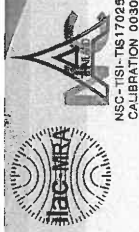


ภาคผนวก จ

สำเนาเอกสารรับรองเครื่องมือการตรวจวัด



Certificate of Calibration

Certificate No. : 65-400499-1

Submitted by : M Green Group Co., Ltd.

188/46 Wisutesukhakhon 25, Prachia-Uttd Rd., Thungkru Bangkok 10140 Thailand

Equipment : Air Chamber (Refrigerator)

Manufacturer : Biobase

Model : BXC-V250M (II)

Range : N/A °C

Resolution : 0.1 °C

Serial No. : YC025025190108

ID No. : N/A

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

Ambient Temperature : (30.0 to 31.0) °C

Relative Humidity : (45 to 50) %

Line Voltage : (229.0 to 232.0) V

Date of Received : 21 September 2022

Date of Calibration : 21 September 2022

Date of Issue : 23 September 2022

Calibrated by : Pernpon 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 Thermocouple probe

ID No. Cert.No.

400029 & 400032 65-400274-1

Traceability

National Institute of Metrology Thailand (NIMT)

Approved by :

(Bunjerd Masri)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written approval of the Calibratech Co., Ltd.



Certificate of Calibration

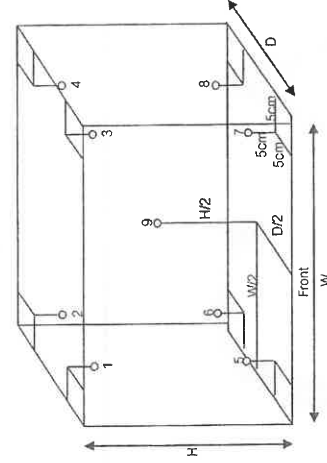
Certificate No. : 65-400499-1

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	3.9	4.8	5.2	5.0	5.2	4.7	5.2	4.1	5.1	0.75

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured		Overall Variation (°C)
			Uniformity (°C)	Stability (°C)	
4.0	2.0	2.0	1.6	0.3	1.9

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%

- o0o -





Certificate of Calibration

Certificate No. : 65-400499-2 Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

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

Equipment : Air Chamber (Oven)

Manufacturer : Memmert

Range : N/A °C Model : UF110

Serial No. : B419.1092 Resolution : 0.1 °C

ID No. : N/A

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

Ambient Temperature : (30.0 to 31.0) °C

Relative Humidity : (45 to 50) %

Line Voltage : (229.0 to 232.0) V

Date of Received : 21 September 2022

Date of Calibration : 21 September 2022

Date of Issue : 23 September 2022

Calibrated by : Permpoon Chamru

Calibration Method : CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

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

Standard Digital Thermometer with Thermocouple probe

ID No. Cert. No. Due Date Traceability

400029 & 400030 65-400272-1 24 Nov 2022

National Institute of Metrology Thailand (NIMT)

Approved by :

(Bunjerd Masri)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 65-400499-2 Page : 2 of 2

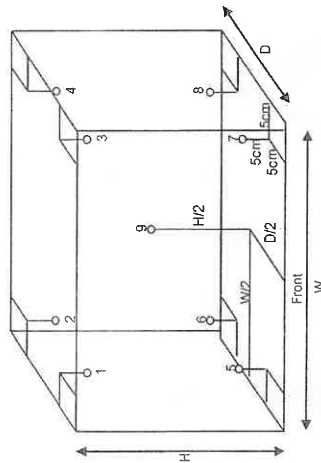
Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

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

Inside of Chamber
 W = 0.56 m
 D = 0.40 m
 H = 0.48 m
 Capacity = 0.11 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	
104.0	104.0	104.0	103.8	103.4	104.6	104.0	104.1	103.8	104.2	103.4	104.1	0.71
180.0	180.0	180.0	179.5	179.1	181.4	179.9	180.3	179.5	181.0	179.0	180.3	0.96

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
104.0	104.0	104.0	104.0	0.8	0.2	1.4
180.0	180.0	180.0	180.0	1.4	0.3	2.7

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%

- o O -





Certificate of Calibration

Certificate No. : 65-400499-3 Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

188/46 Wisetusukhakhon 25, Pracha-Utd Rd., Thungkr Bangkokkok 10140 Thailand

Equipment : Water Bath

Manufacturer : Memmert

Model : WNB29

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 : (30.0 to 31.0) °C

Relative Humidity : (45 to 50) %

Line Voltage : (229.0 to 232.0) V

Date of Received : 21 September 2022

Date of Calibration : 21 September 2022

Date of Issue : 23 September 2022

Calibrated by : Permpon 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 probe

ID No. Cert. No.

400029 & 400031 65-400273-1

Traceability

Due Date 23 Nov 2022
National Institute of Metrology Thailand (NIMT)

Approved by :

(Bunjerd Masri)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

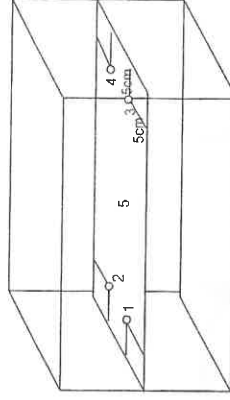
Certificate No. : 65-400499-3

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement



Front

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @					Uncertainty (± °C)	Measured Uniformity (°C)	Measured Stability (°C)
			Sensor No.							
			1	2	3	4	5			
85.0	85.0	85.0	84.65	84.57	84.77	84.70	84.74	0.19	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%

-oOo-





Certificate of Calibration

Certificate No. : 65-420076-1

Page : 1 of 2

Submitted by :

M Green Group Co.,Ltd.

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

Equipment :

pH Meter with electrode

pH meter

Manufacturer : Eutech

Model : pH 700

Range : N/A pH

Resolution : 0.01 pH

Serial No. : 2884323

ID No. : N/A

Electrode

Model : N/A

Serial No. : 40417

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

Ambient Temperature : (25.4 to 26.0) °C

Relative Humidity : (56 to 60) %

Date of Received : 21 September 2022

Date of Calibration : 21 September 2022

Date of Issue : 24 September 2022

Calibrated by : Bunjerd Masri

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-00473/64	27 Aug 2023	National Institute of Metrology Thailand (NIMT)

2. Standard Buffer Solution

pH	Cert. No.	Lot No.	Exp. Date	Traceability
4.008	61235182	795894	14 Feb 2024	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
6.985	61243095	809356	21 Apr 2023	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
10.008	61244986	795895	25 Feb 2023	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025

Approved by :

(Bunjerd Masri)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 65-420076-1

Page : 2 of 2

Result of Calibration :

UUC Condition As-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		Correction (mV)	Uncertainty (± mV)
			(pH)	(mV)		
4, 7, 10	177.4800	4	4.00	177.5	0.0	0.12
	0.0000	7	7.00	0.1	-0.1	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	0.010
	6.985	7.00	-0.01	0.011
	10.008	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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Certificate of Calibration

Certificate No. : 65-410112-1

Page : 1 of 2

Submitted by : M Green Group Co., Ltd.

188/46 Wisetuknakhon 25, Pracha-Utd 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 : 21 September 2022

Date of Calibration : 22 September to 24 September 2022

Date of Issue : 24 September 2022

Calibrated by : Chortip Samchusri

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-00713/65 07 Jan 2023 Success Gateway Co., Ltd., Accredited by TISI Calibration No.0268

Approved by :

(Bunjerd Masri)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 65-410112-1

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)
20.04	19.8	0.2	0.46
24.99	24.7	0.3	0.46
30.03	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.)
40.00	39	1	2.2
60.01	58	2	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%

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Certificate of Calibration

Certificate No. : 65-200300-1

Page : 1 of 2

Submitted by :

M Green Group Co., Ltd.

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

Equipment :

Electronic Balance

Manufacturer : SHIMADZU

Model : AP225WD

Serial No. : D316300690

Capacity : 220 g

Resolution : 0.0001g/102g, 0.0001g/220g

Environment :

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

Ambient Temperature : (26.1 to 26.3) °C

Relative Humidity : (62.1 to 64.5) %

Air Pressure : 1007.0 mbar

Date of Received :

21 September 2022

Date of Calibration :

21 September 2022

Date of Issue :

24 September 2022

Calibrated by :

Akaradath Thippichai

Calibration Method :

In-house method CAL-M2001 based on UKAS Publication ref : LAB 14

Edition 5, July 2015

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

Standard Weights

ID.No.

E261-E2624

Cert.No.

C02213103

Due Date

18 Nov 2022

Traceability

National Institute of Metrology (Thailand), (NIMT)

Approved by :

(Surachai Promthong)
Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 65-200300-1

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	0.00001	0.000012
0.01	0.00000	0.000014
0.1	0.00001	0.000018
1	0.00000	0.000026
10	0.00000	0.000053
20	-0.00001	0.000071
50	0.00001	0.00011
100	-0.00008	0.00020
150	-0.0001	0.00038
200	-0.0001	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 = 2.15 , providing a level of confidence of approximately 95%

Eccentric error

Load test : 50 g

A

B

C

D

E

0.00001

0.00006

0.00004

-0.00006

0.00000

g



Repeatability

Load test : 200 g

Sidev. : 0.000053 g

-o0o-



Certificate of Calibration

Certificate No. : 65-210457-1

Page : 1 of 2

Submitted by :

M Green Group Co., Ltd.

188/46 Wisasuknakhon25, Pracha-Utd Rd., Thungkru, Bangkok 10140 Thailand

Equipment :

Weight

Manufacturer : N/A

Material : Stainless Steel

Weight size : 1 g

ID No. : 63-210391-1

Assumed density of weight : 7950 kg / m³Assumed Air density : 1.2 kg / m³

Ambient Temperature : (20 ± 2) °C

Relative Humidity : (50 ± 10) %

Air Pressure : 1001.1 mbar

Date of Received : 21 September 2022

Date of Calibration : 28 September 2022

Date of Issue : 28 September 2022

Calibrated by : Wuttichai Swaiphong

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 :

(Surachai Promthong)
Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 65-210457-1

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 -0.016 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-





Certificate of Calibration

Certificate No. : 65-210457-2

Page : 1 of 2

Submitted by :

M Green Group Co., Ltd.

188/46 Wisaknakhon25, 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 / m³Assumed Air density : 1.2 kg / m³

Environment :

Ambient Temperature : (20 ± 2) ° C

Relative Humidity : (50 ± 10) %

Air Pressure : 1001.8 mbar

Date of Received : 21 September 2022

Date of Calibration : 28 September 2022

Date of Issue : 28 September 2022

Calibrated by : Wuttichai Swapphong

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 :

(Surachai Promthong)

Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 65-210457-2

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	100 g	none	100 g -0.17 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%

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Certificate of Calibration

Certificate No. : 65-210457-3 Page : 1 of 2

Submitted by : M Green Group Co., Ltd.
188/46 Wisasuknakhon25, Pracha-Uit Rd., Thungkru, Bangkok 10140 ThailandEquipment : Weight
Manufacturer : N/A Material : Stainless Steel
Weight size : 200 g

ID No. : 63-210391-3

Assumed density of weight : 7950 kg / m³Assumed Air density : 1.2 kg / m³

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

Relative Humidity : (50 ± 10) %

Air Pressure : 1001.8 mbar

Date of Received : 21 September 2022

Date of Calibration : 28 September 2022

Date of Issue : 28 September 2022

Calibrated by : Wuttichai Swatphong

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 WeightsID No. E221-E2210 Cert. No. MM-0042-22 Due Date 21 Mar 2025 Traceability
National Institute of Metrology (Thailand), (NIMT)Approved by :
(Surachai Promthong)
Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 65-210457-3 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 +0.09 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%

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Certificate of Calibration

Certificate No. : 65-400500-1

Page : 1 of 2

Submitted by :

M Green Group Co.,Ltd.

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

Equipment :

Digital Thermometer 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 : 3.2 mm.

Length : 100 mm.

Serial No. : PHSTEMB01P

ID No. : N/A

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

Ambient Temperature : (25.4 to 26.0) °C

Relative Humidity : (56 to 60) %

Line Voltage : (224.0 to 225.2) VAC

Date of Received : 21 September 2022

Date of Calibration : 21 September 2022

Date of Issue : 24 September 2022

Calibrated by : Bunjerd Masri

Calibration Method : This instrument was calibrated by In-house method comparison technique CAL-M4003 by compared with PRT in the dry-well calibrator 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-0074-22 20 Jun 2024 National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No. Cert.No. Due Date Traceability

400033 22E569 22 Feb 2024 National Institute of Metrology Thailand (NIMT)

Approved by :

(Bunjerd Masri)

Supervisor

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

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Certificate of Calibration

Certificate No. : 65-400500-1

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)
100	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%

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Certificate of Calibration

Certificate No. : 65-400503-1

Page : 1 of 2

Submitted by :

M Green Group Co., Ltd.

188/46 Wisatesuknakhon 25, Pracha-Uttd Rd.,

Thungkru, 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 :

21 September 2022

Date of Calibration :

23 September to 26 September 2022

Date of Issue :

26 September 2022

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-0016-22 07 Feb 2024

National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No. Cert.No. Due Date Traceability

400003 21E1850 14 Jun 2023

National Institute of Metrology Thailand (NIMT)

400004 21E1850 14 Jun 2023

National Institute of Metrology Thailand (NIMT)

Approved by :

(Bunjerd Masri)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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Certificate of Calibration

Certificate No. : 65-400503-1

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 0.0327 °C

Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
39.7131	40	-0.3	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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Certificate of Calibration

Certificate No. : 65-300541-1

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

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

Equipment : Volumetric Flask

Manufacturer : GLASSCO Class : A

Capacity : 100 ml

ID No. : VF100/01/19

Environment : Ambient Temperature : (23 ± 2) °CRelative Humidity : (50 ± 15) %

Air Pressure : 1007.5 mbar.

Date of Received : 21 September 2022

Date of Calibration : 26 September 2022

Date of Issue : 26 September 2022

Calibrated by : Areerat 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
241005	65-200172-4	02 Dec 2022	National Institute of Metrology (Thailand) (NIMT)

Approved by :


(Wipa Tovadee)
Supervisor

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written approval of the Calibratech Co.,Ltd.



Certificate of Calibration

Certificate No. : 65-300541-1

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	100.081

Uncertainty of measurement with in $\pm$ 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%

-o0o-





Certificate of Calibration

Certificate No. : 65-300541-2

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisatsukunakhon 25, Pracha-Uttd Rd., Thungkru, Bangkok 10140 Thailand

Equipment : Volumetric Flask

Manufacturer : GLASSCO **Class :** A

Capacity : 250 ml

ID No. : VF250/01/19

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

Relative Humidity : (50 ± 15) %

Air Pressure : 1007.4 mbar.

Date of Received : 21 September 2022

Date of Calibration : 26 September 2022

Date of Issue : 26 September 2022

Calibrated by : Areerat 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 65-200172-1 02 Dec 2022 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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Certificate of Calibration

Certificate No. : 65-300541-2

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	250.11

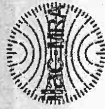
Uncertainty of measurement with in ± 0.049 ml

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 -





Certificate of Calibration

Certificate No. : 65-300541-3

Page : 1 of 2

Submitted by : M Green Group Co.,Ltd.

188/46 Wisetasuknakhon 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 : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Air Pressure : 1007.4 mbar.

Date of Received : 21 September 2022

Date of Calibration : 26 September 2022

Date of Issue : 26 September 2022

Calibrated by : Areerat 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	65-200172-1	02 Dec 2022	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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Certificate of Calibration

Certificate No. : 65-300541-3

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	1000.47

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%

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Certificate of Calibration

Certificate No. : 65-300541-4

Submitted by :

M Green Group Co.,Ltd.

188/46 Wisetstunaknon 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 : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Air Pressure : 1007.4 mbar.

Date of Received : 21 September 2022

Date of Calibration : 26 September 2022

Date of Issue : 26 September 2022

Calibrated by : Arserat 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 65-200172-1 02 Dec 2022

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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Certificate of Calibration

Certificate No. : 65-300541-4

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	151.08
250	251.34

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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Certificate of Calibration

Certificate No. : 65-300541-5

Page : 1 of 2

Submitted by :

M Green Group Co.,Ltd.

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

Equipment :

Measuring Pipette

Manufacturer : GLASSCO

Class : A

Capacity : 10 ml Graduation : 0.1 ml

ID No. : MP10/01/19

Environment :

Ambient Temperature : (23 ± 2) °CRelative Humidity : (50 ± 15) %

Air Pressure : 1002.7 mbar.

Date of Received : 21 September 2022

Date of Calibration : 26 September 2022

Date of Issue : 26 September 2022

Calibrated by :

Areerat 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

241005

65-200172-4

02 Dec 2022

National Institute of Metrology (Thailand) (NIMT)

Approved by :

(Wipa Towadbe)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written approval of the Calibratech Co.,Ltd.



Certificate of Calibration

Certificate No. : 65-300541-5

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 : 12.14 sec.

Nominal Volume (ml)	Measuring Volume (ml)
2	1.9942
5	4.9827
10	9.9888

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-



Certificate of Calibration

Certificate No. : 65-300541-6

Page : 1 of 2

Submitted by :

M Green Group Co.,Ltd.

188/46 Wisatasukrakhon 25, Pracha-Uthit Rd., Thungkru, 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 : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Air Pressure : 1002.7 mbar.

Date of Received : 21 September 2022

Date of Calibration : 26 September 2022

Date of Issue : 26 September 2022

Calibrated by : Areerat 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.

241005 65-200172-4

Due Date

02 Dec 2022

Traceability

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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Certificate of Calibration

Certificate No. : 65-300541-6

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 : 12.14 sec.

Nominal Volume (ml)	Measuring Volume (ml)
5	5.0254
15	15.0847
25	25.0413

Uncertainty of measurement with in ± 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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QUALITY CALIBRATION CO.,LTD.
235 Petchkasem 63/2 Road, Laksoeng, Bangkok, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4384
www.qcalibration.com



CERTIFICATE No : 23T1387
REFERENCE No : 68174-5

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 110
SERIAL No : D415.0802
ID No : EQL-190
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30.32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : PRASERT P.
CALIBRATION DATE : 13-Feb-23

APPROVED BY :
ISSUED DATE : 14-Feb-23
RECEIVED DATE : 13-Feb-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, Laksoeng, Bangkok, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4384

CERTIFICATE No : 23T1387

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 110
ID No : EQL-190
RECEIVED DATE : 13-Feb-23
AMBIENT TEMPERATURE : 24 °C ± 1 °C
S/N : D415.0802
CALIBRATION DATE : 13-Feb-23
RELATIVE HUMIDITY : 50 %RH ± 10 %RH

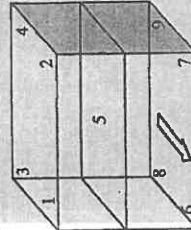
CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS 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 HYDRA 2635A 6635300 2217509 10-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



FRONT

GENERAL INFORMATION

Overall Ambient Temperature around the Chamber (°C) variation : 5
Overall Line Voltage (V) variation : 8
Instrument Condition : Normal
Chamber Size (W*L*H): 56*40*48 cm

CHAMBER PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
37.0	37.0	37.0	36.93	0.07	0.16	0.26
44.0	44.0	44.0	44.17	0.07	0.22	0.27

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations									Uncertainty (± °C)
		#1	#2	#3	#4	#5	#6	#7	#8	#9	
37.0	37.0	36.97	36.95	36.94	36.96	36.94	36.92	36.91	36.84	36.84	0.25
44.0	44.0	44.21	44.23	44.09	44.23	44.23	44.13	44.21	44.15	44.07	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 CUSTOMERS 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 : 02



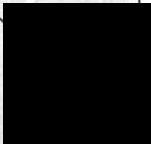
CERTIFICATE No : 23T1386
REFERENCE No : 681744

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 160
SERIAL No : D518.0082
No : EQL-205
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : PRASERT P.
CALIBRATION DATE : 13-Feb-23

APPROVED BY : 
ISSUED DATE : 14-Feb-23
RECEIVED DATE : 13-Feb-23



CERTIFICATE No : 23T1386

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 160
ID No : EQL-205
RECEIVED DATE : 13-Feb-23
AMBIENT TEMPERATURE : 24 °C ± 1 °C
SERIAL No : D518.0082
CALIBRATION DATE : 13-Feb-23
RELATIVE HUMIDITY : 50 %RH ± 10 %RH

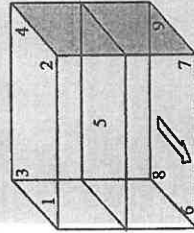
CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS 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 HYDRA 2635A
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



FRONT

GENERAL INFORMATION

Overall Ambient Temperature around the Chamber (°C) variation : 2
Overall Line Voltage (V) variation : 9
Instrument Condition : Normal
Chamber Size (W*L*H): 56*40*72 cm

CHAMBER PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
35.0	35.0	35.0	34.99	0.02	0.14	0.20
36.0	36.0	36.0	36.00	0.03	0.14	0.22
41.5	41.5	41.5	41.46	0.05	0.10	0.19

TEMPERATURE MEASUREMENT ACCURACY TEST

TEMPERATURE MEASUREMENT ACCURACY, 1.251										
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	34.91	34.94	34.93	34.93	34.98	35.03	35.08	35.01	35.08	0.25
36.0	35.93	35.95	35.95	35.94	36.00	36.05	36.10	36.01	36.10	0.25
41.5	41.46	41.47	41.41	41.47	41.50	41.47	41.45	41.43	41.49	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 k

COVERAGE FACTOR k=2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



CERTIFICATE No : 23T1385
REFERENCE No : 68174-3

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 160
SERIAL No : D518.0240
No : EQL-218
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : PRASERT P.
CALIBRATION DATE : 13-Feb-23

APPROVED BY :
ISSUED DATE : 14-Feb-23
RECEIVED DATE : 13-Feb-23



CERTIFICATE No : 23T1385

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 160
ID No : EQL-218
RECEIVED DATE : 13-Feb-23
AMBIENT TEMPERATURE : 24 °C ± 1 °C
SN : D518.0240
CALIBRATION DATE : 13-Feb-23
RELATIVE HUMIDITY : 50 %RH ± 10 %RH

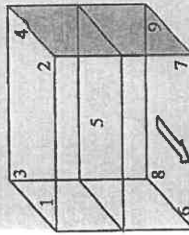
CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS G-20 BY COMPARISON WITH CALIBRATED RTD PH00 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.

REFERENCE STANDARD INSTRUMENTS :-

- 1) DATA LOGGER WITH RTD
- 2) HYDRA 2635A
- 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



FRONT

GENERAL INFORMATION

Overall Ambient Temperature around the Chamber (°C) variation : 2
Overall Line Voltage (V) variation : 12
Instrument Condition : Normal
Chamber Size (W*L*H): 56*40*72 cm

CHAMBER PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
35.0	35.0	35.0	35.00	0.05	0.15	0.26
36.0	36.0	36.0	36.00	0.04	0.16	0.26

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations								Uncertainty (± °C)
		#1	#2	#3	#4	#5	#6	#7	#8	#9
35.0	35.0	34.94	34.98	34.93	34.97	35.10	34.94	35.04	35.05	0.25
36.0	36.0	35.94	35.97	35.92	35.96	36.07	36.11	35.95	36.05	0.25

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 No.: 23T1384
REFERENCE No.: 68174-2

PAGE: 1 OF 2

Certificate of Calibration

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 160
SERIAL No : D519.0140
ID No : EQL-231
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
30,32 RAMA II SOI 63, RAMA II RD., SAMAEDAM,
BANGKHUNTHIAN, BANGKOK 10150

CALIBRATED BY : PRASERT P.
CALIBRATION DATE : 13-Feb-23

APPROVED BY : PONGSAK J.
ISSUED DATE : 14-Feb-23
RECEIVED DATE : 13-Feb-23



CERTIFICATE No.: 23T1384

PAGE: 2 OF 2

Calibration Report

EQUIPMENT : INCUBATOR
MANUFACTURER : MEMMERT
MODEL : IF 160
ID No : EQL-231
RECEIVED DATE : 13-Feb-23
AMBIENT TEMPERATURE : 24 °C ± 1 °C
RELATIVE HUMIDITY : 50 %RH ± 10 %RH

S/N : D519.0140
CALIBRATION DATE : 13-Feb-23
RELATIVE HUMIDITY : 50 %RH ± 10 %RH

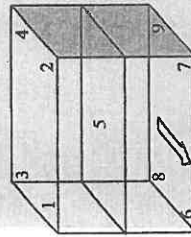
CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS 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 HYDRA 2635A
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 : 2
Overall Line Voltage (V) variation : 8
Instrument Condition : Normal
Chamber Size (W*L*H): 56*40*72 cm

CHAMBER PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
35.0	35.0	35.0	35.03	0.08	0.17	0.32
37.0	37.0	37.0	37.02	0.08	0.22	0.32
41.5	41.5	41.5	41.54	0.04	0.13	0.20

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations					Uncertainty (± °C)				
		#1	#2	#3	#4	#5		#6	#7	#8	#9
35.0	35.0	34.92	35.02	34.99	35.01	35.04	35.03	35.06	35.09	35.10	0.25
37.0	37.0	37.00	36.99	36.95	36.95	37.00	37.02	37.09	37.07	37.11	0.25
41.5	41.5	41.52	41.51	41.47	41.49	41.54	41.53	41.62	41.58	41.56	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



CERTIFICATE No : 23T1391
REFERENCE No : 68175-1

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 SOI 63, RAMA II RD.,
SAMAEDAM, BANGKHUNTHIAN, BANGKOK
10150

CALIBRATED BY : PRASERT P.
CALIBRATION DATE : 13-Feb-23

APPROVED BY : 
ISSUED DATE : 14-Feb-23
RECEIVED DATE : 13-Feb-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



CERTIFICATE No : 23T1391

PAGE : 2 OF 2

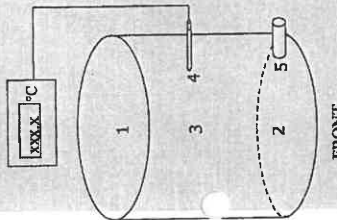
Calibration Report

EQUIPMENT : AUTOCLAVE
MANUFACTURER : HIRAYAMA
ID NUMBER : EQL-155
RECEIVED DATE : 13-Feb-23
AMBIENT TEMPERATURE : 30° C ± 1° C
MODEL : HVE-50
SERIAL NUMBER : 30612085166
CALIBRATION DATE : 13-Feb-23
RELATIVE HUMIDITY : 50 %RH ± 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BASED ON BS 2646 : Part 5 : 1995 BY COMPARISON WITH CALIBRATED THERMOCOUPLE TYPE K UNDER NO LOAD CONDITION. THE THERMOCOUPLES WERE PLACED ON FIVE LOCATIONS AS SHOWN IN THE PICTURE. TWO PROBES WERE PLACES NEAR TOP AND BOTTOM WALL AND EACH PROBE WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE THIRD PROBE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE INSTRUMENT CHAMBER. PROBE NUMBER 4 WAS ATTACHED TO THE LOAD TEMPERATURE PROBE, IF FITTED, WITHIN 20 mm OF ITS TIP. PROBE NUMBER 5 WAS PLACED IN THE CHAMBER DRAIN OR VENT WITHIN 100 mm OF ITS CONNECTION TO THE CHAMBER.
2. N. . FRENCH STANDARD INSTRUMENTS :
 - 1) DATA LOGGER
INSTRUMENT MODEL VALPROBE
SERIAL No S350, DV35, DN94
CERTIFICATE No 23T0885
DUE DATE 27-Jan-24
 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 Tem prature around the Chamber variation : 1.2 °C
Autoclave Condition : Normal
Chamber Size (Diameter* H) 30 * 71 cm

CHAMBER PERFORMANCE

Controller Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)	Pressure (MPa)	Holding time (min)	Operating Cycle time (min)
116	116.48	0.09	0.10	0.27	0.090	15	60
122	122.43	0.09	0.13	0.27	0.130	15	60

TEMPERATURE MEASUREMENT ACCURACY TEST(° C)

TEMPERATURE MEASUREMENT ACCORDING TO ASTM 1153 (°C)							Uncertainty (± °C)
		Measured Temperature (°C) at Spread Locations					
Cont. Temp.	Ind. Temp.	#1	#2	#3	#4	#5	
116	116	116.45	116.50	116.53	116.45	116.45	0.59
122	122	122.40	122.46	122.50	122.39	122.39	0.59

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 FACTOR k =2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT

F



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484



NSC-TS6-TS17623
CALIBRATION 008

Certificate of Calibration

Certificate No. : 23M259
Page : 1 of 2

Equipment : Standard Weight
Manufacturer: LS
Model :
Serial No.:
ID No.: EQL-121
Condition As-Received: Used Item
Received Date: 02 February 2023
Calibration Date: 07 February 2023

Reference: 2302-0060DN
Submitted by: TEST TECH CO.,LTD. (HEAD Office)
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: 1008.9 mbar
30, 32 Rama II Soi 63, Rama II Rd.,
Samaedam, Bangkokthian, Bangkok 10150

Procedure used: Calibration were conducted using in-house calibration procedure CP-M01 according to comparison method against standard weights on the basis of weightings at an average air density of 1.2 kg/m³ and a temperature of 23.4 °C material density of weight is 8000 kg/m³.

Condition of this result of calibration

1.Reference standards Instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Standard weight Set (E2)	YCS31-712-00	50202965	MM-0109-22	11 Jul 2024

2.This certificate is not certified for any commercial transaction.

3.The certificate is valid only to the item calibrated on date and place of calibration.

4.This Certification is traceable to the International System of Unit maintained at-

-National Institute of Metrology Thailand (NIMT)

Calibrated by : Chaowalit Ritirak
Issue Date : 08 February 2023

Approved Signatory :

[] Phalinee Prabpai
[x] Sura Suwanasri
[] Chaowalit Ritirak



Cert No.: 23M259
Page: 2 of 2

Result of calibration

Without adjustment

Nominal Value	Conventional mass	Uncertainty of Measurement (±)	Maximum Permissible error (±)
50 g	50.00015 g	0.10 mg	0.30 mg

The 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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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484



Certificate of Calibration

Certificate No.: 23M260
Page: 1 of 2

Equipment: Standard Weight
Manufacturer: -
Model: -
Serial No.: -
ID No.: EQL-258
Condition As-Received: Used Item
Received Date: 02 February 2023
Calibration Date: 07 February 2023
Reference: 2302-0080DN
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: 1012 mbar
Submitted by: TEST TECH CO.,LTD. (HEAD Office)
30, 32 Rama II Soi 63, Rama II Rd.,
Samaedam, Bangkhunthian, Bangkok 10150

Procedure used: Calibration were conducted using in-house calibration procedure CP-M01 according to comparison method against standard weights on the basis of weighings at an average air density of 1.2 kg/m³ and a temperature of 23.6 °C material density of weight is 8000 kg/m³.

Condition of this result of calibration

1. Reference standards Instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Standard weight Set (E2)	YCS31-712-00	50202965	MM-0109-22	11 Jul 2024

2. This certificate is not certified for any commercial transaction.

3. The certificate is valid only to the item calibrated on date and place of calibration.

4. This Certification is traceable to the International System of Unit maintained at:-

-National Institute of Metrology Thailand (NIMT)

Calibrated by: Chaowalit Rittirak
Issue Date: 08 February 2023

Approved Signatory :

[] Phalinee Prabpaipal
[x] Sura Suwannasri
[] Chaowalit Rittirak



Cert No.: 23M260
Page: 2 of 2

Result of calibration Without adjustment

Nominal Value	Conventional mass	Uncertainty of Measurement (±)	Maximum Permissible error (±)
2 kg	2.0000034 kg	3.0 mg	10 mg

The 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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QUALITY CALIBRATION CO.,LTD.

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



CERTIFICATE No : 2217648
REFERENCE No : 65843-2

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 : PRASERT P.

CALIBRATION DATE : 14-Jul-22

APPROVED BY : 

ISSUED DATE : 15-Jul-22

RECEIVED DATE : 14-Jul-22

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, Bangkok, Bangkok 10160
Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584
www.qcalibration.com

CERTIFICATE No : 2217648

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : WATER BATH
MANUFACTURER : MEMMERT
ID NUMBER : EQL-147
RECEIVED DATE : 14-Jul-22
AMBIENT TEMPERATURE : 24 °C ± 1 °C
MODEL : WPE 45
SERIAL NUMBER : L711.0024
CALIBRATION DATE : 14-Jul-22
RELATIVE HUMIDITY : 50 %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 :-

1) DATA LOGGER WITH RTD
INSTRUMENT MODEL SERIAL No CERTIFICATE No DUE DATE
2625A 6603614 2217514 05-Jul-23

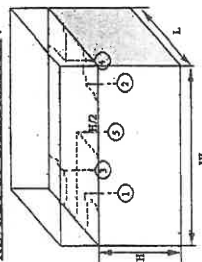
3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.

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 Variation of Ambient Temperature around the Bath (°C) : 0.9

Overall Variation of Line Voltage (V) : 3

Instrument Condition : Normal

Bath Inner Size (W*H) : 60*42*24 cm

BATH PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Indicating Temperature (°C)	Average All Locations (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
41.5	41.5	41.5	41.54	0.05	0.03	0.12
44.5	44.5	44.5	44.50	0.07	0.02	0.15

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations				Uncertainty (± °C)
		#1	#2	#3	#4	
41.5	41.5	41.54	41.55	41.52	41.55	0.14
44.5	44.5	44.48	44.51	44.50	44.51	0.15

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 QC 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 02



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.

Saraburi Tel : +66 3627 3096 Fax : +66 3627 3100

Bangkok Tel : +668 9205 6851 , +669 8247 2360

Website : www.scieco.co.th E-Mail : calibrate@scg.com



NSC-TIS-TIS 17025
CALIBRATION 0244

Certificate No. T230022

Page 1 of 4

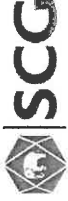
Certificate of Calibration

Equipment : Chamber (Cooling Room)
Manufacturer : -
Model : -
Serial No. : -
Customer Code : EQL-167
ID No. : T1447A1
Customer : Test Tech Co.,Ltd
30, 32 Rama II Soi 63, Rama II Rd., Samaedam,
Bangkhunthian Bangkok 10150
Customer Location : LABORATORY FLOOR 3
Date of Receipt : 13 January 2023
Calibrated By : Sujjar Nakkared (Site Calibration Manager)
Approved By : [REDACTED] / Boonchai Suriyawong (Site Calibration Manager)
Date of Issue : 24 JAN 2023

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

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standard laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Metrological Center.

FM4-L1511715-08-64



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.



NSC-TIS-TIS 17025
CALIBRATION 0244

Certificate No. T230022

Page 2 of 4

Calibration Report

Equipment : Chamber (Cooling Room)
Date of Calibration : 18 January 2023
Environment : Temperature : 25.0-27.2 °C
Line Voltage : 221.9-227.3 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert nine standard thermocouples type T into its chamber , the other one standard thermocouples type T use for ambient temperature measurement . The calibration was done in according to WI-T20 (based on ASTM E145-94 (Reapproved 2001) and AS2853-1986).

All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	TYPE T	TN141-TN150	T222123	5 October 2023
TC	TYPE T	TN151-TN160	T222123	5 October 2023
DATA LOGGER	34970A	T150	T222123	5 October 2023

3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TIS-TIS 17025 CALIBRATION 0244).

4. Condition of calibrated item : good

Equipment Description :

Time Constant 2 Hour 8 Minute At 3 °C
Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close

☒ Not Available

5. Adjustment :

() without adjustment

(X) after adjustment

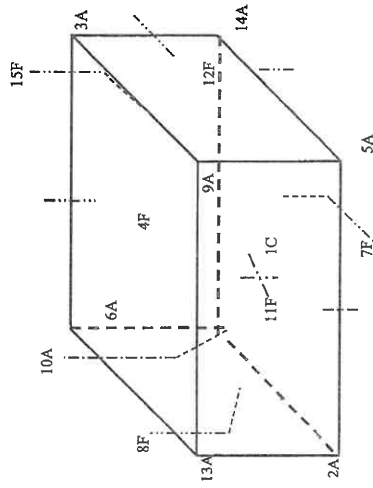
Approved By



FM4-L1511715-05-63



Calibration Report



C = Centre, F = Centre of Face, A = Corner, E = Centre of Edge

1C	=	TN141
2A	=	TN142
3A	=	TN143
4F	=	TN144
5A	=	TN145
6A	=	TN146
7F	=	TN147
8F	=	TN148
9A	=	TN149
10A	=	TN150

11F	=	TN151
12F	=	TN152
13A	=	TN153
14A	=	TN154
15F	=	TN155

Approved By. _____



Calibration Report

Measurement Results:

Average Standard Reading at each position (°C)										
Calibration Point	TN141	TN142	TN143	TN144	TN145	TN146	TN147	TN148	TN149	TN150
	3	2.93	2.77	2.79	2.26	3.04	3.39	2.91	3.05	3.54
		2.95								
	TN151	TN152	TN153	TN154	TN155					
	3.32	3.28	3.00	2.96	2.90					

Chamber (Cooling Room)			Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (± °C)	Uniformity (°C)	Uncertainty (± °C)	Coverage Factor k
	Min, Max	Average					
3.0	2.9, 3.1	3.0	3.01	0.47	1.04	0.98	2.00

* The quoted uncertainty exclude " uniformity "

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 % .

Approved By. _____



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.

Saraburi Tel : +66 3627 3096 Fax : +66 3627 3100

Bangkok Tel : +668 9205 6851 , +669 8247 2360

Website : www.scieco.co.th E-Mail : calibrate@scg.com



NSC-TISI-TIS 17025
CALIBRATION 0244

Certificate No. T230121

Page 1 of 4

Certificate of Calibration

Equipment : Chamber (Cooling Room)
Manufacturer : -
Model : -
Serial No. : -
Customer Code : EQL-181
ID No. : T0399A5
Customer : Test Tech Co.,Ltd
30, 32 Rama II Soi 63, Rama II Rd., Samaedam,
Bangkhunthian Bangkok 10150
Customer Location : LABORATORY FLOOR 4
Date of Receipt : 26 January 2023
Calibrated By : Sujjar Naknakred (Site Calibration Manager)
Approved By : [Redacted] / Boonchai Suriyawong (Site Calibration Manager)
Date of Issue : 01 FEB 2023

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

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standard laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Metrological Center.

FM-L1418/31-08-64



Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.



NSC-TISI-TIS 17025
CALIBRATION 0244

Certificate No. T230121

Page 2 of 4

Calibration Report

Equipment : Chamber (Cooling Room)
Date of Calibration : 30 January 2023
Environment : Temperature : 25.0-27.2 °C
Line Voltage : 221.9-227.3 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert nine standard thermocouples type T into its chamber , the other one standard thermocouples type T use for ambient temperature measurement . The calibration was done in according to WI-T20 (based on ASTM E145-94 (Reapproved 2001) and AS2853-1986) .

All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	TYPE T	TN141-TN150	T222123	5 October 2023
TC	TYPE T	TN151-TN160	T222123	5 October 2023
DATA LOGGER	34970A	TI50	T222123	5 October 2023

3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244.)

4. Condition of calibrated item : good

Equipment Description :

Time Constant : 1 Hour 30 Minute At 3 °C
Fresh Air Damper : ☐ Open ☐ Min ☐ Medium ☐ Max
Close ☒ Not Available

5. Adjustment :

() without adjustment (X) after adjustment

Approved By

FM-L1511715-05-63

FM-L15 I17/15-05-63



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484



NEC-TS-17-1723
CALIBRATION 808

Certificate of Calibration

Certificate No. : 22H2197
Page : 1 of 2

Equipment : Dial Thermo-Hygrometer
Manufacturer: Barigo
Model :
Serial No.:
ID No.: EQL-064
Condition As-Received: Used Item
Received Date: 17 October 2022
Calibration Date: 25 October 2022
Reference: 2210-0461DN
Ambient Temperature: (25 ± 3) °C
Relative Humidity: (50 ± 20) %

This certificate may not be reproduced other than in full,
except with the prior written approval of the head of
Corporate Services 3: Equipment Calibration and Testing Services.

Submitted by: TEST TECH CO.,LTD. (HEAD Office)
30, 32 Rama II Soi 63, Rama II Rd.,
Samaedam, Bangkhunthian, Bangkok 10150

Procedure used: Calibration were conducted using In-house calibration procedure CP-H02 according to comparison
with standard chilled mirror sensor for humidity measurement function and comparison with standard
temperature probe for temperature measurement function into humidity / temperature chamber.

Condition of this result of calibration

1. Reference standards instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Chilled-Mirror Hygrometer	Dew Master	41292	19848	03 Nov 2022
2) Handheld Thermometer With Sensor	1523	3240076	221249	02 Mar 2023

2. The certificate is valid only to the item calibrated on date and place of calibration.

3. This Certification is traceable to the International System of Unit maintained at:-

-National Institute of Standards and Technology (NIST) . The United States of America
-National Institute of Metrology Thailand (NIMT)

Calibrated by : Surasit Phansudnoi
Issue Date : 01 November 2022

Approved Signatory :

[r] Chakrit Waevarijua
[] Pongthippa Tamayakul
[] Viporn Tantiyawutti



Cert. No.: 22H2197
Page.: 2 of 2

Result of Calibration:-		Without Adjustment	
Function:		Humidity measurement.	UUC*
Reference Temperature	Standard Humidity	Reading	Uncertainty
(°C)	(%R.H.)	(%R.H.)	(±%R.H.)
25.0	30.1	29.0	1.5
25.0	40.1	39.0	1.5
25.0	50.1	50.0	1.7
25.0	60.0	61.0	1.7
25.0	75.2	76.5	1.7

Result of Calibration:-		Without Adjustment	
Function:		Temperature measurement.	UUC*
Standard Temperature	Reading	Error	Uncertainty
(°C)	(°C)	(°C)	(±°C)
15.013	15.0	-0.013	0.72
20.023	20.0	-0.023	0.72
25.018	25.0	-0.019	0.72
30.008	30.0	-0.009	0.72

UUC* : Unit Under Calibration

The reported uncertainty of measurement was base on standard uncertainty multiplied
by coverage factor k = 2.00, providing confidence level approximately 95%.

-o0o-

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CERTIFICATE No : 22M9915
REFERENCE No : 66549-2

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : DIGITAL BALANCE
MANUFACTURER : SARTORIUS
MODEL : BP210S
SERIAL No : S0736477
ID No : EQL-008
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : TEST TECH CO., LTD.
3032 RAMA II SOI 63, RAMA II RD.,
SAMAEDAM, BANGKHUNTHIAN, BANGKOK
10150

CALIBRATED BY : PRASERT P.
CALIBRATION DATE : 15-Sep-22
APPROVED BY : 
ISSUED DATE : 21-Sep-22
RECEIVED DATE : 15-Sep-22

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P-010 REV 02



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CERTIFICATE No : 22M9915

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : DIGITAL BALANCE
MANUFACTURER : SARTORIUS
MODEL : BP210S
ID No : EQL-008
SERIAL No : S0736477
AIR PRESSURE : 1011mmbar $\pm$ 1mmbar
AMBIENT TEMPERATURE : 21°C $\pm$ 1°C
RELATIVE HUMIDITY : 51%RH $\pm$ 10%RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 6/2019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS ADJUSTED USING INTERNAL WEIGHT TO ADJUST. THE BALANCE HAS NO ZERO TRACKING FUNCTION. REPEATABILITY WAS MEASURED BY USING 10 REPEATED MEASUREMENTS. LINEARITY WAS MEASURED COVERING 10 POINTS, EVENLY SPREAD OVER THE RANGE. THE INSTRUMENT WAS SET ZERO BEFORE PERFORMING THE LINEARITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN. THE INTERNAL WEIGHT WAS CHECKED BY USING 2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD WEIGHT SET	E2	QK-1-151	C02210415	09-Feb-23
2) STANDARD WEIGHT	E2	15843	C02210419	10-Feb-23
3) STANDARD WEIGHT	E2	QK-1-349	M21032335	26-Mar-23

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON 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:-

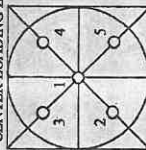
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH CENTRAL BUREAU OF WEIGHTS&MEASURES

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

- ZERO SETTING FUNCTION : NORMAL
- TARE FUNCTION : NORMAL
- REPEATABILITY OF READING AT 200 g WAS 0.000063 g
- DEPARTURE FROM NOMINAL VALUE/LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (±g)
0.00	0.0000	0.0000	0.000090
0.10	0.1000	0.0000	0.000090
0.20	0.2000	0.0000	0.000090
0.50	0.5000	0.0000	0.000091
1.00	1.0000	0.0000	0.000091
2.00	2.0000	0.0000	0.000092
5.00	5.0000	0.0000	0.000093
10.00	10.0000	0.0000	0.000093
20.00	19.9999	0.0001	0.000095
50.00	49.9998	0.0002	0.00010
100.00	99.9998	0.0002	0.00012
200.00	199.9993	0.0007	0.00019

5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	99.9997
2	99.9996
3	99.9995
4	99.9997
5	99.9998
OFF-CENTER LOADING	0.0002

INTERNAL WEIGHT ERROR : 0.00066666666666660376 g

NOTE: THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT PRODUCTION 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



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CERTIFICATE No : 2279917
REFERENCE No : 66549-4

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : HOT AIR OVEN
MANUFACTURER : MEMMERT
MODEL : UFE 500
SERIAL No : G508.0791
ID No : EQL-128
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 : 15-Sep-22

APPROVED BY : 
ISSUED DATE : 21-Sep-22
RECEIVED DATE : 15-Sep-22

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F-G010 REV : 02



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CERTIFICATE No : 2279917

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : HOT AIR OVEN
MANUFACTURER : MEMMERT
MODEL : UFE 500
ID No : EQL-128
RECEIVED DATE : 15-Sep-22
AMBIENT TEMPERATURE : 25 °C ± 1 °C
S/N : G508.0791
CALIBRATION DATE : 15-Sep-22
RELATIVE HUMIDITY : 51 %RH ± 10 %RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TIAS G-20 BY COMPARISON WITH CALIBRATED RTD PH100 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.

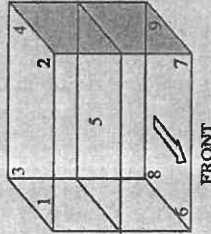
2. REFERENCE STANDARD INSTRUMENTS :-

- 1) DATA LOGGER WITH RTD
HYDRA 2635A
SERIAL No 6653300
CERTIFICATE No 2217509
DUE DATE 10-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 : 1
Overall Line Voltage (V) variation : 3
Instrument Condition : Normal
Chamber Size (W*L*H): 56*40*48 cm



CHAMBER PERFORMANCE					Overall Variation (°C)
Calibrate Point (°C)	Average All Position Temp. (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Temperature	
104.0	104.32	0.15	0.62	1.02	1.02
180.0	180.09	0.29	1.23	1.86	1.86

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	
104.0	104.0	104.23	103.89	104.54	104.02	104.33	104.63	104.42	104.48	104.39	0.38
180.0	180.0	180.16	179.13	180.46	179.35	179.79	180.66	180.36	180.29	180.61	1.1

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 : 02



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www.qualitycalibration.com



CERTIFICATE No : 2279918
REFERENCE No : 66549-5

PAGE: 1 OF 2

Certificate of Calibration

EQUIPMENT : HOT AIR OVEN,
MANUFACTURER : MEMMERT
MODEL : UFE 500
SERIAL No : G512.2005
ID No : EQL-161
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 CHL
CALIBRATION DATE : 15-Sep-22

APPROVED BY : 
ISSUED DATE : 21-Sep-22
RECEIVED DATE : 15-Sep-22

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF
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CERTIFICATE No : 2279918

PAGE: 2 OF 2

Calibration Report

EQUIPMENT : HOT AIR OVEN
MANUFACTURER : MEMMERT
MODEL : UFE 500
ID No : EQL-161
RECEIVED DATE : 15-Sep-22
AMBIENT TEMPERATURE : 25 °C ± 1 °C
S/N : G512.2005
CALIBRATION DATE : 15-Sep-22
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 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.

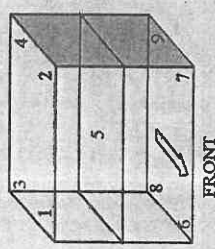
REFERENCE STANDARD INSTRUMENTS :

- 1) DATA LOGGER WITH RTD HYDRA 2635A
2) THERMOMETER WITH RTD HYDRA 2635A
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 : 1
Overall Line Voltage (V) variation : 8
Instrument Condition : Normal
Chamber Size (W*L*H): 56*40*48 cm



CHAMBER PERFORMANCE

Calibrate Point (°C)	Average All Position Temp. (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
104.0	103.98	0.12	0.91	1.00
120.0	119.98	0.13	1.06	1.13
140.0	140.09	0.13	1.35	1.39
150.0	150.03	0.14	1.38	1.49

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations									Uncertainty (± °C)
	#1	#2	#3	#4	#5	#6	#7	#8	#9	
104.0	104.0	104.07	104.09	104.21	103.93	103.58	103.79	103.99	103.78	0.38
120.0	120.0	120.03	120.13	120.34	119.94	119.53	119.69	119.94	119.71	0.38
140.5	140.5	140.15	140.30	140.44	140.10	139.56	139.74	140.03	139.80	0.46
150.5	150.5	150.04	150.25	150.54	150.35	149.46	149.55	149.83	149.60	0.46

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

Equipment: TURBIDIMETER
Model: 2100N
Serial No. (or ID.): 970400003415 (EQL-024)
Manufacturer: HACH
Condition: In Condition
Customer: TEST TECH CO., LTD.
30,32 Rama II Soi 63, Rama II Rd.,
Samaedam, Bangkhuntien Bangkok 10150 Thailand

Environment Condition: Temperature 23 °C ± 2 °C
Humidity 50 %RH ± 15 %RH

Calibration Place: Environment Laboratory, DKSH Technology Limited.
1194 Soi Wachirathamsehit 57, Sukhumvit 101/1 Rd.,
Bangchak, Prakhnong, Bangkok 10260 Thailand

Calibration By: Mr.Wasan Nuchnahee
Calibration Date: 21 September 2022
The Method used: In house method, CAL-WI-23, base on Hach Manufacturer Method 8195
Traceability: This certificate is traceable to Primary standard Fromazin and StabCal accepted by
United States Environmental Protection Agency (EPA) through Hach Company
Certificate No. A1075 , A1074 , A1091 , A1074 , A1074

(Mr. Wasan Nuchnahee)
Person in charge
This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to International or national standard or other recognized national standard laboratories.
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

(Mr. Thalemgkeat Pongngam)
Authorized signatory

DKSH Technology Limited
2533 Sukhumvit Road, Bangkok 10110
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/calibration-thailand

Delivering Growth - In Asia and Beyond.

CAL-FM-C08-08: 20 Jul 2022



Certificate No.: C08220157
Page 2 of 2

Calibration Results:

Before Adjustment

Std Turbidity (NTU)	UUC Reading	Correction	Deviation	Uncertainty
0.060	0.048	0.012	0.0004	0.070
20.40	20.1	0.30	0.05	1.0
208.0	204	2.0	0.5	10
1020.0	1013	7.0	1.2	50
4065.0	3875	190.0	1.8	200

After Adjustment

Std Turbidity (NTU)	UUC Reading	Correction	Deviation	Uncertainty
0.060	0.057	0.003	0.0015	0.070
20.40	20.5	-0.10	0.04	1.0
208.0	206	0.0	0.5	10
1020.0	1018	2.0	0.5	50
4065.0	4064	1.0	0.5	200

The End of Certificate

DKSH Technology Limited
2533 Sukhumvit Road, Bangkok 10110
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/calibration-thailand

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CAL-FM-C08-08: 20 Jul 2022

ใบรับรองการทวนสอบ "เครื่องกลั่นไนโตรเจน"
(Calibration Certificate of Distillation Unit VAPODEST
VAP20, VAP30s)

การดูแลบำรุงรักษาเชิงป้องกัน
Preventive Maintenance



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ฝ่ายบริการหลังการขาย
โทร 0 2 639 7000 E-mail: service.th@dksh.com
ฝ่ายขายและการตลาด
โทร 0 2 639 7000 E-Mail : marketing.th@dksh.com
Website : www.dksh.co.th/technology/scientific-thailand

เงื่อนไขการให้บริการ Preventive Maintenance

บริษัทฯ จะส่งวิศวกรผู้ชำนาญ เพื่อให้บริการตามขอบข่ายของบริการ เฉพาะ ในวันและเวลา ราชการ หากมีความประสงค์ที่จะรับบริการนอกเหนือจากวัน เวลา ราชการ (วันหยุดเสาร์ – อาทิตย์ หรือวันหยุด นักขัตฤกษ์) บริษัทฯ จะคิดค่าบริการเพิ่มเติมตามอัตราที่กฎหมายแรงงานกำหนดไว้

ขอบข่ายการบริการ

- ตรวจสอบสภาพการทำงานต่าง ๆ ของเครื่องมือ
- ทดสอบประสิทธิภาพการทำงานของเครื่องมือ
- รายการผลการตรวจซ่อมเครื่องมือ

หมายเหตุ

- ราคาไม่รวมถึงค่าบริการซ่อม หรือ เปลี่ยนอะไหล่ที่ชำรุดเสียหาย หรือพบสภาพการใช้งาน
- ในกรณีที่ผู้ใช้บริการอยู่นอกเขตพื้นที่ให้บริการ บริษัทฯ จำเป็นต้องคิดค่าใช้จ่ายเพิ่มเติม ได้แก่ ค่าเดินทาง เป็นต้น
- บริษัทฯ ขอสงวนสิทธิ์ ในการเปลี่ยนแปลงราคา โดยไม่แจ้งให้ทราบล่วงหน้า

ช่องทางการติดต่อ



DKSH Technology Limited (บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด)
เลขที่ 2533 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพฯ 10260
เลขประจำตัวผู้เสียภาษี 010-555-001-4547 (สำนักงานใหญ่)



Call center 0 2 639 7000



DKSH Scientific



www.dksh.com/thailand



marketing.tce.th@dksh.com



@dkshscientific

Preventive Maintenance Contract

จำนวนใบการจ้างสัญญาบริการ 1..... ครั้ง ต่อ ปี
 วันที่/ก/วันที่.....28 Mar 2023.....

รายละเอียดผู้รับบริการ

หน่วยงาน	บริษัท เทต จำกัด
ที่อยู่	30,32 ซอยพระรามที่ 2 ซอย 63 ถนนพระรามที่ 2 แขวงสามยุค กรุงเทพมหานคร 10150
โทรศัพท์	0-2893-4211-7 แฟกซ์ 0-2893-4218

ผู้ติดต่อ

ชื่อ - นามสกุล	คุณวิภา วิเศษกิจ
ตำแหน่ง	หัวหน้างาน
โทรศัพท์	0-2893-4211-7 เบอร์ติดต่อ 0-2893-4218
E-mail	Lab_center@estech.co.th

รายละเอียดผู้ให้บริการ

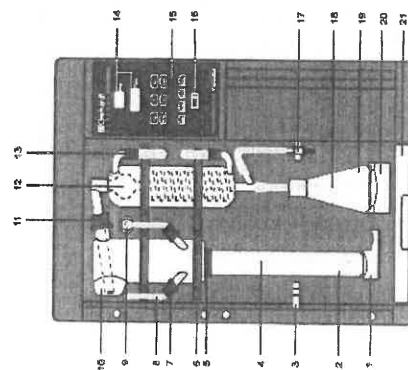
บริษัท สิลคอสเซอร์ เทคโนโลยี จำกัด (ฝ่ายบริการหลังการขาย) (สำนักงานใหญ่) เลขที่ 2533 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพฯ 10260 โทรศัพท์ 0 2 693 7000 Email: siripon.s@silash.com Line ID : siripon3007 เจ้าหน้าที่ประสานงาน : คุณศิริพร อยู่ทองสุข โทรศัพท์ 090 678 6924 02 301 7467	
เจ้าหน้าที่ผู้ให้บริการ	นางจิราพร ฤทธิเดช
ตำแหน่ง	Specialist, Technical Service
โทรศัพท์	0938138736 แฟกซ์
E-mail	Jirayut.j@silash.com

ลงนามผู้รับบริการ	ลงนามผู้ให้บริการ
ตำแหน่ง	ตำแหน่ง
วันที่/ประทับตราบริษัท	วันที่/ประทับตราบริษัท

JOB No: Lsp2302591 MODEL: Vap30 SN: 003718

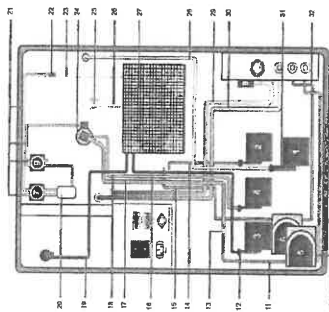
Part : Operational Qualification (OQ)

ตรวจสอบสภาพเครื่อง
 FRONT



Pass	Fail	N/A	Remark
☒	☐	☐	1.Quick clamping device with wedge
☒	☐	☐	2. Kjeldatherm digestion tube
☒	☐	☐	3. Holder for steam inlet tubing
☒	☐	☐	4. PTFP-Inlet tubing, steam
☒	☐	☐	5. Vition-cone
☒	☐	☐	6. Clamping for glassware
☒	☐	☐	7. Screw cap GL18 with silicone seal
☒	☐	☐	8. PTFP-Inlet tubing, NaOH
☒	☐	☐	9. PP-Distributor with PP-threaded joint
☒	☐	☐	10. Distribution head, glass
☒	☐	☐	11. Screw cap GL32 with silicone seal
☒	☐	☐	12. Distillation condenser
☒	☐	☐	13. Screw cap GL14 with plastic screw connection
☒	☐	☐	14. Display
☒	☐	☐	15. Keyboard, chemical-resistant
☒	☐	☐	16. Main switch, green
☒	☐	☐	17. Ventilation valve
☒	☐	☐	18. Distillate outlet tubing
☒	☐	☐	19. Erlenmeyer flask
☒	☐	☐	20. Platform
☒	☐	☐	21. Drip tray

REAR



	Pass	Fail	N/A	Remark
1. Diaphragm pump NaOH	☒	☐	☐	
2. Diaphragm pump H_3BO_3	☒	☐	☒	vap 40 only
3. Diaphragm pump H_2O for steam generator	☒	☐	☐	
4. Diaphragm pump H_2O for sample	☒	☐	☐	vap 30,40 only
5. Peristaltic pump for suction sample	☒	☐	☐	vap 30,40 only
6. Peristaltic pump for suction receiver	☒	☐	☒	option
7. Pinch-solenoid valve, steam	☒	☐	☐	
8. Magnetic valve with pressure control	☒	☐	☐	
9. Pinch-solenoid valve, shut-off	☒	☐	☐	
10. Verprene-tubing 4x8 mm.	☒	☐	☐	vap 30,40 only
11. Verprene-tubing 4x8 mm.	☒	☐	☐	
12. Non-return valve for diaphragm pumps	☒	☐	☐	vap 30,40 only
13. Tubing reduction PP 51x10x5 mm.	☒	☐	☒	vap 30,40 only
14. Silicone tubing 4x7 mm.	☒	☐	☒	option
15. Silicone tubing 4x7 mm.	☒	☐	☐	
16. Silicone -tubing 4x7 mm.	☒	☐	☐	vap 30,40 only
17. Verprene-tubing 8x12 mm.	☒	☐	☐	vap 30,40 only
18. Verprene tubing 4x7 mm.	☒	☐	☐	
19. Silicone tubing 4x7 mm.	☒	☐	☐	
20. Ventilation glass	☒	☐	☐	
21. Novoprene-tubing 4.8x8 mm.	☒	☐	☐	
22. Tubing reduction	☒	☐	☐	
23. Silicone tubing 6x10 mm.	☒	☐	☐	
24. PP-distributor with PP-tiread	☒	☐	☐	
25. SKT-valve (built in with brass fitting)	☒	☐	☐	
26. Silicone tubing 8x16x80 mm.	☒	☐	☐	
27. Steam generator	☒	☐	☐	
28. PTFE-inlet tubing NaOH	☒	☐	☐	
29. Silicone tubing 8x16 for cooling water inlet	☒	☐	☐	
30. Silicone tubing 8x16 for cooling water outlet	☒	☐	☐	
31. Viton-tubing 6x12*50 mm.	☒	☐	☐	
32. Silicone tubing 4x7 mm.	☒	☐	☒	option

รายละเอียดการตรวจสอบ ขั้นตอนการบริการ

ตรวจสอบระบบไฟฟ้า (Electrical Test)

- ความต้านทานทางไฟฟ้าของเครื่องกับกราวด์
- กระแสไฟฟ้าที่ใช้งาน

ตรวจสอบสภาพเครื่อง (Optical Test)

- Main cable
- Electric wiring
- Pumps
- Distribution Head
- Condensor
- Steam generator
- Tubing
- Viton conc

ตรวจสอบ Function การทำงาน (The Function Test)

- ระบบสร้างและควบคุมความดันของ Steam
- ระบบการเติมน้ำเข้า Sample Tube
- ระบบการเติม Na OH
- ระบบการ Suction ส่ง Sample Tube และ Receiver

ระบบการให้พลังงาน

1. TECHNICAL DATA

Main Supply 220 volt + 10% 50 Hz with ground
Nominal current

Pass ☒ Fail ☐ N/A ☐
Remark
6 a.....

1.1 COOLING WATER BATH

Temperature 15-20 °C

Cooling Water Outlet

Control Temperature

Pass ☒ Fail ☐ N/A ☐
Remark
.....
.....

1.2 OPTICAL TEST VAP...30..

Screw cap GL14

Screw cap GL18

Screw cap GL32

Distillation Head

Condensor

Viton Cone

Ventilation Valve

Micro Switch Sample

Pass ☒ Fail ☐ N/A ☐
Remark
.....
.....
.....
.....
.....
.....

2. SYSTEM COOLING WATER INLET

Cooling Water Inlet

Cooling Water Outlet

Magnetic valve

Pass ☒ Fail ☐ N/A ☐
Remark
.....
.....

3.SYSTEM CONTROL

Key Board

Display

Program

Adding H₂O

Adding NaOH

Adding H₃BO₃

Suction Sample

Pass ☒ Fail ☐ N/A ☐
Remark
.....
.....
vap 30,40 only
.....
vap 40 only
vap 30,40 only

4.SYSTEM DISTILLATION

Boiler

Level Sensor

Novoprene-Tubing

Solenoid Valve Shut-Off

Solenoid Valve Steam

Excess Pressure Detector

Ventilation Valve

Heater

Pass ☒ Fail ☐ N/A ☐
Remark
.....
.....
.....
.....
.....
.....

5. PUMP

Pump H₂O Steam

- Non-Return Valve

Pump H₂O Sample

- Non-Return Valve

Pump NaOH

- Non-Return Valve

Pump H₃BO₃

- Non-Return Valve

Pump Suction

Pass ☒ Fail ☐ N/A ☐
Remark
.....
.....
.....
.....
.....
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.....

6. The Following Program Run :

Addition H₂O 0-99 sec.

Addition NaOH 0-99 sec.

Addition H₃BO₃ 0-99 sec.

Reaction Time 0-99 min.

Distillation Time 0-99 min

Steam Capacity 30%-100%

Suction Time 0-99 sec.

The Instrument is in perfect technical shape

Pass ☒ Fail ☐ N/A ☐
Remark
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.....

Remark :

Part : ข้อมูลสนับสนุนด้านเทคนิค (General Technical Support)
การบำรุงรักษาทั่วไป (Basic maintenance)

Cleaning

Glass parts and suction pump should be cleaned before long periods of non-usage (i.e. holidays). This way blockages caused by crystalline deposits are avoided.

The following program should be run:

Addition H_2BO_3 0 s
Addition H_2O_2 13 s
Addition NaOH: 0 s
Reaction time: 7 min.
Distillation time: 100 %
Steam capacity: 20 s
Suction time:

Place an empty digestion tube and an Erlenmeyer flask into position, and start the program.
In case of extreme deposits in the glassware you can clean the system by putting about 10 ml of sulphuric acid into the digestion tube.

Error Code

The micro-processor continually surveys all the functions of the distillation system. As soon as an error state is shown on the display and accompanied by an acoustic signal.

Error message	Measures
No tap water	Check cooling water inlet for blockage. Ensure the tap is turned on
No sample tube	Insert tube
Check chemicals	Check set of tanks
Low water press Enter	Check the water inlet distilled H_2O
Filling steam generator	This message disappears as soon as steam generator is filled

After the above mentioned errors are corrected, the following message is displayed.

Error message	Measures
Stop Prog. No. x continue=Enter	Enter = continue of interrupted program Reset = Standby-mode

Other error messages

Error message	Measures
Wait for steam	Message disappears as soon as standby is reached
Add sol. > 1min Continue=Enter	Check programming Enter=continue of interrupted program Reset=Standby-mode
Program undefined	Check programming
Excess steam pressure	Switch the system off and call service
Sensor error	Switch the system off and call service

ภาคผนวก ฉ

กฎหมายที่เกี่ยวข้อง

ประกาศกระทรวงทรัพยากรธรรมชาติและสิ่งแวดล้อม

เรื่อง กำหนดมาตรฐานควบคุมการระบายน้ำทิ้ง
จากอาคารบางประเภทและบางขนาด

โดยที่ให้มีการปฏิรูประบบราชการโดยให้มีการจัดตั้งกระทรวงทรัพยากรธรรมชาติและสิ่งแวดล้อมขึ้นมา และให้โอนภารกิจของกระทรวงวิทยาศาสตร์ เทคโนโลยีและสิ่งแวดล้อม ในส่วนที่เกี่ยวข้องกับพระราชบัญญัติส่งเสริมและรักษาคุณภาพสิ่งแวดล้อมแห่งชาติ พ.ศ. ๒๕๓๕ ไปเป็นของกระทรวงทรัพยากรธรรมชาติและสิ่งแวดล้อม ประกอบกับการสมควรให้คณะกรรมการควบคุมมลพิษเป็นผู้พิจารณาเห็นชอบกับวิธีการตรวจวัดมาตรฐานการระบายน้ำทิ้ง นอกเหนือจากวิธีการที่กำหนดไว้ในแผนภูมิควบคุมมลพิษ จึงสมควรแก้ไขปรับปรุงประกาศกระทรวงวิทยาศาสตร์ เทคโนโลยีและสิ่งแวดล้อม เรื่อง กำหนดมาตรฐานควบคุมการระบายน้ำทิ้งจากอาคารบางประเภทและบางขนาด

อาศัยอำนาจตามความในมาตรา ๕๕ แห่งพระราชบัญญัติส่งเสริมและรักษาคุณภาพสิ่งแวดล้อมแห่งชาติ พ.ศ. ๒๕๓๕ แก้ไขโดยมาตรา ๑๑๔ แห่งพระราชกฤษฎีกาแก้ไขบทบัญญัติให้สอดคล้องกับการโอนอำนาจหน้าที่ของส่วนราชการ ให้เป็นไปตามพระราชบัญญัติปรับปรุงกระทรวง ทบวง กรม พ.ศ. ๒๕๔๕ อันเป็นพระราชบัญญัติที่มีบทบัญญัติบางประการเกี่ยวกับการจกักสิทธิและเสรีภาพของบุคคล ซึ่งมาตรา ๒๕ ประกอบกับมาตรา ๓๕ มาตรา ๔๙ มาตรา ๕๐ และมาตรา ๕๑ ของรัฐธรรมนูญแห่งราชอาณาจักรไทยบัญญัติให้กระทำได้ โดยอาศัยอำนาจตามบทบัญญัติแห่งกฎหมาย รัฐมนตรีว่าการกระทรวงทรัพยากรธรรมชาติและสิ่งแวดล้อม โดยคำแนะนำของคณะกรรมการควบคุมมลพิษ และโดยความเห็นชอบของคณะกรรมการสิ่งแวดล้อมแห่งชาติ จึงออกประกาศไว้ ดังต่อไปนี้

ข้อ ๑ ให้ยกเลิกประกาศกระทรวงวิทยาศาสตร์ เทคโนโลยีและสิ่งแวดล้อม เรื่อง กำหนดมาตรฐานควบคุมการระบายน้ำทิ้งจากอาคารบางประเภทและบางขนาด ลงวันที่ ๑๐ มกราคม พ.ศ. ๒๕๓๗

ข้อ ๒ ในประกาศนี้

“อาคาร” หมายความว่า อาคารที่ก่อสร้างขึ้น ไม่ว่าจะมิลักษณะเป็นอาคารหลังเดียว หรือเป็นกลุ่มของอาคารซึ่งตั้งอยู่ภายในพื้นที่ซึ่งเป็นบริเวณเดียวกัน และไม่จำเป็นต้องมีระบายน้ำเพื่อเดียว หรือมีหลายท่อที่เชื่อมติดต่อกันระหว่างอาคารหรือไม่ก็ตาม ซึ่งได้แก่

- (๑) อาคารชุด ตามกฎหมายว่าด้วยอาคารชุด
- (๒) โรงแรม ตามกฎหมายว่าด้วยโรงแรม

- (๓) หอพัก ตามกฎหมายว่าด้วยหอพัก
- (๔) สถานบริการประเภทสถานอาบน้ำ นวดหรืออบตัว ซึ่งมีผู้ให้บริการลูกค้า ตามกฎหมายว่าด้วยสถานบริการ

(๕) โรงพยาบาลของทางราชการหรือสถานพยาบาล ตามกฎหมายว่าด้วยสถานพยาบาล

(๖) อาคารโรงเรียนเอกชน ตามกฎหมายว่าด้วยโรงเรียนเอกชน โรงเรียนของทางราชการ อาคารสถาบันอุดมศึกษาของเอกชน ตามกฎหมายว่าด้วยสถาบันอุดมศึกษาของเอกชนและสถาบันอุดมศึกษาของทางราชการ

- (๗) อาคารที่ทำการของทางราชการ รัฐวิสาหกิจ หรือองค์การระหว่างประเทศและของเอกชน
- (๘) อาคารของศูนย์การค้าหรือห้างสรรพสินค้า
- (๙) ตลาด ตามกฎหมายว่าด้วยการสาธารณสุข แต่ไม่รวมถึง ท่าเทียบเรือประมง สะพานปลา หรือกิจการแพปลา

(๑๐) กัดอาคารหรือร้านค้า

“น้ำทิ้ง” หมายความว่า น้ำเสียที่ผ่านระบบบำบัดน้ำเสียแล้วจนเป็นไปตามมาตรฐานควบคุมการระบายน้ำทิ้งตามที่กำหนดไว้ในประกาศนี้

ข้อ ๓ ให้แบ่งประเภทของอาคารตามข้อ ๒ ออกเป็น ๕ ประเภท คือ

- (๑) อาคารประเภท ก.
- (๒) อาคารประเภท ข.
- (๓) อาคารประเภท ค.
- (๔) อาคารประเภท ง.
- (๕) อาคารประเภท จ.

ข้อ ๔ อาคารประเภท ก. หมายความว่า อาคารดังต่อไปนี้

(๑) อาคารชุดที่มีจำนวนห้องสำหรับใช้เป็นที่อยู่อาศัยรวมกันทุกชั้นของอาคาร หรือกลุ่มของอาคารตั้งแต่ ๕๐๐ ห้องขึ้นไป

(๒) โรงแรมที่มีจำนวนห้องสำหรับใช้เป็นห้องพักรวมกันทุกชั้นของอาคาร หรือกลุ่มของอาคารตั้งแต่ ๒๐๐ ห้องขึ้นไป

(๓) โรงพยาบาลของทางราชการ รัฐวิสาหกิจหรือสถานพยาบาล ตามกฎหมายว่าด้วยสถานพยาบาล ที่มีเตียงสำหรับผู้ป่วยไว้ค้างคืนรวมกันทุกชั้นของอาคารหรือกลุ่มของอาคารตั้งแต่ ๓๐ เตียงขึ้นไป

(๑) หอพักที่มีจำนวนห้องสำหรับใช้เป็นที่อยู่อาศัยรวมกันทุกชั้นของอาคาร หรือกลุ่มของอาคาร ตั้งแต่ ๑๐ ห้อง แต่ไม่ถึง ๕๐ ห้อง

(๒) ตลาดที่มีพื้นที่ใช้สอยรวมกันทุกชั้นของอาคาร หรือกลุ่มของอาคารตั้งแต่ ๕๐๐ ตารางเมตร แต่ไม่ถึง ๑,๐๐๐ ตารางเมตร

(๓) กิจการหรือร้านอาหารที่มีพื้นที่ให้บริการรวมกันทุกชั้นของอาคาร หรือกลุ่มของอาคาร ตั้งแต่ ๑๐๐ ตารางเมตร แต่ไม่ถึง ๒๕๐ ตารางเมตร

ข้อ ๘ อาคารประเภท จ. หมายความว่า กิจการหรือร้านอาหารที่มีพื้นที่ให้บริการรวมกันทุกชั้นไม่ถึง ๑๐๐ ตารางเมตร

ข้อ ๙ มาตรฐานควบคุมการระบายน้ำทิ้งจากอาคาร ประเภท ก. ต้องมีค่าดังต่อไปนี้

- (๑) ความเป็นกรดและด่าง (PH) ต้องมีค่าระหว่าง ๕-๙
- (๒) บีโอดี (BOD) ต้องมีค่าไม่เกิน ๒๐ มิลลิกรัมต่อลิตร
- (๓) สารแขวนลอย (Suspended Solids) ต้องมีค่าไม่เกิน ๓๐ มิลลิกรัมต่อลิตร
- (๔) ชีวไฟค์ (Sulfide) ต้องมีค่าไม่เกิน ๑.๐ มิลลิกรัมต่อลิตร
- (๕) สารที่ละลายได้ทั้งหมด (Total Dissolved Solids) ต้องมีค่าเพิ่มขึ้นจากปริมาณสารละลายในน้ำใช้ตามปกติไม่เกิน ๕๐๐ มิลลิกรัมต่อลิตร

- (๖) ตะกอนหนัก (Settleable Solids) ต้องมีค่าไม่เกิน ๐.๕ มิลลิกรัมต่อลิตร
- (๗) น้ำมันและไขมัน (Fat Oil and Grease) ต้องมีค่าไม่เกิน ๒๐ มิลลิกรัมต่อลิตร
- (๘) ทีเคเอ็น (TKN) ต้องมีค่าไม่เกิน ๓๕ มิลลิกรัมต่อลิตร

ข้อ ๑๐ มาตรฐานควบคุมการระบายน้ำทิ้งจากอาคาร ประเภท ข. ต้องเป็นไปตามข้อ ๙

เว้นแต่

- (๑) บีโอดี ต้องมีค่าไม่เกิน ๓๐ มิลลิกรัมต่อลิตร
- (๒) สารแขวนลอย ต้องมีค่าไม่เกิน ๔๐ มิลลิกรัมต่อลิตร
- ข้อ ๑๑ มาตรฐานควบคุมการระบายน้ำทิ้งจากอาคาร ประเภท ค. ต้องเป็นไปตามข้อ ๙

เว้นแต่

- (๑) บีโอดี ต้องมีค่าไม่เกิน ๔๐ มิลลิกรัมต่อลิตร
- (๒) สารแขวนลอย ต้องมีค่าไม่เกิน ๕๐ มิลลิกรัมต่อลิตร

- (๓) ชีวไฟค์ ต้องมีค่าไม่เกิน ๓๐ มิลลิกรัมต่อลิตร
- (๔) ค่าทีเคเอ็น ต้องมีค่าไม่เกิน ๔๐ มิลลิกรัมต่อลิตร

ข้อ ๑๒ มาตรฐานควบคุมการระบายน้ำทิ้งจากอาคาร ประเภท ง. ต้องเป็นไปตามข้อ ๙

เว้นแต่

- (๑) บีโอดี ต้องมีค่าไม่เกิน ๕๐ มิลลิกรัมต่อลิตร
- (๒) สารแขวนลอย ต้องมีค่าไม่เกิน ๕๐ มิลลิกรัมต่อลิตร
- (๓) ชีวไฟค์ ต้องมีค่าไม่เกิน ๔.๐ มิลลิกรัมต่อลิตร
- (๔) ค่าทีเคเอ็น ต้องมีค่าไม่เกิน ๔๐ มิลลิกรัมต่อลิตร
- ข้อ ๑๓ มาตรฐานควบคุมการระบายน้ำทิ้งจากอาคาร ประเภท จ. ต้องมีค่าดังต่อไปนี้

- (๑) ความเป็นกรดและด่างต้องมีค่าระหว่าง ๕-๙
- (๒) บีโอดี ต้องมีค่าไม่เกิน ๒๐๐ มิลลิกรัมต่อลิตร
- (๓) สารแขวนลอย ต้องมีค่าไม่เกิน ๖๐ มิลลิกรัมต่อลิตร
- (๔) น้ำมันและไขมัน ต้องมีค่าไม่เกิน ๑๐๐ มิลลิกรัมต่อลิตร
- ข้อ ๑๔ การตรวจสอบมาตรฐานการระบายน้ำทิ้งจากอาคาร ให้ใช้วิธีการดังต่อไปนี้

(๑) การตรวจสอบค่าความเป็นกรดและด่างให้กระทำโดยใช้เครื่องวัดความเป็นกรดและด่างของน้ำ (PH Meter)

(๒) การตรวจสอบค่าบีโอดีให้กระทำโดยใช้วิธีการอะไซด์โมดิฟิเคชัน (Azide Modification) ที่อุณหภูมิ ๒๐ องศาเซลเซียส เป็นเวลา ๕ วัน คัดออกหรือวิธีการอื่นที่คณะกรรมการควบคุมมลพิษให้ความเห็นชอบ

(๓) การตรวจสอบค่าสารแขวนลอยให้กระทำโดยใช้วิธีการกรองผ่านกระดาษกรองใยแก้ว (Glass Fibre Filter Disc)

(๔) การตรวจสอบค่าชีวไฟค์ให้กระทำโดยใช้วิธีการไตเตรท (Titrate)

(๕) การตรวจสอบค่าสารที่ละลายได้ทั้งหมดให้กระทำโดยใช้วิธีการระเหยแห้งระหว่างอุณหภูมิ ๑๐๓ องศาเซลเซียส ถึงอุณหภูมิ ๑๐๕ องศาเซลเซียส ในเวลา ๑ ชั่วโมง

(๖) การตรวจสอบค่าตะกอนหนักให้กระทำโดยใช้วิธีการกรวยอิมฮอฟฟ์ (Imhoff cone) ขนาดบรรจุ ๑,๐๐๐ ลูกบาศก์เซนติเมตร ในเวลา ๑ ชั่วโมง

(๕) การตรวจสอบค่าน้ำเงินและเงินในกระเป๋าโดยผู้โดยสารที่นำเงินของน้ำเงินและเงิน

(๘) การตรวจสอบค่าที่เดเอ็นให้กระทำโดยใช้วิธีการเจลดาคัล (Kjeldahl)

ข้อ ๑๕ การคิดคำนวณพื้นที่ใช้สอย จำนวนอาคารและจำนวนห้องของอาคาร หรือกลุ่มของอาคาร ให้เป็นไปตามวิธีการคำนวณการควบคุมเขตพื้นที่กำหนด โดยประกาศในราชกิจจานุเบกษา

ข้อ ๑๖ วิธีการเก็บตัวอย่างน้ำ ความถี่ และระยะเวลาในการเก็บตัวอย่างน้ำ ให้เป็นไปตามที่ คณะกรรมการควบคุมมลพิษกำหนด โดยประกาศในราชกิจจานุเบกษา

ข้อ ๑๘ ประกาศให้ใช้บังคับตั้งแต่วันถัดจากวันประกาศในราชกิจจานุเบกษาเป็นต้นไป

ประกาศ ณ วันที่ ๗ พฤศจิกายน พ.ศ. ๒๕๔๘

บงยุทธ์ ตียะไพรัช

รู้มันดีกว่าการกระทรวงทรัพยากรธรรมชาติและสิ่งแวดล้อม