

ภาคผนวก 6

หนังสือรับรองห้องปฏิบัติการวิเคราะห์



ที่ อก ๐๓๑๐(๑)/ ๒ ๖ ๔ ๓

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๓๑ มกราคม ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท ตรวจสอบสิ่งแวดล้อม จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๘ ธันวาคม ๒๕๖๕สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท ตรวจสอบสิ่งแวดล้อม จำกัด จำนวน ๑ แผ่นตามหนังสือที่อ้างถึง บริษัท ตรวจสอบสิ่งแวดล้อม จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๓๐๑๑ สถานที่ตั้งเลขที่ ๕/๔๕ หมู่บ้าน บ้านกลางกรุง บิขทาวน์
ซอยศรีนครินทร์ ๔๖/๑ (ปราโมทย์) แขวงหนองบอน เขตประเวศ กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้นกรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท ตรวจสอบสิ่งแวดล้อม จำกัด ต่ออายุหนังสือรับขึ้น
ทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

นางสาวอนันต์กมล ทองบาง

ทะเบียนเลขที่ ๖-๓๐๑๑-๐-๐๐๐๑

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นายอนุวัฒน์ รดารงค์

ทะเบียนเลขที่ ๖-๓๐๑๑-๖-๐๐๐๑

๒) นางสาวสุธิดา อีสสระ

ทะเบียนเลขที่ ๖-๓๐๑๑-๖-๐๐๐๒

๓) นางสาวเพ็ญฟ้า เสริมใหม่

ทะเบียนเลขที่ ๖-๓๐๑๑-๖-๐๐๐๓

๔) นางสาวสุมานันท์ วัดเมือง

ทะเบียนเลขที่ ๖-๓๐๑๑-๖-๐๐๐๔

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้จะหมดอายุในวันที่ ๓๑ มกราคม ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ
กรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code
ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

ผู้ว่า

โรงงาน

ปฏิบัติการทางเคมีและชีวเคมี กรมโรงงานอุตสาหกรรม

ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๙๔

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



เอกสารแนบท้ายหนังสือรับค่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ตรวจวัดสิ่งแวดล้อม จำกัด

เลขทะเบียน ว-๓๐๑

ที่ อก ๐๓๑๐(๑)/ ๒ ๖ ๔ ๓

ลงวันที่ ๓ ๑ มกราคม ๒๕๖๖

ขอข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๔ รายการ

น้ำเสีย จำนวน 4 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	5-Day BOD Test, Membrane Electrode Method
2	pH	Electrometric Method
3	Total Dissolved Solids	Dried at 180 °C
4	Total Suspended Solids	Dried at 103-105 °C

เอกสารอ้างอิง

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

ภาคผนวก 7

เอกสารสอบเทียบเครื่องมือที่ใช้ในการวิเคราะห์

Balance-Water



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CALIBRATION LABORATORY Co., LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



NSC-TISI-TIS 17025
CALIBRATION 0059
CLC

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : BALANCE
MANUFACTURER : SHIMADZU
MODEL / TYPE : AP225WD
SERIAL NO. : D316300692[LA-001]
CLID. NO. : 362100172
JOB CONTROL NO. : 230321031261

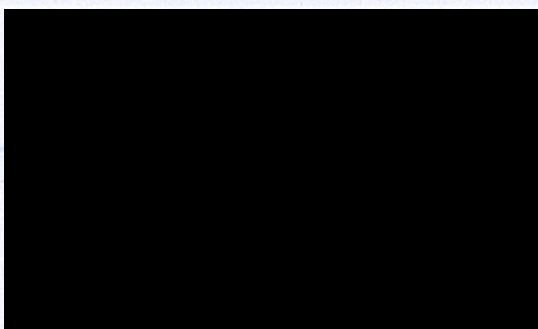
CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023

DATE OF ISSUED : 08 April 2023

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :



Authorized Signatory

08 April 2023

This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q23031261

F3-011-04/01-12

page 1 of 3





CALIBRATION LABORATORY Co., LTD.

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Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



REPORT OF CALIBRATION

FOR

NOMENCLATURE : BALANCE
MANUFACTURER : SHIMADZU
MODEL / TYPE : AP225WD
SERIAL NO. : D316300692[LA-001]
LOCATION SITE : LABORATORY - BALANCE ROOM
DATE OF CALIBRATION : 04 April 2023

ENVIRONMENT CONDITIONS :

Temperature : 23 °C to 24 °C

Relative Humidity : 49 % to 50 %

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-46** according to **EURAMET cg-18 Version 4.0 (11/2015)**.

The calibration was performed by Comparison with Weight Set which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Weight Set, Mettler Toledo Class E2 S/N. 158850.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).

Certificate No. MM-0120-21, Due Date 17 December 2023.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95%. It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

Certificate No. Q23031261

F3-011-04/01-12

page 2 of 3





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CALIBRATION 0059
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CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

CALIBRATION DATA

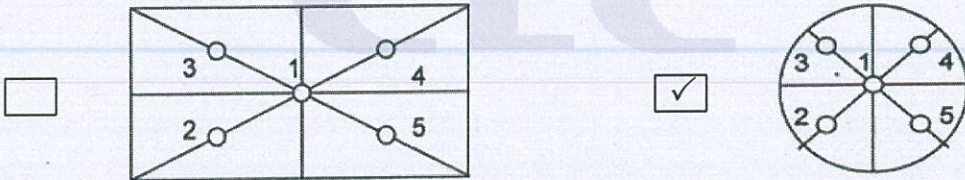
1. Error of indications

Nominal Test Value (g)	Conventional mass (g)	Display Value (g)	Error of Balance (g)	Uncertainty \pm (mg)	Coverage factor <i>k</i>
Unload	0.0000	0.0000	0.0000	0.06	2,00
5.0000	5.0000	5.0000	0.0000	0.11	2,00
10.0000	10.0000	10.0000	0.0000	0.11	2,00
20.0000	20.0000	20.0000	0.0000	0.12	2,00
40.0000	40.0000	40.0000	0.0000	0.14	2,00
60.0000	60.0000	60.0000	0.0000	0.15	2,00
80.0000	80.0000	80.0000	0.0000	0.19	2,00
100.0000	100.0000	100.0000	0.0000	0.17	2,00
120.0000	120.0000	120.0000	0.0000	0.22	2,00
140.0000	140.0000	140.0000	0.0000	0.24	2,00
160.0000	159.9999	160.0000	+0.0001	0.26	2,00
180.0000	180.0000	180.0000	0.0000	0.30	2,00
200.0000	199.9997	199.9997	0.0000	0.26	2,00

2. Repeatability of indications

Nominal Test Value (g)	Standard Deviation of Reading (g)
200.0000	0.00005

3. Effect of eccentric application of a load on the indication

						
Nominal Test Value (g)	Display Value (g)					Maximum Difference of Center Value (g)
	Position 1	Position 2	Position 3	Position 4	Position 5	
100.0000	100.0000	100.0000	99.9999	100.0000	100.0001	0.0001

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 116 of 138

This report is valid for the above stated instrument/s only.

End of Certificate

Certificate No. Q23031261

F3-011-04/01-12

page 3 of 3



Hot air oven

UF 110

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : HOT AIR OVEN
MANUFACTURER : MEMMERT
MODEL / TYPE : UF110
SERIAL NO. : B422.0026[LA-0012]
CLID. NO. : 332202464
JOB CONTROL NO. : 230321031263

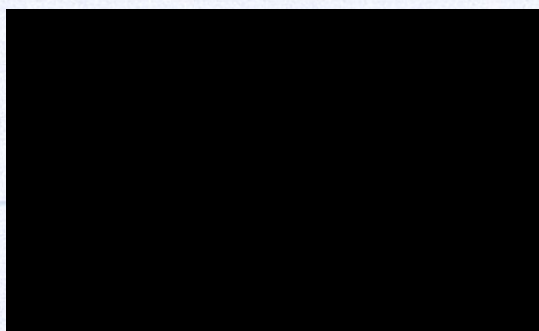
CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023

DATE OF ISSUED : 08 April 2023

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

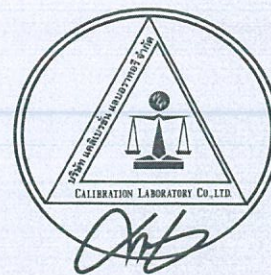
Calibrated By :



Approved By :

Authorized Signatory

08 April 2023



This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q23031263

F3-011-04/01-12

page 1 of 4



@clccalibration

REPORT OF CALIBRATION

FOR

NOMENCLATURE : HOT AIR OVEN
MANUFACTURER : MEMMERT
MODEL / TYPE : UF110
SERIAL NO. : B422.0026[LA-0012]
LOCATION SITE : LABORATORY-HOT ZONE
DATE OF CALIBRATION : 04 April 2023

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C

Relative Humidity : 48% to 51 %

PROCEDURE USED :

This instrument was calibrated under procedure No. **CLC-CPH-07** based on **TLAS G-20** as calibration guidelines.

The calibration was performed by using Hydra Data Logger which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Hydra Data Logger, Fluke Model 2620 S/N. 5592550.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.

Certificate No. Q22066550, Due Date 07 July 2023.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

Certificate No. Q23031263

F3-011-04/01-12

page 2 of 4



@clccalibration

CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties of the measuring hot air oven.

CALIBRATION DATA

1. HOT AIR OVEN PERFORMANCE

DUC		Measured Uniformity	Measured Stability	Measured Overall
Setting (°C)	Indicating (°C)	(°C)	(°C)	Variation (°C)
104.0	104.0	0.80	0.41	2.05
180.0	180.0	1.67	0.20	3.29



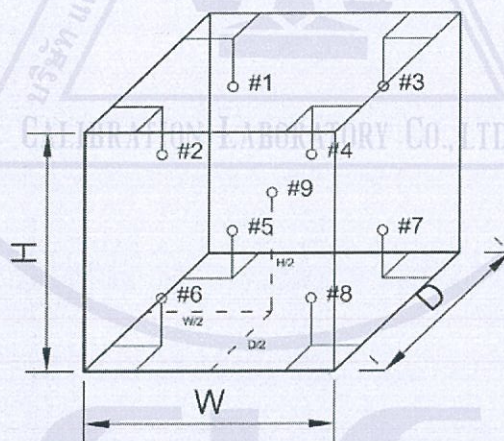
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

DUC		Measured Temperature (°C)@Probe No.9 is Ref.									Uncertainty \pm (°C)	Coverage factor k
Setting (°C)	Indicating (°C)	1	2	3	4	5	6	7	8	9		
104.0	104.0	103.22	103.79	103.49	103.60	103.76	103.70	103.32	104.54	103.90	0.65	2,00
180.0	180.0	178.23	179.61	178.93	179.18	179.39	179.37	178.51	181.15	179.79	0.61	2,00

Technical Note : W = 56 cm, D = 40 cm, H = 48 cm.

The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 008 Page 48 of 54



This report is valid for the above stated instrument/s only.

End of Certificate

Certificate No. Q23031263

F3-011-04/01-12

page 4 of 4



@clccalibration

Incubator



CLC
Accredited
ISO/IEC 17025

CALIBRATION LABORATORY Co., LTD.

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NSC-TISI-TIS 17025
CALIBRATION 0059
CLC

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : INCUBATOR
MANUFACTURER : ACCUPLUS
MODEL / TYPE : SMART i250
SERIAL NO. : 2059-0718-0010[LA-002]
CLID. NO. : 332100155
JOB CONTROL NO. : 230321031264

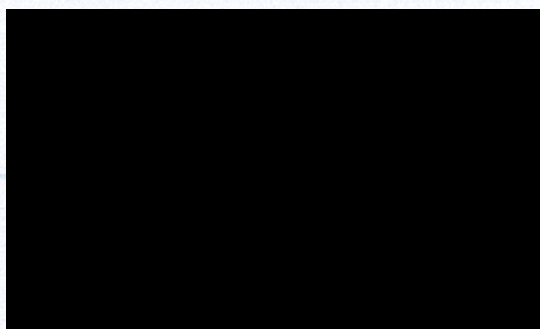
CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023

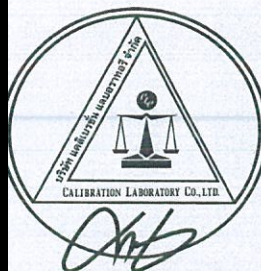
DATE OF ISSUED : 08 April 2023

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :



Authorized Signatory

08 April 2023

This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q23031264

F3-011-04/01-12

page 1 of 4





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CALIBRATION 0059
CLC

REPORT OF CALIBRATION

FOR

NOMENCLATURE : INCUBATOR
MANUFACTURER : ACCUPLUS
MODEL / TYPE : SMART i250
SERIAL NO. : 2059-0718-0010[LA-002]
LOCATION SITE : LABORATORY
DATE OF CALIBRATION : 04 April 2023

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C

Relative Humidity : 48% to 51 %

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-165** according to **TLAS G-20-1/02-08** as calibration guidelines.

The calibration was performed by using Hydra Data Logger which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Hydra Data Logger, Fluke Model 2620 S/N. 5592550.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.

Certificate No. Q22066550, Due Date 07 July 2023.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

Certificate No. Q23031264

F3-011-04/01-12

page 2 of 4





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NSC-TISI-TIS 17025
CALIBRATION 0059
CLC

CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties of the measuring incubator.

CALIBRATION DATA

1. INCUBATOR PERFORMANCE

DUC		Measured Uniformity (°C)	Measured Stability (°C)	Measured Overall Variation (°C)
Setting (°C)	Indicating (°C)			
20.0	20.0	0.47	0.53	1.18





CLC
Accredited
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CALIBRATION LABORATORY Co., LTD.

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NSC-TISI-TIS 17025
CALIBRATION 0059
CLC

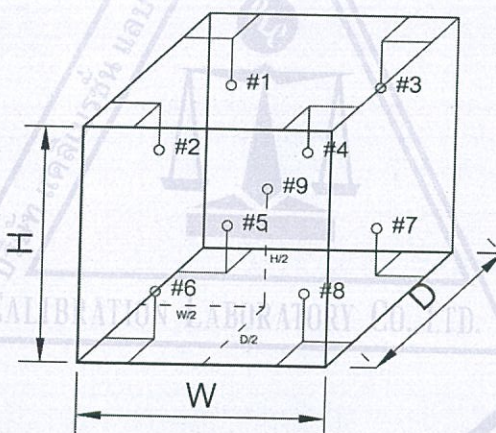
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

DUC		Measured Temperature (°C)@Probe No.9 is Ref.									Uncertainty \pm (°C)	Coverage factor k
Setting (°C)	Indicating (°C)	1	2	3	4	5	6	7	8	9		
20.0	20.0	20.53	20.62	20.75	20.52	20.54	20.60	20.52	20.42	20.45	0.75	2,00

Technical Note : W = 50 cm, D = 48 cm, H = 110 cm.

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 129 of 138



This report is valid for the above stated instrument/s only.

End of Certificate

Certificate No. Q23031264

F3-011-04/01-12

page 4 of 4



Refrigerator

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : REFRIGERATOR
MANUFACTURER : MEDICOOL
MODEL / TYPE : BB-117
SERIAL NO. : BB117-190725001[LA-003]
CLID. NO. : 332100156
JOB CONTROL NO. : 230321031265

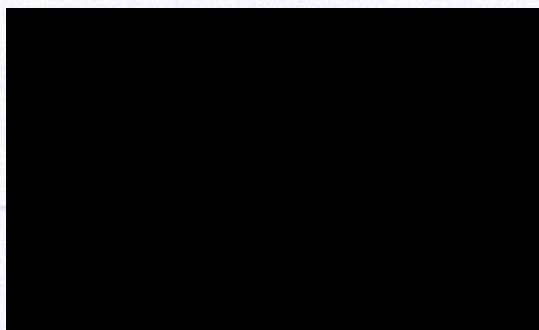
CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023

DATE OF ISSUED : 08 April 2023

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :

Authorized Signatory

08 April 2023



This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q23031265

F3-011-04/01-12

page 1 of 4



@clccalibration

REPORT OF CALIBRATION

FOR

NOMENCLATURE : REFRIGERATOR
MANUFACTURER : MEDICOOL
MODEL / TYPE : BB-117
SERIAL NO. : BB117-190725001[LA-003]
LOCATION SITE : LABORATORY
DATE OF CALIBRATION : 04 April 2023

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C

Relative Humidity : 48% to 51 %

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-165** according to **TLAS G-20-1/02-08** as calibration guidelines.
The calibration was performed by using Hydra Data Logger which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Hydra Data Logger, Fluke Model 2620 S/N. 5592550.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.
Certificate No. Q22066550, Due Date 07 July 2023.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %.
It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

Certificate No. Q23031265

F3-011-04/01-12

page 2 of 4





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CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties of the measuring refrigerator.

CALIBRATION DATA

1. REFRIGERATOR PERFORMANCE

DUC		Measured Uniformity (°C)	Measured Stability (°C)	Measured Overall Variation (°C)
Setting (°C)	Indicating (°C)			
4.0	4.0	0.67	0.91	2.28

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F3-011-04/01-12

page 3 of 4



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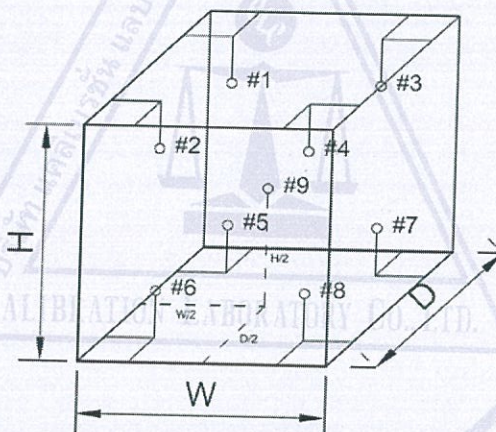
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

DUC		Measured Temperature (°C)@Probe No.9 is Ref.									Uncertainty $\pm (^\circ\text{C})$	Coverage factor k
Setting (°C)	Indicating (°C)	1	2	3	4	5	6	7	8	9		
4.0	4.0	3.37	3.91	3.35	3.51	3.51	3.26	3.17	3.19	3.32	1.14	2,00

Technical Note : W = 50 cm, D = 50 cm, H = 120 cm.

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 129 of 138



This report is valid for the above stated instrument/s only.

End of Certificate



CERTIFICATE OF CALIBRATION

FOR

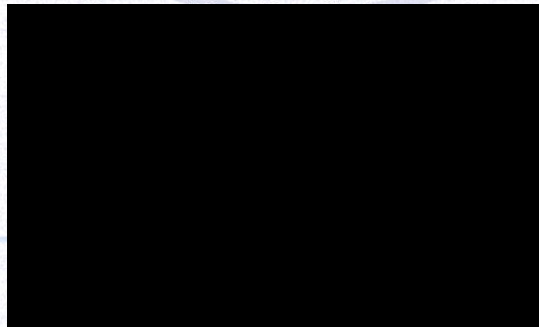
NOMENCLATURE : DIGITAL THERMOHYGRO METER
MANUFACTURER : DIGICON
MODEL / TYPE : TH-02A
SERIAL NO. : 1919E0284991[DTH-01]
CLID. NO. : 232100200
JOB CONTROL NO. : 230309026565

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 09 March 2023 DATE OF ISSUED : 13 March 2023

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :

Authorized Signatory

13 March 2023



This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the
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Certificate No. Q23026565

F3-011-04/01-12

page 1 of 3





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REPORT OF CALIBRATION

FOR

NOMENCLATURE : DIGITAL THERMOHYGRO METER
MANUFACTURER : DIGICON
MODEL / TYPE : TH-02A
SERIAL NO. : 1919E0284991[DTH-01]
DATE OF CALIBRATION : 11 March 2023

ENVIRONMENT CONDITIONS :

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

Relative Humidity : $(55 \pm 10) \% \text{RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-74**. The calibration was performed by using Chilled Mirror Hygrometer and Temperature & Humidity Chamber which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Chilled Mirror Hygrometer, Edgetech Model Dew Master S/N. 36151.

Temperature & Humidity Chamber, PGC Model 9141-5114 S/N.0802282.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Thunder Scientific Corporation.

Certificate No. 21028, Due Date 09 December 2023.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2,00$ which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

Certificate No. Q23026565

F3-011-04/01-12

page 2 of 3



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CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties of the measuring digital thermohygro meter.

CALIBRATION DATA

1. CORRECTION OF TEMPERATURE

Test point (° C)	Actual Temperature (° C)	DUC Reading (° C)	Correction (° C)	Uncertainty ± (° C)
20.0	20.00	19.6	+0.40	0.40
25.0	25.01	24.5	+0.51	
30.0	29.98	29.5	+0.48	

2. CORRECTION OF HUMIDITY

STD Temperature (° C)	STD Reading (%RH)	DUC Reading (%RH)	Correction (%RH)	Uncertainty ± (%RH)
25	40.0	34	+6.0	1.3
25	60.0	52	+8.0	1.5

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 48 of 138

This report is valid for the above stated instrument/s only.

End of Certificate

Certificate No. Q23026565

F3-011-04/01-12

page 3 of 3



Thermohygro Meter

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : DIGITAL THERMOHYGRO METER
MANUFACTURER : DIGICON
MODEL / TYPE : TH-02A
SERIAL NO. : 1919E0284991[DTH-01]
CLID. NO. : 232100200
JOB CONTROL NO. : 230309026565

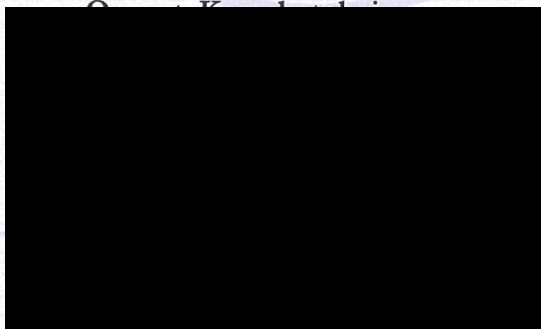
CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 09 March 2023

DATE OF ISSUED : 13 March 2023

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :

Authorized Signatory

13 March 2023



This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the
International System of Units (SI)

Certificate No. Q23026565

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NSC-TISI-TIS 17025
CALIBRATION 0059
CLC

REPORT OF CALIBRATION

FOR

NOMENCLATURE : DIGITAL THERMOHYGRO METER
MANUFACTURER : DIGICON
MODEL / TYPE : TH-02A
SERIAL NO. : 1919E0284991[DTH-01]
DATE OF CALIBRATION : 11 March 2023

ENVIRONMENT CONDITIONS :

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

Relative Humidity : $(55 \pm 10) \% \text{RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-74**. The calibration was performed by using Chilled Mirror Hygrometer and Temperature & Humidity Chamber which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Chilled Mirror Hygrometer, Edgetech Model Dew Master S/N. 36151.

Temperature & Humidity Chamber, PGC Model 9141-5114 S/N.0802282.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Thunder Scientific Corporation.

Certificate No. 21028, Due Date 09 December 2023.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2,00$ which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

Certificate No. Q23026565

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CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties of the measuring digital thermohygro meter.

CALIBRATION DATA

1. CORRECTION OF TEMPERATURE

Test point (° C)	Actual Temperature (° C)	DUC Reading (° C)	Correction (° C)	Uncertainty ± (° C)
20.0	20.00	19.6	+0.40	0.40
25.0	25.01	24.5	+0.51	
30.0	29.98	29.5	+0.48	

2. CORRECTION OF HUMIDITY

STD Temperature (° C)	STD Reading (%RH)	DUC Reading (%RH)	Correction (%RH)	Uncertainty ± (%RH)
25	40.0	34	+6.0	1.3
25	60.0	52	+8.0	1.5

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 48 of 138

This report is valid for the above stated instrument/s only.

End of Certificate

Certificate No. Q23026565

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page 3 of 3



Water Bath



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CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : WATER BATH
MANUFACTURER : MEMMERT
MODEL / TYPE : WNB14
SERIAL NO. : L418.0758[LA-004]
CLID. NO. : 332100157
JOB CONTROL NO. : 230321031268

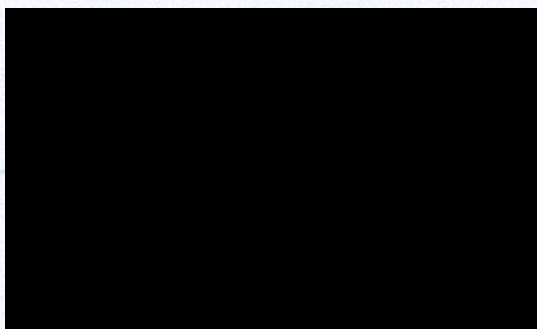
CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 21 March 2023

DATE OF ISSUED : 08 April 2023

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :

Authorized Signatory

08 April 2023



This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to
the International System of Units (SI)

Certificate No. Q23031268

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REPORT OF CALIBRATION

FOR

NOMENCLATURE : WATER BATH
MANUFACTURER : MEMMERT
MODEL / TYPE : WNB14
SERIAL NO. : L418.0758[LA-004]
LOCATION SITE : LABORATORY-HOT ZONE
DATE OF CALIBRATION : 04 April 2023

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C

Relative Humidity : 48% to 51%

PROCEDURE USED :

This instrument was calibrated under procedure No. **WI-305-135** based on **ASTM E 715-80:2016** as calibration guidelines.

The calibration was performed by using Hydra Data Logger which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Hydra Data Logger, Fluke Model 2620 S/N. 5592550.

TRACEABILITY :

The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.

Certificate No. Q23022733, Due Date 01 September 2023.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2,00$ which for a normal distribution corresponds to a coverage probability of approximately 95 %.

It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

Certificate No. Q23031268

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CALIBRATION 0059
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CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties of the measuring water bath.

CALIBRATION DATA

1. WATER BATH PERFORMANCE

Test Point (°C)	DUC Reading (°C)	Uniformity (°C)	Stability (°C)
95.0	95.0	0.33	0.16

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F3-011-04/01-12

page 3 of 4





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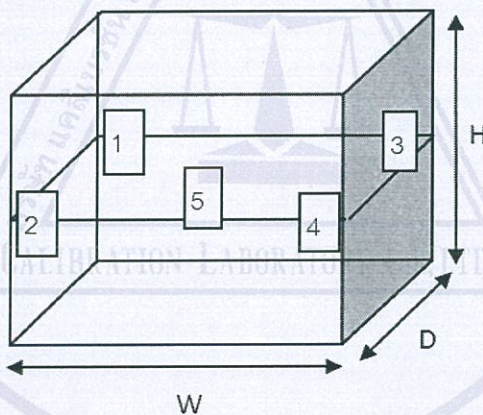
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

Test Point ($^{\circ}\text{C}$)	DUC Reading ($^{\circ}\text{C}$)	STD Reading ($^{\circ}\text{C}$)					Uncertainty \pm ($^{\circ}\text{C}$)
		Probe No. 1	Probe No. 2	Probe No. 3	Probe No. 4	Probe No. 5	
95.0	95.0	96.43	96.14	96.24	96.21	96.33	0.44

Technical Note : W = 35 cm, D = 29 cm, H = 14 cm.

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 01 Page 128 of 138



This report is valid for the above stated instrument/s only.

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End of Certificate

Certificate No. Q23031268

F3-011-04/01-12

page 4 of 4

