

เอกสารแนบ 6

เอกสารสอบเทียบเครื่องมือที่ใช้ในการวิเคราะห์



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



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : BALANCE
MANUFACTURER : METTLER TOLEDO
MODEL / TYPE : MS204TS/00
SERIAL NO. : B935191252[LA-002]
CLID. NO. : 362200356
JOB CONTROL NO. : 240307024790
CALIBRATION SERVICE : ☐ IN-LABORATORY ☒ ON-SITE

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.

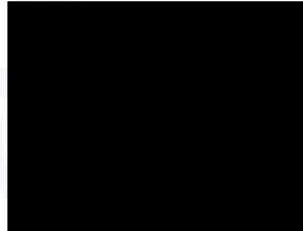
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 07 March 2024

DATE OF ISSUED : 08 April 2024

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :

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. Q24024790

F3-011-05/12-23

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@cdcalibration



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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 : METTLER TOLEDO
MODEL / TYPE : MS204TS/00
SERIAL NO. : B935191252[LA-002]
LOCATION SITE : LABORATORY - BALANCE ROOM
DATE OF CALIBRATION : 04 April 2024

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C

Relative Humidity : 50 % to 51 %

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-46 based on 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 :

1. Weight Set, Phoenix Class E2 S/N. WBS-SET-E2-01.
2. Weight, Sartorius Class E2 S/N. 44329129, 43529037, 44329167, 43529293.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).
Certificate No. MM-0123-22, Due Date 22 August 2024.
2. The measurements are traceable to International System of Units (SI), through Sartorius Lab Instruments GmbH & Co. KG.
Certificate No. M141607, M141608, M141609, M141611. Due Date 15 September 2025.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty 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. Q24024790

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@cdcalibration

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION
MEASUREMENT RESULTS : (X) without adjustment () adjustment

CALIBRATION DATA

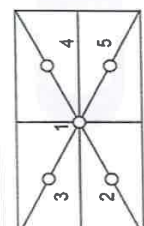
1. Error of indications

| 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 | 0.07 | 2.00 |
| 0.1000 | 0.1000 | 0.0999 | -0.0001 | 0.11 | 2.00 |
| 0.5000 | 0.5000 | 0.5000 | 0.0000 | 0.11 | 2.00 |
| 1.0000 | 1.0000 | 1.0000 | 0.0000 | 0.11 | 2.00 |
| 2.0000 | 2.0000 | 2.0000 | 0.0000 | 0.11 | 2.00 |
| 5.0000 | 5.0000 | 4.9999 | -0.0001 | 0.11 | 2.00 |
| 10.0000 | 10.0000 | 9.9999 | -0.0001 | 0.11 | 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

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

Note: The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 02 Page 116 of 138

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

End of Certificate

Certificate No. Q24024790
F3-011-05/12-23

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@clcalibration

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : BALANCE
MANUFACTURER : SHIMADZU
MODEL / TYPE : AP225WD
SERIAL NO. : D316300692[LA-001]
CLID. NO. : 362100172
JOB CONTROL NO. : 240307024789
CALIBRATION SERVICE : ☐ IN-LABORATORY ☒ ON-SITE

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.

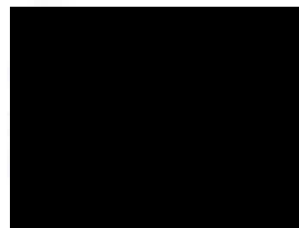
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 07 March 2024

DATE OF ISSUED : 05 April 2024

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Calibrated By :



Approved By :

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. Q24024789

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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 2024

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 based on 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 :

1. Weight Set, Phoenix Class E2 S/N. WBS-SET-E2-01.
2. Weight, Sartorius Class E2 S/N. 44329129, 43529037, 44329167, 43529293.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand). Certificate No. MM-0123-22, Due Date 22 August 2024.
2. The measurements are traceable to International System of Units (SI), through Sartorius Lab Instruments GmbH & Co. KG. Certificate No. M141607, M141608, M141609, M141611. Due Date 15 September 2025.

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. Q24024789

F3-011-05/12-23

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@clcalibration

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION
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 ± (mg) | Coverage factor k |
|--------------------------|-------------------------|---------------------|------------------------|----------------------|-------------------|
| Unload | 0.0000 | 0.0000 | 0.0000 | 0.07 | 2.00 |
| 5.0000 | 5.0000 | 5.0000 | 0.0000 | 0.11 | 2.00 |
| 10.0000 | 10.0000 | 10.0001 | +0.0001 | 0.11 | 2.00 |
| 20.0000 | 20.0000 | 20.0001 | +0.0001 | 0.11 | 2.00 |
| 40.0000 | 40.0000 | 40.0001 | +0.0001 | 0.13 | 2.00 |
| 60.0000 | 60.0000 | 60.0001 | +0.0001 | 0.17 | 2.00 |
| 80.0000 | 80.0000 | 80.0002 | +0.0002 | 0.17 | 2.00 |
| 100.0000 | 100.0000 | 100.0001 | +0.0001 | 0.17 | 2.00 |
| 120.0000 | 120.0000 | 120.0001 | +0.0001 | 0.29 | 2.00 |
| 140.0000 | 140.0000 | 140.0002 | +0.0002 | 0.29 | 2.00 |
| 160.0000 | 160.0000 | 160.0002 | +0.0002 | 0.29 | 2.00 |
| 180.0000 | 180.0000 | 180.0001 | +0.0001 | 0.29 | 2.00 |
| 200.0000 | 200.0001 | 200.0001 | 0.0000 | 0.29 | 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

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| 3. Effect of eccentric application of a load on the instrument | | | | | | |
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Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 02 Page 116 of 138

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

End of Certificate

Certificate No. Q24024789

F3-011-05/12-23

page 3 of 3



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ANAB
ACCREDITED
CALIBRATION AND
DIMENSIONAL MEASUREMENT
ACDM-2814

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : DO METER
MANUFACTURER : YSI
MODEL / TYPE : 5000-230V/5010
SERIAL NO. : 16D101626/19D100367[DOM-01]
CLID. NO. : 272100329

JOB CONTROL NO. : 240408038371

CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.

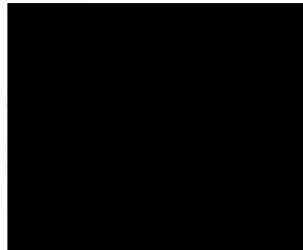
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 08 April 2024

DATE OF ISSUED : 10 April 2024

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :

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. Q24038371

F3-011-05/12-23

page 1 of 3



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ACDM-2814

REPORT OF CALIBRATION

FOR

NOMENCLATURE : DO METER
MANUFACTURER : YSI
MODEL / TYPE : 5000-230V/5010
SERIAL NO. : 16D101626/19D100367[DOM-01]
DATE OF CALIBRATION : 09 April 2024

ENVIRONMENT CONDITIONS :

Temperature : $(25 \pm 2.5) ^\circ\text{C}$ Relative Humidity : $(50 \pm 15) \% \text{RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CFCH-06. The calibration was performed by direct measurement with Certified Reference Material (CRM).

REFERENCE STANDARD USED :

Dissolved Oxygen, Sigma-Aldrich Product ID QC3077-500ML.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through Merck Co., Ltd.
Lot LRAD3840, Due Date October 2024.

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. Q24038371

F3-011-05/12-23

page 2 of 3



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ACDM-2814

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties of Do Meter.

CALIBRATION DATA

CORRECTION OF DO METER @ 20°C

| Nominal Value (mg/L) | DUC Reading (mg/L) | Correction (mg/L) | Uncertainty (mg/L) |
|---------------------------|-------------------------|------------------------|-------------------------|
| 7.78 | 7.80 | -0.02 | ± 0.38 |

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 012 Page 5 of 67

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

End of Certificate

Certificate No. Q24038371
F3-011-05/12-23

page 3 of 3



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DIMENSIONAL MEASUREMENT
ACDM-2814

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. : 240307024791
CALIBRATION SERVICE : ☐ IN-LABORATORY ☒ ON-SITE

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 : 07 March 2024

DATE OF ISSUED : 06 April 2024

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :

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. Q24024791
F3-011-05/12-23

page 1 of 4



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CALIBRATION AND
DIMENSIONAL MEASUREMENT
ACQM-2814

REPORT OF CALIBRATION

FOR

NOMENCLATURE : HOT AIR OVEN
MANUFACTURER : MEMMERT
MODEL / TYPE : UF110
SERIAL NO. : B422.0026[L A-0012]
LOCATION SITE : LABORATORY-HOT ZONE
DATE OF CALIBRATION : 04 April 2024

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C

Relative Humidity : 50% to 52 %

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPTH-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. Q23065868, Due Date 22 June 2024.

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. Q24024791

F3-011-05/12-23

page 2 of 4



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CALIBRATION AND
DIMENSIONAL MEASUREMENT
ACQM-2814

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

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

| Setting (°C) | DUC | | Measured Uniformity (°C) | Measured Stability (°C) | Measured Overall Variation (°C) |
|----------------|-------------------|--|----------------------------|---------------------------|-----------------------------------|
| | Indicating (°C) | | | | |
| 104.0 | 104.0 | | 0.81 | 0.07 | 1.20 |
| 180.0 | 180.0 | | 1.35 | 0.19 | 2.17 |

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Certificate No. Q24024791

F3-011-05/12-23

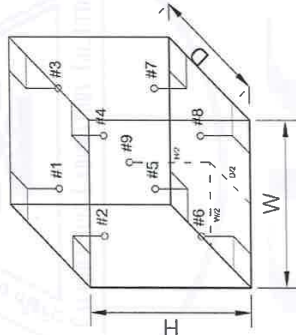
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

| DUC | Measured Temperature (°C)@Probe No.9 is Ref. | | | | | | | | | Uncertainty ± (°C) | Coverage factor k |
|-------|----------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|-----------------------|----------------------|
| | Setting (°C) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 104.0 | 104.0 | 103.11 | 104.12 | 103.56 | 103.79 | 103.72 | 103.88 | 103.57 | 104.18 | 103.88 | 2.00 |
| 180.0 | 180.0 | 178.33 | 180.32 | 178.77 | 179.54 | 179.26 | 179.74 | 179.19 | 180.15 | 179.58 | 2.00 |

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

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 012 Page 58 of 67



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

End of Certificate



CERTIFICATE OF CALIBRATION

FOR

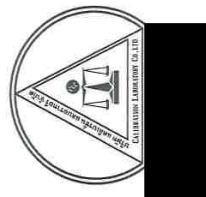
NOMENCLATURE : INCUBATOR
MANUFACTURER : ACCUPLUS
MODEL / TYPE : SMART 1250
SERIAL NO. : 2059-0718-0010[LA-002]
CLID. NO. : 332100155
JOB CONTROL NO. : 240307024792
CALIBRATION SERVICE : ☐ IN-LABORATORY ☒ ON-SITE
CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 07 March 2024

DATE OF ISSUED : 06 April 2024

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :

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. Q24024792
F3-011-05/12-23

page 1 of 4





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2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Ladphrao, Bangkok 10230
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REPORT OF CALIBRATION

FOR

NOMENCLATURE : INCUBATOR
MANUFACTURER : ACCUPLUS
MODEL / TYPE : SMART 1250
SERIAL NO. : 2059-0718-0010[LA-002]
LOCATION SITE : LABORATORY
DATE OF CALIBRATION : 04 April 2024

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C Relative Humidity : 50 % to 52 %

PROCEDURE USED :

This instrument was calibrated under procedure No. W1-305-165 based on 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. Q23065868, Due Date 22 June 2024.

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. Q24024792

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CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

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

| Setting (°C) | DUC | | Measured Uniformity (°C) | Measured Stability (°C) | Measured Overall Variation (°C) |
|----------------|-------------------|------|----------------------------|---------------------------|-----------------------------------|
| | Indicating (°C) | | | | |
| 20.0 | 20.0 | 0.52 | 0.46 | 1.06 | |

Certificate No. Q24024792

F3-011-05/12-23

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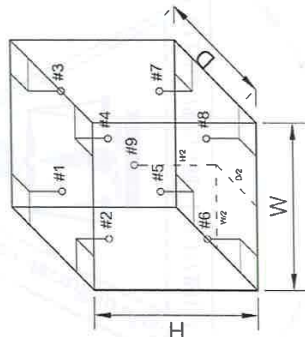
2. TEMPERATURE DISTRIBUTION

CALIBRATION DATA

| DUC | Measured Temperature (°C) @ Probe No.9 is Ref. | | | | | | | | | Uncertainty ± (°C) | Coverage factor k |
|------|--------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------------------------|----------------------|
| | Setting (°C) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 20.0 | 20.0 | 20.58 | 20.70 | 20.70 | 20.46 | 20.54 | 20.53 | 20.53 | 20.36 | 20.39 | 2.00 |

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

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 02 Page 129 of 138



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

End of Certificate



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : pH METER
MANUFACTURER : APERA
MODEL / TYPE : PH700/201T-F
SERIAL NO. : PH700X1019061009/N/A [PH-02]
CLID. NO. : 272401000

JOB CONTROL NO. : 240521051980

CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

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 May 2024

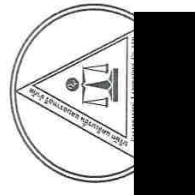
DATE OF ISSUED : 23 May 2024

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :



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. Q24051980
F3-011-05/12-23

page 1 of 4





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NSC-TIS-115 17025
CALIBRATION 0059
CLC

REPORT OF CALIBRATION

FOR

NOMENCLATURE : pH METER
MANUFACTURER : APERA
MODEL / TYPE : PH700/201T-F
SERIAL NO. : PH700X1019061009/N/A [PH-02]
DATE OF CALIBRATION : 22 May 2024

ENVIRONMENT CONDITIONS :

Temperature : $(25 \pm 2.5) ^\circ\text{C}$ Relative Humidity : $(50 \pm 15) \% \text{ RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-128, 238. The calibration was performed by direct measurement with Certified Reference Material (CRM) and comparison with Calibration Bath, Precision Thermometer and IPT which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. pH Standard Solution, NIMT TRM CODE TRM-S-2003, TRM CODE TRM-S-2007.
2. pH Standard Solution, Control Company Catalog Number 06664260,11754256, Lot Number CC787362.
3. Calibration Bath, Kambic Model OB-22/2 ULT S/N. 171115653.
4. Precision Thermometer, ASL Model F200-A-8 S/N. 014433/03.
5. IPT, ASL Model T100-250-1D S/N. L0193A-1-1.

Certificate No. Q24051980

F3-011-05/12-23

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NSC-TIS-115 17025
CALIBRATION 0059
CLC

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).
Lot Number: 040822, 120124, Due Date 04 March 2025.
2. The measurements are traceable to International System of Units (SI), through Control Company.
Certificate No. 4281-14495731, Due Date 27 September 2025.
3. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd.
Certificate No. Q23136342, Due Date 20 December 2024.
4. The measurements are traceable to International System of Units (SI), through Thailand Institute of Scientific and Technological Research (TISTR). Certificate No. PSL-T 0203/67, Due Date 07 December 2024.
5. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).
Certificate No. TT-0136-23, Due Date 12 December 2024.

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. Q24051980

F3-011-05/12-23

page 3 of 4



@clcalibration

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The table in the following gives the calibration results and associated measurement uncertainties of pH meter.

CALIBRATION DATA

1. pH METER RESULT @ 25 °C

| Standard pH Buffer Solution (pH) | pH Meter Reading (pH) | pH Meter Reading (mV) | Correction (pH) | Uncertainty of Measurement (± pH) | k Factor |
|----------------------------------|-----------------------|-----------------------|-----------------|-----------------------------------|----------|
| 4.003 | 4.00 | 180 | +0.003 | 0.014 | 2.00 |
| 7.005 | 7.00 | 1 | +0.005 | 0.014 | 2.00 |
| 10.015 | 10.01 | -168 | +0.005 | 0.100 | 2.00 |

Technical Note. Setting function CAL.3 point (4,7,10).

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 02 Page 91 of 138

*2. TEMPERATURE RESULT [pH PROBE]

| Immersion depth (mm) | Actual Temperature (°C) | DUC Reading (°C) | Correction (°C) | Uncertainty ± (°C) |
|----------------------|-------------------------|------------------|-----------------|--------------------|
| 100 | 25.00 | 25.0 | 0.00 | 0.07 |

Note. Probe Ø 12 mm

* means Calibrations marked " Not TISI Accredited " in this Certificate have been included for completeness.

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of k = 2.00.

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

End of Certificate

Certificate No. Q24051980

F3-011-05/12-23



CERTIFICATE OF CALIBRATION

FOR

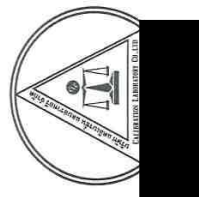
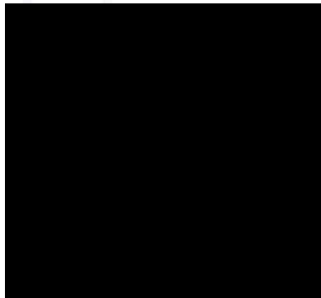
NOMENCLATURE : REFRIGERATOR
MANUFACTURER : MEDICOOL
MODEL / TYPE : BB-117
SERIAL NO. : BB117-190725001[LA-003]
CLID. NO. : 332100156
JOB CONTROL NO. : 240307024793
CALIBRATION SERVICE : ☐ IN-LABORATORY ☒ ON-SITE
CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 07 March 2024

DATE OF ISSUED : 06 April 2024

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :

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. Q24024793

F3-011-05/12-23





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



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 2024

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C Relative Humidity : 50 % to 52 %

PROCEDURE USED :

This instrument was calibrated under procedure No. WI-305-165 based on 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. Q23065868, Due Date 22 June 2024.

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. Q24024793

F3-011-05/12-23



@clcalibration



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



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

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

| Setting (°C) | DUC | | Measured Uniformity (°C) | Measured Stability (°C) | Measured Overall Variation (°C) |
|----------------|-------------------|--|----------------------------|---------------------------|-----------------------------------|
| | Indicating (°C) | | | | |
| 4.0 | 4.0 | | 0.82 | 1.14 | 2.49 |

Certificate No. Q24024793

F3-011-05/12-23



@clcalibration

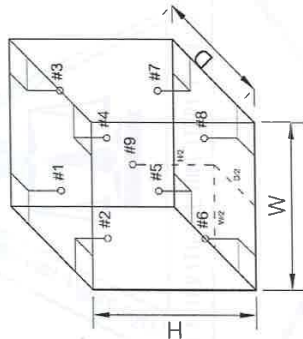
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

| DUC | | Measured Temperature (°C) @Probe No.9 is Ref. | | | | | | | | | Uncertainty ± (°C) | Coverage factor k |
|----------------|-------------------|-------------------------------------------------|------|------|------|------|------|------|------|------|-------------------------|----------------------|
| Setting (°C) | Indicating (°C) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
| 4.0 | 4.0 | 3.22 | 3.93 | 3.21 | 3.93 | 3.52 | 3.29 | 3.02 | 3.18 | 3.31 | 1.40 | 2.00 |

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

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 02 Page 129 of 138



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

End of Certificate



Certificate of Calibration

Certificate Number : SPR24050208-1 Page : 1 of 3
Customer : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 Baan Klang Krung Biz Town, Soi Srinagarindra 46/1 (Pranote),
Nongbon Sub-district, Prawet District, Bangkok 10250

Equipment Name : Soil Hydrometer
Manufacturer : Precision
Model : ASTM 152H
Serial Number : 061
ID. Number : N/A
Environmental Conditions
Ambient Temperature : 20 °C ± 1 °C Received Date : 14 May 2024
Relative Humidity : 50 % ± 15 % Calibration Date : 16 May 2024
Location of Calibration : In-Lab Recommend Due Date : N/A
Calibration Procedure : SP-CPM-04-14 Date of Issue : 17 May 2024

Method of Calibration

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

Calibrated by : [Redacted] Calibration Officer
Approved by : [Redacted] Authorized Signatory



ID LINE : IEC17025

Result of Calibration

Certificate No. : SPR24050208-1

Page : 3 of 3

Range : -5 to 60 g/l Resolution : 1 g/l Accuracy (±) : 1 g/l

Hydrometer Measurement @ 20 °C

Unit : g/l

| Standard Value | UUC Reading | Error | Uncertainty (±) |
|----------------|-------------|--------|-------------------|
| -0.049 | 0 | 0.049 | 0.23 |
| 30.093 | 30 | -0.093 | 0.23 |
| 60.032 | 60 | -0.032 | 0.24 |

Note:

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

Measurement Uncertainty

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

- End of Certificate -

69/29 Moo 1 Klongsi Klongluang Pathumthani 12120 (Thailand) Tel: (662) 193-2220 5 คู่สาย www.สอบเทียบเครื่องมือวัด.com

SP-FM-04-15 REV.0



ID LINE : IEC17025

Calibration Report

Certificate Number : SPR24050208-1

Page : 2 of 3

Reference Standards

| Equipment Name | Model | Serial No. | Certificate No. | Due Date |
|------------------------------|------------------|-----------------|-----------------|-------------|
| Digimatic Micrometer | 293-821-30 | 45121126 | SPR24020353-4 | 14 Mar 2025 |
| Electronic Balance | N/A | 14246789 | SPR23100036-7 | 15 Oct 2024 |
| Barometer | MHB-382SD | 52188 | SPR24020353-10 | 16 Mar 2025 |
| Standard Weight Ring | N/A | N/A | SPR24010142-26 | 11 Jan 2025 |
| Digital Thermometer With PRT | GT11/3850-40-392 | 08000098/100288 | SPR23070077-4 | 20 Jul 2024 |

Traceability

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

69/29 Moo 1 Klongsi Klongluang Pathumthani 12120 (Thailand) Tel: (662) 193-2220 5 คู่สาย www.สอบเทียบเครื่องมือวัด.com

SP-FM-04-15 rev.0



Calibration Report

Page: 2 of 3

Certificate Number : SPR24050208-2

69/29 Moo 1 Klongsi Klongluang Pathumthani 12120 (Thailand) Tel: (662) 193-2220 5 ค่าย www.สอบเทียบเครื่องมือวัด.com

Reference Standards

| Equipment Name | Model | Serial No. | Certificate No. | Due. Date |
|------------------------------|------------------|-----------------|-----------------|-------------|
| Digimatic Micrometer | 293-821-30 | 45121126 | SPR24020353-4 | 14 Mar 2025 |
| Electronic Balance | N/A | 14246789 | SPR23100036-7 | 15 Oct 2024 |
| Barometer | MHB-382SD | 52188 | SPR24020353-10 | 16 Mar 2025 |
| Standard Weight Ring | N/A | N/A | SPR24010142-26 | 11 Jan 2025 |
| Digital Thermometer With PRT | GT11/3850-40-392 | 08000098/100288 | SPR23070077-1 | 20 Jul 2024 |

Traceability

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

Certificate of Calibration

Page: 1 of 3

Certificate Number : SPR24050208-2

Customer : ENVIRONMENTAL MEASUREMENTS CO., LTD.

5/45 Baan Klang Krung Biz Town, Soi Srinagarindra 46/1 (Pramote),
Nongbon Sub-district, Prawet District, Bangkok 10250

| | |
|--------------------------|-------------------|
| Equipment Name | : Soil Hydrometer |
| Manufacturer | : Precision |
| Model | : ASTM 152H-62 |
| Serial Number | : 2201967 |
| D. Number | : N/A |
| Environmental Conditions | |
| Ambient Temperature | : 20 °C ± 1 °C |
| Relative Humidity | : 50 % ± 15 % |
| Location of Calibration | : In-Lab |
| Calibration Procedure | : SP-CFM-04-14 |
| Received Date | : 14 May 2024 |
| Calibration Date | : 16 May 2024 |
| Recommend Due Date | : N/A |
| Date of Issue | : 17 May 2024 |

Method of Calibration

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

The calibration certificate shall not be reproduced except in full, without written approval of SP Metrology System (Thailand).

Calibrated by :

Calibration Officer

Approved by :

Authorized Signatory



Result of Calibration

Certificate No. : SPR24050208-2

Page : 3 of 3

Range : -5 to 60 g/l Resolution : 1 g/l Accuracy (\pm) : 1 g/l

Hydrometer Measurement @ 20 °C Unit : g/l

| Standard Value | UUC Reading | Error | Uncertainty (\pm) |
|----------------|-------------|--------|-----------------------|
| -0.048 | 0 | 0.048 | 0.23 |
| 30.089 | 30 | -0.089 | 0.23 |
| 60.041 | 60 | -0.041 | 0.24 |

Note:

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

Measurement Uncertainty

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

- End of Certificate -



CLC
Accredited
ISO/IEC 17025

21/0-11,14,55 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



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : DIGITAL THERMOMETER WITH PROBE

MANUFACTURER : LUTRON

MODEL / TYPE : MTM-380SD

SERIAL NO. : I.570147/N/A[LA-0013/LA-0013/A]

CLID. NO. : 232204019

JOB CONTROL NO. : 240408038373

CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.

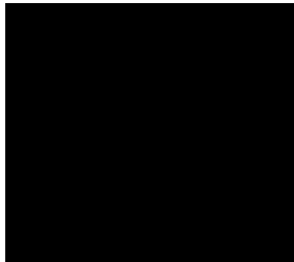
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 08 April 2024

DATE OF ISSUED : 10 April 2024

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :



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. Q24038373

F3-011-05/12-23

page 1 of 3



@clcalibration



REPORT OF CALIBRATION

FOR

NOMENCLATURE : DIGITAL THERMOMETER WITH PROBE
MANUFACTURER : LUTRON
MODEL / TYPE : MTM-380SD
SERIAL NO. : 1.570147/N/A[LA-0013/LA-0013/A]
DATE OF CALIBRATION : 09 April 2024

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. CLC-CPTH-06 based on ASTM E 220-86 as calibration guidelines.

The calibration was performed by using Calibration Bath, Precision Thermometer and IPRT which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Calibration Bath, Kambic Model OB-22/2 ULT, OB-22/2 S/N. 17115653, 17115654.
2. Precision Thermometer, ASL Model F200-A-8 S/N. 014433/03.
3. IPRT, ASL Model TT100-250-1D, TT100-450-1D S/N. L0193A-1-1, L1123A-1-5.

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q23136342, Q23126517. Due Date 20 December 2024, 20 November 2024.
2. The measurements are traceable to International System of Units (SI), through Thailand Institute of Scientific and Technological Research (TISTR). Certificate No. PSL-T 0203/67, Due Date 07 December 2024.
3. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand). Certificate No. TT-0136-23, TT-0132-23. Due Date 12 December 2024, 22 November 2024.

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. Q24038373

F3-011-05/12-23

page 2 of 3



calibration



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The DUC Reading were recorded and the means value were reported of five times measurement in the table below.

CALIBRATION DATA

CORRECTION OF TEMPERATURE : T1 [THERMOCOUPLE TYPE K]

| Immersion depth (mm) | Actual Temperature (°C) | DUC Reading (°C) | Correction (°C) | Uncertainty \pm (°C) |
|----------------------|-------------------------|------------------|-----------------|------------------------|
| 200 | 4.00 | 4.2 | -0.20 | 0.52 |
| | 20.01 | 20.3 | -0.29 | |
| | 95.04 | 95.6 | -0.56 | |
| | 104.02 | 104.9 | -0.88 | |
| | 180.03 | 181.4 | -1.37 | |

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 012 Page 56 of 67

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

End of Certificate

Certificate No. Q24038373

F3-011-05/12-23

page 3 of 3



calibration



CALIBRATION LABORATORY Co., LTD.

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ACREDITED
CALIBRATION AND
MEASUREMENT
ACDM-2814

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. : 240408038369
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.

5/45 BAAK KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 08 April 2024

DATE OF ISSUED : 17 April 2024

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :

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. Q24038369

F3-011-05/12-23

page 1 of 3



@ckcalibration



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ACREDITED
CALIBRATION AND
MEASUREMENT
ACDM-2814

REPORT OF CALIBRATION

FOR

NOMENCLATURE : DIGITAL THERMOHYGRO METER
MANUFACTURER : DIGICON
MODEL / TYPE : TH-02A
SERIAL NO. : 1919E0284991[DTH-01]
DATE OF CALIBRATION : 10 April 2024

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. CLC-CPTH-11. The calibration was performed by using Chilled Mirror Hygrometer which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Chilled Mirror Hygrometer, Edgetech Model Dew Master S/N. 44602.
Temperature & Humidity Chamber, PGC Model 9141-5116 S/N. 1304261.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through Thunder Scientific Corporation.
Certificate No. 21594, Due Date 06 July 2024.

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. Q24038369

F3-011-05/12-23

page 2 of 3



@ckcalibration



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



CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION 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 | 0.27 |
| 25.0 | 25.00 | 24.6 | +0.40 | |
| 30.0 | 30.00 | 29.5 | +0.50 | |

2. CORRECTION OF HUMIDITY

| STD Temperature (° C) | STD Reading (%RH) | DUC Reading (%RH) | Correction (%RH) | Uncertainty ± (%RH) |
|----------------------------|------------------------|------------------------|-----------------------|--------------------------|
| 25 | 40.0 | 32 | +8.0 | 0.8 |
| 25 | 60.0 | 52 | +8.0 | 0.9 |

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 012 Page 59 of 67

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

End of Certificate

Certificate No. Q24038369

F3-011-05/12-23



page 3 of 3



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



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : DIGITAL THERMOHYGRO METER
MANUFACTURER : DIGICON
MODEL / TYPE : TH-02A
SERIAL NO. : 1919E0284980[DTH-02]
CLID. NO. : 232100201
JOB CONTROL NO. : 240408038370
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

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 : 08 April 2024

DATE OF ISSUED : 17 April 2024

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :

Approved By :



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. Q24038370

F3-011-05/12-23



page 1 of 3



CALIBRATION LABORATORY Co., LTD.

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ANAB National Accreditation Board
ACCREDITED
CALIBRATION AND
MAINTENANCE
ACDM-2814

REPORT OF CALIBRATION

FOR

NOMENCLATURE : DIGITAL THERMOHYGRO METER
MANUFACTURER : DIGICON
MODEL / TYPE : TH-02A
SERIAL NO. : 1919E0284980|DTH-02|
DATE OF CALIBRATION : 10 April 2024

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. CLC-CPTH-11. The calibration was performed by using Chilled Mirror Hygrometer which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Chilled Mirror Hygrometer, Edgetech Model Dew Master S/N. 44602.
Temperature & Humidity Chamber, PGC Model 9141-5116 S/N. 1304261.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through Thunder Scientific Corporation.
Certificate No. 21594, Due Date 06 July 2024.

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. Q24038370
F3-011-05/12-23



page 2 of 3

@clcalibration



CALIBRATION LABORATORY Co., LTD.

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ANAB National Accreditation Board
ACCREDITED
CALIBRATION AND
MAINTENANCE
ACDM-2814

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION 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 ($^{\circ}\text{C}$) | Actual Temperature ($^{\circ}\text{C}$) | DUC Reading ($^{\circ}\text{C}$) | Correction ($^{\circ}\text{C}$) | Uncertainty \pm ($^{\circ}\text{C}$) |
|--------------------------------------|----------------------------------------------|---------------------------------------|--------------------------------------|---------------------------------------------|
| 20.0 | 20.00 | 19.7 | +0.30 | 0.27 |
| 25.0 | 25.00 | 24.7 | +0.30 | |
| 30.0 | 30.00 | 29.6 | +0.40 | |

2. CORRECTION OF HUMIDITY

| STD Temperature ($^{\circ}\text{C}$) | STD Reading (%RH) | DUC Reading (%RH) | Correction (%RH) | Uncertainty \pm (%RH) |
|-------------------------------------------|----------------------|----------------------|---------------------|----------------------------|
| 25 | 40.0 | 33 | +7.0 | 0.8 |
| 25 | 60.0 | 53 | +7.0 | 0.9 |

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 012 Page 59 of 67

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

End of Certificate

Certificate No. Q24038370
F3-011-05/12-23

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@clcalibration



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: 02-578-2872 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



NSC-TISI-TIS 17025
CALIBRATION 0659
CLC

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : WATER BATH
MANUFACTURER : M-LAB
MODEL / TYPE : WBN 15
SERIAL NO. : 0335[LA-007]
CLID. NO. : 332300657
JOB CONTROL NO. : 240307024795
CALIBRATION SERVICE : ☐ IN-LABORATORY ☒ ON-SITE

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.

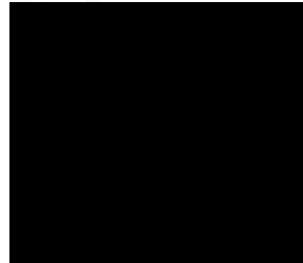
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 07 March 2024

DATE OF ISSUED : 06 April 2024

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :



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. Q24024795

F3-011-05/12-23

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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: 02-578-2872 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



NSC-TISI-TIS 17025
CALIBRATION 0659
CLC

REPORT OF CALIBRATION

FOR

NOMENCLATURE : WATER BATH
MANUFACTURER : M-LAB
MODEL / TYPE : WBN 15
SERIAL NO. : 0335[LA-007]
LOCATION SITE : LABORATORY-HOT ZONE
DATE OF CALIBRATION : 04 April 2024

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C

Relative Humidity : 50% to 52%

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 Series II which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Hydra Series II, Fluke Model 2635A S/N. 7107303.

TRACEABILITY :

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

Certificate No. Q24026699, Due Date 13 September 2024.

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. Q24024795

F3-011-05/12-23

page 2 of 4



@clcalibration

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

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) |
|-------------------|--------------------|-------------------|------------------|
| 85.0 | 85.0 | 0.48 | 0.17 |

Certificate No. Q24024795

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u.6/22



@clcalibration

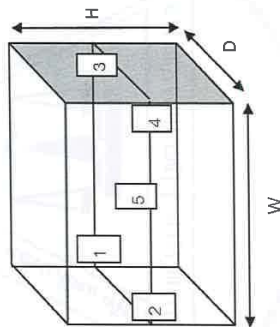
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

| Test Point (°C) | DUC Reading (°C) | STD Reading (°C) | | | | | Uncertainty ± (°C) |
|----------------------|-----------------------|--------------------|-------------|-------------|-------------|-------------|-------------------------|
| | | Probe No. 1 | Probe No. 2 | Probe No. 3 | Probe No. 4 | Probe No. 5 | |
| 85.0 | 85.0 | 84.37 | 84.87 | 84.67 | 84.86 | 84.71 | 0.60 |

Technical Note : W = 35 cm, D = 30 cm, H = 15 cm.

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 02 Page 128 of 138



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

End of Certificate

Certificate No. Q24024795

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@clcalibration



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



NSC-TISI-TIS 17025
CALIBRATION 0659
CLC

CERTIFICATE OF CALIBRATION

FOR

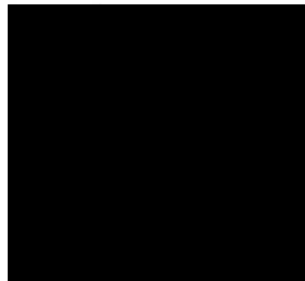
NOMENCLATURE : WATER BATH
MANUFACTURER : MEMMERT
MODEL / TYPE : WNB14
SERIAL NO. : L418.0758[LA-004]
CLID. NO. : 332100157
JOB CONTROL NO. : 240307024794
CALIBRATION SERVICE : ☐ IN-LABORATORY ☒ ON-SITE

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 : 07 March 2024 DATE OF ISSUED : 06 April 2024

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By :



Approved By :

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. Q24024794
F3-011-05/12-23

page 1 of 4



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



NSC-TISI-TIS 17025
CALIBRATION 0659
CLC

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 2024

ENVIRONMENT CONDITIONS :

Temperature : 24 °C to 25 °C

Relative Humidity : 50% to 52%

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 Series II which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Hydra Series II, Fluke Model 2635A S/N. 7107303.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd.
Certificate No. Q24026699, Due Date 13 September 2024.

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. Q24024794
F3-011-05/12-23

page 2 of 4



@clcalibration

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

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 | 0.50 | 0.21 |

Certificate No. Q24024794

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@clcalibration

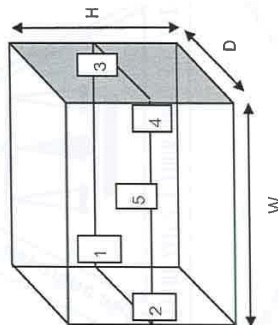
CALIBRATION DATA

2. TEMPERATURE DISTRIBUTION

| Test Point (°C) | DUC Reading (°C) | STD Reading (°C) | | | | | Uncertainty ± (°C) |
|----------------------|-----------------------|--------------------|-------------|-------------|-------------|-------------|-------------------------|
| | | Probe No. 1 | Probe No. 2 | Probe No. 3 | Probe No. 4 | Probe No. 5 | |
| 95.0 | 95.0 | 96.62 | 96.74 | 96.93 | 96.68 | 96.66 | 0.65 |

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

The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 02 Page 128 of 138



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

End of Certificate

Certificate No. Q24024794

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