

## 1. Block Digestion

ผู้ผลิต HANON... รุ่น SH 220F... Serial No. SH322290127... รหัสเครื่อง... LB-Eq-011...

วันที่ทวนสอบ 21.2.2568... ทวนสอบครั้งต่อไป 1.1.1.2569...

## 2. Digital Thermometer with TC Probe

ผู้ผลิต Thermo Scientific... รุ่น Temp 10K... Serial No. 4008958... รหัสเครื่อง... LB-Eq-013

ความละเอียด 0.1... °C วันที่สอบเทียบ 22 April 2025... สอบเทียบครั้งต่อไป 21 April 2026

## 3. ผลการทวนสอบ (ช่วงเวลา 09.00 น. - 18.30 น.)

อุณหภูมิห้อง 25 - 27 °C ความชื้นสัมพัทธ์ 50 - 57 %

| ว/ด/ป  | Position No. | Set point (°C) | อุณหภูมิที่อ่านได้จากเครื่อง (°C) | อุณหภูมิที่อ่านได้เทอร์โมมิเตอร์ (°C) |                |                      | Error  | เกณฑ์การยอมรับ | สรุปผลการทวนสอบ |         | ผู้ทวนสอบ |
|--------|--------------|----------------|-----------------------------------|---------------------------------------|----------------|----------------------|--------|----------------|-----------------|---------|-----------|
|        |              |                |                                   | ครั้งที่ 1 (A)                        | ครั้งที่ 2 (B) | ค่าเฉลี่ยของอุณหภูมิ |        |                | ผ่าน            | ไม่ผ่าน |           |
| 2/7/68 | 1            | 250            | 251                               | 249.9                                 | 250.1          | 250.0                | 0.0    | ±5             | ✓               |         | ฟิม       |
|        | 2            |                |                                   | 250.8                                 | 250.6          | 250.7                | +0.7   | ±5             | ✓               |         |           |
|        | 3            |                |                                   | 250.1                                 | 250.2          | 250.2                | +0.2   | ±5             | ✓               |         |           |
|        | 4            |                |                                   | 250.3                                 | 250.1          | 250.2                | +/-0.2 | ±5             | ✓               |         |           |
|        | 5            |                |                                   | 250.4                                 | 250.5          | 250.5                | +/-0.5 | ±5             | ✓               |         |           |
|        | 6            |                |                                   | 249.8                                 | 249.9          | 249.9                | -0.1   | ±5             | ✓               |         |           |
|        | 7            |                |                                   | 250.4                                 | 250.2          | 250.3                | +0.3   | ±5             | ✓               |         |           |
|        | 8            |                |                                   | 250.6                                 | 250.7          | 250.7                | +0.7   | ±5             | ✓               |         |           |
|        | 9            |                |                                   | 250.5                                 | 250.4          | 250.5                | +0.5   | ±5             | ✓               |         |           |
|        | 10           |                |                                   | 250.1                                 | 250.2          | 250.2                | +0.2   | ±5             | ✓               |         |           |
|        | 11           |                |                                   | 249.9                                 | 250.0          | 250.0                | 0.0    | ±5             | ✓               |         |           |
|        | 12           |                |                                   | 250.5                                 | 250.4          | 250.5                | +0.5   | ±5             | ✓               |         |           |
|        | 13           |                |                                   | 250.0                                 | 250.1          | 250.1                | +0.1   | ±5             | ✓               |         |           |
|        | 14           |                |                                   | 250.5                                 | 250.4          | 250.5                | +0.5   | ±5             | ✓               |         |           |
|        | 15           |                |                                   | 250.2                                 | 250.4          | 250.3                | +0.3   | ±5             | ✓               |         |           |
|        | 16           |                |                                   | 250.0                                 | 249.9          | 250.0                | 0.0    | ±5             | ✓               |         |           |
|        | 17           |                |                                   | 250.8                                 | 250.7          | 250.8                | +0.8   | ±5             | ✓               |         |           |
|        | 18           |                |                                   | 251.0                                 | 250.9          | 251.0                | +1.0   | ±5             | ✓               |         |           |
|        | 19           |                |                                   | 251.1                                 | 251.2          | 251.2                | +1.2   | ±5             | ✓               |         |           |
|        | 20           |                |                                   | 249.8                                 | 250.0          | 249.9                | -0.1   | ±5             | ✓               |         |           |

## 1. Block Digestion

ผู้ผลิต HANON..... รุ่น SH 220F..... Serial No. SH322290127..... รหัสเครื่อง..... LB-Eq-011.....

วันที่ทวนสอบ 21.2.2568..... ทวนสอบครั้งต่อไป..... 1.1.1.2569.....

## 2. Digital Thermometer with TC Probe

ผู้ผลิต Thermo Scientific..... รุ่น Temp 10K..... Serial No. 4008958..... รหัสเครื่อง..... LB-Eq-013.....

ความละเอียด..... 0.1..... °C วันที่สอบเทียบ 22 April 2025..... สอบเทียบครั้งต่อไป 21 April 2026.....

## 3. ผลการทวนสอบ (ช่วงเวลา..... 09.00..... น. -..... 18.30..... น.)

อุณหภูมิห้อง..... 25..... -..... 27..... °C ความชื้นสัมพัทธ์..... 50..... -..... 57..... %

| ว/ด/ป  | Position No. | Set point (°C) | อุณหภูมิที่อ่านได้จากเครื่อง (°C) | อุณหภูมิที่อ่านได้เทอร์โมมิเตอร์ (°C) |                |                      | Error  | เกณฑ์การยอมรับ | สรุปผลการทวนสอบ |         | ผู้ทวนสอบ |
|--------|--------------|----------------|-----------------------------------|---------------------------------------|----------------|----------------------|--------|----------------|-----------------|---------|-----------|
|        |              |                |                                   | ครั้งที่ 1 (A)                        | ครั้งที่ 2 (B) | ค่าเฉลี่ยของอุณหภูมิ |        |                | ผ่าน            | ไม่ผ่าน |           |
| 2/7/68 | 1            | 250            | 251                               | 249.9                                 | 250.1          | 250.0                | 0.0    | ±5             | ✓               |         | ฟิม       |
|        | 2            |                |                                   | 250.8                                 | 250.6          | 250.7                | +0.7   | ±5             | ✓               |         |           |
|        | 3            |                |                                   | 250.1                                 | 250.2          | 250.2                | +0.2   | ±5             | ✓               |         |           |
|        | 4            |                |                                   | 250.3                                 | 250.1          | 250.2                | +/-0.2 | ±5             | ✓               |         |           |
|        | 5            |                |                                   | 250.4                                 | 250.5          | 250.5                | +/-0.5 | ±5             | ✓               |         |           |
|        | 6            |                |                                   | 249.8                                 | 249.9          | 249.9                | -0.1   | ±5             | ✓               |         |           |
|        | 7            |                |                                   | 250.4                                 | 250.2          | 250.3                | +0.3   | ±5             | ✓               |         |           |
|        | 8            |                |                                   | 250.6                                 | 250.7          | 250.7                | +0.7   | ±5             | ✓               |         |           |
|        | 9            |                |                                   | 250.5                                 | 250.4          | 250.5                | +0.5   | ±5             | ✓               |         |           |
|        | 10           |                |                                   | 250.1                                 | 250.2          | 250.2                | +0.2   | ±5             | ✓               |         |           |
|        | 11           |                |                                   | 249.9                                 | 250.0          | 250.0                | 0.0    | ±5             | ✓               |         |           |
|        | 12           |                |                                   | 250.5                                 | 250.4          | 250.5                | +0.5   | ±5             | ✓               |         |           |
|        | 13           |                |                                   | 250.0                                 | 250.1          | 250.1                | +0.1   | ±5             | ✓               |         |           |
|        | 14           |                |                                   | 250.5                                 | 250.4          | 250.5                | +0.5   | ±5             | ✓               |         |           |
|        | 15           |                |                                   | 250.2                                 | 250.4          | 250.3                | +0.3   | ±5             | ✓               |         |           |
|        | 16           |                |                                   | 250.0                                 | 249.9          | 250.0                | 0.0    | ±5             | ✓               |         |           |
|        | 17           |                |                                   | 250.8                                 | 250.7          | 250.8                | +0.8   | ±5             | ✓               |         |           |
|        | 18           |                |                                   | 251.0                                 | 250.9          | 251.0                | +1.0   | ±5             | ✓               |         |           |
|        | 19           |                |                                   | 251.1                                 | 251.2          | 251.2                | +1.2   | ±5             | ✓               |         |           |
|        | 20           |                |                                   | 249.8                                 | 250.0          | 249.9                | -0.1   | ±5             | ✓               |         |           |



## Certificate of Calibration

**Certificate No.** : 68-300307-6

**Page** : 1 of 2

**Submitted by** : Special Lab Envi and Consultant Co., Ltd.

47/91-93 Moo 3, Tambol Tha-It, Pakkret, Nonthaburi 11120

**Equipment** : Burette

Manufacturer : Witeg

Class : A

Capacity : 25 ml

Graduation : 0.05 ml

ID No. : LB-Gw-001

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

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

Air Pressure : 1009.5 mbar.

**Date of Received** : 19 April 2025

**Date of Calibration** : 25 April 2025

**Date of Issue** : 25 April 2025

**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

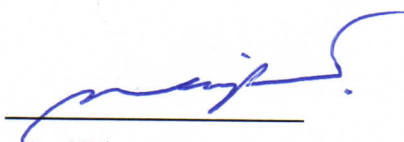
241005

67-200410-4

02 Jun 2025

National Institute of Metrology (Thailand) (NIMT)

Approved by :



( Wipa Tovadee )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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



## Certificate of Calibration

**Certificate No. :** 68-300307-6

**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 : 40.04 sec.

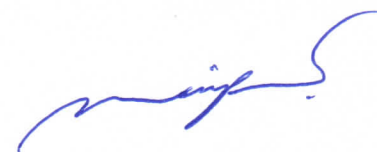
| Nominal Volume ( ml ) | Measuring Volume ( ml ) |
|-----------------------|-------------------------|
| 10                    | 10.0003                 |
| 20                    | 20.0098                 |
| 25                    | 25.0101                 |

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%

- o0o -





# PinAAcle 900F Preventive Maintenance Report

Company Name: Special Lab Envi&Consultant Co.,Ltd  
Instrument Location: AAS ROOM  
Soi Tha It, Rattanathibet Rd, Tha It, Pak Kret, Nonthaburi 11120  
Instrument Serial No.: PFBS17082303  
Date: 8 SEP 2025

## ***PinAAcle 900F Preventive Maintenance (PM)***

|                                              |                                                                |                                                |             |
|----------------------------------------------|----------------------------------------------------------------|------------------------------------------------|-------------|
| <b>Company Name:</b>                         | Special Lab Envi&Consultant Co.,Ltd                            |                                                |             |
| <b>Address<br/>(Instrument Location):</b>    | Soi Tha It, Rattathibet Rd, Tha It, Pak Kret, Nonthaburi 11120 |                                                |             |
| <b>Serial Number:</b>                        | PFBS17082303                                                   | <b>PM Number:</b>                              | 1/1         |
| <b>Customer Name<br/>(if applicable):</b>    | K.Fartiha                                                      | <b>Telephone<br/>Number:</b>                   | 092-2839054 |
| <b>Customer Support<br/>Engineer Name:</b>   | Prasit                                                         | <b>Service Order<br/>Number:</b>               | WO-11606345 |
| <b>Date PM Performed:<br/>(DD-MMM-YYYY)</b>  | 8 SEP 2025                                                     | <b>Next PM Due<br/>Date:<br/>(DD-MMM-YYYY)</b> | 8 SEP 2026  |
| <b>Standard Labor Hours to Complete PM :</b> |                                                                | <b>5 hours</b>                                 |             |

| Part Number    | Release | Publication Date |  |
|----------------|---------|------------------|-------------------------------------------------------------------------------------|
| 09370145 Rev.9 | A       | January 2018     |                                                                                     |

### **Scope**

The purpose of this PM is to ensure the continued functionality of the PinAAcle 900F by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer.

The customer should save their method before the PM begins.

### **General Instructions:**

The customer must provide the engineer operational data to demonstrate recent instrument performance prior to starting the PM.

Always check with the customer before making any changes that may affect the customer's analysis or calibration, including a current back-up of system software and/or data files.

The completed document should be signed by an authorized PerkinElmer and customer representative and left with the customer.

Update the PM sticker and instrument logbook as required.

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## Component List

| Component / Specific Model | Serial #     | Configuration Notes      |
|----------------------------|--------------|--------------------------|
| PinAAcle 900F              | PFBS17082303 | Syngistix Ver 3.0.3.1560 |
|                            |              |                          |
|                            |              |                          |
|                            |              |                          |

## Parts Lists

| Parts Included with the PM  |                                                                     |                          |
|-----------------------------|---------------------------------------------------------------------|--------------------------|
| Part Number (if applicable) | Description                                                         | Quantity                 |
| B0501696                    | Fan Filters                                                         | 1 <input type="text"/>   |
| N3160156                    | O-Ring Kits for Sampling Introduction ( Stainless Steels Nebulizer) | N/A <input type="text"/> |
| N3160157                    | O-Ring Kits for Sampling Introduction ( Plastic Nebulizer)          | 1 <input type="text"/>   |
| N9301714                    | Replacement Acetylene Filter Cartridge                              | 1 <input type="text"/>   |
| TH001022                    | Replacement Air Filter Cartridge                                    | 2 <input type="text"/>   |

| Additional Reagents and Standards Required for PM |                           |         |             |                      |
|---------------------------------------------------|---------------------------|---------|-------------|----------------------|
| Part Number (if applicable)                       | Description               | Quality | Batch/Lot # | Expired Date (MM/YY) |
| N9300183                                          | 1000 mg/L Copper Standard | AR      | 27-156CUY1  | SEP-2026             |

| Additional Reagents and Standards Required for PM (Customer Support Solution) |                       |          |             |                         |
|-------------------------------------------------------------------------------|-----------------------|----------|-------------|-------------------------|
| Part Number (if applicable)                                                   | Description           | Quantity | Batch/Lot # | Expiration Date (MM/YY) |
| N/A                                                                           | DI Water              | 250 ml.  | AR          | AR                      |
| N/A                                                                           | 0.5% HNO <sub>3</sub> | 250 ml.  | AR          | AR                      |

| Additional Tools Required for PM |                             |          |               |
|----------------------------------|-----------------------------|----------|---------------|
| Part Number<br>(if applicable)   | Description                 | Quantity | Serial #      |
| N1013000                         | 0.2A Neutral density filter | 1        | MG0-704       |
| N1013002                         | 1.0A Neutral density filter | 1        | MG2-891       |
| 03030997                         | System 2 EDL Driver         | 1        | 030309-97E    |
| N3050605                         | As System 2 EDL             | 1        | 17986         |
| N3050121                         | Cu Lumina HCL               | 1        | 000003793D12  |
| N3050109                         | Ba Lumina HCL               | 1        | 041123-010120 |
| N3050139                         | K Lumina HCL                | 1        | 0000037B8E1D  |
| N3050152                         | Ni Lumina HCL               | 1        |               |

# Procedure Checklist

Use (✓) to check off those steps in the checklist that have been completed.

## 1. General:

- ☒ Review the instrument performance with the customer and document any recent problems.
- ☒ Inspect the customer log book and make any appropriate PM entries.
- ☒ Perform general inspection of system for cleanliness.

## 2. PC Instrument Software:

- ☒ Instrument Software user files/databases archived, packed, and/or deleted as needed.

## 3. Mechanical:

- ☒ Inspect and clean all fans and filters. Replace filters if necessary
- ☒ Inspect all gas lines for leaks and/or wear. Replace if needed.
- ☒ Clean exterior of the instrument.
- ☒ Inspect the burner head, burner chamber, and nebulizer. Clean if needed as stated in the Hardware Guide.
- ☒ Check burner head dimensions with the feeler gauge as stated in the Hardware Guide in the Maintenance chapter section on cleaning the burner head and checking sloth width. Replace if out of specification
- ☒ Check the condition of the end cap, burner head, and nebulizer O-rings. Replace if necessary.
- ☒ Check the drain system for signs of wear. Replace worn or damaged parts.
- ☒ Visually check for proper flame conditions when igniting the Air-C<sub>2</sub>H<sub>2</sub> and N<sub>2</sub>O-C<sub>2</sub>H<sub>2</sub> flames (if applicable).

## 4. Electrical:

- ☒ Inspect PC boards. Clean if necessary.
- ☒ Carefully check all internal and external cable connections.
- ☒ Check instrument firmware revisions upgrade to current levels (if necessary)
- ☒ Run Diagnostics Test within the Advanced function of the Spectrometer page. Check the results in the service log folder in the Spectrometer BM Log Viewer.

## 5. Optics:

- ☒ Inspect and clean the sample compartment windows, if needed.
- ☒ Inspect optics. Clean or replace if necessary,

## 6. Gasses:

- ☒ Verify that the Gasses supplied to the instrument are within the pressure and purity specifications found in the PinAAcle 900 Series Pre-installation Checklist SDB.
- ☒ Verify that the acetylene filter and air filter element is dry. Replace if necessary.



## 7. Flame Interlock Check:

Description: Check to ensure that all safety interlocks are closed.

| Parameter                                     | Specification                                                                | Test Results                    | Pass/Fail                       |
|-----------------------------------------------|------------------------------------------------------------------------------|---------------------------------|---------------------------------|
| Flame Sensor                                  | Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down                 | Active <input type="checkbox"/> | Passed <input type="checkbox"/> |
| Drain Sensor                                  | Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down                 | Active <input type="checkbox"/> | Passed <input type="checkbox"/> |
| Nebulizer Sensor                              | Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down                 | Active <input type="checkbox"/> | Passed <input type="checkbox"/> |
| C <sub>2</sub> H <sub>2</sub> Pressure Sensor | Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down                 | Active <input type="checkbox"/> | Passed <input type="checkbox"/> |
| Air Pressure Sensor                           | Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down                 | Active <input type="checkbox"/> | Passed <input type="checkbox"/> |
| Burner Head Sensor                            | Choosing Nitrous Oxide as the oxidant should trigger an interlock shuts down | Active <input type="checkbox"/> | Passed <input type="checkbox"/> |

## 8. After PM Performance tests:

### 8.1 Detector Linearity with Barium

Description: Ensures that the detector is linear in the Visible Range.

| Parameter       | Specification   | Certificate Value at 553.6 nm (Abs.) | Test Results | Pass/Fail                       |
|-----------------|-----------------|--------------------------------------|--------------|---------------------------------|
| 1.0 A ND Filter | ± 5% from Cert. | 0.9995                               | 0.9735       | Passed <input type="checkbox"/> |
| 0.2 A ND Filter | ± 5% from Cert. | 0.1886                               | 0.1945       | Passed <input type="checkbox"/> |

### 8.2 Baseline Noise at 1.0 Absorbance with Barium

Description: Ensures that a high absorbance will not produce excessive noise.

| Parameter          | Specification | Results | Pass/Fail                       |
|--------------------|---------------|---------|---------------------------------|
| Standard Deviation | ≤ 0.010       | 0.0018  | Passed <input type="checkbox"/> |

### 8.3 AA Baseline Noise with Copper

Description: Check baseline noise.

| Parameter          | Specification | Results | Pass/Fail                       |
|--------------------|---------------|---------|---------------------------------|
| Standard Deviation | ≤ 0.001       | 0.0001  | Passed <input type="checkbox"/> |

#### 8.4 D<sub>2</sub> Background Compensation with Copper

Description: Verifies the instruments ability to compensate for Background absorption.

| Parameter          | Specification | Results | Pass/Fail                               |
|--------------------|---------------|---------|-----------------------------------------|
| Standard Deviation | $\leq 0.010$  | 0.0019  | Passed <input type="button" value="v"/> |

#### 8.5 AA-BG Baseline Noise with Copper

Description: Ensures that background correction does not produce excessive noise.

| Parameter          | Specification | Results | Pass/Fail                               |
|--------------------|---------------|---------|-----------------------------------------|
| Standard Deviation | $\leq 0.005$  | 0.0010  | Passed <input type="button" value="v"/> |

#### 8.6 AA-BG Baseline Noise with Arsenic

Description: Ensures that background correction does not produce excessive noise at a low wavelength.

| Parameter          | Specification | Results | Pass/Fail                               |
|--------------------|---------------|---------|-----------------------------------------|
| Standard Deviation | $\leq 0.005$  | 0.0017  | Passed <input type="button" value="v"/> |

#### 8.7 Flame Sensitivity

Description: Instrument Sensitivity checked against Copper standard.

| Standard Copper Sensitivity               | Specification | Results (Abs.) | Pass/Fail                                       |
|-------------------------------------------|---------------|----------------|-------------------------------------------------|
| 5 mg/L Sensitivity SS Neb (if applicable) | > 0.250 Abs.  | N/A            | Not Applicable <input type="button" value="v"/> |
| 2 mg/L Sensitivity HS Neb (if applicable) | > 0.250 Abs.  | 0.2926         | Passed <input type="button" value="v"/>         |

#### 10. Review:

- ☒ Review with the customer PM work performed.
- ☒ Review with the customer routine maintenance procedures.
- ☒ Discuss recommended customer supplied materials to have on hand.
- ☒ Attach PM sticker.

## Additional Comments

### Additional Comments Regarding the PM

## Review

*The preventive maintenance checks and if applicable performance tests for PinAAcle 900F have been completed.*

*This PinAAcle 900F Passes ☒ Fails ☐ the preventive maintenance.*

### Review of Preventive Maintenance:

Authorized PerkinElmer Representative:

*Passit*

Date:

8 SEP 2025

(DD-MMM-YYYY)

Authorized Customer Representative:

*fmm.*

Date:

8 SEP 2025

(DD-MMM-YYYY)

| <b><i>Atomic Absorption/FIAS 100/400 Preventive Maintenance (PM)</i></b> |                                                                   |                                                |              |
|--------------------------------------------------------------------------|-------------------------------------------------------------------|------------------------------------------------|--------------|
| <b>Company Name:</b>                                                     | Special Lab Envi&Consultant Co.,Lt                                |                                                |              |
| <b>Address<br/>(Instrument Location):</b>                                | Soi Tha It, Rattana Thibet Rd, Tha It, Pak Kret, Nonthaburi 11120 |                                                |              |
| <b>Room Number:</b>                                                      | AAS Room                                                          |                                                |              |
| <b>Asset Number<br/>(if applicable):</b>                                 | 100S17080201                                                      | <b>Customer<br/>System ID:</b>                 | Khun Fahtiha |
| <b>Service Engineer<br/>Name:</b>                                        | Prasit                                                            | <b>Service Order<br/>Number:</b>               | WO-11614853  |
| <b>Date PM Performed:<br/>(DD-MMM-YYYY)</b>                              | 8 SEP 2025                                                        | <b>Next PM Due<br/>Date:<br/>(DD-MMM-YYYY)</b> | 8 SEP 2026   |

| Part Number | Release | Publication Date |  |
|-------------|---------|------------------|-------------------------------------------------------------------------------------|
| 09370005    | C       | January 2013     |                                                                                     |

#### Scope

The purpose of this PM is to ensure the continued functionality of the Atomic Absorption/FIAS 100/400 by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer.

The customer should save their method before the PM begins.

#### General Instructions:

Always check with the customer before making any changes that may affect the customer's analysis or calibration.

The completed document should be signed by an authorized PerkinElmer and customer representative and left with the customer.

Update the PM sticker and instrument logbook as required.

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## Component List

| Component /<br>Specific Model | Serial #     | Firmware<br>Version | Configuration Notes |
|-------------------------------|--------------|---------------------|---------------------|
| FIAS100                       | 100S17080201 | 2.20                | 3.0.3.1560          |
|                               |              |                     |                     |
|                               |              |                     |                     |
|                               |              |                     |                     |

## Parts Lists

| Parts Included with the PM        |             |          |                |                               |
|-----------------------------------|-------------|----------|----------------|-------------------------------|
| Part Number<br>(if<br>applicable) | Description | Quantity | Batch/Lot<br># | Expiration<br>Date<br>(MM/YY) |
| B050 2706                         | Fan Filter  | 1        | N/A            | N/A                           |
|                                   |             |          |                |                               |

| Additional Tools Required for PM                  |                    |          |                |                                    |
|---------------------------------------------------|--------------------|----------|----------------|------------------------------------|
| Part Number<br>(if<br>applicable)                 | Description        | Quantity | Serial #       | Calibration<br>Due Date<br>(MM/YY) |
|                                                   | Digital Volt Meter | 1        | N/A            | N/A                                |
|                                                   |                    |          |                |                                    |
| Additional Reagents and Standards Required for PM |                    |          |                |                                    |
| Part Number<br>(if<br>applicable)                 | Description        | Quantity | Batch/Lot<br># | Expiration<br>Date<br>(MM/YY)      |
|                                                   | N/A                | N/A      | N/A            | N/A                                |
|                                                   |                    |          |                |                                    |



# Procedure Checklist

Use (✓) to check off those steps in the checklist that have been completed.

## 1. General:

- ☒ Review the instrument performance with the customer and document any recent problems.

- 
- ☐ Is the Working Environment Acceptable? If not, document.

- 
- ☐ Visual Damage (if yes, describe)

- 
- ☒ Check incoming AC line voltage for proper levels and grounding.
  - ☒ Verify Voltage switch on back of instrument is correct
  - ☒ Perform general inspection of system for cleanliness. Clean if needed.
  - ☒ Gas supply cylinders secured, lines leak checked and argon or nitrogen supply pressure verified (45 – 58 psi).
  - ☒ Inspect the customer log book and make any appropriate PM entries.
  - ☒ Fan checked and filter cleaned
  - ☒ Heating mantle or Universal Cell Holder checked

## 2. Instrument components

- ☒ Non-return valve checked/repaired/replaced if needed (B019 8111). Clean the valve if there is any liquid in it. Replace the rubber sleeve (B013 5123) if it is worn. Check the flow meter for any signs of fluid in it. Clean the flow meter if needed.
- ☒ Verify condition of pump pressure adjustment levers (B050 7794 - look for cracks or problems with the springs), pump rollers (B300 0251 check for wear), and thumb screws (B050 7796).
- ☒ Check the Multiport valve for proper switching, flow, and insure there are no leaks. Clean valve parts and replace o-rings if needed (large o-ring: B050 1250, small o-ring: B004 5095). Use a squirt bottle & fishing line to try to dislodge clogs.
- ☒ Firmware Version checked. Latest is 2.20.

## 3. Mixing/Separation Assembly & Pump Tubing:

- ☒ Mixing separator assembly checked
- ☒ Filter/membrane checked (B050 8306)
- ☒ Condition of the pump tubing (replace if necessary), correct pump tubing for the solutions being run. Make sure the correct magazines are being used. B050 7791 for 0.13 – 1.80 mm tubing; B050 7792 for 1.60 – 3.18 mm tubing.

**4. Cell, Cell Windows, Transfer Line:**

- ☒ Cell checked
- ☒ Cell windows checked
- ☒ Transfer line checked for moisture (if moisture is a problem, the Nafion dryer might be needed)

**5. Operational Tests:**

- ☒ Run DI water through the carrier/reductant/sample system. Verify smooth flow of liquid throughout without leaks. Replace tubing & fittings if needed.

**6. Review:**

- ☒ Review with the customer PM work performed.
- ☒ Review with the customer routine maintenance procedures.
- ☒ Discuss recommended customer-supplied materials to have on hand.
- ☒ Attach PM sticker.
- ☒ Update Logbook.

## Additional Comments

| Additional Comments Regarding the PM |
|--------------------------------------|
| N/A                                  |
|                                      |
|                                      |
|                                      |
|                                      |

## Review

|                                                                                                                                       |                                      |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b><i>The preventive maintenance checks and if applicable performance tests for FIAS 100/400 have been completed.</i></b>             |                                      |
| <b><i>This FIAS 100/400 Passes <input checked="" type="checkbox"/> Fails <input type="checkbox"/> the preventive maintenance.</i></b> |                                      |
| <b>Review of Preventive Maintenance:</b>                                                                                              |                                      |
| Authorized PerkinElmer Representative:             | Date:<br>8 SEP 2025<br>(DD-MMM-YYYY) |
| Authorized Customer Representative:                                                                                                   | Date:<br>8 SEP 2025<br>(DD-MMM-YYYY) |

## Document History

| Revision | Description of Change                                             | Page(s) | Date          |
|----------|-------------------------------------------------------------------|---------|---------------|
| A        | First release                                                     |         | May 2008      |
| B        | Addition of Batch/Lot Number, Expiration Date, and Report Fields. | 2,7     | February 2009 |
| C        | Update to new format                                              | All     | January 2013  |

## Certificate of Calibration

**Certificate No. :** 68-400236-1

**Page : 1 of 2**

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.

47/91-93 Moo 3, Tambol Tha-It, Pakkret, Nonthaburi 11120

**Equipment :** Digital Thermometer with Thermocouple probe Type K  
Temperature Indicator

Manufacturer : Thermo Scientific

Model : TEMP 10K

Range : -250 °C to 1372 °C

Resolution : 0.1 °C

Serial No. : 4008958

ID No. : LB-Eq-013

**Environment :** Ambient Temperature :  $(23 \pm 2)$  °C

Relative Humidity :  $(50 \pm 15)$  %

Line Voltage :  $(220 \pm 22)$  VAC

**Date of Received :** 19 April 2025

**Date of Calibration :** 22 April to 24 April 2025

**Date of Issue :** 24 April 2025

**Calibrated by :** Chortip Samchusri

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

The temperature scale used was based on ITS-90

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

1. Platinum Resistance Thermometer (PRT)

| ID No. | Cert. No.  | Due Date    | Traceability                                    |
|--------|------------|-------------|-------------------------------------------------|
| 400001 | TT-0023-24 | 16 Feb 2026 | National Institute of Metrology Thailand (NIMT) |
| 400016 | TT-0053-23 | 15 May 2025 | National Institute of Metrology Thailand (NIMT) |

2. Standard Digital Thermometer

| ID No. | Cert. No. | Due Date    | Traceability                                    |
|--------|-----------|-------------|-------------------------------------------------|
| 400003 | 23E1866   | 01 Jun 2025 | National Institute of Metrology Thailand (NIMT) |
| 400004 | 23E1866   | 01 Jun 2025 | National Institute of Metrology Thailand (NIMT) |

Approved by :

( Permon Chanpu )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 68-400236-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement with Thermocouple probe Type K

Model : Type K Sheath Material : Teflon  
Diameter : 2 mm. Length : 1500 mm.  
Serial No. : N/A ID No. : SL-39

| Immersion Depth<br>( mm. ) | Standard Reading<br>( °C ) | UUC Reading<br>( °C ) | Correction<br>( °C ) | Uncertainty<br>( ± °C ) |
|----------------------------|----------------------------|-----------------------|----------------------|-------------------------|
| 130                        | 3.0028                     | 3.5                   | -0.5                 | 0.18                    |
| 130                        | 20.0022                    | 20.5                  | -0.5                 | 0.18                    |
| 130                        | 104.0020                   | 104.2                 | -0.2                 | 0.45                    |
| 130                        | 150.0022                   | 150.3                 | -0.3                 | 0.58                    |
| 130                        | 180.0023                   | 178.8                 | 1.2                  | 0.65                    |

Model : AD-1218-230 Sheath Material : Stainless  
Diameter : 3.5 mm. Length : 230 mm.  
Serial No. : N/A ID No. : SL-40

| Immersion Depth<br>( mm. ) | Standard Reading<br>( °C ) | UUC Reading<br>( °C ) | Correction<br>( °C ) | Uncertainty<br>( ± °C ) |
|----------------------------|----------------------------|-----------------------|----------------------|-------------------------|
| 124                        | 380.0057                   | 379.5                 | 0.5                  | 1.5                     |
| 124                        | 399.9903                   | 399.3                 | 0.7                  | 1.6                     |

### Remark

UUC : Unit Under Calibration

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

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

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**TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)**  
**CORPORATE SERVICES 3 : EQUIPMENT CALIBRATION AND TESTING SERVICES**

534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250

TEL. 0-2717-3000 FAX. 0-2719-9484

## Certificate of Testing

**Cert.No.:** 25TW23

**Page.:** 1 of 2

**Equipment :** DO Meter

**Manufacturer :** Hanna

**Model :** HI98193

**Serial No. :** 09120032101

**ID No. :** LB-Eq-014

**Received Date :** 04 February 2025

**Test Date :** 05 February 2025

**Reference :** 2502-0115WN-1

**Submitted by :** Special Lab Envi And Consultant Co.,Ltd  
47/91-93 Moo 3 Thambon Tha-it,  
Pakkret, Nonthaburi 11120

**Laboratory Condition :** Temperature (  $25 \pm 5$  ) °C  
Humidity (  $50 \pm 20$  ) %

**Test Procedure :** In - house method : CP-CH9  
by Comparison Technique with Azide Modification Method

**Tested by :** Walalak Sirithean

**Approved by :**   
Approved Signatory

( ) Chakrit Waewwanjua  
( ) Ponpan Paipim  
(✓) Saithip Meangmai

**Issue Date :** 5 February 2025





Cert.No.: 25TW23

Page.: 2 of 2

**Condition of this result of calibration**

1. Reference Standard Instruments :

This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

| <u>Instruments</u> | <u>Serial No.</u> | <u>ID No.</u> | <u>Certificate No.</u> | <u>Due Date</u> |
|--------------------|-------------------|---------------|------------------------|-----------------|
| 1. Burette         | -                 | 130BU10       | 23CG1172               | 22 Mar 2025     |
| 2. Balance         | 14233821          | 110RC001      | 24MM131                | 04 July 2025    |

2. Standard Material :-

| <u>Material</u>                 | <u>Manufacturer</u> | <u>Lot.No.</u> | <u>Assay</u> |
|---------------------------------|---------------------|----------------|--------------|
| Sodium Thiosulfate 5-Hydrate AR | KEMAUS              | 2203162447     | 99.6%        |

**Result :** Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: KC1N8943T

| <b>Titration Method<br/>(Azide Modification Method)</b><br>(mg/L) | <b>DO Meter<br/>Reading</b><br>(mg/L) | <b>Standard Deviation</b><br>(mg/L) |
|-------------------------------------------------------------------|---------------------------------------|-------------------------------------|
| 8.20                                                              | 8.20                                  | 0.0055                              |

This report was certified only for the instrument we tested. It is allowable to use for study  
Intend to use for advertising and referral purpose is prohibited. This report may not be reproduced  
other in full, without written approval of the laboratory

-o0o-

## Certificate of Calibration

**Certificate No. :** 68-200127-1

**Page : 1 of 2**

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.  
47/91-93 Moo 3, Tambol Tha-It, Pakkret, Nonthaburi 11120

**Equipment :** Electronic Balance  
Manufacturer : AND Model : GR-200  
Serial No. : 14245322 ID No. : LB-Eq-016  
Capacity : 210 g Resolution : 0.0001 g

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

Special Lab Envi and Consultant Co., Ltd.

Ambient Temperature : (25.5 to 26.1) °C

Relative Humidity : (56.6 to 57.0) %

Air Pressure : 1008.0 mbar

**Date of Received :** 19 April 2025

**Date of Calibration :** 19 April 2025

**Date of Issue :** 22 April 2025

**Calibrated by :** Satja Sangkhum

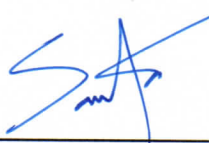
**Calibration Method :** In-house method CAL-M2001 based on UKAS Publication ref : LAB 14  
Edition 7 - November 2022

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

Standard Weights

| ID No.     | Cert. No. | Due Date    | Traceability                                       |
|------------|-----------|-------------|----------------------------------------------------|
| E261-E2624 | C02242009 | 07 Nov 2025 | National Institute of Metrology (Thailand), (NIMT) |

Approved by :

  
( Surachai Premthong )  
Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 68-200127-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

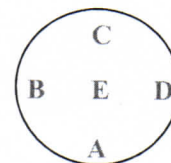
| Nominal Value<br>(g) | Correction<br>(g) | Uncertainty<br>$\pm$ (g) |
|----------------------|-------------------|--------------------------|
| 0.001                | 0.0000            | 0.00011                  |
| 0.01                 | 0.0000            | 0.00011                  |
| 0.1                  | 0.0000            | 0.00011                  |
| 0.5                  | 0.0000            | 0.00011                  |
| 2                    | 0.0000            | 0.00011                  |
| 5                    | 0.0000            | 0.00011                  |
| 10                   | 0.0000            | 0.00011                  |
| 50                   | 0.0001            | 0.00014                  |
| 100                  | 0.0001            | 0.00020                  |
| 200                  | 0.0000            | 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  
 -0.0005 0.0002 0.0004 0.0002 0.0000 g



Repeatability

Load test : 200 g  
 Stdev. : 0.00005 g

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|                                                                                  |                                                     |                                 |
|----------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------|
|  | บริษัท สเปเชียล แล็บ เอ็นไว แอนด์ คอนซัลแตนท์ จำกัด | หน้าที่: 1 / 1                  |
|                                                                                  | แบบบันทึกการทวนสอบอุณหภูมิของ Heating block (COD)   | วันที่บังคับใช้: 01 / 04 / 2563 |

1. Heating block (COD)

ผู้ผลิต MLAB รุ่น DB 1602 Serial No. 0141 รหัสเครื่อง LB-Eg-012  
วันที่ทวนสอบ 1 มินาคม 2568 ทวนสอบครั้งต่อไป 1 กันยายน 2568

2. Digital Thermometer with TC Probe

ผู้ผลิต Thermo Scientific รุ่น Temp 10k Serial No. 4008958 รหัสเครื่อง LB-Eg-013  
ความละเอียด 0.1 (°C) วันที่ทวนสอบ 22 April 2024 ทวนสอบครั้งต่อไป 21 April 2025

3. ผลการทวนสอบ (ช่วงเวลา 9.00 น. - 16.30 น.)

อุณหภูมิห้อง 26.4 (°C) ความชื้นสัมพัทธ์ 54.5 %

| วัน/เดือน/ปี | Position No. | Set point (°C) | อุณหภูมิที่อ่านได้จากเครื่อง (°C) | อุณหภูมิที่อ่านได้เทอร์โมมิเตอร์ (°C) |               |                      | เกณฑ์การยอมรับ | สรุปผลการทวนสอบ |         | ผู้ทวนสอบ |
|--------------|--------------|----------------|-----------------------------------|---------------------------------------|---------------|----------------------|----------------|-----------------|---------|-----------|
|              |              |                |                                   | ครั้งที่1 (A)                         | ครั้งที่2 (B) | ค่าเฉลี่ยของอุณหภูมิ |                | ผ่าน            | ไม่ผ่าน |           |
| 1/3 /68      | 1            | 150.0          | 150.0                             | 150.5                                 | 150.4         | 150.5                | +2             | ✓               |         | บุศรา     |
|              | 2            |                |                                   | 150.4                                 | 150.3         | 150.4                | +2             | ✓               |         |           |
|              | 3            |                |                                   | 150.0                                 | 151.0         | 151.0                | +2             | ✓               |         |           |
|              | 4            |                |                                   | 150.1                                 | 150.2         | 150.2                | +2             | ✓               |         |           |
|              | 5            |                |                                   | 150.4                                 | 150.3         | 150.4                | +2             | ✓               |         |           |
|              | 6            |                |                                   | 150.2                                 | 150.3         | 150.3                | +2             | ✓               |         |           |
|              | 7            |                |                                   | 149.9                                 | 149.8         | 149.9                | +2             | ✓               |         |           |
|              | 8            |                |                                   | 150.1                                 | 150.1         | 150.1                | +2             | ✓               |         |           |
|              | 9            |                |                                   | 150.4                                 | 150.5         | 150.5                | +2             | ✓               |         |           |
|              | 10           |                |                                   | 150.2                                 | 150.3         | 150.3                | +2             | ✓               |         |           |
|              | 11           |                |                                   | 149.7                                 | 149.9         | 149.8                | +2             | ✓               |         |           |
|              | 12           |                |                                   | 151.0                                 | 151.1         | 151.1                | +2             | ✓               |         |           |
|              | 13           |                |                                   | 149.9                                 | 149.9         | 149.9                | +2             | ✓               |         |           |
|              | 14           |                |                                   | 150.8                                 | 150.9         | 150.9                | +2             | ✓               |         |           |
|              | 15           |                |                                   | 150.5                                 | 150.2         | 150.4                | +2             | ✓               |         |           |
|              | 16           |                |                                   | 151.0                                 | 151.0         | 151.0                | +2             | ✓               |         |           |
|              | 17           |                |                                   | 149.9                                 | 149.8         | 149.9                | +2             | ✓               |         |           |
|              | 18           |                |                                   | 150.3                                 | 150.3         | 150.3                | +2             | ✓               |         |           |
|              | 19           |                |                                   | 149.9                                 | 150.0         | 150.0                | +2             | ✓               |         |           |
|              | 20           |                |                                   | 151.2                                 | 151.2         | 151.2                | +2             | ✓               |         |           |
|              | 21           |                |                                   | 150.2                                 | 150.3         | 150.3                | +2             | ✓               |         |           |
|              | 22           |                |                                   | 150.0                                 | 150.0         | 150.0                | +2             | ✓               |         |           |
|              | 23           |                |                                   | 150.5                                 | 150.6         | 150.6                | +2             | ✓               |         |           |
|              | 24           |                |                                   | 150.8                                 | 150.6         | 150.7                | +2             | ✓               |         |           |
|              | 25           |                |                                   | 151.2                                 | 151.3         | 151.3                | +2             | ✓               |         |           |



## Certificate of Calibration

**Certificate No. :** 68-400223-2

**Page : 1 of 2**

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.  
47/91 Moo 3 Thambol Tha-it, Pakkret, Nonthaburi 11120

**Equipment :** Temperature controlled enclosure(Incubator)  
Manufacturer : Lovibond Model : FKU 1800  
Range : N/A °C Resolution : 0.1 °C  
Serial No. : 0914643-01 ID No. : LB-Eq-004

**Environment :** On site calibration was carried out at the Laboratory, Special Lab Envi and Consultant Co., Ltd.  
Ambient Temperature : (26.0 to 26.5) °C  
Relative Humidity : (45 to 50) %  
Line Voltage : (226.0 to 226.5) V

**Date of Received :** 19 April 2025

**Date of Calibration :** 19 April 2025

**Date of Issue :** 25 April 2025

**Calibrated by :** Permpon Chanpu

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

The temperature scale used was based on ITS-90

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

| ID No.          | Cert. No.   | Due Date    | Traceability                                    |
|-----------------|-------------|-------------|-------------------------------------------------|
| 400046 & 400042 | 68-400007-1 | 28 Jul 2025 | National Institute of Metrology Thailand (NIMT) |

Approved by :



( Permpon Chanpu )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 68-400223-2

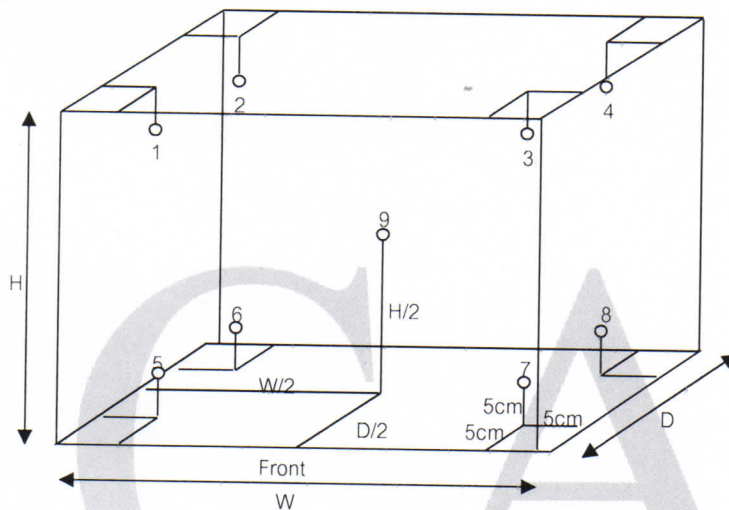
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

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



Inside of Chamber  
 W = 0.55 m  
 D = 0.73 m  
 H = 0.50 m  
 Capacity = 0.20 m<sup>3</sup>

| 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                           | 20.35                                  | 20.26 | 20.28 | 20.31 | 20.21 | 20.09 | 20.29 | 20.17 | 20.22 | 0.63                  |

| Test Point<br>(°C) | Setting Temperature<br>(°C) | Indicating Temperature<br>(°C) | Measured Uniformity<br>(°C) | Measured Stability<br>(°C) | Overall Variation<br>(°C) |
|--------------------|-----------------------------|--------------------------------|-----------------------------|----------------------------|---------------------------|
| 20.0               | 20.0                        | 20.0                           | 0.22                        | 0.34                       | 0.85                      |

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 -

*[Handwritten signature]*





## Certificate of Calibration

**Certificate No. :** 68-400223-1

**Page : 1 of 2**

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.  
47/91 Moo 3 Thambol Tha-it, Pakkret, Nonthaburi 11120

**Equipment :** Temperature controlled enclosure(Incubator)

Manufacturer : Lovibond

Model : FKU 1800

Range : N/A °C

Resolution : 0.1 °C

Serial No. : 0925481-19

ID No. : LB-Eq-005

**Environment :** On site calibration was carried out at the Laboratory, Special Lab Envi and Consultant Co., Ltd.

Ambient Temperature : (24.5 to 25.0) °C

Relative Humidity : (40 to 45) %

Line Voltage : (226.0 to 226.5) V

**Date of Received :** 19 April 2025

**Date of Calibration :** 19 April 2025

**Date of Issue :** 25 April 2025

**Calibrated by :** Permpon Chanpu

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

The temperature scale used was based on ITS-90

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

| ID No.          | Cert. No.   | Due Date    | Traceability                                    |
|-----------------|-------------|-------------|-------------------------------------------------|
| 400046 & 400047 | 68-400007-2 | 29 Jul 2025 | National Institute of Metrology Thailand (NIMT) |

Approved by :



( Permpon Chanpu )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-400237-1

**Page : 1 of 2**

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.  
47/91-93 Moo 3, Tambol Tha-It, Pakkret, Nonthaburi 11120

**Equipment :** Liquid in Glass Thermometer  
 Manufacturer : SK Model : N/A  
 Range : 0 °C to 100 °C Resolution : 1 °C  
 Serial No. : N/A Immersion : Total  
 ID No. : LB-Eq-021

**Environment :** Ambient Temperature : (23 ± 2) °C  
 Relative Humidity : (50 ± 15) %  
 Line Voltage : (220 ± 22) VAC

**Date of Received :** 19 April 2025

**Date of Calibration :** 23 April 2025

**Date of Issue :** 23 April 2025

**Calibrated by :** Chortip Samchusri

**Calibration Method :** This instrument was calibrated by In-house method comparison technique CAL-M4001 based on ASTM E77-07 by compared with PRT in the liquid bath at the constant controlled temperature.

The temperature scale used was based on ITS-90

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

1. Platinum Resistance Thermometer (PRT)

| ID No. | Cert. No.  | Due Date    | Traceability                                    |
|--------|------------|-------------|-------------------------------------------------|
| 400001 | TT-0023-24 | 16 Feb 2026 | National Institute of Metrology Thailand (NIMT) |

2. Standard Digital Thermometer

| ID No. | Cert. No. | Due Date    | Traceability                                    |
|--------|-----------|-------------|-------------------------------------------------|
| 400003 | 23E1866   | 01 Jun 2025 | National Institute of Metrology Thailand (NIMT) |
| 400004 | 23E1866   | 01 Jun 2025 | National Institute of Metrology Thailand (NIMT) |

Approved by :   
 ( Permpon Chanpu )  
 Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-400237-1

**Page : 2 of 2**

**Result of Calibration :** Without Adjustment

**UUC Condition As-Received :** Good

**Function :** Temperature measurement

Ice point check : UUC\* reading 0 ° C Standard reading -0.4844 ° C

| Standard Reading<br>( ° C ) | UUC Reading<br>( ° C ) | Correction<br>( ° C ) | Uncertainty<br>( ± ° C ) |
|-----------------------------|------------------------|-----------------------|--------------------------|
| 24.1969                     | 25                     | -0.8                  | 0.31                     |
| 29.0828                     | 30                     | -0.9                  | 0.31                     |
| 39.1955                     | 40                     | -0.8                  | 0.31                     |

Remark

UUC : Unit Under Calibration

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

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

- oOo -





## Certificate of Calibration

**Certificate No. :** 68-400237-2

**Page : 1 of 2**

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.  
47/91-93 Moo 3, Tambol Tha-It, Pakkret, Nonthaburi 11120

**Equipment :** Liquid in Glass Thermometer  
**Manufacturer :** SK **Model :** N/A  
**Range :** 0 °C to 100 °C **Resolution :** 1 °C  
**Serial No. :** N/A **Immersion :** Total  
**ID No. :** LB-Eq-020

**Environment :** Ambient Temperature : (23 ± 2) °C  
 Relative Humidity : (50 ± 15) %  
 Line Voltage : (220 ± 22) VAC

**Date of Received :** 19 April 2025

**Date of Calibration :** 23 April 2025

**Date of Issue :** 23 April 2025

**Calibrated by :** Chortip Samchusri

**Calibration Method :** This instrument was calibrated by In-house method comparison technique CAL-M4001 based on ASTM E77-07 by compared with PRT in the liquid bath at the constant controlled temperature.

The temperature scale used was based on ITS-90

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

1. Platinum Resistance Thermometer (PRT)

| ID No. | Cert. No.  | Due Date    | Traceability                                    |
|--------|------------|-------------|-------------------------------------------------|
| 400001 | TT-0023-24 | 16 Feb 2026 | National Institute of Metrology Thailand (NIMT) |

2. Standard Digital Thermometer

| ID No. | Cert. No. | Due Date    | Traceability                                    |
|--------|-----------|-------------|-------------------------------------------------|
| 400003 | 23E1866   | 01 Jun 2025 | National Institute of Metrology Thailand (NIMT) |
| 400004 | 23E1866   | 01 Jun 2025 | National Institute of Metrology Thailand (NIMT) |

Approved by :



( Permpon Chanpu )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-400237-2

**Page : 2 of 2**

**Result of Calibration :** Without Adjustment

**UUC Condition As-Received :** Good

**Function :** Temperature measurement

Ice point check : UUC\* reading 0 °C Standard reading -0.0899 °C

| Standard Reading<br>( °C ) | UUC Reading<br>( °C ) | Correction<br>( °C ) | Uncertainty<br>( ± °C ) |
|----------------------------|-----------------------|----------------------|-------------------------|
| 24.9944                    | 25                    | 0.0                  | 0.31                    |

### Remark

UUC : Unit Under Calibration

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

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

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## CALIBRATION CERTIFICATE

Date of Issue Jun 17, 2025

Cert No. 25/2478

Order No. 25060343

Customer SPECIAL LAB ENVI AND CONSULTANT CO., LTD.  
47/91 Moo 3, Tha-It, Pakkert, Nonthaburi 11120

Place of Calibration Laboratory Room

Description Oven

Model UF30

Serial No. B123.0544

ID.No. LB-Eq-047

Date of Receipt Jun 16, 2025

Date of Calibration Jun 16, 2025

### Environment

Temperature (Min) 29.4 °C (Max) 30.8 °C

Relative Humidity (Min) 48.7 %rh (Max) 52.6 %rh

### Calibration Method

WI-17 : The reference thermometer was placed into the chamber and measurement was performed based on AS-2853.

The temperature scale in use at this laboratory is the International Temperature Scale of 1990.

| Standard Equipment                          | Serial No. | Certificate No. | Due Date    |
|---------------------------------------------|------------|-----------------|-------------|
| 1) Data Acquisition Switch Unit with Sensor | MY49007789 | QR25-0353       | 30 Jan 2026 |

This certificate is traceable to SI unit.

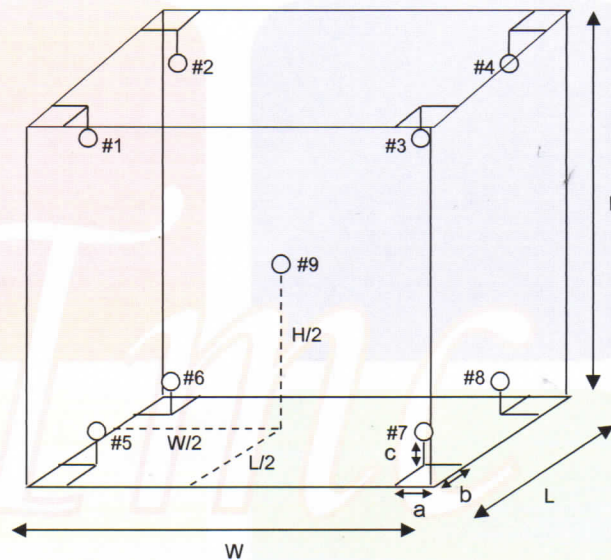
## CALIBRATION CERTIFICATE

Date of Issue Jun 17, 2025

Cert No. 25/2478

Order No. 25060343

Results (without adjustment)



Position of reference thermometers were placed

**Note.**

- 1). Dimension (W x L x H) is 40 x 25 x 32 cm.
- 2). Stability - greatest one half of difference between max peak and min peak of each reference probe measured temperature obtained during the calibration interval.
- 3). Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady state conditions. The reference sensor should preferably be located at the geometric center of the chamber.





## CALIBRATION CERTIFICATE

Date of Issue Jun 17, 2025

Cert No. 25/2478

Order No. 25060343

### Results (without adjustment)

| Cal Point<br>(°C) | UUC<br>Setting<br>(°C) | UUC<br>Reading<br>(°C) | Reference<br>Thermometer<br>(°C) |         | Stability<br>$\pm$ (°C) | Uniformity<br>(°C) | Uncertainty<br>$\pm$ (°C) |
|-------------------|------------------------|------------------------|----------------------------------|---------|-------------------------|--------------------|---------------------------|
| 104.0             | 104.0                  | 104.0                  | Position 1                       | 104.381 | 0.062                   | 0.911              | 0.36                      |
|                   |                        |                        | Position 2                       | 103.624 |                         |                    |                           |
|                   |                        |                        | Position 3                       | 103.718 |                         |                    |                           |
|                   |                        |                        | Position 4                       | 103.628 |                         |                    |                           |
|                   |                        |                        | Position 5                       | 103.579 |                         |                    |                           |
|                   |                        |                        | Position 6                       | 103.557 |                         |                    |                           |
|                   |                        |                        | Position 7                       | 103.569 |                         |                    |                           |
|                   |                        |                        | Position 8                       | 103.587 |                         |                    |                           |
|                   |                        |                        | Position 9                       | 103.513 |                         |                    |                           |

| Cal Point<br>(°C) | UUC<br>Setting<br>(°C) | UUC<br>Reading<br>(°C) | Reference<br>Thermometer<br>(°C) |         | Stability<br>$\pm$ (°C) | Uniformity<br>(°C) | Uncertainty<br>$\pm$ (°C) |
|-------------------|------------------------|------------------------|----------------------------------|---------|-------------------------|--------------------|---------------------------|
| 150.0             | 150.0                  | 150.0                  | Position 1                       | 150.997 | 0.115                   | 1.597              | 0.50                      |
|                   |                        |                        | Position 2                       | 149.610 |                         |                    |                           |
|                   |                        |                        | Position 3                       | 149.802 |                         |                    |                           |
|                   |                        |                        | Position 4                       | 149.659 |                         |                    |                           |
|                   |                        |                        | Position 5                       | 149.570 |                         |                    |                           |
|                   |                        |                        | Position 6                       | 149.512 |                         |                    |                           |
|                   |                        |                        | Position 7                       | 149.500 |                         |                    |                           |
|                   |                        |                        | Position 8                       | 149.743 |                         |                    |                           |
|                   |                        |                        | Position 9                       | 149.471 |                         |                    |                           |





## CALIBRATION CERTIFICATE

Date of Issue Jun 17, 2025

Cert No. 25/2478

Order No. 25060343

### Results (without adjustment)

| Cal Point<br>(°C) | UUC<br>Setting<br>(°C) | UUC<br>Reading<br>(°C) | Reference<br>Thermometer<br>(°C) |         | Stability<br>±(°C) | Uniformity<br>(°C) | Uncertainty<br>±(°C) |
|-------------------|------------------------|------------------------|----------------------------------|---------|--------------------|--------------------|----------------------|
| 180.0             | 180.0                  | 180.0                  | Position 1                       | 181.288 | 0.079              | 1.994              | 0.57                 |
|                   |                        |                        | Position 2                       | 179.511 |                    |                    |                      |
|                   |                        |                        | Position 3                       | 179.762 |                    |                    |                      |
|                   |                        |                        | Position 4                       | 179.572 |                    |                    |                      |
|                   |                        |                        | Position 5                       | 179.506 |                    |                    |                      |
|                   |                        |                        | Position 6                       | 179.420 |                    |                    |                      |
|                   |                        |                        | Position 7                       | 179.327 |                    |                    |                      |
|                   |                        |                        | Position 8                       | 179.840 |                    |                    |                      |
|                   |                        |                        | Position 9                       | 179.353 |                    |                    |                      |

The stability and uniformity were taken into account in the measurement uncertainty stated.

The above results are valid exclusively for calibration samples as mentioned in this report.

This reported expanded uncertainty was based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with ONAC requirements.

APPROVED SIGNATORY :

*D.M.*

☐ MR. PRAJUCKPETCH THONGSOOKCHOTE

☒ MR. DAMRONG MULSING

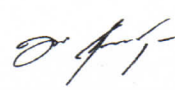
☐ MR. JATURAPAT THONGSOOKCHOTE

Certificate No. : HIT-2522-0864

Page : 1 of 2

**CERTIFICATE OF CALIBRATION**

|                                |                                                                                                                                     |                            |                  |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------|
| <b>Equipment :</b>             | Advanced pH/ORP/Temperature Benchtop Meter                                                                                          |                            |                  |
| <b>Meter Model :</b>           | HI6221-02                                                                                                                           | <b>Serial No. :</b>        | 102180040111     |
| <b>Probe Model :</b>           | HI1053B                                                                                                                             | <b>Serial No. :</b>        | 1140205N         |
| <b>Resolution (pH) :</b>       | 0.01                                                                                                                                | <b>Resolution (mV) :</b>   | 0.1              |
| <b>Manufacturer :</b>          | Hanna Instruments                                                                                                                   | <b>Made in :</b>           | Romania          |
| <b>Condition As-Received :</b> | New Product                                                                                                                         | <b>Reference :</b>         | RE250928         |
| <b>Ambient Temperature :</b>   | ( 25 ± 2 ) °C                                                                                                                       | <b>Relative Humidity :</b> | ( 50 ± 15 ) % RH |
| <b>Customer name :</b>         | SPECIAL LAB ENVI AND CONSULTANT CO., LTD.<br>47/91-93 Moo.3 , T. Tha-it, A. Pakkret,<br>Nonthaburi 11120                            |                            |                  |
| <b>Received date :</b>         | 21 May 2025                                                                                                                         |                            |                  |
| <b>Calibrate date :</b>        | 26 May 2025                                                                                                                         |                            |                  |
| <b>Issue date :</b>            | 26 May 2025                                                                                                                         |                            |                  |
| <b>Calibrated Location :</b>   | Hanna Instruments (Thailand) Ltd.                                                                                                   |                            |                  |
| <b>Calibration Procedure :</b> | This calibrator was conducted by using in-house: calibration procedure<br>CP-01, CP-02 by using certified reference material (CRM). |                            |                  |

**Calibrated by :** ☒ Mr. Pichit Petthong**Approved by :** 

Mr. Anan Suwanchaisakul

Authorized Signatory



This certificate was certified only for the instrument we calibrated.

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

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approval of the head of Hanna Instrument (Thailand)

### 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   | 25E299          | Technology Promotion<br>Association (Thailand-Japan) |
| Thermometer with sensor        | HI98509   | 36943D     | 24T1281         |                                                      |
| Digital Thermo-Hygrometer      | HT-771SD  | AI.07155   | 25H171          |                                                      |

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    | $4.007 \pm 0.006 @ 25^{\circ}\text{C}$  | 1086537    | 26 April 2026   |
| pH 7.0          | CPA chem    | $6.965 \pm 0.007 @ 25^{\circ}\text{C}$  | 1074440    | 8 February 2026 |
| pH 10.0         | CPA chem    | $10.011 \pm 0.008 @ 25^{\circ}\text{C}$ | 1086538    | 26 April 2026   |

### Calibration Result :

1. Performing standard curve by Simulator at: -177.5, 0.0, 177.5 mV

(Measurement Electrical Potential) After Adjust Result.

| Unit Under<br>Calibration    | Nominal<br>Value | Standard<br>Voltage Input | Actual Reading |        | Uncertainty of<br>Measurement ( $\pm$ mV) |
|------------------------------|------------------|---------------------------|----------------|--------|-------------------------------------------|
|                              | pH               | mV                        | pH             | mV     |                                           |
| pH Meter<br>S/N 102180040111 | 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<br>Calibration    | Standard pH<br>Buffer Solution | Actual<br>Reading (pH) | Actual<br>Reading (mV) | Uncertainty of<br>Measurement ( $\pm$ pH) |
|------------------------------|--------------------------------|------------------------|------------------------|-------------------------------------------|
| pH Electrode<br>S/N 1140205N | 4.007                          | 4.01                   | 181.4                  | 0.011                                     |
|                              | 6.965                          | 6.97                   | 7.7                    | 0.012                                     |
|                              | 10.011                         | 10.01                  | -170.5                 | 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 \*\***





TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL.0-2717-3000-29 FAX.0-2719-9484



## Certificate of Calibration

Cert.No.: 25CH644

Page.: 1 of 3

**Equipment :** pH Meter  
**Manufacturer :** Horiba  
**Model :** LAQUAact-PH130  
**Serial No. :** D08C0004  
**ID No. :** -  
**Condition As-Received:** Used Item  
**Received Date :** 02 June 2025  
**Calibration Date :** 05 June 2025  
**Reference :** 2506-0035WN-1  
**Submitted by :** Special Lab Envi And Consultant Co.,Ltd  
47/91-93 Moo 3 Thambon Tha-it, Pakkret  
Nonthaburi 11120

**Ambient Temperature :** (25 ± 2.5) °C  
**Relative Humidity :** (50 ± 15) %  
**Calibration Procedure :** In - house method :  
- CP-CH5 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM)  
- CP-CH8 by comparison with temperature standard

**Calibrated by :** Khit Ruttanaprapachai

**Approved by :** \_\_\_\_\_  
Approved Signatory

( ) Chakrit Waewwanjua  
( ) Ponpan Paipim  
(✓) Saithip Meangmai

**Issue Date :** 6 June 2025

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

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Cert.No.: 25CH644

Page.: 2 of 3

**Condition of this calibration result**

1. Reference Standard Instrument

| <u>Instrument</u>              | <u>Serial No.</u> | <u>ID No.</u> | <u>Cert. No.</u> | <u>Due Date</u> |
|--------------------------------|-------------------|---------------|------------------|-----------------|
| 1) Document Process Calibrator | 43160066          | 130RC092      | 25E1217          | 17 Apr 2026     |
| 2) Ref. Standard Thermometer   | 2188080           | 130RC044      | 24I1022          | 16 Sep 2025     |

- This measurement result is traceable to SI through Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials : The measurement results are traceable to SI through CPA chem Ltd.,  
ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

| <u>Buffer Solution</u> | <u>Manufacturer</u> | <u>Lot No.</u> | <u>Exp. date</u> |
|------------------------|---------------------|----------------|------------------|
| pH 4.007               | CPA chem            | 1066665        | 18 Jan 2027      |
| pH 6.865               | CPA chem            | 940103         | 02 Nov 2025      |
| pH 9.180               | CPA chem            | 1066668        | 18 Jan 2026      |

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

**Calibration Results**

**Function** : mV Measurement

**Performing standard curve by Document Process Calibrator at pH (4,7,9)**

| Unit Under Calibration     | Nominal Value | Standard Voltage Input | Actual Reading |      | Uncertainty of Measurement<br>( ±mV ) | Coverage factor<br><i>k</i> |
|----------------------------|---------------|------------------------|----------------|------|---------------------------------------|-----------------------------|
|                            | pH            | mV                     | mV             | pH   |                                       |                             |
| pH Meter<br>S/N.: D08C0004 | 4.00          | 177.48                 | 177            | 4.00 | 0.58                                  | 2.00                        |
|                            | 6.86          | 8.28                   | 8              | 6.86 | 0.58                                  | 2.00                        |
|                            | 9.18          | -128.97                | -129           | 9.18 | 0.58                                  | 2.00                        |



Cert.No.: 25CH644

Page.: 3 of 3

### Calibration Results

#### Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7,9)

| Unit Under Calibration         | Standard pH Buffer Solution | Actual pH Reading | Actual mV Reading (mV) | Uncertainty of pH Measurement ( $\pm$ ) | Coverage factor $k$ |
|--------------------------------|-----------------------------|-------------------|------------------------|-----------------------------------------|---------------------|
| pH Electrode<br>S/N.: 988E0098 | 4.007                       | 4.02              | 146                    | 0.0086                                  | 2.05                |
|                                | 6.865                       | 6.87              | -16                    | 0.043                                   | 2.65                |
|                                | 9.180                       | 9.20              | -135                   | 0.045                                   | 2.65                |

#### Function : Temperature Measurement

##### **( \* ) Without adjustment**

This equipment was connected with Temperature Probe;

- Model : 9651

- Serial No. : 988E0098

Dimension of probe

- Length : 100 mm.

- Diameter : 16 mm.

- Immersion Depth : 90 mm.

| Calibration Point (°C) | Standard Temperature (°C) | UUC* Reading (°C) | Error (°C) | Uncertainty of measurement ( $\pm$ °C) | Coverage factor $k$ |
|------------------------|---------------------------|-------------------|------------|----------------------------------------|---------------------|
| 25.0                   | 25.005                    | 25.0              | -0.005     | 0.13                                   | 2.00                |
| 30.0                   | 30.004                    | 30.0              | -0.004     | 0.13                                   | 2.00                |
| 40.0                   | 40.004                    | 40.0              | -0.004     | 0.13                                   | 2.00                |

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

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## Certificate of Calibration

**Certificate No. :** 68-400223-4

**Page : 1 of 2**

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.  
47/91-93 Moo 3, Tambol Tha-It, Pakkret, Nonthaburi 11120

**Equipment :** Temperature controlled enclosure (Refrigerator)  
Manufacturer : Frozen Model : CC-2288F  
Range : N/A °C Resolution : 1 °C  
Serial No. : CC-2288F-1163-003 ID No. : LB-Eq-046

**Environment :** On site calibration was carried out at the Laboratory, Special Lab Envi and Consultant Co., Ltd.  
Ambient Temperature : (25.5 to 26.5) °C  
Relative Humidity : (50 to 55) %  
Line Voltage : (226.0 to 226.5) V

**Date of Received :** 19 April 2025

**Date of Calibration :** 19 April 2025

**Date of Issue :** 26 April 2025

**Calibrated by :** Permpon Chanpu

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

The temperature scale used was based on ITS-90

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

| ID No.          | Cert. No.   | Due Date    | Traceability                                    |
|-----------------|-------------|-------------|-------------------------------------------------|
| 400029 & 400032 | 67-400584-1 | 29 Apr 2025 | National Institute of Metrology Thailand (NIMT) |

Approved by :



( Permpon Chanpu )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 68-400223-4

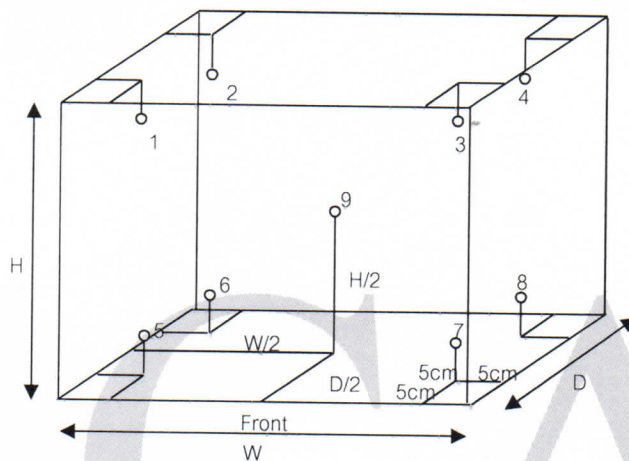
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

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



Inside of Chamber

W = 1.02 m

D = 0.47 m

H = 1.48 m

Capacity = 0.71 m<sup>3</sup>

| 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   |                          |
| 3                     | 3                              | 3                                 | 4.0                                       | 3.0 | 2.8 | 2.6 | 4.0 | 4.0 | 2.2 | 2.0 | 3.0 | 1.0                      |

| Test Point<br>( ° C ) | Setting Temperature<br>( ° C ) | Indicating Temperature<br>( ° C ) | Measured Uniformity<br>( ° C ) | Measured Stability<br>( ° C ) | Overall Variation<br>( ° C ) |
|-----------------------|--------------------------------|-----------------------------------|--------------------------------|-------------------------------|------------------------------|
| 3                     | 3                              | 3                                 | 1.3                            | 0.5                           | 2.7                          |

Remark The uncertainty is not combine uniformity of the air chamber

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

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

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*[Handwritten signature]*







**BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., LTD.**  
99/9 Moo 2, Maha Sawat, Phutthamonthon, Nakhon Pathom. 73170. Thailand.  
Tel: +66 3424 5299 Fax: +66 3424 5250  
E-mail: bkk@becthai.com Website: www.becthai.com



Certificate No. : CAL-25-504

Page : 1 of 3

## CERTIFICATE OF CALIBRATION

|                       |   |                                          |
|-----------------------|---|------------------------------------------|
| Equipment             | : | Spectrophotometer                        |
| Manufacturer          | : | Merck                                    |
| Model                 | : | Prove 100                                |
| Serial No.            | : | 1809112938                               |
| ID No.                | : | LB-Eq-031                                |
| Customer              | : | Special Lab Envi And Consultant Co.,Ltd. |
|                       | : | 47/91-93 Moo 3, Tambol Tait ,            |
|                       | : | Amphur Pakrad, Nonthaburi, 11120         |
| Location              | : | Becthai Laboratory                       |
| Date of Receipt       | : | 8 August 2025                            |
| Date of Calibration   | : | 13 August 2025                           |
| Date of Issue         | : | 13 August 2025                           |
| Ambient Temperature   | : | (25±10) °C                               |
| Relative Humidity     | : | (60±20) %                                |
| Condition As-Received | : | Used Item                                |

Calibrated by

Ms. Bussayamas Noppakhun

Calibration Engineer

Approved by

( Ms. Jintana Sangthaijaroenlap)

Calibration Manager

The reported expended uncertainty of measurement was based on a combined standard uncertainty multiplied by a coverage factor  $k$  providing a level of confidence of approximately 95%.

This certificate may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laborator

Indicated values are valid for the state of the Spectrophotometer at the time of calibration only.



**BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., LTD.**  
99/9 Moo 2, Maha Sawat, Phutthamonthon, Nakhon Pathom. 73170. Thailand.  
Tel: +66 3424 5299 Fax: +66 3424 5250  
E-mail: bkk@becthai.com Website: www.becthai.com



Certificate No. : CAL-25-504

Page : 2 of 3

## CALIBRATION REPORT

### Conditions of this result of calibration

#### 1. Reference Standard Material :

| <u>Material</u>        | <u>Model</u> | <u>Serial No.</u> | <u>Cert.No.</u> | <u>Due date</u> |
|------------------------|--------------|-------------------|-----------------|-----------------|
| Holmium Glass Filter   | RM-HG        | 24563             | 128818          | 3 February 2027 |
| Neutral Density Filter | RM-1N2N3N    | 24568             | 128830          | 3 February 2027 |

#### 2. Traceability : This certification is traceable to the International System of Unit maintained at;

The Starna Scientific Ltd. Accredited Calibration Laboratory No. 0659.

#### 3. Method of calibration :

The calibration procedure was carried out according to ASTM E275-08 (2022) and ASTM E925-09 (2014).

#### 4. Result of calibration :

( ☒ ) without adjustment ( ☐ ) after adjustment

#### 5. Equipment Specifications:

Spectral Bandwidth : 4 nm  
Data Interval : 1 nm  
Scan Speed : N/A nm/min



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Certificate No. : CAL-25-504

Page : 3 of 3

## CALIBRATION REPORT

### Wavelength Calibration

| Certified Values of Reference Material | Nominal Value (nm) | UUC*Reading (nm) | Error (nm) | Uncertainty of Measurement ( $\pm$ nm) | k Factor |
|----------------------------------------|--------------------|------------------|------------|----------------------------------------|----------|
| 418.48                                 | 418.48             | 418              | -0.48      | 0.59                                   | 2.00     |
| 536.90                                 | 536.90             | 537              | 0.10       | 0.59                                   | 2.00     |
| 637.94                                 | 637.94             | 638              | 0.06       | 0.59                                   | 2.00     |

### Photometric Calibration for Visible

| Wavelength (nm)  | Certified Values of Reference Material (A) | UUC* Reading (A) | Error (A) | Uncertainty of Measurement ( $\pm$ A) | k Factor |
|------------------|--------------------------------------------|------------------|-----------|---------------------------------------|----------|
| 420.0            | Zero                                       | 0.000            | 0.0000    | 0.0028                                | 2.00     |
|                  | 0.5834                                     | 0.583            | -0.0004   | 0.0045                                | 2.00     |
|                  | 0.7246                                     | 0.724            | -0.0006   | 0.0045                                | 2.00     |
|                  | 1.0361                                     | 1.034            | -0.0021   | 0.0045                                | 2.00     |
| 440.0            | Zero                                       | 0.000            | 0.0000    | 0.0028                                | 2.00     |
|                  | 0.5663                                     | 0.567            | 0.0007    | 0.0045                                | 2.00     |
|                  | 0.7103                                     | 0.710            | -0.0003   | 0.0045                                | 2.00     |
|                  | 1.0154                                     | 1.015            | -0.0004   | 0.0045                                | 2.00     |
| 465.0            | Zero                                       | 0.000            | 0.0000    | 0.0028                                | 2.00     |
|                  | 0.5256                                     | 0.526            | 0.0004    | 0.0045                                | 2.00     |
|                  | 0.6679                                     | 0.669            | 0.0011    | 0.0045                                | 2.00     |
|                  | 0.9541                                     | 0.955            | 0.0009    | 0.0045                                | 2.00     |
| 546.1<br>(546.0) | Zero                                       | 0.000            | 0.0000    | 0.0028                                | 2.00     |
|                  | 0.522                                      | 0.521            | -0.0010   | 0.0045                                | 2.00     |
|                  | 0.6938                                     | 0.693            | -0.0008   | 0.0045                                | 2.00     |
|                  | 0.9918                                     | 0.991            | -0.0008   | 0.0045                                | 2.00     |
| 590.0            | Zero                                       | 0.000            | 0.0000    | 0.0028                                | 2.00     |
|                  | 0.5563                                     | 0.555            | -0.0013   | 0.0045                                | 2.00     |
|                  | 0.7504                                     | 0.749            | -0.0014   | 0.0045                                | 2.00     |
|                  | 1.0735                                     | 1.072            | -0.0015   | 0.0045                                | 2.00     |
| 635.0            | Zero                                       | 0.000            | 0.0000    | 0.0028                                | 2.00     |
|                  | 0.5641                                     | 0.563            | -0.0011   | 0.0045                                | 2.00     |
|                  | 0.7305                                     | 0.729            | -0.0015   | 0.0045                                | 2.00     |
|                  | 1.0444                                     | 1.043            | -0.0014   | 0.0045                                | 2.00     |

**Remark :** Each individual filter is measured against the empty filter holder (blank) used to zero the Spectrophotometer.

**Note:**

UUC\* : Unit Under Calibration

- End of Report -





**BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., LTD.**  
99/9 Moo 2, Maha Sawat, Phutthamonthon, Nakhon Pathom. 73170. Thailand.  
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Certificate No. : CAL-25-243

Page : 1 of 3

## CERTIFICATE OF CALIBRATION

|                       |   |                                          |
|-----------------------|---|------------------------------------------|
| Equipment             | : | Spectrophotometer                        |
| Manufacturer          | : | Thermo Scientific                        |
| Model                 | : | Genesys 20                               |
| Serial No.            | : | 3SGT041007                               |
| ID No.                | : | LB-Eq-029                                |
| Customer              | : | Special Lab Envi And Consultant Co.,Ltd. |
|                       | : | 47/91-93 Moo 3, Tambol Tait,             |
|                       | : | Amphur Pakrad, Nonthaburi, 11120         |
| Location              | : | Becthai Laboratory                       |
| Date of Receipt       | : | 30 April 2025                            |
| Date of Calibration   | : | 2 May 2025                               |
| Date of Issue         | : | 2 May 2025                               |
| Ambient Temperature   | : | (25±10) °C                               |
| Relative Humidity     | : | (60±20) %                                |
| Condition As-Received | : | Used Item                                |

Calibrated by

Ms. Nopparat Suntarotayan

Calibration Engineer

Approved by

( Ms. Jintana Sangthaijaroenlap)

Calibration Manager

The reported expanded uncertainty of measurement was based on a combined standard uncertainty multiplied by a coverage factor  $k$  providing a level of confidence of approximately 95%.

This certificate may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory

Indicated values are valid for the state of the Spectrophotometer at the time of calibration only.



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Certificate No. : CAL-25-243

Page : 2 of 3

## CALIBRATION REPORT

### Conditions of this result of calibration

#### 1. Reference Standard Material :

| <u>Material</u>        | <u>Model</u> | <u>Serial No.</u> | <u>Cert.No.</u> | <u>Due date</u>  |
|------------------------|--------------|-------------------|-----------------|------------------|
| Holmium Glass Filter   | RM-HG        | 12705             | 117342          | 13 December 2025 |
| Neutral Density Filter | RM-1N2N3N    | 8323              | 117341          | 13 December 2025 |

2. Traceability : This certification is traceable to the International System of Unit maintained at;  
The Starna Scientific Ltd. Accredited Calibration Laboratory No. 0659.

#### 3. Method of calibration :

The calibration procedure was carried out according to ASTM E275-08 (2022) and ASTM E925-09 (2014).

#### 4. Result of calibration :

( ☒ ) without adjustment ( ☐ ) after adjustment

#### 5. Equipment Specifications:

Spectral Bandwidth : 8 nm  
Data Interval : 1 nm  
Scan Speed : N/A nm/min



Certificate No. : CAL-25-243

Page : 3 of 3

## CALIBRATION REPORT

### Wavelength Calibration

| Certified Values of Reference Material | Nominal Value (nm) | UUC*Reading (nm) | Error (nm) | Uncertainty of Measurement ( $\pm$ nm) | k Factor |
|----------------------------------------|--------------------|------------------|------------|----------------------------------------|----------|
| 418.40                                 | 418                | 418              | -0.40      | 0.59                                   | 2.00     |
| 537.00                                 | 537                | 537              | 0.00       | 0.59                                   | 2.00     |
| 638.00                                 | 638                | 638              | 0.00       | 0.59                                   | 2.00     |

### Photometric Calibration for Visible

| Wavelength (nm)  | Certified Values of Reference Material (A) | UUC* Reading (A) | Error (A) | Uncertainty of Measurement ( $\pm$ A) | k Factor |
|------------------|--------------------------------------------|------------------|-----------|---------------------------------------|----------|
| 420.0            | Zero                                       | 0.000            | 0.0000    | 0.0028                                | 2.00     |
|                  | 0.5703                                     | 0.573            | 0.0027    | 0.0045                                | 2.00     |
|                  | 0.7336                                     | 0.739            | 0.0054    | 0.0045                                | 2.00     |
|                  | 1.0709                                     | 1.074            | 0.0031    | 0.0045                                | 2.00     |
| 440.0            | Zero                                       | 0.000            | 0.0000    | 0.0028                                | 2.00     |
|                  | 0.5592                                     | 0.561            | 0.0018    | 0.0045                                | 2.00     |
|                  | 0.716                                      | 0.720            | 0.0040    | 0.0045                                | 2.00     |
|                  | 1.0454                                     | 1.046            | 0.0006    | 0.0045                                | 2.00     |
| 465.0            | Zero                                       | 0.000            | 0.0000    | 0.0028                                | 2.00     |
|                  | 0.5094                                     | 0.511            | 0.0016    | 0.0045                                | 2.00     |
|                  | 0.6601                                     | 0.663            | 0.0029    | 0.0045                                | 2.00     |
|                  | 0.963                                      | 0.965            | 0.0020    | 0.0045                                | 2.00     |
| 546.1<br>(546.0) | Zero                                       | 0.000            | 0.0000    | 0.0028                                | 2.00     |
|                  | 0.5206                                     | 0.523            | 0.0024    | 0.0045                                | 2.00     |
|                  | 0.6677                                     | 0.672            | 0.0043    | 0.0045                                | 2.00     |
|                  | 0.9763                                     | 0.979            | 0.0027    | 0.0045                                | 2.00     |
| 590.0            | Zero                                       | 0.000            | 0.0000    | 0.0028                                | 2.00     |
|                  | 0.5522                                     | 0.553            | 0.0008    | 0.0045                                | 2.00     |
|                  | 0.6966                                     | 0.698            | 0.0014    | 0.0045                                | 2.00     |
|                  | 1.0201                                     | 1.020            | -0.0001   | 0.0045                                | 2.00     |
| 635.0            | Zero                                       | 0.000            | 0.0000    | 0.0028                                | 2.00     |
|                  | 0.5377                                     | 0.542            | 0.0043    | 0.0045                                | 2.00     |
|                  | 0.6649                                     | 0.670            | 0.0051    | 0.0045                                | 2.00     |
|                  | 0.9736                                     | 0.977            | 0.0034    | 0.0045                                | 2.00     |

Remark : Each individual filter is measured against the empty filter holder (blank) used to zero the Spectrophotometer.

Note:

UUC\* : Unit Under Calibration

- End of Report -



## Certificate of Calibration

**Certificate No. :** 68-410119-1

**Page :** 1 of 2

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.  
47/91-93 Moo 3, Tambol Tha-It, Pakkret, Nonthaburi 11120

**Equipment :** Digital Thermo-Hygrometer

Manufacturer : Testo Model : 608-H1  
Range Temperature : 0 °C to 50 °C Resolution : 0.1 °C  
Range Humidity : 10 %R.H. to 95 %R.H. Resolution : 0.1 %R.H.  
Serial No. : 2083236817 ID No. : LB-Eg-042

**Environment :** Ambient Temperature :  $(23 \pm 2) ^\circ\text{C}$   
Relative Humidity :  $(50 \pm 15) \%$

**Date of Received :** 05 August 2025

**Date of Calibration :** 11 August 2025

**Date of Issue :** 11 August 2025

**Calibrated by :** Chortip Samchusri

**Calibration Method :** This instrument was calibrated by In-house method comparison technique CAL-M4013 by compared with standard probe sensor humidity/temperature into humidity/temperature chamber.

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

Digital Indicator with Standard Probe Temp&Hum

| ID No.          | Cert. No.     | Due Date    | Traceability                                                      |
|-----------------|---------------|-------------|-------------------------------------------------------------------|
| 400034 & 400035 | SG-H-00599/68 | 02 Jan 2026 | Success Gateway Co., Ltd., Accredited by TISI Calibration No.0268 |

Approved by :



( Permpoon Chanpu )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-410119-1

**Page :** 2 of 2

**UUC Condition As-Received :** Good

**Result of Calibration :** Without Adjustment

**Function :** Temperature measurement

Reference Humidity @ 50 %R.H.

| Standard Temperature<br>( °C ) | UUC Reading<br>( °C ) | Correction<br>( °C ) | Uncertainty<br>( ± °C ) |
|--------------------------------|-----------------------|----------------------|-------------------------|
| 25.00                          | 24.9                  | 0.1                  | 0.46                    |

**Result of Calibration :** Without Adjustment

**Function :** Humidity measurement

Reference Temperature @ 25 °C

| Standard Humidity<br>( %R.H. ) | UUC Reading<br>( %R.H. ) | Correction<br>( %R.H. ) | Uncertainty<br>( ± %R.H. ) |
|--------------------------------|--------------------------|-------------------------|----------------------------|
| 50.0                           | 57.6                     | -7.6                    | 2.2                        |

### Remark

UUC : Unit Under Calibration

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

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

- o0o -





## Certificate of Calibration

**Certificate No. :** 68-400223-3

**Page : 1 of 2**

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.  
47/91-93 Moo 3 Tambol Tha-It, Pakkret, Nonthaburi 11120

**Equipment :** Water Bath  
 Manufacturer : Memmert  
 Range : N/A °C  
 Serial No. : L520.0201  
 Model : WNB22  
 Resolution : 0.1 °C  
 ID No. : LB-Eq-041

**Environment :** On site calibration was carried out at the Laboratory, Special Lab Envi and Consultant Co., Ltd.  
 Ambient Temperature : (34.0 to 35.0) °C  
 Relative Humidity : (50 to 55) %  
 Line Voltage : (226.0 to 226.5) V

**Date of Received :** 19 April 2025

**Date of Calibration :** 19 April 2025

**Date of Issue :** 26 April 2025

**Calibrated by :** Permpon 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 & 400031 | 68-400214-1 | 25 Oct 2025 | National Institute of Metrology Thailand (NIMT) |

Approved by :

( Permpon Chanpu )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

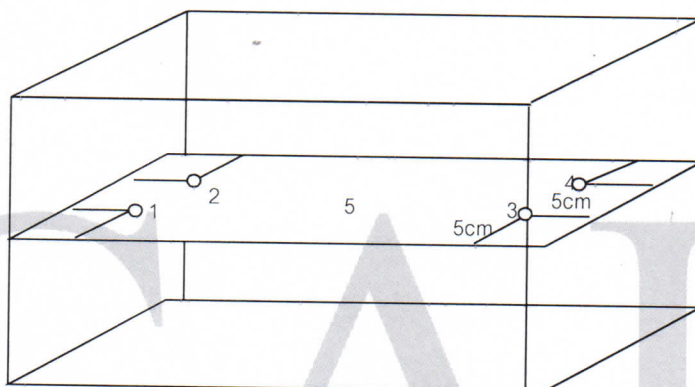
Certificate No. : 68-400223-3

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.                                   |        |        |        |        |                          |                                |                               |
|                       |                                |                                   | 1                                     | 2      | 3      | 4      | 5      |                          |                                |                               |
| 62.0                  | 62.0                           | 62.0                              | 62.03                                 | 62.05  | 62.01  | 62.04  | 62.00  | 0.19                     | 0.12                           | 0.07                          |
| 85.0                  | 85.0                           | 85.0                              | 84.82                                 | 84.76  | 84.94  | 84.85  | 84.86  | 0.20                     | 0.16                           | 0.08                          |
| 95.0                  | 95.0                           | 95.0                              | 94.78                                 | 94.73  | 94.88  | 94.82  | 94.82  | 0.19                     | 0.15                           | 0.07                          |
| 100.0                 | CCC                            | 101.0                             | 100.58                                | 100.92 | 100.61 | 100.57 | 100.63 | 0.24                     | 0.40                           | 0.12                          |

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 -

*[Handwritten signature]*



## Certificate of Calibration

**Certificate No. :** 68-210329-1

**Page : 1 of 2**

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.  
47/91-93 Moo 3, Tambol Tha-It, Pakkret, Nonthaburi 11120

**Equipment :** Weight

Manufacturer : LS

Material : Stainless Steel

Weight size : 1 g

ID No. : LB-Eq-034

Assumed density of weight : 7950 kg / m<sup>3</sup>

Assumed Air density : 1.2 kg / m<sup>3</sup>

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

Relative Humidity : ( 50 ± 10 ) %

Air Pressure : 1010.0 mbar

**Date of Received :** 05 August 2025

**Date of Calibration :** 18 August 2025

**Date of Issue :** 18 August 2025

**Calibrated by :** Wuttichai Swatphong

**Calibration Method :** In-house method CAL-M2101 based on OIML R 111-1 : 2004(E)

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

Standard Weights

| ID No.      | Cert. No.  | Due Date    | Traceability                                       |
|-------------|------------|-------------|----------------------------------------------------|
| E2413-E2425 | MM-0044-25 | 11 Apr 2028 | National Institute of Metrology (Thailand), (NIMT) |

Approved by :



( Satja Sangkhum )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

Certificate No. : 68-210329-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

| No. | Nominal Value | Id.Mark | Conventional mass Value |           | Measuring Uncertainty |
|-----|---------------|---------|-------------------------|-----------|-----------------------|
| 1   | 1 g           | none    | 1 g                     | -0.061 mg | $\pm$ 0.023 mg        |

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

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

- o0o -

# CAL





## Certificate of Calibration

**Certificate No. :** 68-210329-2

**Page : 1 of 2**

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.  
47/91-93 Moo 3, Tambol Tha-It, Pakkret, Nonthaburi 11120

**Equipment :** Weight

**Manufacturer :** LS

**Material :** Stainless Steel

**Weight size :** 100 g

**ID No. :** LB-Eq-035

**Assumed density of weight :** 7950 kg / m<sup>3</sup>

**Assumed Air density :** 1.2 kg / m<sup>3</sup>

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

Relative Humidity : ( 50 ± 10 ) %

Air Pressure : 1009.8 mbar

**Date of Received :** 05 August 2025

**Date of Calibration :** 18 August 2025

**Date of Issue :** 18 August 2025

**Calibrated by :** Wuttichai Swatphong

**Calibration Method :** In-house method CAL-M2101 based on OIML R 111-1 : 2004(E)

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

Standard Weights

| ID No.      | Cert. No.  | Due Date    | Traceability                                       |
|-------------|------------|-------------|----------------------------------------------------|
| E2413-E2425 | MM-0044-25 | 11 Apr 2028 | National Institute of Metrology (Thailand), (NIMT) |

Approved by :

  
( Satja Sangkhun )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-210329-2

**Page : 2 of 2**

**Result of Calibration :** Without Adjustment

**UUC Condition As-Received :** Good

| No. | Nominal Value | Id.Mark | Conventional mass Value |          | Measuring Uncertainty |
|-----|---------------|---------|-------------------------|----------|-----------------------|
| 1   | 100 g         | none    | 100 g                   | -0.06 mg | $\pm$ 0.11 mg         |

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

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

- o0o -

CAL





## Certificate of Calibration

**Certificate No. :** 68-210329-3

**Page : 1 of 2**

**Submitted by :** Special Lab Envi and Consultant Co., Ltd.  
47/91-93 Moo 3, Tambol Tha-It, Pakkret, Nonthaburi 11120

**Equipment :** Weight  
Manufacturer : LS Material : Stainless Steel  
Weight size : 200 g  
ID No. : LB-Eq-036  
Assumed density of weight : 7950 kg / m<sup>3</sup>  
Assumed Air density : 1.2 kg / m<sup>3</sup>

**Environment :** Ambient Temperature : ( 20 ± 2 ) °C  
Relative Humidity : ( 50 ± 10 ) %  
Air Pressure : 1009.8 mbar

**Date of Received :** 05 August 2025

**Date of Calibration :** 18 August 2025

**Date of Issue :** 18 August 2025

**Calibrated by :** Wuttichai Swatphong

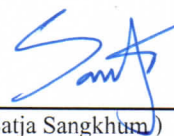
**Calibration Method :** In-house method CAL-M2101 based on OIML R 111-1 : 2004(E)

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

Standard Weights

| ID No. | Cert. No. | Due Date    | Traceability                                       |
|--------|-----------|-------------|----------------------------------------------------|
| E2420  | C02250960 | 06 Jun 2028 | National Institute of Metrology (Thailand), (NIMT) |

Approved by :



( Satja Sangkhun )

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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## Certificate of Calibration

**Certificate No. :** 68-210329-3

**Page : 2 of 2**

**Result of Calibration :** Without Adjustment

**UUC Condition As-Received :** Good

| No. | Nominal Value | Id.Mark | Conventional mass Value |          | Measuring Uncertainty |
|-----|---------------|---------|-------------------------|----------|-----------------------|
| 1   | 200 g         | none    | 200 g                   | -0.11 mg | $\pm$ 0.17 mg         |

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

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

- o0o -

# CAL

