

## เอกสารแนบ 6

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เอกสารสอบเทียบเครื่องมือที่ใช้ในการวิเคราะห์

## Calibration Results

Certificate No. : WK2402-300-865

Page 2 of 2

### Calibration Result of the Accuracy

Function : Dissolved Oxygen Measurement at 25 °C

Resolution: 0.01 mg/L

Unit : mg/L

| STD<br>Solution | UUC Reading       |                  | Error | Uncertainty<br>( $\pm$ mg/L) |
|-----------------|-------------------|------------------|-------|------------------------------|
|                 | Before Adjustment | After Adjustment |       |                              |
| 0.00            | 0.32              | 0.00             | 0.00  | 0.15                         |
| 8.40            | 9.15              | 8.37             | -0.03 | 0.33                         |
| 8.70            | 9.01              | 8.65             | -0.05 | 0.33                         |
| 9.00            | 9.24              | 8.92             | -0.08 | 0.33                         |

( ) Without Adjustment (X) After Adjustment

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\*\*\* End of Certificate \*\*\*

# Certificate of Calibration

Certificate No.: WK2402-300-865

Page 1 of 2

**Customer** : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
67/35-36, 3rd Floor, Petchkasem 7/1, Petchkasem Rd.,  
Watthapa, Bangkok Yai, Bangkok 10600 Thailand.

|                    |                    |                     |                  |
|--------------------|--------------------|---------------------|------------------|
| Instrument         | : Dissolved Oxygen | Ambient Temperature | : (25.0 ± 2) °C  |
| Manufacturer       | : HANNA            | Humidity            | : (50.0 ±15) %RH |
| Model              | : HI5421           | Received Date       | : 27-Feb-24      |
| Serial No.         | : 04240005101      | Calibrated Date     | : 27-Feb-24      |
| Identity No.       | : KCLAI178H        | Issued Date         | : 27-Feb-24      |
| Range              | : See to data      | Calibrated Location | : In Lab         |
| Resolution         | : See to date      |                     |                  |
| Calibration Method | : CP-WK-C03        |                     |                  |

### Reference standard instruments :

| Instrument           | Serial No. | Certificate No. | Due Date  | Traceability to       |
|----------------------|------------|-----------------|-----------|-----------------------|
| Zero Oxygen Solution | HI7040L    | S0115/20        | 30-Aug-25 | NIST                  |
| DO Meter             | 874477     | WK2305-300-241  | 25-May-24 | WK Electric Co., Ltd. |
| Digital Thermometer  | WK-CT-025  | WK2402-300-25   | 25-Feb-25 | WK Electric Co., Ltd. |

NIST : National Institute of Standard and Technology.

This result calibrate was found accurate as shown on date place of calibrate only  
This certificate is traceability to th International System of Unit (SI)

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

Calibrated by : \_\_\_\_\_  
Approved by : \_\_\_\_\_

Approved by :

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**Condition of this calibration result**

1. Reference Standard Instruments : This certification is traceable to the international unit of unit maintained through:

| Instruments                    | Model     | Serial No. | Certificate No. | Traceable                                          |
|--------------------------------|-----------|------------|-----------------|----------------------------------------------------|
| Documenting Process Calibrator | Fluke 753 | 43160061   | LF24-0014       | Measuretronix Limited.                             |
| Thermometer with sensor        | HI98509   | 39643D     | 23T1453         | Technology Promotion Association (Thailand-Japan). |
| Digital Thermo-Hygrometer      | HT-771SD  | AL07155    | 24H41           |                                                    |

2. Reference Standard Materials : pH calibration standard traceable thru CPA chem Ltd.

| Buffer Solution | Manufacture | Certified Value                         | Lot Number | Exp. date   |
|-----------------|-------------|-----------------------------------------|------------|-------------|
| pH 4.0          | CPA chem    | $4.008 \pm 0.006 @ 25^{\circ}\text{C}$  | 898494     | 3 June 2024 |
| pH 7.0          | CPA chem    | $6.985 \pm 0.007 @ 25^{\circ}\text{C}$  | 898500     | 28 May 2024 |
| pH 10.0         | CPA chem    | $10.011 \pm 0.012 @ 25^{\circ}\text{C}$ | 898502     | 24 May 2024 |

**Calibration Result :**

1. Performing standard curve by Simulator at: -177.5, 0.0, 177.5 mV  
(Measurement Electrical Potential) After Adjust Result.

| Unit Under Calibration      | Nominal Value | Standard Voltage Input | Actual Reading |        | Uncertainty of Measurement ( $\pm$ mV) |
|-----------------------------|---------------|------------------------|----------------|--------|----------------------------------------|
|                             |               |                        | pH             | mV     |                                        |
| pH Meter<br>S/N 04160019101 | 4.01          | 177.5                  | 4.01           | 177.5  | 0.097                                  |
|                             | 7.01          | 0.0                    | 7.01           | 0.0    | 0.058                                  |
|                             | 10.01         | -177.5                 | 10.01          | -177.5 | 0.097                                  |

2. Performing three buffer standard curve by using buffer nominal : pH 4,7,10 After Adjustment.

| Unit Under Calibration       | Standard pH Buffer Solution | Actual Reading (pH) | Actual Reading (mV) | Uncertainty of Measurement ( $\pm$ pH) |
|------------------------------|-----------------------------|---------------------|---------------------|----------------------------------------|
| pH Electrode<br>S/N 094430BN | 4.008                       | 4.02                | 159.3               | 0.010                                  |
|                              | 6.985                       | 6.99                | -13.6               | 0.011                                  |
|                              | 10.011                      | 10.04               | -187.9              | 0.014                                  |

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

\*\* End of certificate \*\*

Certificate No. : HIT-2410-0320

Page : 1 of 2

**CERTIFICATE OF CALIBRATION**

|                         |                                             |                   |             |  |  |
|-------------------------|---------------------------------------------|-------------------|-------------|--|--|
| Equipment :             | pH/mV and EC/TDS/Salinity/Resistivity Meter |                   |             |  |  |
| Meter Model :           | HI5521-02                                   | Serial No. :      | 04160019101 |  |  |
| Probe Model :           | HI1131B                                     | Serial No. :      | 094430BN    |  |  |
| Resolution (pH) :       | 0.01                                        | Resolution (mV) : | 0.1         |  |  |
| Manufacturer :          | Hanna Instruments                           |                   |             |  |  |
| Condition As-Received : | Used Product                                |                   |             |  |  |
| Ambient Temperature :   | ( 25 ± 2 ) °C                               |                   |             |  |  |
| Relative Humidity :     | ( 50 ± 15 ) % RH                            |                   |             |  |  |
| Customer name :         | Okla Testing & Consulting Service Co., Ltd. |                   |             |  |  |

67/35-36, 3RD Floor, Phetkasem 7/1 Road, Wat Tha Pra,  
Bangkok Yai, Bangkok 10600 Thailand

Received date : 28 February 2024

Calibrate date : 4 March 2024

Issue date : 5 March 2024

Calibrated Location : Hanna Instruments (Thailand) Ltd.

Calibration Procedure : This calibrator was conducted by using in-house: calibration procedure  
CP-01, CP-02 by using certified reference material (CRM)

Calibrated by :

Approved by :

Authorized Signatory

  
Hanna Instruments  
(Thailand) Limited

This certificate was certified only for the instrument we calibrated.

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

\*\* This certificate may not be reproduced other than in full, except with the prior written \*\*  
approval of the head of Hanna Instrument (Thailand)



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 Email: sale@cal-laboratory.com



NSC-TIS-TIS 17025  
CALIBRATION 0659  
CLC



Accredited  
ISO/IEC 17025  
CLC

## REPORT OF CALIBRATION

### FOR

NOMENCLATURE : DIGITAL THERMOMETER  
MANUFACTURER : HANNA INSTRUMENTS  
MODEL / TYPE : HI5521/Hi7662-W  
SERIAL NO. : 04160019101/0615024N  
DATE OF CALIBRATION : 19 October 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-305-187 based on ASTM E 644-11:2019 as calibration guidelines.

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

#### REFERENCE STANDARD USED :

1. Calibration Bath, Kambie Model OB-22/2 ULT S/N. 17115653.
2. Precision Thermometer, ASL Model F200-A-8 S/N. 014433/03.
3. IPT, ASL Model T100-250-1D S/N. PO106346-1-13.

#### TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through Calibration Laboratory Co., Ltd. Certificate No. Q22130792, Due Date 05 January 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 0010/66, Due Date 06 November 2023.
3. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand). Certificate No. TT-0020-23, Due Date 22 February 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. Q23115955

F3-011-04/01-12

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@ckcalibration



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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 Email: sale@cal-laboratory.com



NSC-TIS-TIS 17025  
CALIBRATION 0659  
CLC

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : DIGITAL THERMOMETER  
MANUFACTURER : HANNA INSTRUMENTS  
MODEL / TYPE : HI5521/Hi7662-W  
SERIAL NO. : 04160019101/0615024N  
CLID. NO. : 232202088  
JOB CONTROL NO. : 231017115955

CUSTOMER : OKLA TESTING & CONSULTING SERVICE CO., LTD.  
6735-36, 3RD FLOOR, PHETKASEM 7/1 RD., WATTAPRA,  
BANGKOKYAI, BANGKOK 10600 THAILAND

DATE OF RECEIVED : 17 October 2023

DATE OF ISSUED : 20 October 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 :

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. Q23115955

F3-011-04/01-12

page 1 of 3



@ckcalibration

## Certificate of Calibration

Page : 1 of 2

Certificate No. : 67-200069-1

Submitted by :

Okla Testing&amp;Consulting Service Co.,Ltd.

67/35-36, 3rd Floor, Petchkasem 7/1, Petchkasem Rd.,

Wattapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment :

Electronic Balance

Manufacturer : Sartorius

Model : BSA224S-CW

Serial No. : 35790699

Capacity : 200 g Resolution : 0.0001 g

Environment :

On site calibration was carried out at ti Laboratory Environmental,Okla

Testing&amp;Consulting Service Co.,Ltd.

Ambient Temperature : (28.4 to 28.5) °C

Relative Humidity : (49.4 to 51.1) %

Air Pressure : 1012.0 mbar

Date of Received :

26 February 2024

Date of Calibration :

26 February 2024

Date of Issue :

27 February 2024

Calibrated by :

Akaradath Thippichai

Calibration Method :

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

Edition 7 - November 2022

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

Standard Weights

ID No.

Cert. No.

Traceability

Due Date

E261-E2624

C02232088

08 Nov 2024

National Institute of Metrology (Thailand), (NIMT)

Approved by :

Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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CONDITION OF CALIBRATION ITEM : GOOD

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 [ THERMISTOR ]

| Immersion depth (mm) | Actual Temperature (°C) | DUC Reading (°C) | Correction (°C) | Uncertainty ± (°C) |
|----------------------|-------------------------|------------------|-----------------|--------------------|
| 105                  | 19.99                   | 20.0             | -0.01           | 0.07               |
|                      | 24.98                   | 25.0             | -0.02           |                    |
|                      | 30.01                   | 30.1             | -0.09           |                    |

Note: Probe Ø 3.5 mm

Materials : Metal Sheath.

Note: The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 02 Page 35 of 138

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

### End of Certificate ###

Certificate No. Q23115955

F3-011-04/01-12

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@clcalibration



## Certificate of Calibration

Certificate No. : 67-400117-2 Page : 1 of 2

Submitted by : Okla Testing &amp; Consulting Service Co., Ltd.

67/35-36, 3rd Floor, Petchkasem 7/1, Petchkasem Rd.,

Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Temperature controlled enclosure (Oven)

Manufacturer : KWF

Model : SOV70B

Range : N/A °C Resolution : 0.1 °C

Serial No. : KWF2021021902 ID No. : OKLA-LAB-013/170621

Environment : On site calibration was carried out at the Laboratory,

Okla Testing &amp; Consulting Service Co., Ltd.

Ambient Temperature : (32.0 to 33.0) °C

Relative Humidity : (50 to 55) %

Line Voltage : (221.0 to 223.0) V

Date of Received : 26 February 2024

Date of Calibration : 26 February 2024

Date of Issue : 29 February 2024

Calibrated by : Pempon 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 &amp; 400032 66-400594-1 27 Apr 2024 National Institute of Metrology Thailand (NIMT)

Approved by

Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 67-200069-1 Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

| Nominal Value<br>(g) | Correction<br>(g) | Uncertainty<br>± (g) |
|----------------------|-------------------|----------------------|
| 0.01                 | 0.0000            | 0.00011              |
| 0.05                 | 0.0000            | 0.00011              |
| 0.1                  | 0.0000            | 0.00011              |
| 0.2                  | 0.0000            | 0.00011              |
| 0.5                  | 0.0000            | 0.00011              |
| 1                    | 0.0000            | 0.00011              |
| 10                   | 0.0000            | 0.00011              |
| 50                   | 0.0000            | 0.00014              |
| 100                  | 0.0000            | 0.00020              |
| 150                  | 0.0001            | 0.00038              |
| 200                  | 0.0002            | 0.00038              |

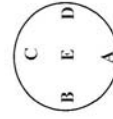
This result of calibration was found accurate as shown on date and place of calibration only.

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

Eccentric error

Load test : 50 g

|         |        |        |        |        |
|---------|--------|--------|--------|--------|
| A       | B      | C      | D      | E      |
| -0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 |



Repeatability

Load test : 200 g

Sidev. : 0.00000 g

-o0o-



## Certificate of Calibration

Certificate No. : 67-400117-1 Page : 1 of 2

## Submitted by :

Okla Testing &amp; Consulting Service Co., Ltd.

67/35-36, 3rd Floor, Petchkasem 7/1, Petchkasem Rd.,

Wathapra, Bangkok Yai, Bangkok 10600 Thailand

## Equipment :

Temperature controlled enclosure (Incubator)

Manufacturer : S-Cool

Model : SM 61 M

Range : N/A °C

Resolution : 0.1 °C

Serial No. : 18021147

ID No. : OKLA-LAB-011/190

## Environment :

On site calibration was carried out at the Laboratory,

Okla Testing &amp; Consulting Service Co., Ltd.

Ambient Temperature : (32.0 to 33.0) °C

Relative Humidity : (50 to 55) %

Line Voltage : (221.0 to 223.0) V

Date of Received : 26 February 2024

Date of Calibration : 26 February 2024

Date of Issue : 29 February 2024

## Calibrated by :

Kittisak Kokaco

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.

Traceability

400046 &amp; 400047

67-400047-2

Due Date

26 Jul 2024  
National Institute of Metrology Thailand (NIMT)

Approved by

Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

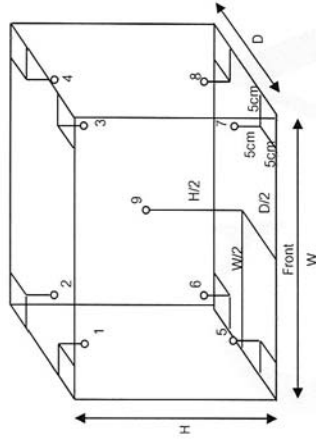
Certificate No. : 67-400117-2 Page : 2 of 2

## Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

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



| 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           | 102.5                    | 102.5                       | 106.4                                  | 105.0 | 105.2 | 106.1 | 103.0 | 104.0 | 103.4 | 105.4 | 104.0 | 0.94               |
| 140.0           | 139.5                    | 139.5                       | 144.1                                  | 142.2 | 142.4 | 143.7 | 138.5 | 139.7 | 139.3 | 142.4 | 140.2 | 1.3                |
| 160.0           | 159.5                    | 159.5                       | 164.3                                  | 162.4 | 162.6 | 163.8 | 158.6 | 159.8 | 159.3 | 162.5 | 160.3 | 1.3                |
| 180.0           | 179.5                    | 179.5                       | 186.2                                  | 183.7 | 183.8 | 185.7 | 174.7 | 180.1 | 179.4 | 183.7 | 180.3 | 1.7                |

| Test Point (°C) | Setting Temperature (°C) | Indicating Temperature (°C) | Measured Uniformity (°C) | Measured Stability (°C) | Overall Variation (°C) |
|-----------------|--------------------------|-----------------------------|--------------------------|-------------------------|------------------------|
| 104.0           | 102.5                    | 102.5                       | 2.6                      | 0.3                     | 3.8                    |
| 140.0           | 139.5                    | 139.5                       | 4.1                      | 0.4                     | 6.1                    |
| 160.0           | 159.5                    | 159.5                       | 4.1                      | 0.4                     | 6.2                    |
| 180.0           | 179.5                    | 179.5                       | 6.0                      | 0.6                     | 12.0                   |

Remark The uncertainty is not combine uniformity of the air chamber

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

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

-o0o-



## Certificate of Calibration

**Customer** : Okla Testing & Consulting Service Co., Ltd.

**Address** : 67/35-36, 3<sup>rd</sup> Floor, Phekasem 7/1 Rd.,  
Wathapra, Bangkokyai, BKK. 10600

**Equipment** : Refrigerator

**Manufacturer** : SANDEN

**Model** : SPB-0500

**Serial No.** : SPB0500-231007454

**ID No.** : -

**Resolution** : 0.1 °C

**Location of Calibration** : Central Laboratory FL.3

**Reference Job No.** : JB24048

**Received Request Date** : 12 February 2024

**Calibrated by** : Pawut Wongnarakornkul

**Date of Calibration** : 12 February 2024

**Approved by :**

**Date of Issue**

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

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Megafil Co., Ltd.

MG-FM-7.8-001, R00 (01/07/19)

## Certificate of Calibration

Certificate No. : 67-400117-1

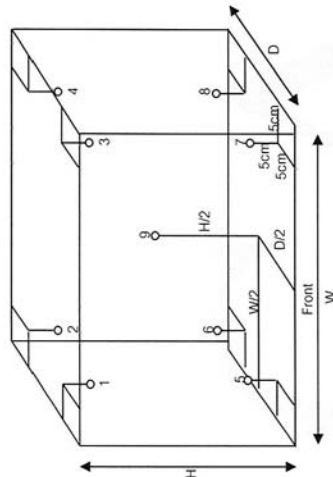
Page : 2 of 2

**Result of Calibration** : Without Adjustment

**UUC Condition As-Received** : Good

**Function** : Temperature measurement

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



| Test Point<br>(°C) | Setting Temperature<br>(°C) | Indicating Temperature<br>(°C) | Measured Temperature (°C) @ Sensor No. |       |       |       |       |       |       |       |       | Uncertainty<br>(± °C) |
|--------------------|-----------------------------|--------------------------------|----------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------|
|                    |                             |                                | 1                                      | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     |                       |
| 20.0               | 20.0                        | 20.0                           | 20.46                                  | 20.25 | 19.60 | 19.58 | 19.84 | 19.64 | 19.45 | 19.59 | 20.01 | 0.34                  |

| Test Point<br>(°C) | Setting Temperature<br>(°C) | Indicating Temperature<br>(°C) | Measured           |                   |                   | Overall Variation<br>(°C) |
|--------------------|-----------------------------|--------------------------------|--------------------|-------------------|-------------------|---------------------------|
|                    |                             |                                | Uniformity<br>(°C) | Stability<br>(°C) | Variation<br>(°C) |                           |
| 20.0               | 20.0                        | 20.0                           | 0.589              | 0.073             | 1.129             |                           |

Remark The uncertainty is not combine uniformity of the air chamber

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

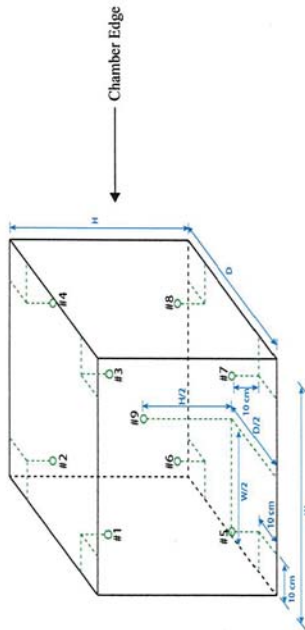
This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%

- o0o -



## Result of Calibration

Sensor installation at nine locations as show in figure.

Chamber capacity (W x H x D) : (0.55 x1.61 x 0.42) m : 0.37 m<sup>3</sup>

| Position         | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Ref. Std/ID No.: | RTD50501 | RTD50502 | RTD50503 | RTD50504 | RTD50505 | RTD50506 | RTD50507 | RTD50508 | RTD50509 |

## Temperature distribution

| Cal. Point<br>(°C) | Setting Temperature<br>(°C) | Indicating Temperature<br>(°C) | Measured Temperature (°C) @ Sensor No.<br>(Sensor No.9 is REF) |      |      |      |      |      |      |      |      | Uncertainty<br>(± °C) |
|--------------------|-----------------------------|--------------------------------|----------------------------------------------------------------|------|------|------|------|------|------|------|------|-----------------------|
|                    |                             |                                |                                                                |      |      |      |      |      |      |      |      |                       |
|                    |                             |                                | 1                                                              | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    |                       |
| 2.0                | 2.0                         | 2.0                            | 2.03                                                           | 1.26 | 1.94 | 1.31 | 3.06 | 2.95 | 2.21 | 2.15 | 2.17 | 0.44                  |
| 4.0                | 4.0                         | 4.0                            | 3.96                                                           | 3.22 | 3.84 | 3.31 | 5.05 | 4.91 | 4.19 | 4.18 | 4.14 | 0.44                  |
| 6.0                | 6.0                         | 6.0                            | 5.85                                                           | 5.16 | 5.88 | 5.32 | 7.07 | 6.91 | 6.18 | 6.24 | 6.10 | 0.44                  |

## Chamber performance

| Cal. Point (°C) | Setting Temperature (°C) | Indicating Temperature (°C) |     |         | Measured Uniformity (°C) | Measured Stability (± °C) | Overall Variation (°C) |
|-----------------|--------------------------|-----------------------------|-----|---------|--------------------------|---------------------------|------------------------|
|                 |                          | Min                         | Max | Average |                          |                           |                        |
| 2.0             | 2.0                      | 2.0                         | 2.0 | 2.0     | 1.07                     | 0.19                      | 2.06                   |
| 4.0             | 4.0                      | 4.0                         | 4.0 | 4.0     | 1.09                     | 0.22                      | 2.04                   |
| 6.0             | 6.0                      | 6.0                         | 6.0 | 6.0     | 0.98                     | 0.24                      | 2.18                   |

**Note:** The quoted uncertainty include Stability and 20% of Uniformity.

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensor.

Uniformity = The maximum difference of measured temperatures at any sensors and measured temperature at the reference location which are observed at the same time.

Overall Variation = The Difference of the maximum and minimum measured temperatures throughout observation.

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

- End of Certificate -

## Calibration Report

|             |                       |                                |                     |
|-------------|-----------------------|--------------------------------|---------------------|
| Equipment   | : Refrigerator        | Manufacturer                   | : SANDEN            |
| Model       | : SPB-0500            | Serial No                      | : SPB0500-231007454 |
| Environment | : Ambient Temperature | ( 24.3 to 24.9 ) °C            |                     |
|             | Relative Humidity     | ( 45.3 to 51.9 ) %             |                     |
|             | Line Voltage          | ( 226 to 228 ) V <sub>ac</sub> |                     |

## Detail of this calibration result.:

1. This instrument was calibrated by insert 9 standards Resistance Thermometer Detector, in to the chamber, under no load condition in according to TLAS G-20-1/02-08 (E).

2. The temperature scale used was based on ITS-90.

3. Reference standards instrument :

| Instrument                      | Model   | Serial No./ID No. | Certificate No. | Due Date         |
|---------------------------------|---------|-------------------|-----------------|------------------|
| Data Acquisition Switch unit    | 34972A  | MY49010832        | QR23-2679       | 15 November 2024 |
| Resistance Thermometer Detector | 100 ohm | RTD505(01 to 10)  | QR23-2679       | 15 November 2024 |

4. This certificate was certified only for the instrument we calibrated.

5. The measured values in this report refer to the time of examination.

6. This certificate is traceable to SI Unit through Quality Reborn Co.,Ltd.

NSC - ONSC accredited no. Calibration 0292

7. Condition of calibrated item : Good

UUC Description :

Operation time 5 Hour 00 Minute Calibration point 2.0, 4.0, 6.0 °C

The air ventilation of the instrument was set at position.

Fresh Air Damper

|                                     |               |          |                              |                                 |                              |
|-------------------------------------|---------------|----------|------------------------------|---------------------------------|------------------------------|
| <input checked="" type="checkbox"/> | Open          | Position | <input type="checkbox"/> Min | <input type="checkbox"/> Medium | <input type="checkbox"/> Max |
| <input type="checkbox"/>            | Close         |          |                              |                                 |                              |
| <input checked="" type="checkbox"/> | Not Available |          |                              |                                 |                              |

8 Result of calibration :

( X ) Without adjustment ( ) After adjustment

## Certificate of Calibration

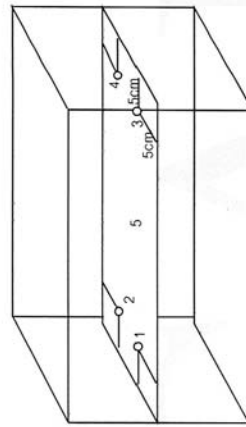
Certificate No. : 67-400117-4

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement



Front

| Test Point<br>(°C) | Setting Temperature<br>(°C) | Indicating Temperature<br>(°C) | Measured Temperature (°C) @ Sensor |       |       |       |       | Uncertainty<br>(± °C) | Measured Uniformity<br>(°C) | Measured Stability<br>(°C) |
|--------------------|-----------------------------|--------------------------------|------------------------------------|-------|-------|-------|-------|-----------------------|-----------------------------|----------------------------|
|                    |                             |                                | No.                                |       |       |       |       |                       |                             |                            |
| 60                 | As Mark 60                  | -                              | 1                                  | 2     | 3     | 4     | 5     | 0.53                  | 0.69                        | 0.40                       |
|                    |                             |                                | 60.02                              | 59.97 | 60.02 | 59.95 | 60.05 |                       |                             |                            |

Remark: The uncertainty is not combine uniformity of the water bath

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

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

-o0o-



## Certificate of Calibration

Certificate No. : 67-400117-4

Page : 1 of 2

Submitted by :

Okla Testing & Consulting Service Co., Ltd.  
67/35-36, 3rd Floor, Petchkasem 7/1, Petchkasem Rd.,  
Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment :

Water Bath

Manufacturer : LabTech

Model : LWB-222A

Range : N/A °C

Resolution : 0.01 °C

Serial No. : BCCLJ23001C

ID No. : OKLA-LAB-008/122011

Environment :

On site calibration was carried out at the Laboratory,

Okla Testing &amp; Consulting Service Co., Ltd.

Ambient Temperature : (32.0 to 33.0) °C

Relative Humidity : (50 to 55) %

Line Voltage : (221.0 to 223.0) V

Date of Received : 26 February 2024

Date of Calibration : 26 February 2024

Date of Issue : 29 February 2024

Calibrated by : Pernpon Chanpu

Calibration Method :

This instrument was calibrated by In-house method CAL-M4006 based on ASTM E715-80

The temperature scale used was based on ITS-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

400029 &amp; 400043 66-400593-1

25 Apr 2024

National Institute of Metrology Thailand (NIMT)

Approved

Laboratory Manager

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.



Measurement Results:

This equipment was connected with Air Temperature Sensor on display. Model: -, Serial number: -.

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 30 °C

The results of calibration of air temperature are reported in table below.

| Determined (°C) | Standard Reading (°C) | UUC Reading (°C) | Error (°C) | Uncertainty (°C) |
|-----------------|-----------------------|------------------|------------|------------------|
| 20.0            | 20.00                 | 20.1             | 0.1        | 0.30             |
| 25.0            | 25.00                 | 25.3             | 0.3        | 0.30             |
| 30.0            | 30.00                 | 30.3             | 0.3        | 0.30             |

UUC: Unit Under Calibration

\*\*\*End of Certificate of Calibration\*\*\*



Jiranatee Associates Co.,Ltd  
63/14-15, 67/35-36  
Perthkarn 7/71, Rd, Wattapara, Bangkokkylai,  
Bangkok 10600 (Thailand)  
Tel: +6686860812  
Mobile: +66863899453  
E-mail: jnac-calibration@jiranatee.com  
Web site: www.jiranatee.com

Accredited calibration laboratory  
ISO/IEC 17025:2017  
MSC-TSI-TS 17025  
CALIBRATION 0367  
Air Temperature measurement laboratory  
Calibration services department.

Certificate No. : CAT-006-66

Page 1 of 2 Pages

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS-RECEIVED  
CUSTOMER

: Digital Thermo Hygrometer  
: KEPLER  
: KTH-02  
: 234011890  
: -  
: Used item  
: Okla Testing and consulting services Co., Ltd.  
67/35-36, 3rd Fl, Phetkasem soi 7/1, Wat Thapra,  
Bangkokkylai, Bangkok, Thailand 10600.

RECEIVED DATE  
MEASUREMENT DATE  
ISSUE DATE

: 18 Oct 2023  
: 19 Oct 2023  
: 19 Oct 2023

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:  
Temperature  
Relative Humidity

: 23.0 ± 3.0 °C  
: 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibration procedure:  
The Air Temperature calibration was done by In-  
House calibration method as WI-CL-009 according to  
comparison method with Standard Gilled Mirror  
hygrometer and standard Humidity generator  
chamber.

Traceability:  
This instrument was calibrated using standard  
equipment whose accuracy is traceability through  
National Institute of Standards and Technology to  
the international system of units (SI) via Process  
Sensing Technologies, Corp. Certificate number:  
57483-A.

Uncertainty of Measurement:

The reported uncertainty of measurement is based  
on the standard uncertainty multiplied by a  
coverage factor k=2, which for a normal distribution  
corresponds to a coverage probability of  
approximately 95%. The standard uncertainty has  
been determined in accordance with the GUM  
'Evaluation of measurement data - Guide to the  
expression of uncertainty in measurement'

Calibrated by:

Approved signatory:

Calibration department manager



JIRANATEE ASSOCIATES CO.,LTD.

Continuation of Certificate of Calibration Number: CRH-008-66

Measurement Results:

This equipment was connected with Relative Humidity Sensor on display. Model: -, Serial number: -.

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 40%RH to 80%RH

The results of calibration of relative humidity are reported in table below.

| Determined (%RH) | Standard Reading (%RH) | UUC Reading (%RH) | Error (%RH) | Uncertainty (%RH) |
|------------------|------------------------|-------------------|-------------|-------------------|
| 40.0             | 40.12                  | 40.0              | -0.1        | 1.16              |
| 60.0             | 60.22                  | 60.0              | -0.2        | 1.17              |
| 80.0             | 80.39                  | 79.0              | -1.4        | 1.15              |

UUC\*: Unit Under Calibration

\*\*\*End of Certificate of Calibration\*\*\*



Page 2 of 2 Pages



JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd  
63/14-15, 67/35-36  
Perthkasem 7/1, Rd. Wattapara, Bangkokkylai,  
Bangkok 10600 (Thailand)  
Tel: +6686508812  
Mobile: +66863999453  
E-mail: jnac-calibration@jiranatee.com  
Web site: www.jiranatee.com

Accredited calibration laboratory  
ISO/IEC 17025:2017  
NSC-TSI-15 17025  
CALIBRATION 0367

Relative humidity measurement laboratory  
Calibration services department.

## CERTIFICATE OF CALIBRATION

Certificate No. : CRH-008-66

Page 1 of 2 Pages

MEASUREMENT ITEM  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS-RECEIVED  
CUSTOMER

: Digital Thermo Hygrometer  
: KEPLER  
: KTH-02  
: 234011890  
: -  
: Used item  
: Okla Testing and consulting services Co., Ltd.  
67/35-36, 3rd Fl, Phetkasem soi 7/1, Wat Thapra,  
Bangkokkylai, Bangkok, Thailand 10600.

RECEIVED DATE  
MEASUREMENT DATE  
ISSUE DATE

: 18 Oct 2023  
: 19 Oct 2023  
: 19 Oct 2023

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature : 23.0 ± 3.0 °C  
Relative Humidity : 55.0 ± 15.0 %RH

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibration procedure:  
The Relative humidity calibration was done by In-  
House calibration method as WI-CL-010 according to  
comparison method with Standard Chilled Mirror  
hygrometer and standard Humidity generator  
chamber.

Traceability:  
This instrument was calibrated using standard  
equipment whose accuracy is traceability through  
National Institute of Standards and Technology to  
the international system of units (SI) via Process  
Sensing Technologies, Corp. Certificate number:  
57483-A.

Uncertainty of Measurement:  
The reported uncertainty of measurement is based  
on the standard uncertainty multiplied by a  
coverage factor k=2, Which for a normal distribution  
corresponds to a coverage probability of  
approximately 95%. The standard uncertainty has  
been determined in accordance with the GUM  
'Evaluation of measurement data - Guide to the  
expression of uncertainty in measurement'

Calibrated by:

Approved signatory:

Calibration department manager

## Certificate of Calibration

Certificate No. : 67-300115-14

Page : 2 of 2

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

UUC Condition As-Received : Good

Delivery Time : 38.85 sec.

| Nominal Volume ( ml ) | Measuring Volume ( ml ) |
|-----------------------|-------------------------|
| 5                     | 5.0020                  |
| 15                    | 14.9767                 |
| 25                    | 24.9836                 |

Uncertainty of measurement with in  $\pm$  0.0066 ml

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

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

- oDo -



Approved by :

Supervisor



## Certificate of Calibration

Certificate No. : 67-300115-14

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,

Watthapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment

: Burette

Manufacturer : ISOLAB

Class : A

Capacity : 25 ml

Graduation : 0.05 ml

ID No. : BU25/01

Environment

: Ambient Temperature : ( 20  $\pm$  3 ) °C

Relative Humidity : ( 50  $\pm$  10 ) %

Air Pressure : 1011.8 mbar.

Date of Received : 26 February 2024

Date of Calibration : 02 March 2024

Date of Issue : 02 March 2024

Calibrated by : Wipa Tovadee

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

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

Electronic Balance

ID No. : 241003

Cert. No. : 66-200388-2

Due Date : 02 Jun 2024

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



Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 67-300115-12

**Page :** 2 of 2

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

**UUC Condition As-Received :** Good

| Nominal Volume ( ml ) | Measuring Volume ( ml ) |
|-----------------------|-------------------------|
| 50                    | 50.07                   |
| 100                   | 100.13                  |

Uncertainty of measurement with in  $\pm$  0.063 ml

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

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

-oOo-

## Certificate of Calibration

**Certificate No. :** 67-300115-12

**Page :** 1 of 2

**Submitted by :** Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,

Watthapra, Bangkok Yai, Bangkok 10600 Thailand

**Equipment :** Cylinder

**Manufacturer :** DURAN

**Class :** A

**Capacity :** 100 ml

**Graduation :** 1 ml

**ID No. :** CY100/01

**Environment :** Ambient Temperature : (20  $\pm$  3) °C

Relative Humidity : (50  $\pm$  10) %

Air Pressure : 1011.1 mbar.

**Date of Received :** 26 February 2024

**Date of Calibration :** 02 March 2024

**Date of Issue :** 02 March 2024

**Calibrated by :** Areerat Sombun

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

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

Electronic Balance

**ID No. :** 241002

**Cert. No. :** 66-200388-1

**Due Date :** 02 Jun 2024

**Traceability :**

National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor



## Certificate of Calibration

Certificate No. : 67-300115-11

Page : 2 of 2

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

UUC Condition As-Received : Good

| Nominal Volume ( ml ) | Measuring Volume ( ml ) |
|-----------------------|-------------------------|
| 30                    | 30.24                   |
| 50                    | 50.27                   |

Uncertainty of measurement with in  $\pm$  0.054 ml

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

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

-o0o-



## Certificate of Calibration

Certificate No. : 67-300115-11

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,  
Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Cylinder

Manufacturer : FAVORIT

Class : A

Capacity : 50 ml

Graduation : 1 ml

ID No. : CY50/01

Environment : Ambient Temperature : ( 20  $\pm$  3 ) °C

Relative Humidity : ( 50  $\pm$  10 ) %

Air Pressure : 1005.8 mbar.

Date of Received : 26 February 2024

Date of Calibration : 02 March 2024

Date of Issue : 02 March 2024

Calibrated by : Areerat Sombun

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

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

Electronic Balance

ID No. : 241002

Cert. No. : 66-200388-1

Due Date : 02 Jun 2024

Traceability

National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 67-300115-13

Page : 2 of 2

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

UUC Condition As-Received : Good

| Nominal Volume ( ml ) | Measuring Volume ( ml ) |
|-----------------------|-------------------------|
| 250                   | 248.94                  |
| 500                   | 499.25                  |

Uncertainty of measurement with in  $\pm$  0.12 ml

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

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

-o0o-



## Certificate of Calibration

Certificate No. : 67-300115-13

Page : 1 of 2

Submitted by : Okla Testing &amp; Consulting Service Co.,Ltd.

67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,

Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Cylinder

Manufacturer : BOROSIL Class : A

Capacity : 500 ml Graduation : 5 ml

ID No. : CY500/01

Environment : Ambient Temperature : ( 20  $\pm$  3 ) °CRelative Humidity : ( 50  $\pm$  10 ) %

Air Pressure : 1005.7 mbar.

Date of Received : 26 February 2024

Date of Calibration : 02 March 2024

Date of Issue : 02 March 2024

Calibrated by : Areerat Sombun

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

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

Electronic Balance

| ID No. | Cert. No.   | Due Date    | Traceability                                      |
|--------|-------------|-------------|---------------------------------------------------|
| 241002 | 66-200388-1 | 02 Jun 2024 | National Institute of Metrology (Thailand) (NIMT) |

Approved by : -

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 67-300115-1

Page : 2 of 2

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

UUC Condition As-Received : Good

Delivery Time : 5.89 sec.

| Nominal Volume ( ml ) | Measuring Volume ( ml ) |
|-----------------------|-------------------------|
| 0.1                   | 0.1010                  |
| 0.5                   | 0.4988                  |
| 1                     | 1.0004                  |

Uncertainty of measurement with in  $\pm$  0.0026 ml

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

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

-oOo-



## Certificate of Calibration

Certificate No. : 67-300115-1

Page : 1 of 2

Submitted by : Okla Testing &amp; Consulting Service Co.,Ltd.

67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,

Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Measuring Pipette

Manufacturer : GLASSCO

Class : A

Capacity : 1 ml

Graduation : 0.01 ml

ID No. : MP1/01

Environment : Ambient Temperature : (20  $\pm$  3) °CRelative Humidity : (50  $\pm$  10) %

Air Pressure : 1007.4 mbar.

Date of Received : 26 February 2024

Date of Calibration : 02 March 2024

Date of Issue : 02 March 2024

Calibrated by : Areerat Sombun

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

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

Electronic Balance

| ID No. | Cert. No.   | Due Date    | Traceability                                      |
|--------|-------------|-------------|---------------------------------------------------|
| 241005 | 66-200388-4 | 02 Jun 2024 | National Institute of Metrology (Thailand) (NIMT) |

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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



## Certificate of Calibration

Certificate No. : 67-300115-2

Page : 2 of 2

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

UUC Condition As-Received : Good

Delivery Time : 9.75 sec.

| Nominal Volume ( ml ) | Measuring Volume ( ml ) |
|-----------------------|-------------------------|
| 0.5                   | 0.5023                  |
| 2.5                   | 2.4847                  |
| 5                     | 4.9835                  |

Uncertainty of measurement with  $\pm$  0.0027 ml

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

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

-oOo-



## Certificate of Calibration

Certificate No. : 67-300115-2

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,

Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Measuring Pipette

Manufacturer : GLASSCO

Class : A

Capacity : 5 ml

Graduation : 0.05 ml

ID No. : MP5/01

Environment : Ambient Temperature : ( 20  $\pm$  3 ) °C

Relative Humidity : ( 50  $\pm$  10 ) %

Air Pressure : 1007.4 mbar.

Date of Received : 26 February 2024

Date of Calibration : 02 March 2024

Date of Issue : 02 March 2024

Calibrated by : Areerat Sombun

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

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

Electronic Balance

ID No. : 241005

Cert. No. : 66-200388-4

Due Date : 02 Jun 2024

Traceability

National Institute of Metrology (Thailand) (NIMT)

Approved by :



The Uncertainties are for a confidence probability of approximately 95%

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



## Certificate of Calibration

Certificate No. : 67-300115-3

Page : 2 of 2

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

UUC Condition As-Received : Good

Delivery Time : 11.11 sec.

| Nominal Volume ( ml ) | Measuring Volume ( ml ) |
|-----------------------|-------------------------|
| 1                     | 1.0010                  |
| 5                     | 4.9790                  |
| 10                    | 9.9759                  |

Uncertainty of measurement with in  $\pm$  0.0039 ml

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

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

- o0o -



## Certificate of Calibration

Certificate No. : 67-300115-3

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3<sup>rd</sup> Floor, Petekkasem 7/1, Petekkasem Rd.,

Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Measuring Pipette

Manufacturer : GLASSCO Class : A

Capacity : 10 ml Graduation : 0.1 ml

ID No. : MP10/01

Environment : Ambient Temperature : ( 20  $\pm$  3 ) °C

Relative Humidity : ( 50  $\pm$  10 ) %

Air Pressure : 1007.2 mbar.

Date of Received : 26 February 2024

Date of Calibration : 02 March 2024

Date of Issue : 02 March 2024

Calibrated by : Arceat Sombun

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

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

Electronic Balance

ID No. Cert.No. Due Date Traceability

241005 66-200388-4 02 Jun 2024 National Institute of Metrology (Thailand) (NIMT)

Approved by

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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



## Certificate of Calibration

**Certificate No. :** 67-300115-6 **Page :** 2 of 2

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

**UUC Condition As-Received :** Good

Delivery Time : 15.28 sec.

| Nominal Volume ( ml ) | Measuring Volume ( ml ) |
|-----------------------|-------------------------|
| 20                    | 20.0063                 |

Uncertainty of measurement with in  $\pm$  0.0064 ml

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

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

- oDo -



Approved by :

Supervisor



## Certificate of Calibration

**Certificate No. :** 67-300115-6 **Page :** 1 of 2

**Submitted by :** Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,  
Wathapra, Bangkok Yai, Bangkok 10600 Thailand

**Equipment :** Volumetric Pipette  
**Manufacturer :** GLASSCO  
**Capacity :** 20 ml  
**ID No. :** VP20/01  
**Class :** A

**Environment :**  
**Ambient Temperature :** (20  $\pm$  3) °C  
**Relative Humidity :** (50  $\pm$  10) %  
**Air Pressure :** 1007.6 mbar.

**Date of Received :** 26 February 2024

**Date of Calibration :** 02 March 2024

**Date of Issue :** 02 March 2024

**Calibrated by :** Arcerat Sombun

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

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

Electronic Balance

| ID No. | Cert. No.   | Due Date    | Traceability                                      |
|--------|-------------|-------------|---------------------------------------------------|
| 241005 | 66-200388-4 | 02 Jun 2024 | National Institute of Metrology (Thailand) (NIMT) |

The Uncertainties are for a confidence probability of approximately 95%

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



## Certificate of Calibration

Certificate No. : 67-300115-8

Page : 2 of 2

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

UUC Condition As-Received : Good

| Nominal Volume ( ml ) | Measuring Volume ( ml ) |
|-----------------------|-------------------------|
| 100                   | 99.983                  |

Uncertainty of measurement with in  $\pm$  0.018 ml

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

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

-o0o-

## Certificate of Calibration

Certificate No. : 67-300115-8

Page : 1 of 2

Submitted by : Okla Testing &amp; Consulting Service Co.,Ltd.

67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,  
Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Volumetric Flask

Manufacturer : SCI

Class : A

Capacity : 100 ml

ID No. : VF100/01

Environment : Ambient Temperature :  $(20 \pm 3)$  °CRelative Humidity :  $(50 \pm 10)$  %

Air Pressure : 1005.8 mbar.

Date of Received : 26 February 2024

Date of Calibration : 02 March 2024

Date of Issue : 02 March 2024

Calibrated by : Areearat Sonbun

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

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

Electronic Balance

| ID No. | Cert. No.   | Due Date    | Traceability                                      |
|--------|-------------|-------------|---------------------------------------------------|
| 241005 | 66-200388-4 | 02 Jun 2024 | National Institute of Metrology (Thailand) (NIMT) |

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 67-300115-9

Page : 2 of 2

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

UUC Condition As-Received : Good

| Nominal Volume ( ml ) | Measuring Volume ( ml ) |
|-----------------------|-------------------------|
| 500                   | 499.92                  |

Uncertainty of measurement with in  $\pm$  0.075 ml

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

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

- o0o -

## Certificate of Calibration

Certificate No. : 67-300115-9

Page : 1 of 2

Submitted by : Okla Testing & Consulting Service Co.,Ltd.

67/35-36, 3<sup>rd</sup> Floor, Petchkasem 7/1, Petchkasem Rd.,

Wathapra, Bangkok Yai, Bangkok 10600 Thailand

Equipment : Volumetric Flask

Manufacturer : BOROSIL

Class : A

Capacity : 500 ml

ID No. : VF500/01

Environment : Ambient Temperature : ( 20  $\pm$  3 ) °C

Relative Humidity : ( 50  $\pm$  10 ) %

Air Pressure : 1006.0 mbar.

Date of Received : 26 February 2024

Date of Calibration : 02 March 2024

Date of Issue : 02 March 2024

Calibrated by : Areerat Sombun

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

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

Electronic Balance

ID No. : 241002

Cert. No. : 66-200388-1

Due Date : 02 Jun 2024

Traceability

National Institute of Metrology (Thailand) (NIMT)

Approved by :

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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