: Burette

Manufacturer : GLASSCO

Class : A

Capacity : 10 ml

Graduation : 0.05 ml

ID No. : 2212-0344-1

Environment

: Ambient Temperature : (20 ± 3) °CRelative Humidity : (50 ± 10) %

Air Pressure : 1008.0 mbar.

Date of Received

: 20 September 2024

Date of Calibration : 23 September 2024

Date of Issue : 23 September 2024

Calibrated by

: Areearat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.

Cert.No.

Due Date

Traceability

241005

67-200210-4

02 Dec 2024

National Institute of Metrology (Thailand) (NIMT)

Approved by :

(Wipa Toadee)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 67-300569-1

Page : 2 of 2

Result of Calibration :

This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Delivery Time : 15.92 sec.

Nominal Volume (ml)	Measuring Volume (ml)
2	2.0044
5	5.0024
10	9.9915

Uncertainty of measurement with in $\pm$ 0.0039 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

-o0o-



CAL

Calibratech Co., Ltd.

7/106-7 Moo 2, Subhacharasri 3 Rd., Banggood, Pakkred, Nonthaburi 11120
Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.co@yahoo.com, calibratech_cal@hotmail.comNSC-769-76317025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-300569-2 Page : 1 of 2

Submitted by : M Green Group Co., Ltd.
183/46 Wisetasukrakhon 25, Pracha-Ud Rd., Thungkru, Bangkok 10140 ThailandEquipment : Burette
Manufacturer : GLASSCO Class : A
Capacity : 25 ml Graduation : 0.1 ml
ID No. : 2212-0344-2Environment : Ambient Temperature : (20 ± 3) °C
Relative Humidity : (50 ± 10) %
Air Pressure : 1008.0 mbar.Date of Received : 20 September 2024
Date of Calibration : 23 September 2024
Date of Issue : 23 September 2024
Calibrated by : Arcarat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

Reference Standard Instruments : This certification is traceable to the International System of Units
Electronic BalanceID No. Cert. No. Due Date Traceability
241005 67-200210-4 02 Dec 2024 National Institute of Metrology (Thailand) (NIMT)Approved by : 
(Wipa Towadee)
Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-02

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Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech_cal@yahoo.com, calibratech_cal@hotmail.com

Certificate of Calibration

Certificate No. : 67-300569-2 Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C
UUC Condition As-Received : Good

Delivery Time : 46.13 sec.

Nominal Volume (ml)	Measuring Volume (ml)
5	5.0039
15	14.9824
25	24.9757

Uncertainty of measurement with 1σ $\pm$ 0.0066 ml
This result of calibration was found accurate as shown on date and piece of calibration only.
This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

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CAL-F0031-03

CAL

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NSO-TB-17817026
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-300569-3 Page : 1 of 2

Submitted by : M Green Group Co., Ltd.
188/46 Wisatsuknakhon 25, Pracha-Utd Rd., Thungkri, Bangkok 10140 Thailand

Equipment : Measuring Pipette
Manufacturer : GLASSCO Class : A
Capacity : 10 ml Graduation : 0.1 ml
ID No. : MP1001/19

Environment : Ambient Temperature : $(20 \pm 3) ^\circ\text{C}$
Relative Humidity : $(50 \pm 10) \%$
Air Pressure : 1000.8 mbar.

Date of Receipt : 20 September 2024
Date of Calibration : 23 September 2024
Date of Issue : 23 September 2024
Calibrated by : Ararat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.	Cal. No.	Due Date	Traceability
241005	67-200210-4	02 Dec 2024	National Institute of Metrology (Thailand) (NIMT)

Approved by :
(Wipa Tovalae)
Supervisor



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CAL-FRC01-01

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Certificate of Calibration

Certificate No. : 67-300569-3 Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at $20 ^\circ\text{C}$
UUC Condition As-Received : Good

Delivery Time : 12.20 sec.

Nominal Volume (ml)	Measuring Volume (ml)
2	1.9998
5	4.9871
10	9.9742

Uncertainty of measurement with in ± 0.0039 ml
This result of calibration was found accurate as shown on date and place of calibration only.
This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

- oDo -



CAL-FRC01-01

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NSC-TIS-718 17075
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-300569-4

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

188/46 Wisetukhaekhon 25, Pracha-Utd Rd., Thungkrn, Bangkok 10140 Thailand

Equipment : Measuring Pipette

Manufacturer : GLASSCO

Class : A

Capacity : 25 ml

Graduation : 0.1 ml

ID No. : MP25/01/19

Environment : Ambient Temperature : (20 ± 3) °C

Relative Humidity : (50 ± 10) %

Air Pressure : 1000.8 mbar.

Date of Received : 20 September 2024

Date of Calibration : 23 September 2024

Date of Issue : 23 September 2024

Calibrated by : Arcarat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.

Cert.No.

Due Date

Traceability

241005

67-200210-4

02 Dec 2024

National Institute of Metrology (Thailand) (NIMT)

Approved by :

(Wipa Tovadee)

Supervisor

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Certificate of Calibration

Certificate No. : 67-300569-4

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Delivery Time : 15.20 sec.

Nominal Volume (ml)	Measuring Volume (ml)
5	5.0302
15	15.0832
25	25.0398

Uncertainty of measurement with in $\pm$ 0.0067 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

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CAL-140714-07



Certificate of Calibration

Page : 1 of 2

Certificate No. : 67-400548-1

Submitted by :

M Green Group Co., Ltd.

188/46 Wisetnukhakhon 25, Pracha-Ud Rd., Thungkru Bangkok 10140 Thailand

Equipment :

Temperature controlled enclosure (Refrigerator)

Manufacturer : Biobase

Model : BXC-V250M (II)

Resolution : 0.1 °C

ID No. : N/A

Serial No. : YC025025190108

Environment : On site calibration was carried out at the Laboratory, M Green Group Co., Ltd.

Ambient Temperature : (26.3 to 27.4) °C

Relative Humidity : (39 to 47) %

Line Voltage : (226.0 to 230.0) V

Date of Received : 20 September 2024

Date of Calibration : 20 September 2024

Date of Issue : 21 September 2024

Calibrated by : Permpon Chuapui

Calibration Method : CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

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

Standard Digital Thermometer with RTD Probe

ID No.

Traceability

400046 & 400042

Due Date

National Institute of Metrology Thailand (NIMT)

26 Jan 2025

Approved by :

(Permpon Chuapui)

Supervisor

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Certificate of Calibration

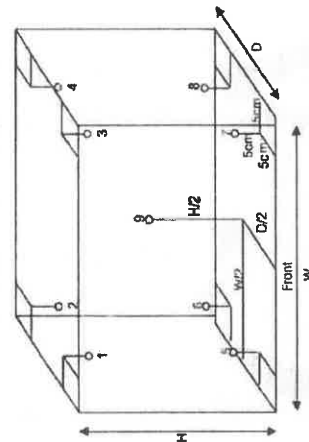
Certificate No. : 67-400548-1

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

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



Inside of Chamber

W = 0.50 m

D = 0.40 m

H = 1.20 m

Capacity = 0.24 m³

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.									Uncertainty (± °C)
			1	2	3	4	5	6	7	8	9	
4.0	2.0	2.0	4.70	4.42	5.04	4.99	4.52	4.22	4.74	4.67	3.89	0.45

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)		Measured Stability (°C)		Overall Variation (°C)
			1,2,3,4,5,6,7,8,9	1,2,3,4,5,6,7,8,9	1,2,3,4,5,6,7,8,9	1,2,3,4,5,6,7,8,9	
4.0	2.0	2.00	1.23	0.13	0.13	0.13	1.40

Remark: The uncertainty is not combine uniformity of the air chamber

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%

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CAL

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NIMT-TISI-TIS17025
CALIBRATION 0030

Certificate of Calibration

Page : 1 of 2

Certificate No. : 67-400548-2

Submitted by : M Green Group Co., Ltd.

188/46 Wisatsukhakhon 25, Pracha-Utd Rd., Thungkru Bangkok 10140 Thailand

Equipment : Temperature controlled enclosure (Oven)

Manufacturer : Memmert

Model : UF110

Range : N/A °C

Resolution : 0.1 °C

Serial No. : B419.1092

ID No. : N/A

Environment : On site calibration was carried out at the Laboratory, M Green Group Co., Ltd.

Ambient Temperature : (26.3 to 27.4) °C

Relative Humidity : (39 to 47) %

Line Voltage : (226.0 to 230.0) V

Date of Received : 20 September 2024

Date of Calibration : 20 September 2024

Date of Issue : 21 September 2024

Calibrated by : Pempon Chanpu

Calibration Method : CAL-M4004, TLAS G-20

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

Standard Digital Thermometer with Thermocouple probe

ID No. Cert. No. Due Date

400046 & 400023 67-400198-1 01 Oct 2024

Traceability

National Institute of Metrology Thailand (NIMT)

Approved by :

(Pempon Chanpu)

Supervisor

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CAL-P0001-01



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Certificate of Calibration

Page : 2 of 2

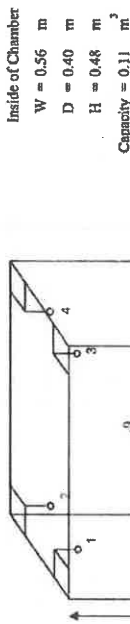
Certificate No. : 67-400548-2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

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



Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.									Uncertainty (± °C)
			1	2	3	4	5	6	7	8	9	
103.0	103.0	103.0	102.3	102.9	103.7	103.7	102.3	102.3	103.8	102.2	102.7	0.82
104.0	104.0	104.0	103.3	103.9	104.8	104.6	103.3	103.3	104.8	103.2	103.7	0.84
105.0	105.0	105.0	104.3	104.9	105.8	105.7	104.3	104.3	105.8	104.3	104.7	0.83
150.0	150.0	150.0	149.3	149.9	151.3	151.2	149.1	149.2	151.2	149.3	149.5	1.1
180.0	180.0	180.0	179.0	179.8	181.4	181.1	178.8	179.0	181.1	178.8	179.3	1.1

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
103.0	103.0	103.0	1.3	0.3	2.0
104.0	104.0	104.0	1.5	0.3	2.1
105.0	105.0	105.0	1.4	0.3	2.0
150.0	150.0	150.0	2.3	0.5	2.7
180.0	180.0	180.0	2.5	0.5	3.3

Remark: The uncertainty is not combine uniformity of the air chamber

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%

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CAL-P0001-01



Certificate of Calibration

Certificate No. : 67-400548-3 Page : 1 of 2

Submitted by : M Green Group Co., Ltd.
188/46 Wisatsukhakhon 25, Pracha-Ud Rd., Thungkru Bangkok 10140 ThailandEquipment : Water Bath
Manufacturer : Memmert
Range : N/A °C
Resolution : 0.1 °C
Serial No. : L619.0037
ID No. : N/A

Environment : On site calibration was carried out at the Laboratory, M Green Group Co., Ltd.

Ambient Temperature : (26.3 to 27.4) °C

Relative Humidity : (39 to 47) %

Line Voltage : (226.0 to 230.0) V

Date of Received : 20 September 2024

Date of Calibration : 20 September 2024

Date of Issue : 21 September 2024

Calibrated by : Pempon Chianpu

Calibration Method : This instrument was calibrated by In-house method CAL-M4006 based on ASTM E715-80
The temperature scale used was based on ITS-90Reference Standard Instruments : This certification is traceable to the International System of Units
Standard Digital Thermometer with RTD probeID No. 400046 & 400024 Cert. No. 67-400198-2 Due Date 30 Sep 2024
Traceability National Institute of Metrology Thailand (NIMT)

Approved by :

(Pempon Chianpu)

Supervisor

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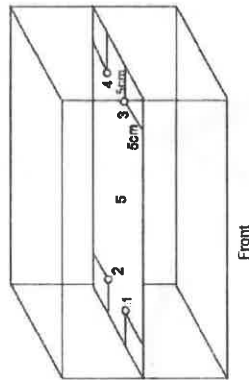
Certificate of Calibration

Certificate No. : 67-400548-3 Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement



Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.					Uncertainty (± °C)	Measured Uniformity (°C)	Measured Stability (°C)
			1	2	3	4	5			
85.0	85.0	85.0	84.55	84.44	84.49	84.46	84.62	0.20	0.25	0.06

Remark The uncertainty is not combine uniformity of the water bath

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%

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Certificate of Calibration

Page : 1 of 2

Certificate No. : 67-400548-4

Submitted by : M Green Group Co., Ltd.

188/46 Wisatsukhakhon 25, Pracha-Ud Rd., Thungkru Bangkok 10140 Thailand

Equipment : Temperature controlled enclosure (Incubator)

Manufacturer : Biobase
Range : 0 °C to 65 °C
Resolution : 0.1 °C
Model : Biochemistry Incubator
Serial No. : KYP1502202003
ID No. : N/A

Environment : On site calibration was carried out at the Laboratory, M Green Group Co., Ltd.

Ambient Temperature : (31.0 to 32.0) °C
Relative Humidity : (50 to 55) %
Line Voltage : (226.0 to 230.0) V

Date of Received : 20 September 2024

Date of Calibration : 20 September 2024

Date of Issue : 21 September 2024

Calibrated by : Perupon Chanpu

Calibration Method : CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

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

Standard Digital Thermometer with RTD Probe

ID No. : 400029 & 400048

Traceability:

Cert. No. : 67-400444-1

Due Date : 02 Feb 2025

National Institute of Metrology Thailand (NIMT)

Approved by :

(Perupon Chanpu)

Supervisor

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Certificate of Calibration

Page : 2 of 2

Certificate No. : 67-400548-4

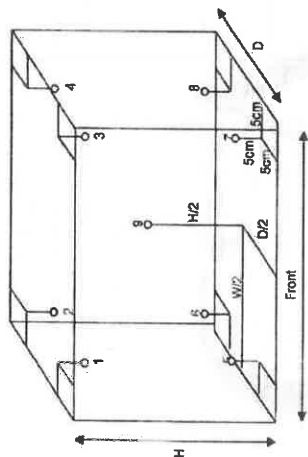
Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

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

Inside of Chamber
W = 0.45 m
D = 0.41 m
H = 0.85 m
Capacity = 0.16 m³



Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.							Uncertainty (± °C)
			1	2	3	4	5	6	7	
20.0	20.4	20.4	20.23	20.18	20.08	20.15	19.90	19.92	19.90	0.82

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
20.0	20.4	20.4	0.38	0.43	0.96

Remark: The uncertainty is not combine uniformity of the air chamber

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%

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Certificate of Calibration

Certificate No. : 67-300571-1 Page : 1 of 2

Submitted by : M Green Group Co., Ltd.
188/46 Wisutesukhakon 25, Pracha-Utd Rd., Thungku, Bangkok 10140 ThailandEquipment : Cylinder
Manufacturer : GLASSCO Class : A
Capacity : 100 ml Graduation : 1 ml
ID No. : CY10001/24Environment : Ambient Temperature : (20 ± 3) °C
Relative Humidity : (50 ± 10) %
Air Pressure : 1003.9 mbar.Date of Received : 20 September 2024
Date of Calibration : 24 September 2024
Date of Issue : 24 September 2024
Calibrated by : Arcarat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No. : 241002 Cert. No. : 67-200210-1 Due Date : 02 Dec 2024
Traceability : National Institute of Metrology (Thailand) (NIMT)

Approved by :

(Wipa Torader)

Supervisor

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Certificate of Calibration

Certificate No. : 67-300571-1 Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
50	50.45
100	100.52

Uncertainty of measurement with in $\pm$ 0.063 ml
This result of calibration was found accurate as shown on date and place of calibration only.
This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

-o0o-



CAL

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NSO-TIS-TIS17075
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-300571-2

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

188/46 Wisetuknakhon 25, Pracha-Utd Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Cylinder

Manufacturer : GLASSCO **Class :** A

Capacity : 250 ml **Graduation :** 2 ml

ID No. : CY250/01/19

Environment : Ambient Temperature : (20 ± 3) °C

Relative Humidity : (50 ± 10) %

Air Pressure : 1004.1 mbar.

Date of Received : 20 September 2024

Date of Calibration : 24 September 2024

Date of Issue : 24 September 2024

Calibrated by : Aracrat Sornbun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No. : 241/002

Cert. No. : 67-200210-1

Due Date : 02 Dec 2024

Traceability : National Institute of Metrology (Thailand) (NIMT)

Approved by :

(Wipa Towanee)

Supervisor

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CAL-300571-03

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Tel.(02) 964-6211 Fax (02) 964-5155, e-mail : calibratech.co@yahoo.com, calibratech.co@hotmail.com

Certificate of Calibration

Certificate No. : 67-300571-2

Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
150	151.02
250	251.16

Uncertainty of measurement with in ± 0.087 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2.00 , providing a level of confidence of approximately 95%

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CAL-300571-02

CAL

Calibratech Co., Ltd.

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MSG-TSI-71817075
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-300571-3 Page : 1 of 2

Submitted by : M Green Group Co., Ltd.
188/46 Wisatsuknakhon 25, Pracha-Utd Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Cylinder
Manufacturer : GLASSCO Class : A
Capacity : 1000 ml Graduation : 10 ml
ID No. : CY1000/01/24

Environment : Ambient Temperature : (20 ± 3) °C
Relative Humidity : (50 ± 10) %
Air Pressure : 1001.7 mbar.

Date of Received : 20 September 2024
Date of Calibration : 24 September 2024
Date of Issue : 24 September 2024
Calibrated by : Areerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID.No.	Cert.No.	Due Date	Traceability
241002	67-200210-1	02 Dec 2024	National Institute of Metrology (Thailand) (NIMT)

Approved by : 
(Wipa Tovadee)
Supervisor

The Uncertainties are for a confidence probability of approximately 95%
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CAL

Calibratech Co., Ltd.

7/106-7 Moo 2, Sukhprachuen 3 Rd., Bangpoo, Pakkred, Nonthaburi 11120
Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.co@yahoo.com, calibratech.co@gmail.com

Certificate of Calibration

Certificate No. : 67-300571-3 Page : 2 of 2

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C
UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
500	500.74
1000	1003.10

Uncertainty of measurement with in $\pm$ 0.17 ml
This result of calibration was found accurate as shown on date and place of calibration only.
This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%

-o0o-





CAL-00031-02



Certificate of Calibration

Certificate No. : 67-410112-1

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

188/46 Wisatesukhakon 25, Pracha-Uthit Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Digital Thermo-Hygrometer

Manufacturer : Digicon

Model : TH-02A

Range Temperature : 0 °C to 50 °C Resolution : 0.1 °C

Range Humidity : 20 %R.H. to 99 %R.H. Resolution : 1 %R.H.

Serial No. : 1819A0771796 ID No. : N/A

Environment : Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Date of Received : 20 September 2024

Date of Calibration : 23 September to 24 September 2024

Date of Issue : 24 September 2024

Calibrated by : Chortip Sanchusri

Calibration Method : This instrument was calibrated by In-house method comparison technique CAL-M4013 by compared with standard probe sensor humidity/temperature into humidity/temperature chamber.

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

Digital Indicator with Standard Probe Temp&Hum

ID No. Cert. No. Due Date Traceability

400034 & 400035 SG-H-00611/67 04 Jan 2025 Success Gateway Co., Ltd., Accredited by TISI Calibration No.0268

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 67-410112-1

Page : 2 of 2

UUC Condition As-Received : Good

Result of Calibration : Without Adjustment

Function : Temperature measurement

Reference Humidity @ 50 %R.H.

Standard Temperature (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
19.99	19.7	0.3	0.46
25.00	24.7	0.3	0.46
30.01	29.7	0.3	0.46

Result of Calibration : Without Adjustment

Function : Humidity measurement

Reference Temperature @ 25 °C

Standard Humidity (%R.H.)	UUC Reading (%R.H.)	Correction (%R.H.)	Uncertainty (± %R.H.)
40.01	38	2	2.2
60.00	56	4	2.3

Remark

UUC : Unit Under Calibration

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%

- o O o -

Approved by :

P

(Permpoon Charpu)

Supervisor





Certificate of Calibration

Certificate No. : 67-400547-1 Page : 1 of 2

Submitted by : M Green Group Co., Ltd.
188/46 Wisetuekhaekon 25, Pracha-Uthit Rd., Thungkru Bangkok 10140 Thailand

Equipment : Temperature Indicator with Thermistor Probe

Temperature Indicator

Manufacturer : Eutech Model : pH 700
Range : N/A °C Resolution : 0.1 °C
Serial No. : 2884323 ID No. : N/A

Thermistor probe

Model : N/A Sheath Material : Stainless
Diameter : 3 mm. Length : 115 mm.

Serial No. : PHSTEMB01P 279 ID No. : N/A

Environment : On site calibration was carried out at the Laboratory, M Green Group Co., Ltd.

Ambient Temperature : (26.3 to 26.7) °C

Relative Humidity : (40 to 45) %

Line Voltage : (220.0 to 223.0) VAC

Date of Received : 20 September 2024

Date of Calibration : 20 September 2024

Date of Issue : 21 September 2024

Calibrated by : Permpon Chamru

Calibration Method : This instrument was calibrated by In-house method comparison technique CAL-M4003 by compared with PRT in the liquid bath at the constant controlled temperature.

The temperature scale used was based on ITS-90

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

1. Platinum Resistance Thermometer (PRT)

ID No. Cert. No. Due Date Traceability

400002 TT-0095-24 01 Jul 2026 National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No. Cert. No. Due Date Traceability

400033 24E633 21 Feb 2026 National Institute of Metrology Thailand (NIMT)

Approved by :

(Permpon Chamru)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 67-400547-1 Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As Received : Good

Function : Temperature measurement

Immersion Depth (mm.)	Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
130	25.004	24.9	0.1	0.19

Remark

UUC : Unit Under Calibration

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%

-cdo





Certificate of Calibration

Certificate No. : 67-300570-3

Page : 1 of 2

Submitted by

: M Green Group Co., Ltd.

188/46 Wisetukulnakhon 25, Pracha-Uthit Rd., Thungkru, Bangkok 10140 Thailand

Equipment

: Volumetric Flask

Manufacturer : GLASSCO

Class : A

Capacity : 1000 ml

ID No. : VF1000/01/19

Environment

: Ambient Temperature : (20 ± 3) °C

Relative Humidity : (50 ± 10) %

Air Pressure : 1003.3 mbar.

Date of Received : 20 September 2024

Date of Calibration : 24 September 2024

Date of Issue : 24 September 2024

Calibrated by : Areerat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No. Cert No.

Due Date

Traceability

241002 67-200210-1

02 Dec 2024

National Institute of Metrology (Thailand) (NIMT)

Approved by :

(Wipa Tovadee)

Supervisor

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Certificate of Calibration

Certificate No. : 67-300570-3

Page : 2 of 2

Result of Calibration :

This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
1000	1000.25

Uncertainty of measurement with in ± 0.14 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2.00 , providing a level of confidence of approximately 95%

-o0o-



CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Subprachasam 3 Rd., Bangpood, Pathum, Nonthaburi 11120
Tel.(02) 964-6211 Fax.(02) 964-5135, e-mail : calibratech.co@yaboo.com, calibratech.co@gmail.comNSG-T81-T817025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-300570-1

Page : 1 of 2

Submitted by : M Green Group Co., Ltd

188/46 Wiatesukrakhon 25, Pracha-Uthit Rd., Thungkru, Bangkok 10140 Thailand

Equipment

: Volumetric Flask

Manufacturer : GLASSCO

Class : A

Capacity : 100 ml

ID No. : VF100/01/19

Environment

: Ambient Temperature :

°C

(20 ± 3)

Relative Humidity :

%

(50 ± 10)

Air Pressure :

mbar.

1003.9

Date of Received

: 20 September 2024

Date of Calibration

: 24 September 2024

Date of Issue

: 24 September 2024

Calibrated by

: Areearat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.

Cert. No.

Due Date

Traceability

241005

67-200210-4

02 Dec 2024

National Institute of Metrology (Thailand) (NIMT)

Approved by:

(Wipa Tovaldes)

Supervisor

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CAL-00031-03

CAL

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Tel.(02) 964-6211 Fax.(02) 964-5135, e-mail : calibratech.co@yaboo.com, calibratech.co@gmail.com

Certificate of Calibration

Certificate No. : 67-300570-1

Page : 2 of 2

Result of Calibration :

This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
100	100.063

Uncertainty of measurement with in

±

0.018 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2.00 , providing a level of confidence of approximately 95%

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CAL-00031-03

CAL

Calibratech Co., Ltd.

7/106-7 Moo 2, Sudbanyachuan 3 Rd., Bangpood, Pakkred, Northaburi 11120
Tel.(02) 964-4211 Fax.(02) 964-5155, e-mail : calibratech.co@yahoo.com, calibratech.co@hotmail.com



NSC-TSI-17075
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-300570-2 **Page : 1 of 2**

Submitted by : M Green Group Co., Ltd.
188/46 Wisetusuknakhon 25, Pracha-Utd Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Volumetric Flask
Manufacturer : GLASSCO **Class :** A
Capacity : 250 ml
ID No. : VF250/01/19

Environment :
Ambient Temperature : (20 ± 3) °C
Relative Humidity : (50 ± 10) %
Air Pressure : 1003.8 mbar.

Date of Received : 20 September 2024
Date of Calibration : 24 September 2024
Date of Issue : 24 September 2024
Calibrated by : Arcenat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-22

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

Electronic Balance

ID No.	Cert. No.	Due Date	Traceability
241002	67-200210-1	02 Dec 2024	National Institute of Metrology (Thailand) (NIMT)

Approved by : 
(Wipa Towadee)
Supervisor

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CAL-F001(01)

CAL

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Tel.(02) 964-4211 Fax.(02) 964-5155, e-mail : calibratech.co@yahoo.com, calibratech.co@hotmail.com

Certificate of Calibration

Certificate No. : 67-300570-2 **Page : 2 of 2**

Result of Calibration : This result of true Volume is referred to standard temperature at 20 °C
UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
250	250.04

Uncertainty of measurement with in ± 0.051 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2.00 , providing a level of confidence of approximately 95%

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CAL-F001(01)

CAL

Calibratech Co., Ltd.

7/106-7 Moo 2, Subhacharasri 3 Rd., Banggood, Pathum Thani 11120
Tel: (02) 964-6211 Fax: (02) 964-5155, e-mail: calibratech.co@yaho.com, calibratech.co@hotmail.com



NSG-TSI-11817025
CALIBRATION 00380

Certificate of Calibration

Certificate No. : 67-420106-1

Page : 1 of 2

Submitted by :

M Green Group Co., Ltd.

18846 Wisetachakorn 25, Pracha-Ud Rd., Thungkru Bangkok 10140 Thailand

Equipment :

pH Meter with electrode

pH meter

Manufacturer : Eutech

Model : pH 700

Range : N/A

Resolution : 0.01 pH

Serial No. : 2884323

ID No. : N/A

Electrode

Model : EPC7252101B

Serial No. : 01X099320

Environment : On site calibration was carried out at the Laboratory, M Green Group Co., Ltd.

Ambient Temperature : (26.3 to 26.7)°C

Relative Humidity : (40 to 45) %

Date of Received : 20 September 2024

Date of Calibration : 20 September 2024

Date of Issue : 21 September 2024

Calibrated by : Pempon Chanpu

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

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

1. Multiproduct Calibrator

ID No.	Cert. No.	Due Date	Traceability
400005	SG-E-00307/66	23 Aug 2025	National Institute of Metrology Thailand (NIMT)

2. Standard Buffer Solution

pH	Cert. No.	Lot No.	Exp. Date	Traceability
4.008	61293328	1027612	15 Sep 2026	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
6.987	61297593	1027614	15 Sep 2025	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
10.010	61306165	1027613	15 Sep 2025	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025

Approved by :

(Pempon Chanpu)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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CAL-F0031-03

CAL

Calibratech Co., Ltd.

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Tel: (02) 964-6211 Fax: (02) 964-5155, e-mail: calibratech.co@yaho.com, calibratech.co@hotmail.com

Certificate of Calibration

Certificate No. : 67-420106-1

Page : 2 of 2

Result of Calibration :

UUC Condition A= Received : Good

Function : Electrical measurement

pH meter

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

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

Function : pH meter with electrode

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

Adjustment Curve at nominal pH	Standard Buffer (pH)	UUC Reading (pH)	Correction (pH)	Uncertainty (± pH)
4, 7, 10	4.008	4.01	0.00	0.0097
	6.987	7.00	-0.01	0.011
	10.010	10.01	0.00	0.014

Remark

UUC : Unit Under Calibration

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2,
providing a level of confidence of approximately 95%

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P



CAL-F0031-03

CAL

Calibratech Co.,Ltd.

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Tel.(02) 964-6211 Fax.(02) 964-4155, e-mail : cal@caltech.co.th, cal@caltech.co.th



NSG-TIS-17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 67-400560-1

Page : 1 of 2

Submitted by :

M Green Group Co., Ltd.

188/46 Wisatuenkarn 25, Pracha-Utd Rd., Thungku, Bangkok 10140 Thailand

Equipment :

Liquid in Glass Thermometer

Manufacturer : N/A

Model : N/A

Range : 0 °C to 100 °C

Resolution : 1 °C

Serial No. : N/A

Immersion : Total

ID No. : 94-49747

Environment :

Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Line Voltage : (220 ± 22) VAC

Date of Received :

20 September 2024

Date of Calibration :

23 September 2024

Date of Issue :

23 September 2024

Calibrated by :

Chortip Samchusri

Calibration Method : This instrument was calibrated by In-house method comparison technique CAL-M4001 based on ASTM E77-07 by compared with PRT in the liquid bath at the constant controlled temperature.

The temperature scale used was based on ITS-90

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

1. Platinum Resistance Thermometer (PRT)

ID No.	Cert.No.	Due Date	Traceability
400001	TT-0023-24	16 Feb 2026	National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No.	Cert.No.	Due Date	Traceability
400003	23E1866	01 Jun 2025	National Institute of Metrology Thailand (NIMT)
400004	23E1866	01 Jun 2025	National Institute of Metrology Thailand (NIMT)

Approved by :

(Permpon Chuapra)

Supervisor

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CAL-00031-01

CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sathapachuan 3 Rd., Bangpoo, Pakkred, Nonthaburi 11120
Tel.(02) 964-6211 Fax.(02) 964-4155, e-mail : cal@caltech.co.th, cal@caltech.co.th

Certificate of Calibration

Certificate No. : 67-400560-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

Ice point check : UUC* reading 0 °C Standard reading -0.0321 °C

Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
39.8223	40	-0.2	0.31

Remark

UUC : Unit Under Calibration

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%

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P



CAL-00031-01

CAL

Calibratech Co., Ltd.

7/106-7 Moo 2, Sukkrapachasan 3 Rd., Banggood, Pathum Thani 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech-cal@yahoo.com, calibratech-cal@hotmail.com

Certificate No. : 67-300572-1

Submitted by

: M Green Group Co., Ltd.

183/46 Wisetstulaknon 25, Prachin-Ubid Rd., Thungkru, Bangkok 10140 Thailand

Page : 1 of 2

Certificate of Calibration

Equipment

: Imhoff Cone

Manufacturer : VITLAB

Capacity : 1000 ml

Graduation : 0.1, 50 ml

ID No. : CY1000/01/22

Environment

: Ambient Temperature : (20 ± 3) °C

Relative Humidity : (50 ± 10) %

Air Pressure : 1001.5 mbar.

Date of Received

: 20 September 2024

Date of Calibration

: 23 September 2024

Date of Issue

: 23 September 2024

Calibrated by

: Atsarat Sombun

Calibration Method : In-house method CAL-M3001 based on ASTM E 542-01

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

Electronic Balance

ID No.

Cert. No.

Due Date

Traceability

241002

67-200210-1

02 Dec 2024

National Institute of Metrology (Thailand) (NIMT)

Approved by :

(Wipa Tivakoo)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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CAL-74031-01

CAL

Calibratech Co., Ltd.

7/106-7 Moo 2, Sukkrapachasan 3 Rd., Banggood, Pathum Thani 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech-cal@yahoo.com, calibratech-cal@hotmail.com

Certificate No. : 67-300572-1

Page : 2 of 2

Result of Calibration :

This result of true Volume is referred to standard temperature at 20 °C

UUC Condition As-Received : Good

Nominal Volume (ml)	Measuring Volume (ml)
500	500.74
1000	1009.16

Uncertainty of measurement with in ± 0.17 ml

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2.00 , providing a level of confidence of approximately 95%

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Certificate of Calibration

Certificate No. : 67-200334-1 Page : 1 of 2

Submitted by : M Green Group Co., Ltd.
188/46 Wisatesukmakhon 25, Pracha-Uthit Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Electronic Balance
Manufacturer : SHIMADZU Model : AP225WD
Serial No. : D316300690
Capacity : 220 g Resolution : 0.00001g/102g, 0.0001g/220g

Environment : On site calibration was carried out at the Laboratory, M Green Group Co., Ltd.
Ambient Temperature : (24.9 to 26.3) °C
Relative Humidity : (40.8 to 55.4) %
Air Pressure : 1003.0 mbar

Date of Received : 20 September 2024
Date of Calibration : 20 September 2024
Date of Issue : 21 September 2024
Calibrated by : Akaradeth Thippichai

Calibration Method : In-house method CAL-M2001 based on UKAS Publication ref: LAB 14
Edition 7 - November 2022

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

ID No.	Cert. No.	Due Date	Traceability
E261-E2624	C02232088	08 Nov 2024	National Institute of Metrology (Thailand), (NIMT)

Approved by : 
(Sajja Sangthum)
Supervisor

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Certificate of Calibration

Certificate No. : 67-200334-1 Page : 2 of 2

Result of Calibration : Without Adjustment
UUC Condition As-Received : Good
Departure of indication from nominal value

Nominal Value (g)	Correction (g)	Uncertainty ± (g)
0.001	0.00000	0.000015
0.01	0.00000	0.000016
0.1	0.00000	0.000018
1	0.00000	0.000026
10	0.00000	0.000053
20	-0.00003	0.000071
50	0.00006	0.00011
100	0.00004	0.00020
150	0.00001	0.00038
200	0.00000	0.00038

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.13$, providing a level of confidence of approximately 95%

Eccentric error	Load test : 50 g	
	A B C D E	
	-0.00005 0.00001 0.00002 0.00000 0.00000	g

Repeatability : Load test : 200 g
Sidev. : 0.000000 g

-000-







Certificate of Calibration

Certificate No. : 67-210362-1 Page : 1 of 2

Submitted by : M Green Group Co., Ltd.
188/46 Wisetnakrakhon 25, Pracha-Utd Rd., Thungkrn. Bangkok 10140 ThailandEquipment : Weight
Manufacturer : N/A Material : Stainless SteelWeight size : 1 g
ID No. : 63-210391-1
Assumed density of weight : 7950 kg / m³
Assumed Air density : 1.2 kg / m³
Ambient Temperature : (20 ± 2) °C
Relative Humidity : (50 ± 10) %
Air Pressure : 1005.7 mbarDate of Received : 20 September 2024
Date of Calibration : 23 September 2024
Date of Issue : 23 September 2024

Calibrated by : Wutichai Swaphong

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

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

Standard Weights

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

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 67-210362-1 Page : 2 of 2

Result of Calibration : Without Adjustment
UUC Condition As-Received : Good

No.	Nominal Value	Id Mark	Conventional mass Value	Measuring Uncertainty
1	1 g	none	1 g +0.003 mg	± 0.023 mg

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%

-o0o-



CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukprachasani 3 Rd., Banggood, Pakred, Nonthaburi 11120
Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.co@yahoo.com, calibratech.co@hotmail.com



NBC-TB1-TB17325
CALIBRATION 0058

Certificate of Calibration

Page : 1 of 2

Certificate No. : 67-210362-2

Submitted by : M Green Group Co., Ltd.

188/46 Wisetnakomkhon 25, Pracha-Utd Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Weight

Manufacturer : N/A Material : Stainless Steel

Weight size : 100 g

ID No. : 63-210391-2

Assumed density of weight : 7950 kg / m³

Assumed Air density : 1.2 kg / m³

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

Relative Humidity : (50 ± 10) %

Air Pressure : 1005.7 mbar

Date of Received : 20 September 2024

Date of Calibration : 23 September 2024

Date of Issue : 23 September 2024

Calibrated by : Wutichai Swaphong

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

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

Standard Weights

ID No. Cert. No.

E221-E2210 MM-0042-22

Due Date

21 Mar 2025

Traceability

National Institute of Metrology (Thailand), (NIMT)

Approved by :

(Sajja Sangkhuan)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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CAL-TH01-43



CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukprachasani 3 Rd., Banggood, Pakred, Nonthaburi 11120
Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.co@yahoo.com, calibratech.co@hotmail.com

Certificate of Calibration

Certificate No. : 67-210362-2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

No.	Nominal Value	Id.Mark	Conventional mass Value	Measuring Uncertainty
1	100 g	none	100 g +0.06 mg	± 0.11 mg

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%

-o0o-

(Signature)



CAL-TH01-01



Certificate of Calibration

Certificate No. : 67-210362-3 Page : 1 of 2

Submitted by : M Green Group Co., Ltd.
188/46 Wisutesukmakdon 25, Pracha-Uthit Rd., Thungkru, Bangkok 10140 Thailand

Equipment :
Weight
Manufacturer : N/A Material : Stainless Steel
Weight size : 200 g

ID No. : 63-210391-3
Assumed density of weight : 7950 kg / m³
Assumed Air density : 1.2 kg / m³
Ambient Temperature : (20 ± 2) °C
Relative Humidity : (50 ± 10) %
Air Pressure : 1005.7 mbar

Date of Received : 20 September 2024
Date of Calibration : 23 September 2024
Date of Issue : 23 September 2024
Calibrated by : Wuttichai Swapkong

Calibration Method : In-house method CAL-M2101 based on OIML R 111-1 : 2004(E)
Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Weights

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

Approved by :


(Satej Singkhum)
Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 67-210362-3 Page : 2 of 2

Result of Calibration : Without Adjustment
UUC Condition As-Received : Good

No.	Nominal Value	Id. Mark	Conventional mass Value	Measuring Uncertainty
1	200 g	none	200 g +0.06 mg	± 0.17 mg

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%

-o0o-







CERTIFICATE No : 25T0970
REFERENCE No : 76012-2

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 160
SERIAL No : D518.0082
ID No : EQL-205
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO.,LTD.
30.32 RAMA II RD., SAMAEADAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : CHAICHARN CH.
CALIBRATION DATE : 04-Feb-25
APPROVED BY :
PONGSAK J.
ISSUED DATE : 12-Feb-25
RECEIVED DATE : 04-Feb-25

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



F-G010 REV : 03



CERTIFICATE No : 25T0970

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 160
ID No : EQL-205
RECEIVED DATE : 04-Feb-25
AMBIENT TEMPERATURE : 25 °C ± 1 °C
RELATIVE HUMIDITY : 50 %RH ± 10 %RH
S/N : D518.0082
CALIBRATION DATE : 04-Feb-25

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TIAS G-20 BY COMPARISON WITH CALIBRATED RTD Pt100 UNDER NO LOAD CONDITION. THE TEMPERATURE PROBES WERE PLACED ON NINE POINTS AND LOCATED ONE THERMOMETER PROBE 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 THERMOMETER PROBE 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.

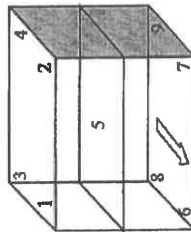
2. REFERENCE STANDARD INSTRUMENTS :-

- 1) DATA LOGGER WITH RTD
MODEL : HYDRA 2635A
SERIAL No : 7301307
CERTIFICATE No : 24T6467
DUE DATE : 26-Jun-25
3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE 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 : 2
Overall Line Voltage (V) variation : 11
Instrument Condition : Normal
Chamber Size (W*L*H): 56*40*72 cm



CHAMBER PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Average All Position (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
35.0	35.0	34.98	0.03	0.08	0.12
36.0	36.0	35.99	0.02	0.16	0.16
41.5	41.6	41.51	0.03	0.19	0.23

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	
35.0	35.0	34.96	35.01	34.94	35.00	35.01	34.99	34.98	34.97	35.01	0.25
36.0	36.0	35.98	36.03	35.95	36.01	36.01	35.91	35.99	36.04	35.99	0.25
41.6	41.6	41.49	41.53	41.43	41.52	41.59	41.53	41.42	41.53	41.58	0.36

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



F-G010 REV : 03



CERTIFICATE No : 25T0975
REFERENCE No : 76012-7

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : AUTOCLAVE
MANUFACTURER : HIRAYAMA
MODEL : HVE-50
SERIAL No : 30612085166
No : EQL-155
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO.,LTD.
30,32 RAMA II RD., SAMAEADAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : CHAICHARN CH.
CALIBRATION DATE : 04-Feb-25

APPROVED BY :
PONGSAK J.
ISSUED DATE : 12-Feb-25
RECEIVED DATE : 04-Feb-25

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



CERTIFICATE No : 25T0975

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : AUTOCLAVE
MANUFACTURER : HIRAYAMA
ID NUMBER : EQL-155
RECEIVED DATE : 04-Feb-25
AMBIENT TEMPERATURE : 29° C ± 1° C
MODEL : HVE-50
SERIAL NUMBER : 30612085166
CALIBRATION DATE : 04-Feb-25
RELATIVE HUMIDITY : 53 %RH ± 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BASED ON BS 2646-1:2021 BY COMPARISON WITH CALIBRATED RTD DATA LOGGERS UNDER NO LOAD CONDITION. THE SENSORS WERE PLACED ON FIVE LOCATIONS AS SHOWN IN THE PICTURE. THE SENSOR ON LOCATION 1 AND 2 WERE PLACED IN THE UPPER HALF AND LOWER HALF OF CHAMBER FREE SPACE RESPECTIVELY. THE THIRD SENSOR WAS PLACED WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE INSTRUMENT CHAMBER. SENSOR NUMBER 4 WAS ATTACHED TO THE LOAD TEMPERATURE PROBE, IF FITTED. WITHIN 15 mm OF ITS TIP. SENSOR NUMBER 5 WAS PLACED IN THE CHAMBER DRAIN OR VENT WITHIN 100 mm OF ITS CONNECTION TO THE CHAMBER.

REFERENCE STANDARD INSTRUMENTS :-

- 1) DATA LOGGER
INSTRUMENT MODEL : VALPROBE
SERIAL No : S350S367.DV35.DN94
CERTIFICATE No : 25T0777
DUE DATE : 24-Jan-26
3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDES 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.

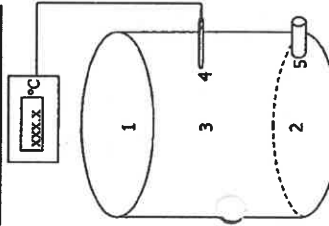
RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

GENERAL INFORMATION

Overall Ambient Temperature around the Chamber variation : 1.2 °C
Autoclave Condition : Normal
Chamber Size (Diameter*H): 30 * 71 cm

CHAMBER PERFORMANCE

Controller Temperature (°C)	Average All Position (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)	Pressure (MPa)	Holding time (min)	Operating Cycle time (min)
115	115.71	0.10	0.20	0.20	0.090	15	60
121	121.65	0.10	0.20	0.20	0.125	15	60



FRONT

TEMPERATURE MEASUREMENT ACCURACY TEST(°C)

Calibration Point	Controller Temp.	Indicating Temp.	Measured Temperature (°C) at Spread Locations					Uncertainty (± °C)
			#1	#2	#3	#4	#5	
115	115	115	115.66	115.65	115.76	115.76	115.70	0.63
121	121	121	121.59	121.60	121.71	121.71	121.66	0.64

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

NOTE 2 : THE STABILITY TERM IN THE UNCERTAINTY BUDGET WAS REPLACED BY THE STANDARD REPEATABILITY.

NOTE 3 : LOCATION 3 WAS REFERENCE LOCATION.

NOTE 4 : 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





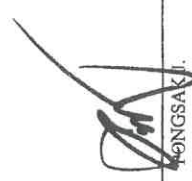
CERTIFICATE No : 24T6582
REFERENCE No : 73767-1

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : WATER BATH
MANUFACTURER : MEMMERT
MODEL : WPE 45
SERIAL No : L711.0024
ID No : EQL-147
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEADAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : CHAICHARN CH.
CALIBRATION DATE : 01-Jul-24

APPROVED BY : 
ISSUED DATE : 02-Jul-24
RECEIVED DATE : 01-Jul-24

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



CERTIFICATE No : 24T6582

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : WATER BATH
MANUFACTURER : MEMMERT
ID NUMBER : EQL-147
RECEIVED DATE : 01-Jul-24
AMBIENT TEMPERATURE : 24 °C ± 1 °C
MODEL : WPE 45
SERIAL NUMBER : L711.0024
CALIBRATION DATE : 01-Jul-24
RELATIVE HUMIDITY : 51 %RH ± 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO ASTM E715-80 (REAPPROVED 2001) BY COMPARISON WITH CALIBRATED RTD. THE PROBES WERE PLACED ON FIVE POINTS AND LOCATED ONE PROBE IN EACH OF THE FOUR CORNERS OF THE BATH AND PLACED THE FIFTH RTD WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE WATER VOLUME (REFERENCE LOCATION) UNDER NO LOAD CONDITION.

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT : 1) DATA LOGGER WITH RTD
MODEL : 2625A
SERIAL No : 6603614
CERTIFICATE No : 23T6642
DUE DATE : 19-Jul-24

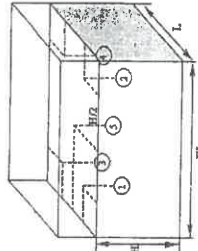
3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.

4. THIS RESULT EXCLUDES 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



PROBE INSTALLATION
POSITION IN THE BATH

GENERAL INFORMATION

Overall Variation of Ambient Temperature around the Bath (°C) : 1.1

Overall Variation of Line Voltage (V) : 4

Instrument Condition : Normal

Bath Inner Size (W*L*H) : 59*35*22 cm

BATH PERFORMANCE

Calibrate Point (°C)	Average All Position Temp. (±°C)	Temperature Stability (±°C)	Radius Uniformity (°C)	Axial Uniformity (°C)	Overall Variation (°C)
41.5	41.50	0.05	0.04	0.02	0.12
44.5	44.48	0.03	0.03	0.03	0.08

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Measured Temperature (°C) at Spread Locations					Uncertainty (±°C)
	#1	#2	#3	#4	Ref. 5	
41.5	41.51	41.47	41.51	41.48	41.50	0.14
44.5	44.47	44.47	44.49	44.47	44.49	0.14

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

NOTE 2 : 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

