

ภาคผนวก 9 :

เอกสารรับรองห้องปฏิบัติการ,เอกสารขึ้นทะเบียนน้ำเสีย และเอกสารเทียบเครื่องมือวัด

## 9.1. เอกสารรับรองห้องปฏิบัติการ

ที่ อก ๐๓๑๐(๑)/ ๑๕๔๒๖



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๘ ตุลาคม ๒๕๖๕

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท อีโคเทค วอเตอร์ซิสเต็มส์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๔ กันยายน ๒๕๖๕

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท อีโคเทค วอเตอร์ซิสเต็มส์ จำกัด จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท อีโคเทค วอเตอร์ซิสเต็มส์ จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียน  
ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๕๕ สถานที่ตั้งเลขที่ ๒๐ ซอยเคหะร่มเกล้า ๗๔ แยก ๖  
แขวงราษฎร์พัฒนา เขตสะพานสูง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท อีโคเทค วอเตอร์ซิสเต็มส์ จำกัด ต่ออายุ  
หนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายเปี่ยมศักดิ์ ไชยสิงห์

ทะเบียนเลขที่ ว-๒๕๕-ค-๐๐๐๑

๒) นางอังสนา ร่มสายหยุด

ทะเบียนเลขที่ ว-๒๕๕-ค-๐๐๐๒

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นายอนุรักษ์ ตันตราสัย

ทะเบียนเลขที่ ว-๒๕๕-จ-๐๐๐๑

๒) นางสาวปริญญ์ หมดจิ

ทะเบียนเลขที่ ว-๒๕๕-จ-๐๐๐๒

๓) นายนิสิต เหลืองภัทรวงศ์

ทะเบียนเลขที่ ว-๒๕๕-จ-๐๐๐๓

๔) นายประพันธ์ วงษ์เจ๊ะเซ็ม

ทะเบียนเลขที่ ว-๒๕๕-จ-๐๐๐๔

๕) นางสาวสุทธิดา มินกาเซ็ม

ทะเบียนเลขที่ ว-๒๕๕-จ-๐๐๐๕

๖) นางสาวญาณิศา สุวรรณมาศ

ทะเบียนเลขที่ ว-๒๕๕-จ-๐๐๐๖

๗) นางสาววริศรา บุญลาภามณี

ทะเบียนเลขที่ ว-๒๕๕-จ-๐๐๐๗

๘) นางสาวจิราพร ฤทธิ์เต็ม

ทะเบียนเลขที่ ว-๒๕๕-จ-๐๐๐๘

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย ตามสิ่งที่ส่งมาด้วย



Rail

หนังสือฉบับนี้...

- ๒ -

หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๑ ตุลาคม ๒๕๖๘ หากประสงค์จะต่ออายุหนังสือ  
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ  
กรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นสุดอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code  
ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายประสม ดำรงพงษ์)  
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน  
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม



กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th

ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์





เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท อีโคเทค วอเตอร์ซิสเต็มส์ จำกัด เลขทะเบียน ว-๒๙๕

ที่ อก ๐๓๑๐(๑)/ ๑๕๙๒๖ ลงวันที่ ๒๔ ตุลาคม ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๘ รายการ

น้ำเสีย จำนวน 8 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	5-Day BOD Test, Azide Modification Method
2	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method
3	Oil & Grease	Liquid-Liquid, Partition-Gravimetric Method
4	pH	Electrometric Method
5	Sulfide	Iodometric Method
6	Total Dissolved Solids	Dried at 180 °C
7	Total Kjeldahl Nitrogen	Semi-Micro-Kjeldahl Method
8	Total Suspended Solids	Dried at 103-105 °C

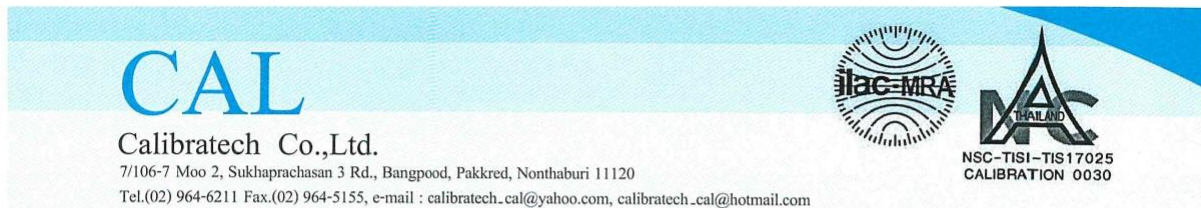
เอกสารอ้างอิง

APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 23<sup>rd</sup> ed. Washington, DC: APHA, 2017.



## 9.2 เอกสารเทียบเครื่องมือวัด

### Autoclave



## Certificate of Calibration

**Certificate No. :** 65-400508-3 **Page : 1 of 2**

**Submitted by :** Ecotech Water Systems Co., Ltd.  
20 Soi Kheharomklao 74 Yak 6, Ratphatthana, Saphansung, Bangkok 10240

**Equipment :** Autoclave  
**Manufacturer :** LABTECH **Model :** LAC-5060S  
**Range :** N/A °C **Resolution** 0.1 °C  
**Serial No. :** 090414007 **ID No. :** INS008

**Environment :** On site calibration was carried out at the Laboratory, Ecotech Water Systems Co., Ltd.  
**Ambient Temperature :** (26.0 to 27.0) °C  
**Relative Humidity :** (48 to 52) %  
**Line Voltage :** (225.0 to 226.4) V

**Date of Received :** 30 September 2022  
**Date of Calibration :** 30 September 2022  
**Date of Issue :** 01 October 2022  
**Calibrated by :** Permpon Chanpu

**Calibration Method :** This instrument was calibrated by In-house method CAL-M4007 based on  
 BS 2646 Part5 : 1993  
 The temperature scale used was based on ITS-90

**Reference Standard Instruments :** This certification is traceable to the International System of Units  
 Standard Temperature Data Logger with RTD pt 100

ID No.	Cert. No.	Due Date	Traceability
400039	65-400420-1	15 Feb 2023	National Institute of Metrology Thailand (NIMT)
400040	65-400420-2	15 Feb 2023	National Institute of Metrology Thailand (NIMT)
400041	65-400420-3	15 Feb 2023	National Institute of Metrology Thailand (NIMT)

Approved by :

(Bunjerd Marsi)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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7/106-7 Moo 2, Sukhaprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

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

## Certificate of Calibration

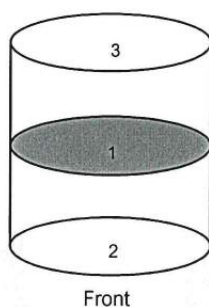
**Certificate No. 65-400508-3**

**Page : 2 of 2**

**Result of Calibration** : Without Adjustment

**UUC Condition As-Received** : Good

**Function** : Temperature measurement



Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Temperature (°C) @ Sensor No.			Uncertainty (± °C)	Measured Uniformity (°C)	Measured Stability (°C)	Sterilizing Time (minute)	Pressure Gauge Reading (kgf/cm²)
			1	2	3					
121.0	121.0	121.0	121.5	121.0	121.1	0.71	0.6	0.1	15	1.2

### Remark

1. UUC : Unit Under Calibration
2. Pressure Gauge reading are out of accreditation's scope.

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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## Eletronic Balance



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

NSC-TISI-TIS17025  
CALIBRATION 0030

## Certificate of Calibration

**Certificate No. :** 65-200308-1 **Page : 1 of 2**

**Submitted by :** Ecotech Water Systems Co., Ltd.  
20 Soi Kheharomklao 74 Yak 6, Ratphatthana, Saphansung, Bangkok 10240

**Equipment :** Electronic Balance  
Manufacturer : OHAUS Model : PA214  
Serial No. : 8328380168 ID No. : INS013  
Capacity : 210 g Resolution : 0.0001 g

**Environment :** On site calibration was carried out at the Laboratory, Ecotech Water Systems Co., Ltd.  
Ambient Temperature : (24.6 to 24.7) °C  
Relative Humidity : (59.9 to 61.3) %  
Air Pressure : 1005.0 mbar


**Date of Received :** 30 September 2022  
**Date of Calibration :** 30 September 2022  
**Date of Issue :** 01 October 2022  
**Calibrated by :** Satja Sangkhum

**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.	Cert. No.	Due Date	Traceability
E261-E2624	C02213103	18 Nov 2022	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. : 65-200308-1**

**Page : 2 of 2**

**Result of Calibration :** After Adjustment

**UUC Condition As-Received :** Good

Departure of indication from nominal value

Nominal Value (g)	Correction (g)	Uncertainty $\pm$ (g)	Error before Adjustment (g)
0.01	0.0000	0.00011	0.0000
0.1	0.0000	0.00011	0.0000
1	0.0000	0.00011	-0.0001
5	0.0000	0.00011	0.0000
10	0.0000	0.00011	-0.0003
20	-0.0001	0.00011	-0.0004
50	0.0001	0.00012	-0.0014
100	0.0000	0.00020	-0.0027
150	0.0000	0.00038	-0.0042
200	0.0000	0.00038	-0.0055

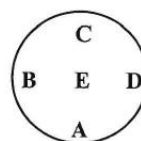
This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor  $k = 2.11$ , providing a level of confidence of approximately 95%

Eccentric error

Load test : 50 g

A B C D E  
0.0002 0.0001 -0.0003 -0.0001 0.0000 g



Repeatability

Load test : 200 g

Stdev. : 0.00005 g

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*Handwritten signature*



## COD Reactor

# CAL

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

## Certificate of Calibration

**Certificate No. :** 65-400523-1

**Page : 1 of 2**

**Submitted by :** Ecotech Water Systems Co., Ltd.

20 Soi Kheharomklao 74 Yak 6, Ratphatthana, Saphansung, Bangkok 10240

**Equipment :** COD Reactor

Manufacturer : Hanna

Model : HI839800

Range : N/A °C

Resolution : 0.1 °C

Serial No. : 05220009101

ID No. : N/A

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

Relative Humidity : (50 ± 15) %

**Date of Received :** 30 September 2022

**Date of Calibration :** 03 October 2022

**Date of Issue :** 03 October 2022

**Calibration Method :** This instrument was calibrated by In-house method direct measurement with Standard Digital Thermometer with TC Type T probe

The temperature scale used was based on ITS-90

### Reference Standard Instruments :

Standard Digital Thermometer with TC Probe

ID No.	Cert. No.	Due Date	Traceability
400029 & 400030	65-400272-1	24 Nov 2022	National Institute of Metrology Thailand (NIMT)
400029 & 400032	65-400274-1	25 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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Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech\_cal@hotmail.com

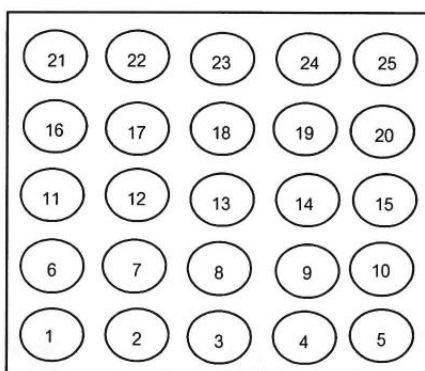
## Certificate of Calibration

**Certificate No. :** 65-400523-1

**Page : 2 of 2**

**Result of Calibration :** Without Adjustment

**Function :** Temperature measurement



Controller

Test Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Standard Reading at Position (°C)									
			1	2	3	4	5	6	7	8	9	10
150.0	150.0	150.0	150.6	150.1	152.0	150.1	149.7	149.3	151.3	152.0	150.9	150.4

Test Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Standard Reading at Position (°C)									
			11	12	13	14	15	16	17	18	19	20
150.0	150.0	150.0	149.4	152.0	151.4	151.0	150.1	150.3	150.6	151.8	151.7	149.9


Test Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Standard Reading at Position (°C)					Uncertainty (± °C)
			21	22	23	24	25	
150.0	150.0	150.0	150.3	149.9	151.4	150.2	150.1	0.73

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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## Hot Air Oven



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

NSC-TISI-TIS17025  
CALIBRATION 0030

### Certificate of Calibration

**Certificate No. :** 65-400508-2 **Page : 1 of 2**

**Submitted by :** Ecotech Water Systems Co., Ltd.  
20 Soi Kheharomklao 74 Yak 6, Ratphatthana, Saphansung, Bangkok 10240

**Equipment :** Air Chamber (Oven)  
 Manufacturer : LABTECH Model : LDO-080F  
 Range : N/A °C Resolution : 0.1 °C  
 Serial No. : 081029024 ID No. : INS007

**Environment :** On site calibration was carried out at the Laboratory, Ecotech Water Systems Co., Ltd.  
 Ambient Temperature : (26.0 to 27.0) °C  
 Relative Humidity : (48 to 52) %  
 Line Voltage : (225.0 to 226.4) V

**Date of Received :** 30 September 2022  
**Date of Calibration :** 30 September 2022  
**Date of Issue :** 01 October 2022  
**Calibrated by :** Permpon 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.	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. : 65-400508-2**

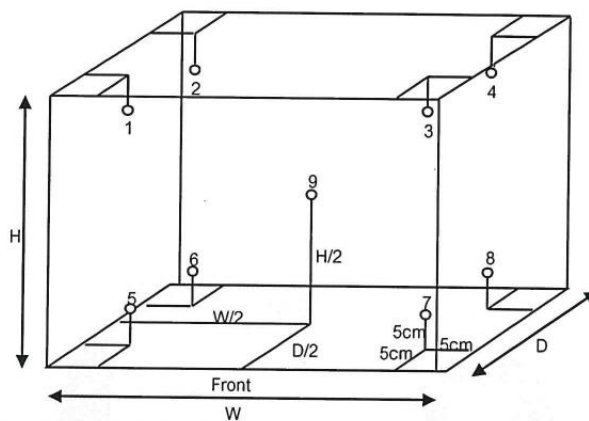
**Page : 2 of 2**

**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 = 0.50 m

D = 0.40 m

H = 0.40 m

Capacity = 0.08 m<sup>3</sup>

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	104.3	103.4	104.6	104.2	103.2	103.5	104.1	105.3	105.3	1.7
180.0	180.0	180.0	179.1	178.7	180.0	179.1	178.6	178.9	178.9	181.6	181.8	2.9

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
104.0	104.0	104.0	2.5	1.3	4.6
180.0	180.0	180.0	4.3	2.2	7.5

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

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


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

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B



**Incubator-BioBase**



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NSC-TISI-TIS17025  
CALIBRATION 0030

## Certificate of Calibration

**Certificate No. :** 65-400508-6 **Page : 1 of 2**

**Submitted by :** Ecotech Water Systems Co., Ltd.  
 20 Soi Kheharomklao 74 Yak 6, Ratphatthana, Saphansung, Bangkok 10240

**Equipment :** Air Chamber (Incubator)  
 Manufacturer : Biobase Model : BJPX-B400II  
 Range : N/A °C Resolution : 0.1 °C  
 Serial No. : KYP400II2010002 ID No. : N/A


**Environment :** On site calibration was carried out at the Laboratory, Ecotech Water Systems Co., Ltd.  
 Ambient Temperature : (24.6 to 26.8) °C  
 Relative Humidity : (58 to 60) %  
 Line Voltage : (225.0 to 226.5) V

**Date of Received :** 30 September 2022  
**Date of Calibration :** 30 September 2022  
**Date of Issue :** 01 October 2022  
**Calibrated by :** Bunjerd Masri  
**Calibration Method :** CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

**Reference Standard Instruments :** This certification is traceable to the International System of Units  
 Standard Digital Thermometer with RTD Probe

<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceability</u>
400046 & 400047	65-400419-3	03 Feb 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. : 65-400508-6**

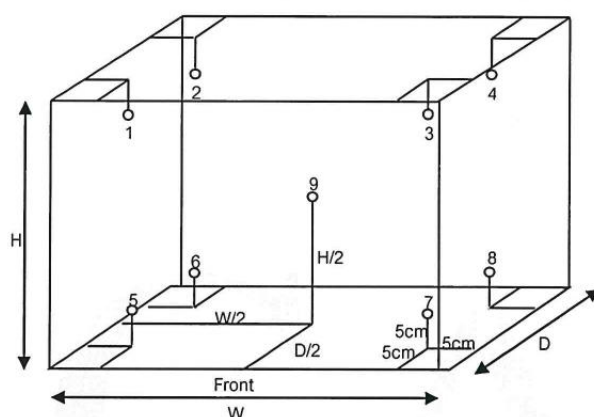
**Page : 2 of 2**

**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 = 0.58 m

D = 0.55 m

H = 1.28 m

Capacity = 0.41 m<sup>3</sup>

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	
20.0	20.0	20.0	20.18	20.15	20.21	20.13	20.07	20.07	20.11	20.07	20.02	0.44

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
20.0	20.0	20.0	0.22	0.20	0.5

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

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


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

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B



## pH Meter



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NSC-TISI-TIS 17025  
CALIBRATION 0030

## Certificate of Calibration

**Certificate No. :** 65-420082-2 **Page : 1 of 2**

**Submitted by :** Ecotech Water Systems Co., Ltd.  
20 Soi Kheharomklao 74 Yak 6, Ratphatthana, Saphansung, Bangkok 10240

**Equipment :** pH Meter with electrode  
pH meter  
Manufacturer : Eutech Model : PC 450  
Range : N/A pH Resolution : 0.01 pH  
Serial No. : 2535550 ID No. : N/A  
Electrode  
Model : N/A Serial No. : 01X099323

**Environment :** On site calibration was carried out at the Laboratory, Ecotech Water Systems Co., Ltd.  
Ambient Temperature : (25.0 to 26.0)° C  
Relative Humidity : (55 to 60) %

**Date of Received :** 30 September 2022  
**Date of Calibration :** 30 September 2022  
**Date of Issue :** 01 October 2022  
**Calibrated by :** Permpoon Chanpu

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


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

**1. Multiproduct Calibrator**

<u>ID No.</u>	<u>Cert. No.</u>	<u>Due Date</u>	<u>Traceability</u>
400005	SG-E-00473/64	27 Aug 2023	National Institute of Metrology Thailand (NIMT)

**2. Standard Buffer Solution**

<u>pH</u>	<u>Cert. No.</u>	<u>Lot No.</u>	<u>Exp. Date</u>	<u>Traceability</u>
4.008	61235182	833447	19 Aug 2024	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
6.985	61255708	833449	19 Aug 2023	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
10.008	61244986	833448	19 Aug 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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NSC-TISI-TIS17025  
CALIBRATION 0030

## Certificate of Calibration

**Certificate No. :** 65-420082-1

**Page : 1 of 2**

**Submitted by :** Ecotech Water Systems Co., Ltd.

20 Soi Kheharomklao 74 Yak 6, Ratphatthana, Saphansung, Bangkok 10240

**Equipment :** pH Meter with electrode

pH meter

Manufacturer : Eutech

Model : PC 700

Range : N/A

pH

Resolution : 0.01 pH

Serial No. : 2728583

ID No. : N/A

Electrode

Model : N/A

Serial No. : 01X099323

**Environment :** On site calibration was carried out at the Laboratory, Ecotech Water Systems Co., Ltd.

Ambient Temperature : (25.0 to 26.0)° C

Relative Humidity : (55 to 60) %

**Date of Received :** 30 September 2022

**Date of Calibration :** 30 September 2022

**Date of Issue :** 01 October 2022

**Calibrated by :** Permpon Chanpu

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

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

### 1. Multiproduct Calibrator

ID No.	Cert. No.	Due Date	Traceability
400005	SG-E-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	833447	19 Aug 2024	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
6.985	61255708	833449	19 Aug 2023	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
10.008	61244986	833448	19 Aug 2023	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025

Approved by :

( Bunjerd Masri )

Supervisor

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## Certificate of Calibration

**Certificate No. : 65-420082-1**

**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	166.7	10.8	0.12
	0.0000	7	7.00	-8.4	8.4	0.086
	-177.4800	10	10.00	-183.5	6.0	0.12

**Function :** pH meter with electrode

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

Adjustment Curve at nominal pH	Standard Buffer ( pH )	UUC Reading ( pH )	Correction ( pH )	Uncertainty ( ± pH )
4, 7, 10	4.008	4.01	0.00	0.0097
	6.985	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 measurment was based on a standard uncertainty multiplied by a coverage factor  $k = 2$  ,  
providing a level of confidence of approximately 95%

- o0o -




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## Certificate of Calibration

**Certificate No. :** 65-400509-1

**Page : 1 of 2**

**Submitted by :** Ecotech Water Systems Co., Ltd.

20 Soi Kheharomklao 74 yeak 6, Ratphatthana, Saphansung, Bangkok 10240

**Equipment :** Digital Thermometer with Thermistor probe

Temperature Indicator

Manufacturer : Eutech

Model : PC 700

Range : N/A °C

Resolution : 0.1 °C

Serial No. : 2728583

ID No. : N/A

Thermistor probe

Model : N/A

Sheath Material : Stainless

Diameter : 3.5 mm.

Length : 100 mm.

Serial No. : CONSEN9501D 028

ID No. : N/A

**Environment :** On site calibration was carried out at the Laboratory, Ecotech Water Systems Co., Ltd.

Ambient Temperature : (25.0 to 26.0) °C

Relative Humidity : (55 to 60) %

Line Voltage : (225.0 to 225.9) VAC

**Date of Received :** 30 September 2022

**Date of Calibration :** 30 September 2022

**Date of Issue :** 01 October 2022

**Calibrated by :** Permpon Chanpu

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

The temperature scale used was based on ITS-90

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

1. Platinum Resistance Thermometer (PRT)

ID No.	Cert. No.	Due Date	Traceability
400002	TT-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

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## Certificate of Calibration

**Certificate No. : 65-400509-1**

**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	20.003	20.3	-0.3	0.19
100	25.002	25.3	-0.3	0.19
100	30.004	30.3	-0.3	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. : 65-420082-2**

**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	177.6	-0.1	0.12
	0.0000	7	7.02	0.0	0.0	0.086
	-177.4800	10	10.00	-177.5	0.0	0.12

**Function :** pH meter with electrode

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

Adjustment Curve at nominal pH	Standard Buffer ( pH )	UUC Reading ( pH )	Correction ( pH )	Uncertainty ( ± pH )
4, 7, 10	4.008	4.01	0.00	0.0097
	6.985	7.00	-0.01	0.011
	10.008	10.00	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. :** 65-400509-2

**Page : 1 of 2**

**Submitted by :** Ecotech Water Systems Co., Ltd.

20 Soi Kheharomklao 74 yeak 6, Ratphatthana, Saphansung, Bangkok 10240

**Equipment :** Digital Thermometer with Thermistor probe

Temperature Indicator

Manufacturer : Eutech

Model : PC 450

Range : N/A °C

Resolution : 0.1 °C

Serial No. : 2535550

ID No. : N/A

Thermistor probe

Model : N/A

Sheath Material : Stainless

Diameter : 3.5 mm.

Length : 100 mm.

Serial No. : CONSEN91W 141

ID No. : N/A

**Environment :** On site calibration was carried out at the Laboratory, Ecotech Water Systems Co., Ltd.

Ambient Temperature : (25.0 to 26.0) °C

Relative Humidity : (55 to 60) %

Line Voltage : (225.0 to 225.9) VAC

**Date of Received :** 30 September 2022

**Date of Calibration :** 30 September 2022

**Date of Issue :** 01 October 2022

**Calibrated by :** Permpon Chanpu

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

The temperature scale used was based on ITS-90


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

1. Platinum Resistance Thermometer (PRT)

ID No.	Cert. No.	Due Date	Traceability
400002	TT-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. : 65-400509-2**

**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	20.005	20.1	-0.1	0.19
100	25.006	25.1	-0.1	0.19
100	30.005	30.1	-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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## Refrigerator

# CAL

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

NSC-TISI-TIS17025  
CALIBRATION 0030

## Certificate of Calibration

**Certificate No. :** 65-400508-1 **Page : 1 of 2**

**Submitted by :** Ecotech Water Systems Co., Ltd.  
 20 Soi Kheharomklao 74 Yak 6, Ratphatthana, Saphansung, Bangkok 10240


**Equipment :** Air Chamber (Refrigerator)  
 Manufacturer : Every Digital Model : N/A  
 Range : N/A °C Resolution : 0.1 °C  
 Serial No. : ASS1001 ID No. : INS005

**Environment :** On site calibration was carried out at the Laboratory, Ecotech Water Systems Co., Ltd.  
 Ambient Temperature : (24.6 to 26.8) °C  
 Relative Humidity : (58 to 60) %  
 Line Voltage : (225.0 to 226.5) V

**Date of Received :** 30 September 2022  
**Date of Calibration :** 30 September 2022  
**Date of Issue :** 01 October 2022  
**Calibrated by :** Bunjerd Masri  
**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.	Due Date	Traceability
400046 & 400023	65-400157-1	02 Oct 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. : 65-400508-1**

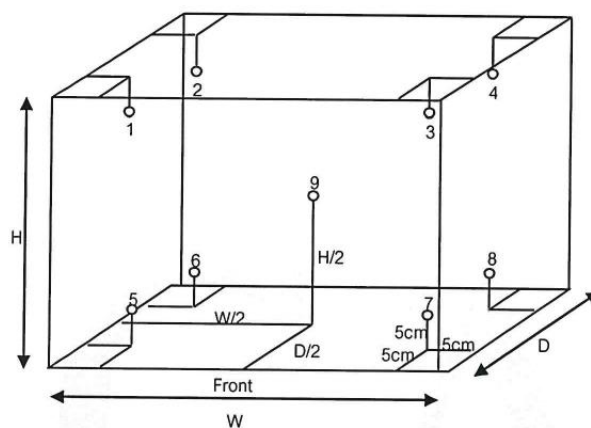
**Page : 2 of 2**

**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 = 1.00 m

D = 0.50 m

H = 1.35 m

Capacity = 0.68 m<sup>3</sup>

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	3.0	3.0	4.3	4.1	3.9	4.2	4.1	4.2	4.1	4.3	4.0	0.63

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
4.0	3.0	3.0	0.6	0.3	0.8

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

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

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

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NSC-TISI-TIS17025  
CALIBRATION 0030

## Certificate of Calibration

**Certificate No. :** 65-400508-4

**Page : 1 of 2**

**Submitted by :** Ecotech Water Systems Co., Ltd.

20 Soi Kheharomklao 74 Yak 6, Ratphatthana, Saphansung, Bangkok 10240

**Equipment :** Air Chamber (Refrigatorator)

Manufacturer : S-Cool

Model : N/A

Range : N/A °C

Resolution : 1 °C

Serial No. : Eco-Ins14

ID No. : N/A

**Environment :** On site calibration was carried out at the Laboratory, Ecotech Water Systems Co., Ltd.

Ambient Temperature : (24.6 to 26.8) °C

Relative Humidity : (58 to 60) %

Line Voltage : (225.0 to 226.5) V

**Date of Received :** 30 September 2022

**Date of Calibration :** 30 September 2022

**Date of Issue :** 01 October 2022

**Calibrated by :** Bunjerd Masri

**Calibration Method :** CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

**Reference Standard Instruments :** This certification is traceable to the International System of Units  
Standard Digital Thermometer with RTD Probe

ID No.	Cert. No.	Due Date	Traceability
400046 & 400043	65-400419-2	02 Feb 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. : 65-400508-4

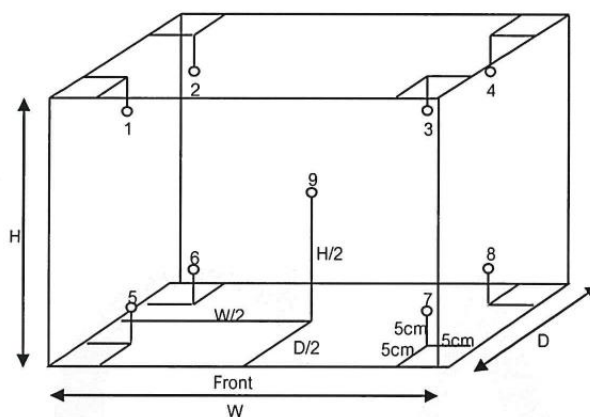
Page : 2 of 2

**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 = 1.02 m

D = 0.44 m

H = 1.30 m

Capacity = 0.58 m<sup>3</sup>

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	4	4	5.18	4.99	4.44	3.88	5.05	5.20	4.41	3.66	4.04	1.3

Test Point (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Uniformity (°C)	Measured Stability (°C)	Overall Variation (°C)
4.0	4.0	4.0	1.30	0.62	2.3

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


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

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


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## Therme-Hygro Meter



**CAL**  
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Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech\_cal@yahoo.com, calibratech\_cal@hotmail.com



NSC-TISI-TIS 17025  
CALIBRATION 0030

### Certificate of Calibration

**Certificate No. :** 65-410116-1

**Page : 1 of 2**

**Submitted by :** Ecotech Water Systems Co., Ltd.  
20 Soi Kheharomklao 74 Yak 6, Ratphatthana, Saphansung, Bangkok 10240

**Equipment :** Digital Thermo-Hygrometer  
 Manufacturer : Digicon Model : TH-03A  
 Range Temperature : -10 °C to 50 °C Resolution : 0.1 °C  
 Range Humidity : 20 %R.H. to 99 %R.H. Resolution : 1 %R.H.  
 Serial No. : 365052106 ID No. : N/A

**Environment :** Ambient Temperature : (23 ± 2) °C  
Relative Humidity : (50 ± 15) %

**Date of Received :** 30 September 2022

**Date of Calibration :** 03 October to 05 October 2022


**Date of Issue :** 05 October 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%

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



# CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

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

## Certificate of Calibration

**Certificate No. :** 65-410116-1

**Page : 2 of 2**

**UUC Condition As-Received :** Good

**Result of Calibration :** Without Adjustment

**Function :** Temperature measurement ( Mode : In )

Reference Humidity @ 50 %R.H.

Standard Temperature ( °C )	UUC Reading ( °C )	Correction ( °C )	Uncertainty ( ± °C )
20.00	20.5	-0.5	0.46
24.97	25.4	-0.4	0.46
30.01	29.9	0.1	0.46

**Result of Calibration :** Without Adjustment

**Function :** Humidity measurement

Reference Temperature @ 25 °C

Standard Humidity ( %R.H. )	UUC Reading ( %R.H. )	Correction ( %R.H. )	Uncertainty ( ± %R.H. )
40.01	38	2	2.2
49.99	48	2	2.2
60.02	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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# CAL

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NSC-TISI-TIS17025  
CALIBRATION 0030

## Certificate of Calibration

**Certificate No. :** 65-410116-2

**Page :** 1 of 2

**Submitted by :** Ecotech Water Systems Co., Ltd.

20 Soi Kheharomklao 74 Yak 6, Ratphatthana, Saphansung, Bangkok 10240

**Equipment :** Digital Thermo-Hygrometer

Manufacturer : Digicon

Model : TH-03A

Range Temperature : -10 °C to 50 °C Resolution : 0.1 °C

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

Serial No. : 365051554

ID No. : N/A

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

Relative Humidity : (50 ± 15) %

**Date of Received :** 30 September 2022

**Date of Calibration :** 03 October to 05 October 2022

**Date of Issue :** 05 October 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
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400034 & 400035	SG-H-00713/65	07 Jan 2023	Success Gateway Co., Ltd., Accredited by TISI Calibration No.0268
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Approved by :

( Bunjerd Masri )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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

## Certificate of Calibration

**Certificate No. :** 65-410116-2

**Page : 2 of 2**

**UUC Condition As-Received :** Good

**Result of Calibration :** Without Adjustment

**Function :** Temperature measurement ( Mode : In )

Reference Humidity @ 50 %R.H.

Standard Temperature ( °C )	UUC Reading ( °C )	Correction ( °C )	Uncertainty ( ± °C )
19.99	20.3	-0.3	0.46
25.00	25.2	-0.2	0.46
30.00	29.8	0.2	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. )
39.98	39	1	2.2
50.00	49	1	2.2
59.99	59	1	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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