

## ภาคผนวก จ

เอกสารสอบเทียบเครื่องมือตรวจวัดและวิเคราะห์



**SMART TECH CALIBRATION & SERVICES CO., LTD.**

14/506 MOO 3, RANGSIT-NAKHON NAYOK ROAD, LAM PHAK KUT,  
THANYABURI, PATHUM THANI 12110, THAILAND  
Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com



## Certificate of Calibration

**Certificate No.** STCR-2501066-1**Work Order No.** STCR-2501066

Page 1 of 3

**Customer Name** : TNP ENVIRONMENT CO., LTD.  
332/173 Moo 3, Bang Rak Phatthana, Bang Bua Thong,  
Nonthaburi 11110

**Equipment Name** : Light Meter  
**Manufacturer** : Tenmars  
**Model** : TM-209M  
**Serial Number** : 200700319  
**Control Number** : TNP-F-L02  
**Received Date** : Jan 21, 2025  
**Calibration Date** : Jan 27, 2025  
**Recommended Due Date** : Jan 27, 2026  
**Calibration Method** : Calibration Procedure No. CPP-04-01

**Environmental Conditions**

**Ambient Temperature** :  $(25 \pm 2) ^\circ\text{C}$   
**Ambient Relative Humidity** :  $(50 \pm 15) \% \text{RH}$   
**Calibration Place** : Permanent Calibration Laboratory

**Condition as received** : Normal

**Calibration Result** : See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

**Date of Issue** : Jan 28, 2025

**Approved by :**

**Calibrated by** : M. Teaw

Laboratory Manager



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# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2501066-1

Page 2 of 3

## Standards Equipment Used

<u>Equipment Name</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>	<u>Traceability to</u>
Standard Light Meter	210801715	5523631031351793	Nov 5, 2025	MP-TH

## Traceability

This calibration is traceable to the International System of Unit via :

- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.



# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2501066-1

Page 3 of 3

Results of Calibration: [ ☒ ] Without adjustment [ ☐ ] With adjustment

Appearance and Function of Use Inspection : GOOD

Luminance Accuracy Test

Unit : Lux

Range	STD. Value	UUC. Reading	Correction	(±) Uncertainty
40 Lux	25.08	25.06	0.02	1.2
400 Lux	50.06	49.6	0.46	2.2
	100.1	100.4	-0.3	4.7
	200.0	200.3	-0.3	8.9
	500.1	497	3.1	23
4000 Lux	1000	1007	-7	44
	2000	2028	-28	88
	3000	3025	-25	132
	5000	5050	-50	220

**Note :** Calibrated to standard lamp, color temperature 2856 K.

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -







## Certificate of Calibration

Certificate Number : SPR24100392-1

Page : 1 of 3

Customer : TNP ENVIRONMENT CO.,LTD.

332/173 Moo.3, Bang Rak Phatthana, Bang Bua Thong, Nonthaburi  
11110

Equipment Name : Sound Calibrator

Manufacturer : Criffer

Model : CR2 Plus

Serial Number : 37000018

ID. Number : TNP-F-CAL03

### Environmental Conditions

Ambient Temperature :  $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Received Date : 22 Oct 2024

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

Calibration Date : 25 Oct 2024

Location of Calibration : In-Lab

Recommend Due Date : 25 Oct 2025

Calibration Procedure : In-House Method

Date of Issue : 26 Oct 2024

### Method of Calibration

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

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

Calibrated by : Mr.Nanthawat Wanasit

Approved by :

Calibration Officer

Authorized Signatory



## Calibration Report

Certificate Number : SPR24100392-1

Page : 2 of 3

### Reference Standards

Equipment Name	Model	Serial No.	Certificate No.	Due. Date
Measuring Receiver	8902A	2950A02471	E3U2401129	05 Sep 2025
AUDIO Analyzer	8903B	3011A09975	EL02442/24	23 Jan 2025

### Traceability

This certification is traceable to the International System of Unit maintained at :

NA - NA Caltechnologies Co., Ltd.

PCAL - Professional Calibration & Services Co.,Ltd



## Result of Calibration

Certificate No. : SPR24100392-1

Page : 3 of 3

Function : Sound Level

UUC Setting ( $\pm$ dB )	Standard Reading ( dB )	Error ( dB )	Uncertainty ( $\pm$ dB )
94	93.2	0.8	1.5
114	113.2	0.8	1.5

### Note:

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

### Measurement Uncertainty

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

- End of Certificate -



**SMART TECH CALIBRATION & SERVICES CO., LTD.**

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## Certificate of Calibration

**Certificate No.** STCR-2503156-3

**Work Order No.** STCR-2503156

Page 1 of 3

**Customer Name** : TNP Environment Co., Ltd.  
332/173 Vision Smart Life Village, Bang Rak Pattana Subdistrict,  
Bang Bua Thong District, Nonthaburi Province 11110

**Equipment Name** : Sound Level Meter  
**Manufacturer** : Scarlet Tech  
**Model** : ST-25D  
**Serial Number** : 10340913  
**Control Number** : TNP-F-S40  
**Received Date** : Mar 12, 2025  
**Calibration Date** : Mar 13, 2025  
**Recommended Due Date** : Mar 13, 2026  
**Calibration Method** : Calibration Procedure No. CPE-04-01

**Environmental Conditions**

**Ambient Temperature** :  $(25 \pm 2) ^\circ\text{C}$   
**Ambient Relative Humidity** :  $(50 \pm 15) \% \text{RH}$   
**Calibration Place** : Permanent Calibration Laboratory

**Condition as received** : Normal

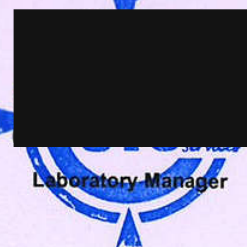
**Calibration Result** : See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

**Date of Issue** : Mar 14, 2025

**Approved by :**

**Calibrated by** : C. Jirayu



Laboratory Manager



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# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2503156-3

Page 2 of 3

## Standards Equipment Used

<u>Equipment Name</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>	<u>Traceability to</u>
Sound Calibrator	N975185	5523631031354566	Nov 6, 2025	MP-TH

## Traceability

This calibration is traceable to the International System of Unit via :

- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.





# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2503156-3

Page 3 of 3

UUC Range : (30 to 130) dB

Resolution : 0.1 dB

Results of Calibration: [ ☒ ] Without adjustment [ ☐ ] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz

Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	94.1 dB	-	-0.01 dB	0.40 dB
	114.07 dB	113.9 dB	-	0.17 dB	0.40 dB
SLOW	94.09 dB	94.1 dB	-	-0.01 dB	0.40 dB
	114.07 dB	113.9 dB	-	0.17 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz

Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	94.1 dB	-	-0.01 dB	0.40 dB
	114.07 dB	113.9 dB	-	0.17 dB	0.40 dB
SLOW	94.09 dB	94.1 dB	-	-0.01 dB	0.40 dB
	114.07 dB	113.9 dB	-	0.17 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -



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## Certificate of Calibration

Certificate No. STCR-2507022-7

Work Order No. STCR-2507022

Page 1 of 3

**Customer Name** : TNP Environment Co., Ltd.  
332/173 Vision Smart Life Village, Bang Rak Pattana Subdistrict,  
Bang Bua Thong District, Nonthaburi Province 11110

**Equipment Name** : Sound Level Meter  
**Manufacturer** : SCARLET  
**Model** : ST-25D  
**Serial Number** : 10340946  
**Control Number** : TNP-F-S31  
**Received Date** : Jun 25, 2025  
**Calibration Date** : Jun 29, 2025  
**Recommended Due Date** : Jun 29, 2026  
**Calibration Method** : Calibration Procedure No. CPE-04-01

**Environmental Conditions**

**Ambient Temperature** :  $(25 \pm 2) ^\circ\text{C}$   
**Ambient Relative Humidity** :  $(50 \pm 15) \% \text{RH}$   
**Calibration Place** : Permanent Calibration Laboratory

**Condition as received** : Normal

**Calibration Result** : See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

**Date of Issue** : Jun 29, 2025

**Approved by :**

**Calibrated by** : Y. Perapon

Laboratory Manager



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# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2507022-7

Page 2 of 3

## Standards Equipment Used

<u>Equipment Name</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>	<u>Traceability to</u>
Sound Calibrator	N975185	5523631031354566	Nov 6, 2025	MP-TH

## Traceability

This calibration is traceable to the International System of Unit via :

- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.



# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2507022-7

Page 3 of 3

UUC Range : (30 to 130) dB

Resolution : 0.1 dB

Results of Calibration: [ ☒ ] Without adjustment [ ☐ ] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz

Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	94.0 dB	-	0.09 dB	0.40 dB
	114.07 dB	113.9 dB	-	0.17 dB	0.40 dB
SLOW	94.09 dB	94.1 dB	-	-0.01 dB	0.40 dB
	114.07 dB	114.0 dB	-	0.07 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz

Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	94.1 dB	-	-0.01 dB	0.40 dB
	114.07 dB	114.0 dB	-	0.07 dB	0.40 dB
SLOW	94.09 dB	94.1 dB	-	-0.01 dB	0.40 dB
	114.07 dB	113.9 dB	-	0.17 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -





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## Certificate of Calibration

Certificate No. STCR-2410106-1

Work Order No. STCR-2410106

Page 1 of 3

**Customer Name** : TNP Environment Co., Ltd.  
332/173 Vision Smart Life Village, Bang Rak Pattana Subdistrict,  
Bang Bua Thong District, Nonthaburi Province 11110

**Equipment Name** : Noise Dosimeter  
**Manufacturer** : SOUNDTEK  
**Model** : ST-130  
**Serial Number** : 220300013  
**Control Number** : TNP-F-ND8  
**Received Date** : Oct 25, 2024  
**Calibration Date** : Oct 28, 2024  
**Recommended Due Date** : Oct 28, 2025  
**Calibration Method** : Calibration Procedure No. CPE-04-01

**Environmental Conditions**

**Ambient Temperature** :  $(25 \pm 2) ^\circ\text{C}$   
**Ambient Relative Humidity** :  $(50 \pm 15) \% \text{RH}$   
**Calibration Place** : Permanent Calibration Laboratory

**Condition as received** : Normal

**Calibration Result** : See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

**Date of Issue** : Oct 30, 2024

**Calibrated by** : Y. Perapon

**Approved by :**

Laboratory Manager



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# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2410106-1

Page 2 of 3

## Standards Equipment Used

<u>Equipment Name</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>	<u>Traceability to</u>
Sound Calibrator	N975185	5523631030478623	Nov 9, 2024	MP-TH

## Traceability

This calibration is traceable to the International System of Unit via :

- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.



# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2410106-1

Page 3 of 3

UUC Range : (30 to 140) dB

Resolution : 0.1 dB

Results of Calibration: [ ] Without adjustment [ ☒ ] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz

Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.2 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	113.2 dB	114.1 dB	-0.03 dB	0.40 dB
SLOW	94.09 dB	93.2 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	113.2 dB	114.1 dB	-0.03 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz

Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	92.7 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	112.7 dB	114.1 dB	-0.03 dB	0.40 dB
SLOW	94.09 dB	92.7 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	112.7 dB	114.1 dB	-0.03 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -



**SMART TECH CALIBRATION & SERVICES CO., LTD.**

14/506 MOO 3, RANGSIT-NAKHON NAYOK ROAD, LAM PHAK KUT,  
THANYABURI, PATHUM THANI 12110, THAILAND

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## Certificate of Calibration

Certificate No. STCR-2410106-3

Work Order No. STCR-2410106

Page 1 of 3

**Customer Name** : TNP Environment Co., Ltd.  
332/173 Vision Smart Life Village, Bang Rak Pattana Subdistrict,  
Bang Bua Thong District, Nonthaburi Province 11110

**Equipment Name** : Noise Dosimeter  
**Manufacturer** : SOUNDTEK  
**Model** : ST-130  
**Serial Number** : 220300015  
**Control Number** : TNP-F-ND10  
**Received Date** : Oct 25, 2024  
**Calibration Date** : Oct 28, 2024  
**Recommended Due Date** : Oct 28, 2025  
**Calibration Method** : Calibration Procedure No. CPE-04-01

**Environmental Conditions**

**Ambient Temperature** :  $(25 \pm 2) ^\circ\text{C}$   
**Ambient Relative Humidity** :  $(50 \pm 15) \% \text{RH}$   
**Calibration Place** : Permanent Calibration Laboratory

**Condition as received** : Normal

**Calibration Result** : See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

**Date of Issue** : Oct 30, 2024

**Calibrated by** : Y. Perapon

**Approved by :**

Laboratory Manager



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# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2410106-3

Page 2 of 3

## Standards Equipment Used

<u>Equipment Name</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>	<u>Traceability to</u>
Sound Calibrator	N975185	5523631030478623	Nov 9, 2024	MP-TH

## Traceability

This calibration is traceable to the International System of Unit via :

- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.



# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2410106-3

Page 3 of 3

UUC Range : (30 to 140) dB

Resolution : 0.1 dB

Results of Calibration: [ ] Without adjustment [ ☒ ] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz

Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.0 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	113.0 dB	114.1 dB	-0.03 dB	0.40 dB
SLOW	94.09 dB	93.0 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	113.0 dB	114.1 dB	-0.03 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz

Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.0 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	112.9 dB	114.1 dB	-0.03 dB	0.40 dB
SLOW	94.09 dB	93.0 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	112.9 dB	114.1 dB	-0.03 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -





**MICROCAL COMPANY LIMITED**

214 Bangwaek Rd., Bangphai, Bangkoe Bangkok 10160

Tel.: 0-2865-4647-8 Fax: 0-2865-4649

<http://www.microcal.in.th>**CALIBRATION CERTIFICATE**

Page 1 of 3

**Certificate No. : L202504186-0001****Date Issued : 22-Apr-25**

**Customer** : TNP Environment Co., Ltd.  
332/173 Vision Smart Life Village Bang Rak Pattana Subdistrict, Bang Bua  
Thong District Nonthaburi Province 11110

**Equipment** : SAMPLING PUMPS

**Manufacturer** : Criffer

**Model** : CR-4

**Serial No.** : 23000605

**ID No./Tag No.** : TNP-F-CAL04

**Date Received** : 17-Apr-25

**Date Calibrated** : 21-Apr-25

**Calibrated by** : Nattawat Laochai

Calibration Method or Calibration Procedure Used

In-house method : CP-34 by comparison against mass flow calibrator.

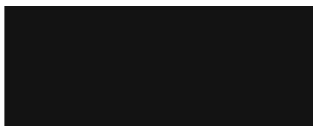
This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

Result of Calibration

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

This certificate may not be reproduced other than in full except with the prior written approval of the Miracle International Technology Company Limited.

Approved by:



**Certificate No. :** L202504186-0001

**Note :** The actual flow rate is determined by the equation :

$$Q_{Meas} = Q_{Ref} \times \frac{P_{Ref}}{P_{Meas}} \times \frac{T_{Meas}}{T_{Ref}}$$

; Q = Flow rate

; P = Absolute pressure

; T = Absolute temperature

; Subscript "Meas" = Measurement condition

; Subscript "Ref" = Reference condition

Condition As-Received : Used Item

The measurement results and statements of conformity with specification only relate to the item calibrated.

**Traceability of Certificate :**

The International System of Units (SI) through

MIT Calibration Certificate No. L202411001-0003 for Mass Flow Calibrator (200 SCCM) Serial No. 96093001W, Due 04-Dec-26

MIT Calibration Certificate No. L202408314-0015 for Mass Flow Calibrator (2000 SCCM) Serial No. 96093001W, Due 09-Sep-25

MIT Calibration Certificate No. L202408314-0016 for Mass Flow Calibrator (20 SCM) Serial No. 96093001W, Due 09-Sep-25

**End of Certificate**

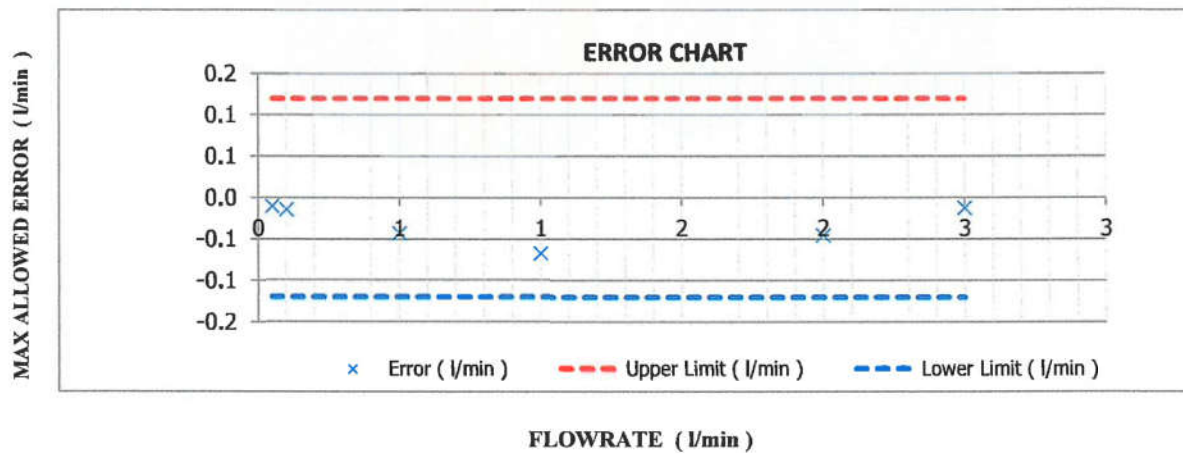
Certificate No. : L202504186-0001

**Ambient Temperature** :  $(25 \pm 2)^{\circ}\text{C}$   
**Relative Humidity** :  $(50 \pm 15)\%\text{RH}$   
**Capacity Range** : 6 l/min  
**Calibration Media** : Air  
**Type** : Mass Flowmeter

**Unit Under Calibration Reference Condition :** At atmospheric pressure and room temperature condition

Temperature ( $^{\circ}\text{C}$ )	Pressure (kPa)	UUC Reading (l/min)	STD Reading (l/min)	Error (l/min)	Uncertainty ( $\pm$ l/min)
24.00	100.75	0.050	0.05975	-0.00975	0.00088
24.10	100.77	0.100	0.11395	-0.01395	0.0011
24.20	101.62	0.500	0.54263	-0.04263	0.0058
24.50	102.01	1.00	1.0679	-0.0679	0.012
24.20	102.99	2.00	2.0453	-0.0453	0.020
24.10	103.59	2.50	2.512	-0.012	0.025

**Error = Unit Under Calibration - Standard**





**TNP ENVIRONMENT CO.,LTD.**

เลขที่ 332/173 หมู่ 3 ตำบลบางรักพัฒนา อำเภอบางบัวทอง จังหวัดนนทบุรี 11110 โทรศัพท์: 02-156-8273

E-mail: tnp.envi@gmail.com เลขประจำตัวผู้เสียภาษี 0125560008957 สำนักงานใหญ่

## Personal Pump Calibration Report

Calibrate No. : CP078/2025

Calibrate Date : 13 October 2025

Equipment Type : Personal Pump  
Calibration Type : CRIFFER CR-4 S/N. 23000605  
Volume for Calibration : 2.0, 2.5 l/min  
Environment Conditions : 30.0 Deg C.  
Environment Pressure : 760.0 mmHg.  
Customer Name : ห้างหุ้นส่วนจำกัด นราธิวาสโรจโมหิน

Item	Personal Pump Serial Number	Flow Rate	First Time	Second Time	Third Time	Forth Time	Average	Uncertainty
1.	TNP-F-P03	2.0 l/min	1.999	1.998	2.001	2.000	2.000	±0.002
2.	TNP-F-P04	2.0 l/min	1.998	2.002	2.001	2.000	2.000	±0.002
3.	TNP-F-P05	2.5 l/min	2.499	2.498	2.499	2.498	2.499	±0.001
4.	TNP-F-P06	2.5 l/min	2.500	2.501	2.502	2.500	2.501	±0.001

Calibration By

Environmental Scientist

Approved By

Laboratory Manager

## CERTIFICATE OF CALIBRATION

Certificate No. : COF-044-67

Page 1 of 2 Pages

**MEASUREMENT ITEM** : Top Load Orifice  
**MANUFACTURER** : TISCH  
**MODEL/TYPE** : TE-5028  
**SERIAL NUMBER** : 3945  
**ID NUMBER** : TNP-F-CAL02  
**CONDITION AS-RECEIVED** : Used item  
**CUSTOMER** : TNP Environment Co., Ltd.  
332/173 Vision Smart Life Village, Bangrak Phatthana,  
Bang Bua Thong District, Nonthaburi 11110

**RECEIVED DATE** : 29 Oct 2024  
**MEASUREMENT DATE** : 30 Oct 2024  
**ISSUE DATE** : 30 Oct 2024

### ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature	: $23.0 \pm 3.0$	°C
Relative Humidity	: $55.0 \pm 15.0$	%RH
Atmospheric Pressure	: $1010 \pm 10$	hPa

### CALIBRATION CONDITION:

Preconditioning : 24 hours at ambient conditions.  
Measurement Condition : The average values during measurement are 23.9 °C and 55.8 %RH.

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

### TABULATION OF RESULTS:

The table on next page give the measured values.

### Calibration procedure:

The Orifice gas flow device was calibrated against Standard Rotary Displacement Meter (Roots Meter) Model G65/MC/W2-dp. The WI-CL-004 was used as a calibration guideline.

### Traceability:

This certificate provides a traceability of the measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0063-23.

### Uncertainty of Measurement:

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

### Calibrated by:

- ☐ Mr. Sorawit Thachalad  
☒ Miss Jitraporn Lertsomphol

### Approved signatory:

Calibration Department Manager



**MEASUREMENT RESULTS:**

The Orifice gas flow device was calibrated by direct comparison method with the Standard Rotary Displacement Meter (Roots Meter). The Humid air was used as a medium in the system. The standard conditions are 25°C (298.15 K) and 760 mmHg for standard temperature and standard pressure respectively.

**Table 1:** The results of  $Q$  Standard calibration data

Plate	Flow rate $m^3/min$	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	$\Delta p_{meter}$ mmHg	$\Delta p_{Orifice}$ inH <sub>2</sub> O	$Y$	Standard Flow [ $Q_s$ ] $m^3/min$
1	0.703	758.163	23.78	22.67	49.921	1.158	1.077	0.660
2	0.999	758.204	23.26	22.30	35.795	2.480	1.577	0.959
3	1.117	758.225	23.29	22.38	30.579	3.143	1.776	1.079
4	1.164	758.281	23.31	22.57	28.519	3.425	1.854	1.127
5	1.414	758.199	23.33	22.86	18.318	5.237	2.292	1.387

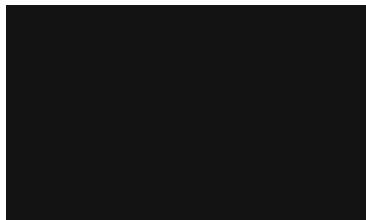
Slope ( $m$ ): **1.66978**  
 Intercept ( $b$ ): **-0.02500**  
 Correlation coefficient ( $r$ ): **0.99989**  
 Uncertainty ( $k=2$ ): **0.015**  $m^3/min$

**Table 2:** The results of  $Q$  actual calibration data

Plate	Flow rate $m^3/min$	Pressure [Pa] mmHg	Temperature [Ta] °C	Temperature [Tm] °C	$\Delta p_{meter}$ mmHg	$\Delta p_{Orifice}$ inH <sub>2</sub> O	$Y$	Standard Flow [ $Q_s$ ] $m^3/min$
1	0.703	758.163	23.78	22.67	49.921	1.158	0.673	0.659
2	0.999	758.204	23.26	22.30	35.795	2.480	0.985	0.955
3	1.117	758.225	23.29	22.38	30.579	3.143	1.109	1.075
4	1.164	758.281	23.31	22.57	28.519	3.425	1.157	1.123
5	1.414	758.199	23.33	22.86	18.318	5.237	1.431	1.382

Slope ( $m$ ): **1.04588**  
 Intercept ( $b$ ): **-0.01565**  
 Correlation coefficient ( $r$ ): **0.99989**  
 Uncertainty ( $k = 2$ ): **0.015**  $m^3/min$

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





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## CERTIFICATE OF CALIBRATION

Issue Date : 12 June 2025

Certificate No. : 25-0753-026

Work Order No. : 25/0753

Customer Name : TNP ENVIRONMENT CO.,LTD.  
332/173 Moo 3 Bang Rak Phatthana,  
Bang Bua Thong, Nonthaburi 11110

Date of Received : 12 June 2025

Date of Calibration : 12 June 2025

Instrument Details : Description : Electronic Balance  
Manufacturer : sartorius  
Model : SECURA224-1S  
Serial No. : 0041305301  
ID No. : TNP.LAB.31  
Resolution : 0.0001 g  
Capacity : 220 g  
Location : ห้องปฏิบัติการ 2 ชั้น 3

Calibration Method : This calibration was conducted by using in-house method according to calibration procedure no. CWI-B-01 based on UKAS LAB14 edition 6, October 2019

### Environmental Condition

Temperature : Maximum 25.6°C / Minimum 25.2°C  
Humidity : Maximum 48%R.H. / Minimum 44%R.H.  
Air Pressure : Maximum 999.3hPa / Minimum 999.2hPa

### Traceability of Measurement

: This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI)

Calibrated by : Mr. Itsara Sawanbancha  
Calibration Engineer

Approved by : 

Asst. Laboratory Manager

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## CERTIFICATE OF CALIBRATION

Issue Date : 12 June 2025

Certificate No. : 25-0753-026

Work Order No. : 25/0753

### Details of Calibration

#### 1. Reference Standards Instrument

Instrument	Capacity of Weight	Serial No. / ID No.	Certificate No.	Due date
Weight Set E2	1mg to 200g	B744909236	22-130801	6 December 2025

2. Certificate traceable : This certificate traceable to The International System of Unit refer to  
Asia Medical and Agricultural Laboratory and Research center Co., Ltd. , NSC-ONSC Calibration  
No. 0152

3. Condition of item : Used

4. Calibration site : On-site

### Result of Calibration

#### 1. Calibration result : Check performance before calibration

Applied Weight g	Balance Reading g	Correction Value g	Uncertainty ( $\pm$ ) g	Coverage Factor (k)
100.0000	100.0000	0.0000	0.00019	2.00
200.0000	200.0000	0.0000	0.00032	2.00

2. The result of check performance in frist step has to Reset span

#### 3. Calibration result : After set span by Internal Calibration

3.1 Repeatability number of repeatability is 10 times

Normal Value ( g )	Standard Deviation of Reading ( g )
100	0.0000316
200	0.0000316

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

The 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%.





## CERTIFICATE OF CALIBRATION

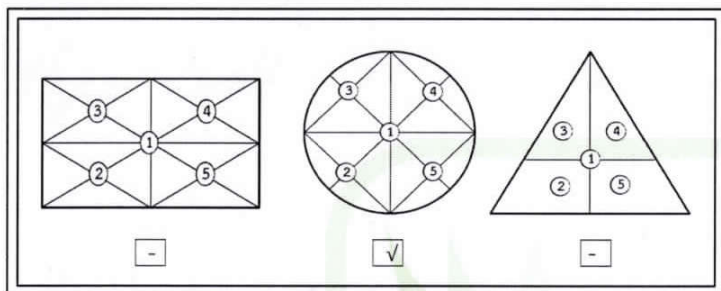
Certificate No. : 25-0753-026

Issue Date : 12 June 2025

Work Order No. : 25/0753

### 3. Calibration result : After set span by Internal Calibration (continued)

3.2 Eccentric or Off-center Error A mass of 100 g was placed and moved to various position on pan.



Result of Eccentric Error		
Position 1	100.0000	g
Position 2	100.0000	g
Position 3	100.0000	g
Position 4	99.9999	g
Position 5	100.0000	g
(Maximum Difference)	0.0001	g

### 3.3 Departure of indication from nominal value

Applied Weight g	Balance Reading g	Correction Value g	Uncertainty (±) g	Coverage Factor (k)
Unload	0.0000	0.0000	0.000090	2.00
0.1000	0.1000	0.0000	0.000090	2.00
0.5000	0.5000	0.0000	0.000090	2.00
1.0000	1.0000	0.0000	0.000090	2.00
5.0000	5.0000	0.0000	0.000090	2.00
10.0000	10.0000	0.0000	0.00010	2.00
20.0000	20.0000	0.0000	0.00010	2.00
50.0000	50.0000	0.0000	0.00012	2.00
100.0000	100.0000	0.0000	0.00019	2.00
200.0000	200.0000	0.0000	0.00032	2.00

#### Note

Calibrate items in good condition and this report customer request and accepted in certificate

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

The 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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**Statements of conformity report**

Refer to Certificate No. : 25-0753-026

Issue Date : 12 June 2025

Work Order No. : 25/0753

**Detail of Equipment**

Description : Electronic Balance

Manufacturer : sartorius

ID No. : TNP.LAB.31

Model : SECURA224-1S

Resolution : 0.0001 g

Serial no. : 0041305301

Capacity : 220 g

**Result of Calibration**

This result of calibration : Adjustment

Unit : g

Applied Weight	Balance Reading	Correction Value	Uncertainty	Uncertainty + Correction	Limit of performance	Evaluation
0.1000	0.1000	0.0000	0.000090	0.000090	0.00016	Pass
0.5000	0.5000	0.0000	0.000090	0.000090	0.00016	Pass
1.0000	1.0000	0.0000	0.000090	0.000090	0.00016	Pass
5.0000	5.0000	0.0000	0.000090	0.000090	0.00016	Pass
10.0000	10.0000	0.0000	0.00010	0.00010	0.00017	Pass
20.0000	20.0000	0.0000	0.00010	0.00010	0.00017	Pass
50.0000	50.0000	0.0000	0.00012	0.00012	0.00019	Pass
100.0000	100.0000	0.0000	0.00019	0.00019	0.00026	Pass
200.0000	200.0000	0.0000	0.00032	0.00032	0.00039	Pass

The conformity certificate documents validity following ISO/IEC Guide 98-4 : Role of measurement uncertainty in conformity assessment based on statement with guard band refer to NATA User checks and maintenance of laboratory balances consider expanded measurement uncertainty (k=95%)

**The tolerance and decision rules ;**Limit of performance (LoP) =  $2.26 \text{ sw} + |\text{Corr}| + U(\text{Cal})$ Evaluation of decision = Measurement uncertainty + Absolute correction ;  $\leq \text{LoP}$  is pass ,  $> \text{LoP}$  is Fail

Statements of conformity decision by :

Asst. Laboratory Manager



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## CERTIFICATE OF CALIBRATION

Issue Date : 12 June 2025

Certificate No. : 25-0753-025  
Work Order No. : 25/0753

Customer Name : TNP ENVIRONMENT CO.,LTD.  
332/173 Moo 3 Bang Rak Phatthana,  
Bang Bua Thong, Nonthaburi 11110

Date of Received : 12 June 2025

Date of Calibration : 12 June 2025

Instrument Details : Description : Electronic Balance  
Manufacturer : SHIMADZU  
Model : AP225WD  
Serial No. : D316301848  
ID No. : TNP.LAB.30  
Resolution : 0.00001 g / 0.0001 g  
Capacity : 102 g / 220 g  
Location : ห้องปฏิบัติการ 2 ชั้น 3

Calibration Method : This calibration was conducted by using in-house method according to calibration procedure no. CWI-B-01 based on UKAS LAB14 edition 6, October 2019

### Environmental Condition

Temperature : Maximum 25.5°C / Minimum 25.2°C  
Humidity : Maximum 48%R.H. / Minimum 45%R.H.  
Air Pressure : Maximum 999.2hPa / Minimum 999.1hPa

### Traceability of Measurement

: This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI)

Calibrated by : Mr. Itsara Sawanbancha  
Calibration Engineer

Approved by : 

Asst. Laboratory Manager

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PAGE 1/3





## CERTIFICATE OF CALIBRATION

Issue Date : 12 June 2025

Certificate No. : 25-0753-025

Work Order No. : 25/0753

### Details of Calibration

#### 1. Reference Standards Instrument

Instrument	Capacity of Weight	Serial No. / ID No.	Certificate No.	Due date
Weight Set E2	1mg to 200g	B744909236	22-130801	6 December 2025

2. Certificate traceable : This certificate traceable to The International System of Unit refer to  
Asia Medical and Agricultural Laboratory and Research center Co., Ltd. , NSC-ONSC Calibration  
No. 0152
3. Condition of item : Used
4. Calibration site : On-site

### Result of Calibration

#### 1. Calibration result : Check performance before calibration

Applied Weight g	Balance Reading g	Correction Value g	Uncertainty ( $\pm$ ) g	Coverage Factor (k)
50.00005	50.00009	-0.00004	0.000080	2.00
99.99996	100.00004	-0.00008	0.00016	2.00
200.0000	200.0007	-0.0007	0.00032	2.00

#### 2. The result of check performance in first step has to Reset span

#### 3. Calibration result : After set span by External Reset span by weight 100 g ID No. WE2-02

##### 3.1 Repeatability number of repeatability is 10 times

Norminal Value ( g )	Standard Deviation of Reading ( g )
50	0.00000480
100	0.00000480
200	0.0000422

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

The 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%.



## CERTIFICATE OF CALIBRATION

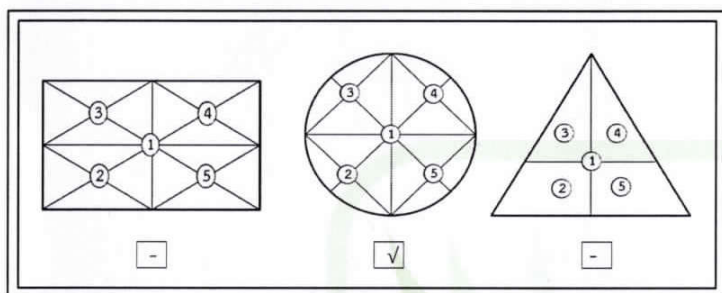
Certificate No. : 25-0753-025

Issue Date : 12 June 2025

Work Order No. : 25/0753

### 3. Calibration result : After set span by External Reset span by weight 100 g ID No. WE2-02 (continued)

3.2 Eccentric or Off-center Error A mass of 100 g was placed and moved to various position on pan.



Result of Eccentric Error		
Position 1	99.99997	g
Position 2	100.00001	g
Position 3	100.00002	g
Position 4	99.99999	g
Position 5	99.99998	g
(Maximum Difference)	0.00005	g

### 3.3 Departure of indication from nominal value

Applied Weight g	Balance Reading g	Correction Value g	Uncertainty (±) g	Coverage Factor (k)
Unload	0.00000	0.00000	0.000020	2.00
0.10001	0.10001	0.00000	0.000020	2.00
0.50001	0.50003	-0.00002	0.000020	2.00
1.00001	1.00000	0.00001	0.000020	2.00
5.00002	5.00001	0.00001	0.000020	2.00
10.00001	10.00001	0.00000	0.000040	2.00
19.99999	19.99997	0.00002	0.000050	2.00
50.00005	50.00005	0.00000	0.000080	2.00
99.99996	99.99997	-0.00001	0.00016	2.00
200.0000	200.0000	0.0000	0.00032	2.00

#### Note

Calibrate items in good condition and this report customer request and accepted in certificate

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

The 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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## Statements of conformity report

Refer to Certificate No. : 25-0753-025

Issue Date : 12 June 2025

Work Order No. : 25/0753

### Detail of Equipment

Description : Electronic Balance

Manufacturer : SHIMADZU

ID No. : TNP.LAB.30

Model : AP225WD

Resolution : 0.00001 g / 0.0001 g

Serial no. : D316301848

Capacity : 102 g / 220 g

### Result of Calibration

This result of calibration : Adjustment

Unit : g

Applied Weight	Balance Reading	Correction Value	Uncertainty	Uncertainty + Correction	Limit of performance	Evaluation
0.10001	0.10001	0.00000	0.000020	0.000020	0.000051	Pass
0.50001	0.50003	-0.00002	0.000020	0.000040	0.000051	Pass
1.00001	1.00000	0.00001	0.000020	0.000030	0.000051	Pass
5.00002	5.00001	0.00001	0.000020	0.000030	0.000051	Pass
10.00001	10.00001	0.00000	0.000040	0.000040	0.000071	Pass
19.99999	19.99997	0.00002	0.000050	0.000070	0.000081	Pass
50.00005	50.00005	0.00000	0.000080	0.000080	0.00011	Pass
99.99996	99.99997	-0.00001	0.00016	0.00017	0.00019	Pass
200.0000	200.0000	0.0000	0.00032	0.00032	0.00035	Pass

The conformity certificate documents validity following ISO/IEC Guide 98-4 : Role of measurement uncertainty in conformity assessment based on statement with guard band refer to NATA User checks and maintenance of laboratory balances consider expanded measurement uncertainty (k=95%)

### The tolerance and decision rules ;

Limit of performance (LoP) =  $2.26 \text{ sw} + |\text{Corr}| + U(\text{Cal})$

Evaluation of decision = Measurement uncertainty + Absolute correction ;  $\leq \text{LoP}$  is pass ,  $> \text{LoP}$  is Fail

Statements of conformity decision by :

Asst. Laboratory Manager

**SMART TECH CALIBRATION & SERVICES CO., LTD.**

14/506 MOO 3, RANGSIT-NAKHON NAYOK ROAD, LAM PHAK KUT,  
THANYABURI, PATHUM THANI 12110, THAILAND  
Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com



## Certificate of Calibration

**Certificate No. STCR-2503156-1****Work Order No. STCR-2503156**

Page 1 of 3

**Customer Name** : TNP Environment Co., Ltd.  
332/173 Vision Smart Life Village, Bang Rak Pattana Subdistrict,  
Bang Bua Thong District, Nonthaburi Province 11110

**Equipment Name** : Sound Level Meter  
**Manufacturer** : Scarlet Tech  
**Model** : ST-25D  
**Serial Number** : 10340912  
**Control Number** : TNP-F-S38  
**Received Date** : Mar 12, 2025  
**Calibration Date** : Mar 13, 2025  
**Recommended Due Date** : Mar 13, 2026  
**Calibration Method** : Calibration Procedure No. CPE-04-01

**Environmental Conditions**

**Ambient Temperature** :  $(25 \pm 2) ^\circ\text{C}$   
**Ambient Relative Humidity** :  $(50 \pm 15) \% \text{RH}$   
**Calibration Place** : Permanent Calibration Laboratory

**Condition as received** : Normal

**Calibration Result** : See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

**Date of Issue** : Mar 14, 2025

**Approved by :**

**Calibrated by** : C. Jirayu



Laboratory Manager



@smarttechcal

# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2503156-1

Page 2 of 3

## Standards Equipment Used

<u>Equipment Name</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>	<u>Traceability to</u>
Sound Calibrator	N975185	5523631031354566	Nov 6, 2025	MP-TH

## Traceability

This calibration is traceable to the International System of Unit via :

- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.





# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2503156-1

Page 3 of 3

UUC Range : (30 to 130) dB

Resolution : 0.1 dB

Results of Calibration: [ ] Without adjustment [ ☒ ] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz

Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	94.7 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	114.6 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	94.7 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	114.6 dB	113.9 dB	0.17 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz

Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	94.7 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	114.6 dB	113.9 dB	0.17 dB	0.40 dB
SLOW	94.09 dB	94.7 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	114.6 dB	113.9 dB	0.17 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -





**SMART TECH CALIBRATION & SERVICES CO., LTD.**

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THANYABURI, PATHUM THANI 12110, THAILAND

Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com



## Certificate of Calibration

**Certificate No.** STCR-2503160-6

**Work Order No.** STCR-2503160

Page 1 of 3

**Customer Name** : TNP Environment Co., Ltd.  
332/173 Vision Smart Life Village, Bang Rak Pattana Subdistrict,  
Bang Bua Thong District, Nonthaburi Province 11110

**Equipment Name** : Sound Level Meter  
**Manufacturer** : Scarlet Tech  
**Model** : ST-25D  
**Serial Number** : 10340956  
**Control Number** : TNP-F-S42  
**Received Date** : Mar 22, 2025  
**Calibration Date** : Mar 24, 2025  
**Recommended Due Date** : Mar 24, 2026  
**Calibration Method** : Calibration Procedure No. CPE-04-01

**Environmental Conditions**

**Ambient Temperature** :  $(25 \pm 2) ^\circ\text{C}$   
**Ambient Relative Humidity** :  $(50 \pm 15) \% \text{RH}$   
**Calibration Place** : Permanent Calibration Laboratory

**Condition as received** : Normal

**Calibration Result** : See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

**Date of Issue** : Mar 25, 2025

**Approved by :**

**Calibrated by** : S. Sompoch



Laboratory Manager



@smarttechcal

# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2503160-6

Page 2 of 3

## Standards Equipment Used

<u>Equipment Name</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>	<u>Traceability to</u>
Sound Calibrator	N975185	5523631031354566	Nov 6, 2025	MP-TH

## Traceability

This calibration is traceable to the International System of Unit via :

- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.



# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2503160-6

Page 3 of 3

UUC Range : (38 to 130) dB

Resolution : 0.1 dB

Results of Calibration: [ ☒ ] Without adjustment [ ☐ ] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz

Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	94.0 dB	-	0.09 dB	0.40 dB
	114.07 dB	114.0 dB	-	0.07 dB	0.40 dB
SLOW	94.09 dB	94.0 dB	-	0.09 dB	0.40 dB
	114.07 dB	114.0 dB	-	0.07 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz

Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.9 dB	-	0.19 dB	0.40 dB
	114.07 dB	114.0 dB	-	0.07 dB	0.40 dB
SLOW	94.09 dB	93.9 dB	-	0.19 dB	0.40 dB
	114.07 dB	114.0 dB	-	0.07 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -





**SMART TECH CALIBRATION & SERVICES CO., LTD.**

14/506 MOO 3, RANGSIT-NAKHON NAYOK ROAD, LAM PHAK KUT,  
THANYABURI, PATHUM THANI 12110, THAILAND

Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com



## Certificate of Calibration

**Certificate No.** STCR-2506068-2

**Work Order No.** STCR-2506068

Page 1 of 3

**Customer Name** : TNP Environment Co., Ltd.  
332/173 Vision Smart Life Village, Bang Rak Pattana Subdistrict,  
Bang Bua Thong District, Nonthaburi Province 11110

**Equipment Name** : Sound Level Meter  
**Manufacturer** : SCARLET  
**Model** : ST-25D  
**Serial Number** : 10341001  
**Control Number** : TNP-F-S32  
**Received Date** : Jun 10, 2025  
**Calibration Date** : Jun 13, 2025  
**Recommended Due Date** : Jun 13, 2026  
**Calibration Method** : Calibration Procedure No. CPE-04-01

**Environmental Conditions**

**Ambient Temperature** :  $(25 \pm 2) ^\circ\text{C}$   
**Ambient Relative Humidity** :  $(50 \pm 15) \% \text{RH}$   
**Calibration Place** : Permanent Calibration Laboratory

**Condition as received** : Normal

**Calibration Result** : See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

**Date of Issue** : Jun 17, 2025

**Calibrated by** : A. Somchai

**Approved by :**



Laboratory Manager



@smarttechcal



# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2506068-2

Page 2 of 3

## Standards Equipment Used

<u>Equipment Name</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>	<u>Traceability to</u>
Sound Calibrator	N975185	5523631031354566	Nov 6, 2025	MP-TH

## Traceability

This calibration is traceable to the International System of Unit via :

- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.



# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2506068-2

Page 3 of 3

UUC Range : (28 to 133) dB

Resolution : 0.1 dB

Results of Calibration: [ ] Without adjustment [ ☒ ] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz

Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	85.6 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	105.8 dB	114.1 dB	-0.03 dB	0.40 dB
SLOW	94.09 dB	85.6 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	105.8 dB	114.1 dB	-0.03 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz

Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	85.6 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	105.8 dB	114.1 dB	-0.03 dB	0.40 dB
SLOW	94.09 dB	85.6 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	105.8 dB	114.1 dB	-0.03 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -



**SMART TECH CALIBRATION & SERVICES CO., LTD.**

14/506 MOO 3, RANGSIT-NAKHON NAYOK ROAD, LAM PHAK KUT,  
THANYABURI, PATHUM THANI 12110, THAILAND

Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com



## Certificate of Calibration

**Certificate No.** STCR-2507022-5

**Work Order No.** STCR-2507022

Page 1 of 3

**Customer Name** : TNP Environment Co., Ltd.  
332/173 Vision Smart Life Village, Bang Rak Pattana Subdistrict,  
Bang Bua Thong District, Nonthaburi Province 11110

**Equipment Name** : Sound Level Meter  
**Manufacturer** : SCARLET  
**Model** : ST-25D  
**Serial Number** : 10340948  
**Control Number** : TNP-F-S29  
**Received Date** : Jun 25, 2025  
**Calibration Date** : Jun 29, 2025  
**Recommended Due Date** : Jun 29, 2026  
**Calibration Method** : Calibration Procedure No. CPE-04-01

**Environmental Conditions**

**Ambient Temperature** :  $(25 \pm 2) ^\circ\text{C}$   
**Ambient Relative Humidity** :  $(50 \pm 15) \% \text{RH}$   
**Calibration Place** : Permanent Calibration Laboratory

**Condition as received** : Normal

**Calibration Result** : See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2$ , providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

**Date of Issue** : Jun 29, 2025

**Approved by :**

**Calibrated by** : Y. Perapon



@smarttechcal

Laboratory Manager

# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2507022-5

Page 2 of 3

## Standards Equipment Used

<u>Equipment Name</u>	<u>Serial No.</u>	<u>Certificate No.</u>	<u>Due Date</u>	<u>Traceability to</u>
Sound Calibrator	N975185	5523631031354566	Nov 6, 2025	MP-TH

## Traceability

This calibration is traceable to the International System of Unit via :

- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.





# Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2507022-5

Page 3 of 3

UUC Range : (30 to 130) dB

Resolution : 0.1 dB

Results of Calibration: [ ✓ ] Without adjustment [ ] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz

Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	94.0 dB	-	0.09 dB	0.40 dB
	114.07 dB	114.0 dB	-	0.07 dB	0.40 dB
SLOW	94.09 dB	94.0 dB	-	0.09 dB	0.40 dB
	114.07 dB	114.0 dB	-	0.07 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz

Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	94.0 dB	-	0.09 dB	0.40 dB
	114.07 dB	114.0 dB	-	0.07 dB	0.40 dB
SLOW	94.09 dB	94.0 dB	-	0.09 dB	0.40 dB
	114.07 dB	113.9 dB	-	0.17 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -





# THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

## Calibration Certificate

Issued by : Calibration & Test Section : Meteorological Instruments Bureau

Date of Issue 20 January, 2025

Certification No. 055/25

Page : 1 of 6

Object : Vantage Pro2 Weather Station

Manufacturer : Davis Instruments

Mode No. : 6152CM ID No. : TNP-F-W02

Mfg Code : Display BF210628045 Transmitter BF210628045

Customer : TNP ENVIRONMENT CO.,LTD.  
332/173 Moo 3 T.Bang Rak Phatthana,  
A.Bang Bua Thong, Nonthaburi 11110.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1011.1 hPa

NATIONAL STANDARD WIND TUNNEL : Wind Aloft Plotting Board  
: Micromanometer Theodor Friedrichs FC014 Serial No. 9310119 : HOOK GAGE NO 1425  
N.I.S.T. Test Reference Number 731/241460 : Standard Velocity at 20 - 30 m/sec  
: Ultrasonic Anemometer Model DA-650-3TV (sensor TR-90AH)  
Serial Number 110730029 (sensor 120629586)

JAPAN QUALITY ASSURANCE ORGANIZATION : Standard Velocity at 0 - 20 m/sec

STANDARD THERMOMETER : Theodor Friedrich : Dry No.8390/94 Wet No. 8389/94

: Thermoschneider No.9188 : testo 645 Serial No. 02848057

STANDARD BAROMETER : Digital Type PT

Calibrated by :

Mr. Watcharapol Subwat

Mechanical Engineer



## THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

### The Result of Calibration

Certification No. 055/25

20 January, 2025

Page : 2 of 6

Standard Ultrasonic Anemometer	HOOK GAGE NO. 1425			TESTED ANEMOMETER	
	Pressure	Vacumm	Velocity	Velocity	Correction
m/sec	inches H2O	inches H2O	m/sec	m/sec	m/sec
1.00	-	-	-	0.9	0.10
3.02	-	-	-	3.0	0.02
5.00	-	-	-	4.9	0.10
7.00	-	-	-	7.0	0.00
9.02	-	-	-	8.9	0.12
11.01	-	-	-	11.0	0.01
13.01	-	-	-	13.0	0.01
15.01	-	-	-	15.0	0.01
17.02	-	-	-	17.0	0.02
20.02	-	-	-	20.0	0.02

Wind Aloft Plotting Board.	
US.DEPARTMENT OF COMMERCE WEATHER BUREAU	
WIND DIRETION	TESTED WIND DIRECTION
0	0
90	90
180	180
270	

Calibr

Mechanical Engineer

M



# THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

## The Result of Calibration

Certification No. 055/25

20 January, 2025

Page : 3 of 6

Standard Barometer	Tested Barometer	Correction
Pressure	Pressure	
1013.70	1013.9	-0.20
1014.91	1014.9	0.01
1014.64	1014.7	-0.06
1015.33	1015.3	0.03
1011.48	1011.6	-0.12
1012.20	1012.3	-0.10
1012.49	1012.5	-0.01
1013.53	1013.5	0.03
1013.07	1013.0	0.07
1013.91	1013.7	0.21
1013.56	1013.5	0.06
1010.69	1010.7	-0.01
1011.07	1011.0	0.07
1011.24	1011.2	0.04
1011.47	1011.5	-0.03
1011.65	1011.6	0.05
1011.97	1011.9	0.07
1012.25	1012.2	0.05
1008.92	1009.1	-0.18
1011.11	1011.2	-0.09

Average

Calibration

Mechanical Engineer





## THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

### *The Result of Calibration*

Certification No. 055/25

20 January, 2025

Page : 4 of 6

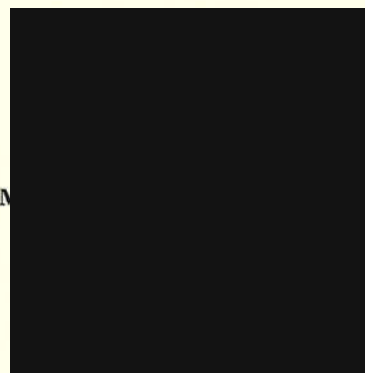
Standard Temp. °C	Temperature Sensor Reading	
	Reading °C	Correction °C
45.5	45.5	0.0
30.2	30.2	0.0
15.6	15.7	-0.1

Calib



Mechanical Engineer

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## THAI METEOROLOGICAL DEPARTMENT

4353 Sukhumvit, Bangna, Bangkok 10260 Tel. 081-454-2804,0-2399-0469

### *The Result of Calibration*

Certification No. 055/25

20 January, 2025

Page : 5 of 6

Standard Humidity % R.H.	Relative Humidity Sensor Reading	
	Reading % R.H.	Correction % R.H.
48.2	48	0.20
62.4	64	-1.60
93.5	97	-3.50

Calibrated

Mechanical Engineer

Met



Date of Issue 20 January, 2025

Certification No. 055/25

Page: 6 of 6

## ใบรับรอง

หนังสือฉบับนี้ขอรับรองว่า เครื่องวัดฝน ยี่ห้อ Davis Instruments แบบ TIPPING BUCKET Product No. 6152CM Mfg. Code. BF210628045 ทำการสอบเทียบกับแก้ววัดฝนแบบ แก้วดวง GAUGE DIAMETER 8.0 INCHES, NEGRETTI & ZAMBRA LONDON No. 71082 และสามารถนำไปใช้ได้ มีค่าถูกต้องตามรายละเอียดของเครื่องมือ (0.2 mm./TIP)

ลงชื่อ

วิศวกรชำนาญการ

## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : VIBRATION METER  
MANUFACTURER : INSTANTEL  
MODEL / TYPE : 721A2601/721A3301  
SERIAL NO. : UM19249/UM19249  
CLID. NO. : 252403051  
JOB CONTROL NO. : 241227138134  
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : TNP ENVIRONMENT CO., LTD.  
332/173 MOO 3 TAMBON BANG RAK PHATTANA,  
AMPHOE BANG BUA THONG, NONTABURI 11110

DATE OF RECEIVED : 27 December 2024

DATE OF ISSUED : 06 January 2025

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

Calibrated By :

Suwit Phuanbusabong  
Calibration Engineer

Approved By :

Authorized Signatory  
06 January 2025

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

Certificate No. Q24138134

F3-011-05/12-23

page 1 of 1





## REPORT OF CALIBRATION FOR

**NOMENCLATURE** : **VIBRATION METER**  
**MANUFACTURER** : **INSTANTEL**  
**MODEL / TYPE** : **721A2601/721A3301**  
**SERIAL NO.** : **UM19249/UM19249**  
**DATE OF CALIBRATION** : **03 January 2025**

---

### ENVIRONMENT CONDITIONS :

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

**Relative Humidity** :  **$(55 \pm 15) \%RH$**

### PROCEDURE USED :

This instrument was calibrated under procedure No. **CLC-CPEE-08** based on **ISO 16063-21** as calibration guideline.

The calibration was performed by using Digital Multimeter, Programmable Timer/Counter, Vibration Calibrator which maintained by the Calibration Laboratory Co., Ltd.

### REFERENCE STANDARD USED :

1. Vibration Calibrator, The Modal Shop Model 9110D S/N. 11424.
2. Programmable Timer/Counter, Philips Model PM6680B S/N. SM607101.
3. Digital Multimeter, Keysight Technologies Model 3458A S/N. MY59352733.

### TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. AV-0030-24, Due Date 19 July 2025.
2. The measurements are traceable to International System of Units (SI), through Aeronautical Radio of Thailand Ltd. Certificate No. 07-0050/24 , Due Date 13 May 2025 .
3. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. EE-0060-24, Due Date 26 June 2025.

### UNCERTAINTY :

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

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

**Certificate No. Q24138134**

**F3-011-05/12-23**

page 2 of 4



**CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION**

**MEASUREMENT RESULTS : ( X ) without adjustment ( ) adjustment**

## CALIBRATION DATA

### 1. VELOCITY RESULT

Test point		Mode	STD Reading	DUC Reading	Correction	Uncertainty
( mm/s )	( frequency )		( mm/s )	( mm/s )	( mm/s )	± ( % of rdg. )
10	80 Hz	peak	10.000	10.239	-0.239	1.5
20	80 Hz		20.000	20.311	-0.311	1.5
30	80 Hz		30.000	30.389	-0.389	1.5
40	80 Hz		40.000	40.445	-0.445	1.5
50	80 Hz		50.000	50.519	-0.519	1.5

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 012 Page 2 of 67



## CALIBRATION DATA

### \*2. FREQUENCY RESULT

STD Applied ( Hz )	DUC Reading ( Hz )	Correction ( Hz )	Uncertainty $\pm$ ( Hz )
50	49	+1	0.6
80	79	+1	0.6
100	99	+1	0.6

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

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

### End of Certificate ###

Certificate No. Q24138134

F3-011-05/12-23

page 4 of 4





## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : VIBRATION METER  
MANUFACTURER : INSTANTEL  
MODEL / TYPE : 721A2601/721A3301  
SERIAL NO. : UM22200/UM22200  
CLID. NO. : 252403052  
JOB CONTROL NO. : 241227138135  
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : TNP ENVIRONMENT CO., LTD.  
332/173 MOO 3 TAMBON BANG RAK PHATTANA,  
AMPHOE BANG BUA THONG, NONTABURI 11110

DATE OF RECEIVED : 27 December 2024

DATE OF ISSUED : 06 January 2025

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

Calibrated By :

Suwit Phuanbusabong  
Calibration Engineer

Approved By :

Authorized Signatory  
06 January 2025

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

Certificate No. Q24138135

F3-011-05/12-23

page 1 of 1



## REPORT OF CALIBRATION FOR

**NOMENCLATURE** : **VIBRATION METER**  
**MANUFACTURER** : **INSTANTEL**  
**MODEL / TYPE** : **721A2601/721A3301**  
**SERIAL NO.** : **UM22200/UM22200**  
**DATE OF CALIBRATION** : **03 January 2025**

---

### ENVIRONMENT CONDITIONS :

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

**Relative Humidity :**  $(55 \pm 15) \%RH$

### PROCEDURE USED :

This instrument was calibrated under procedure No. **CLC-CPEE-08** based on **ISO 16063-21** as calibration guideline.

The calibration was performed by using Digital Multimeter, Programmable Timer/Counter, Vibration Calibrator which maintained by the Calibration Laboratory Co., Ltd.

### REFERENCE STANDARD USED :

1. Vibration Calibrator, The Modal Shop Model 9110D S/N. 11424.
2. Programmable Timer/Counter, Philips Model PM6680B S/N. SM607101.
3. Digital Multimeter, Keysight Technologies Model 3458A S/N. MY59352733.

### TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. AV-0030-24, Due Date 19 July 2025.
2. The measurements are traceable to International System of Units (SI), through Aeronautical Radio of Thailand Ltd. Certificate No. 07-0050/24 , Due Date 13 May 2025 .
3. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. EE-0060-24, Due Date 26 June 2025.

### UNCERTAINTY :

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

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

**Certificate No. Q24138135**

**F3-011-05/12-23**

page 2 of 4



**CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION**

**MEASUREMENT RESULTS : ( X ) without adjustment ( ) adjustment**

## CALIBRATION DATA

### 1. VELOCITY RESULT

Test point		Mode	STD Reading	DUC Reading	Correction	Uncertainty
( mm/s )	( frequency )		( mm/s )	( mm/s )	( mm/s )	± ( % of rdg. )
10	80 Hz	peak	10.000	10.277	-0.277	1.5
20	80 Hz		20.000	20.338	-0.338	1.5
30	80 Hz		30.000	30.403	-0.403	1.5
40	80 Hz		40.000	40.467	-0.467	1.5
50	80 Hz		50.000	50.558	-0.558	1.5

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 012 Page 2 of 67



## CALIBRATION DATA

### \*2. FREQUENCY RESULT

STD Applied ( Hz )	DUC Reading ( Hz )	Correction ( Hz )	Uncertainty $\pm$ ( Hz )
50	49	+1	0.6
80	79	+1	0.6
100	99	+1	0.6

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

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

### End of Certificate ###

Certificate No. Q24138135

F3-011-05/12-23

page 4 of 4





## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : VIBRATION METER  
MANUFACTURER : INSTANTEL  
MODEL / TYPE : 721A2601/721A3301  
SERIAL NO. : UM15019/UM15019  
CLID. NO. : 252000717  
JOB CONTROL NO. : 241227138133  
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : TNP ENVIRONMENT CO., LTD.  
332/173 MOO 3 TAMBON BANG RAK PHATTANA,  
AMPHOE BANG BUA THONG, NONTABURI 11110

DATE OF RECEIVED : 27 December 2024

DATE OF ISSUED : 06 January 2025

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

Calibrated By :

Suwit Phuanbusabong  
Calibration Engineer

Approved By :

Authorized Signatory

06 January 2025

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

Certificate No. Q24138133

F3-011-05/12-23

page 1 of 1



## REPORT OF CALIBRATION FOR

**NOMENCLATURE** : **VIBRATION METER**  
**MANUFACTURER** : **INSTANTEL**  
**MODEL / TYPE** : **721A2601/721A3301**  
**SERIAL NO.** : **UM15019/UM15019**  
**DATE OF CALIBRATION** : **03 January 2025**

---

### ENVIRONMENT CONDITIONS :

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

**Relative Humidity :**  $(55 \pm 15) \% \text{RH}$

### PROCEDURE USED :

This instrument was calibrated under procedure No. **CLC-CPEE-08** based on **ISO 16063-21** as calibration guideline.

The calibration was performed by using Digital Multimeter, Programmable Timer/Counter, Vibration Calibrator which maintained by the Calibration Laboratory Co., Ltd.

### REFERENCE STANDARD USED :

1. Vibration Calibrator, The Modal Shop Model 9110D S/N. 11424.
2. Programmable Timer/Counter, Philips Model PM6680B S/N. SM607101.
3. Digital Multimeter, Keysight Technologies Model 3458A S/N. MY59352733.

### TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. AV-0030-24, Due Date 19 July 2025.
2. The measurements are traceable to International System of Units (SI), through Aeronautical Radio of Thailand Ltd. Certificate No. 07-0050/24 , Due Date 13 May 2025 .
3. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. EE-0060-24, Due Date 26 June 2025.

### UNCERTAINTY :

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

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

**Certificate No. Q24138133**

**F3-011-05/12-23**

page 2 of 4



**CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION**

**MEASUREMENT RESULTS : ( X ) without adjustment ( ) adjustment**

## CALIBRATION DATA

### 1. VELOCITY RESULT

Test point		Mode	STD Reading	DUC Reading	Correction	Uncertainty
( mm/s )	( frequency )		( mm/s )	( mm/s )	( mm/s )	± ( % of rdg. )
10	80 Hz	peak	10.000	10.186	-0.186	1.5
20	80 Hz		20.000	20.211	-0.211	1.5
30	80 Hz		30.000	30.274	-0.274	1.5
40	80 Hz		40.000	40.325	-0.325	1.5
50	80 Hz		50.000	50.391	-0.391	1.5

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 012 Page 2 of 67



## CALIBRATION DATA

### \*2. FREQUENCY RESULT

STD Applied ( Hz )	DUC Reading ( Hz )	Correction ( Hz )	Uncertainty $\pm$ ( Hz )
50	49	+1	0.6
80	79	+1	0.6
100	100	0	0.6

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

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

### End of Certificate ###

Certificate No. Q24138133

F3-011-05/12-23

page 4 of 4





## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : VIBRATION METER  
MANUFACTURER : INSTANTEL  
MODEL / TYPE : 721A2601/721A3301  
SERIAL NO. : UM22048/UM22048  
CLID. NO. : 252403049  
JOB CONTROL NO. : 241226138069  
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : TNP ENVIRONMENT CO., LTD.  
332/173 MOO 3 TAMBON BANG RAK PHATTANA,  
AMPHOE BANG BUA THONG, NONTABURI 11110

DATE OF RECEIVED : 26 December 2024

DATE OF ISSUED : 04 January 2025

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

Calibrated By :

Suwit Phuanbusabong  
Calibration Engineer

Approved By :

Authorized Signatory  
04 January 2025

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

Certificate No. Q24138069

F3-011-05/12-23

page 1 of 1



## REPORT OF CALIBRATION FOR

**NOMENCLATURE** : **VIBRATION METER**  
**MANUFACTURER** : **INSTANTEL**  
**MODEL / TYPE** : **721A2601/721A3301**  
**SERIAL NO.** : **UM22048/UM22048**  
**DATE OF CALIBRATION** : **27 December 2024**

---

### ENVIRONMENT CONDITIONS :

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

**Relative Humidity :**  $(55 \pm 15) \% \text{RH}$

### PROCEDURE USED :

This instrument was calibrated under procedure No. **CLC-CPEE-08** based on **ISO 16063-21** as calibration guideline.

The calibration was performed by using Digital Multimeter, Programmable Timer/Counter, Vibration Calibrator which maintained by the Calibration Laboratory Co., Ltd.

### REFERENCE STANDARD USED :

1. Vibration Calibrator, The Modal Shop Model 9110D S/N. 11424.
2. Programmable Timer/Counter, Philips Model PM6680B S/N. SM607101.
3. Digital Multimeter, Keysight Technologies Model 3458A S/N. MY59352733.

### TRACEABILITY :

1. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. AV-0030-24, Due Date 19 July 2025.
2. The measurements are traceable to International System of Units (SI), through Aeronautical Radio of Thailand Ltd. Certificate No. 07-0050/24 , Due Date 13 May 2025 .
3. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. EE-0060-24, Due Date 26 June 2025.

### UNCERTAINTY :

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

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

**Certificate No. Q24138069**

**F3-011-05/12-23**

page 2 of 4



**CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION**

**MEASUREMENT RESULTS : ( X ) without adjustment ( ) adjustment**

## CALIBRATION DATA

### 1. VELOCITY RESULT

Test point		Mode	STD Reading	DUC Reading	Correction	Uncertainty
( mm/s )	( frequency )		( mm/s )	( mm/s )	( mm/s )	± ( % of rdg. )
10	80 Hz	peak	10.000	10.216	-0.216	1.5
20	80 Hz		20.000	20.288	-0.288	1.5
30	80 Hz		30.000	30.356	-0.356	1.5
40	80 Hz		40.000	40.412	-0.412	1.5
50	80 Hz		50.000	50.492	-0.492	1.5

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 012 Page 2 of 67



## CALIBRATION DATA

### \*2. FREQUENCY RESULT

STD Applied ( Hz )	DUC Reading ( Hz )	Correction ( Hz )	Uncertainty $\pm$ ( Hz )
50	49	+1	0.6
80	80	0	0.6
100	100	0	0.6

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

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

### End of Certificate ###

Certificate No. Q24138069

F3-011-05/12-23

page 4 of 4



@clccalibration





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Salathammassop, Thawewatthana, Bangkok 10170 Thailand

Tel : 0-2408-8474-5 Fax : 0-2408-8477 Email : info@crystalcal.com www.crystalcal.com



## CERTIFICATE OF CALIBRATION

Certificate No. : 24-1179-001

Issue Date : 7 September 2024

Work Order No. : 24/1179

Customer Name : TNP ENVIRONMENT CO.,LTD.  
332/173 Moo 3 Bang Rak Phatthana,  
Bang Bua Thong, Nonthaburi 11110

Date of Received : 6 September 2024

Date of Calibration : 6 September 2024

Instrument Details : Description : pH meter  
Manufacturer : HORIBA  
Model : LAQUA-PH1100  
Serial No. : B80A0042  
ID No. : TNP.LAB.02  
Resolution : 0.01 pH  
Location : Laboratory

Calibration Method : This instrument was calibrated by in-house calibration procedure no. CWI-C-02 based on direct measurement by using standard voltage calibrator and certified reference material (CRM)

### Environmental Condition

Temperature : Area Monitoring between 15°C to 40°C  
Humidity : Area Monitoring between 30%RH to 85%RH

### Traceability of Measurement

: This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI)

Calibrated by : Mr. Kritsada Kaewwangpa  
Calibration Engineer

Approved by :

Laboratory Manager

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Crystal Calibration Sales and Service Co., Ltd.

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## CERTIFICATE OF CALIBRATION

Certificate No. : 24-1179-001

Issue Date : 7 September 2024

Work Order No. : 24/1179

### Details of Calibration

#### 1. Certified Reference Material / Certified of Instrument

Certified Reference Material	CRM Code	Lot no.	Expire Date
1.1 Buffer Solution pH 4.00	TRM-S-2027	150823	1 July 2025
1.2 Buffer Solution pH 7.00	TRM-S-2034	230524	1 July 2025
1.3 Buffer Solution pH 10.00	TRM-S-2031	160823	1 July 2025

Instrument	Certificate no.	Serial No. / ID No.	Due Date
1.4 DC Source Calibrator	23E3042	9791008	14 September 2024
1.5 Digital Thermometer with sensor	24-0002-013	316A14010055 / RTD-PH-02	8 January 2025

#### 2. This certificate traceable to the international unit (SI)

Buffer solution no. 1.1 traceable to : Nation Institute of Metrology (Thailand)  
Buffer solution no. 1.2 traceable to : Nation Institute of Metrology (Thailand)  
Buffer solution no. 1.3 traceable to : Nation Institute of Metrology (Thailand)  
Instrument no. 1.4 traceable to : Technology Promotion Association (Thailand-Japan) NAC Calibration No. 0008  
Instrument no. 1.5 traceable to : Crystal Calibration slaes and service Co., Ltd., NAC Calibration No. 0260

3. Condition of item : Used

4. Calibration location : On-site

### Result of Calibration

Measurement Function : mV Measurement  
Performing : Standard curve by Voltage calibrator at pH ( 4, 7, 10 )

Norminal value pH	Applied DC voltage mV	Average indicator reading		Uncertainty (±) mV	Coverage Factor k
		mV	pH		
0	414.1	414.0	0.03	0.083	2.00
2	295.8	295.8	2.02	0.083	2.00
4	177.5	177.5	4.01	0.083	2.00
7	0.0	-0.1	7.00	0.083	2.00
9	-118.3	-118.3	9.00	0.083	2.00
10	-177.5	-177.6	10.01	0.083	2.00
12	-295.8	-295.9	12.01	0.083	2.00
14	-414.1	-414.2	14.02	0.083	2.00

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## CERTIFICATE OF CALIBRATION

Certificate No. : 24-1179-001

Issue Date : 7 September 2024

Work Order No. : 24/1179

### Result of calibration

Measurement Function : pH Measurement with electrode

Performing : Three buffer standard curve using buffer nominal pH (4, 7, 10)

STD buffer solution pH @ 25 °C	Average indicator reading			Uncertainty (±) pH	Coverage factor k
	pH	mV	pH correction		
4.01	3.99	155.6	0.02	0.012	2.00
7.00	6.99	-21.4	0.01	0.012	2.00
10.01	10.02	-197.0	-0.01	0.012	2.00

### Descriptions of electrode :

Electrode Type : Glass electrode

Manufacturer : HORIBA

Serial no. : 9XB0575

Model : 9615S

ID No. : N/A

### Detail of % slope form calculation

pH range	% Slope value	% Slope recommend
4 pH to 7 pH	100.1	95% - 105%
7 pH to 10 pH	98.6	

**Note :** Calibrate items it good condition and this report customer request and accepted in certificate

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

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





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## CERTIFICATE OF CALIBRATION

Issue Date : 7 September 2024  
Certificate No. : 24-1179-002  
Work Order No. : 24/1179

Customer Name : TNP ENVIRONMENT CO.,LTD.  
332/173 Moo 3 Bang Rak Phatthana,  
Bang Bua Thong, Nonthaburi 11110

Date of Received : 6 September 2024

Date of Calibration : 6 September 2024

Instrument Details : Description : Digital Thermometer with probe  
Manufacturer : HORIBA  
Model : LAQUA-PH1100  
Serial No. : B80A0042  
ID No. : TNP.LAB.02  
Resolution : 0.1 °C  
Location : Laboratory

Calibration Method : This instrument was calibrated by comparison of indication with Standard Thermometer into calibration bath temperature controller according to calibration procedure no. CWI-T-09

### Environmental Condition

Temperature : Area Monitoring between 15°C to 40°C

Humidity : Area Monitoring between 30%RH to 85%RH

### Traceability of Measurement

: This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI) and The temperature scale in use at this laboratory is The International Temperature scale of 1990.

Calibrated by : Mr. Kritsada Kaewwangpa  
Calibration Engineer

Approved by : 

Laboratory Manager

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Crystal Calibration Sales and Service Co., Ltd.

PAGE 1/2

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Email : info@crystalcal.com







## CERTIFICATE OF CALIBRATION

Certificate No. : 24-1179-002

Issue Date : 7 September 2024

Work Order No. : 24/1179

### Details of Calibration

#### 1. Reference Standards Instrument

Instrument	Serial No. / ID No.	Certification	Due Date
Thermometer Readout	316A14010055	24-0002-001	5-Jan-2025
Standard Thermometers (RTD)	4706698-001	24-0002-001	5-Jan-2025

2. Certificate traceable : This certificate traceable to The International System of Unit (SI unit)

3. Condition of equipment : Used

4. Calibration site : On-Site

### Result of Calibration

Calibration result : Without Adjustment

Calibration point (°C)	STD. Value (°C)	UUC Reading (°C)	Correction value (°C)	Uncertainty ± (°C)
25	25.00	25.0	+ 0.00	0.11

**Note :** Calibrate items it good condition and this report customer request and accepted in certificate

Electrode Type : Combination Electrode

Manufacturer : HORIBA

Model : 9615S

Serial no. : 9XB0575

ID No. : N/A

UUC : Unit Under Calibration.

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

The 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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## Statements of conformity report

Refer to Certificate No. : 24-1179-002

Issue Date : 7 September 2024

Work Order No. : 24/1179

### Detail of Equipment

Description : Digital Thermometer with probe

Manufacturer : HORIBA

Serial no. : B80A0042

Model : LAQUA-PH1100

ID No. : TNP.LAB.02

### Result of Calibration

This result of calibration : Without adjustment

Tolerance	1 °C
-----------	------

Resolution : 0.1 °C

Calibration point	STD value	UUC reading	Correction	Uncertainty	Uncertainty + Absolute correc.	Evaluation
25	25.00	25.0	0.00	0.11	0.11	Pass

The conformity certificate documents validity following ISO/IEC Guide 98-4 : Role of measurement uncertainty in conformity assessment based on statement with guard band refer to specification tolerance limit of customer consider expanded measurement uncertainty (k=95%)

### The tolerance and decision rules ;

MPE of Customer = Measurement uncertainty + Absolute error ;  $\leq$  MPE is pass ,  $>$  MPE is Fail

Statements of conformity decision by :

Laboratory Manager



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## CERTIFICATE OF CALIBRATION

Certificate No. : 24-1179-007

Work Order No. : 24/1179

Issue Date : 11 September 2024

Customer Name : TNP ENVIRONMENT CO.,LTD.  
332/173 Moo 3 Bang Rak Phatthana,  
Bang Bua Thong, Nonthaburi 11110

Date of Received : 5 September 2024

Date of Calibration : 10 September 2024

Instrument Details : Description : Digital Thermo hygrometer  
Manufacturer : EXTECH  
Model : 445814  
Serial No. : PONPE5816745  
ID No. : TNP.LAB.04  
Location : Humidity and Temperature Laboratory

Calibration Method : This instrument was calibrated by comparison of indication with Standard Chilled Mirror Hygrometer and Standard Thermometer into Temperature and Humidity Chamber controller according to calibration procedure no. CWI-H-01

### Environmental Condition

Temperature : Laboratory Control at  $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Humidity : Laboratory Control at  $55\%\text{RH} \pm 20\%\text{RH}$

### Traceability of Measurement

: This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI) and The temperature scale in use at this laboratory is The International Temperature scale of 1990.

Calibrated by : Miss Phiraya Prawabut  
Calibration Engineer

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

Laboratory Manager

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## CERTIFICATE OF CALIBRATION

Certificate No. : 24-1179-007

Issue Date : 11 September 2024

Work Order No. : 24/1179

### Details of Calibration

#### 1. Reference Standards Instrument

Instrument	Serial No.	Certification	Due Date
1.1 Chilled Mirror Hygrometer	157151 / 157152	TH-0069-23	24 February 2025
1.2 Digital Thermometer with RTD	15000016 / RTD-11	23-1415-003	16 October 2024

#### 2. Certificate traceable

: This certificate traceable to The International System of Unit refer to

No. 1.1 National Institute of Metrology (Thailand), NAC Calibration No. 0144

No. 1.2 Crystal Calibration Sales and Service Co., Ltd. , NAC Calibration No. 0260

#### 3. Condition of item

: Used

#### 4. Calibration location

: Permanent

### Result of Calibration

#### 1. Temperature Measurement : Without Adjustment

Resolution of UUC : 0.1 °C

Calibration Point (°C)	Average Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty ± (°C)
17	17.066	17.0	+ 0.066	0.30
23	23.050	23.3	- 0.250	0.30
30	30.050	30.5	- 0.450	0.30

#### 2. Humidity Measurement : Without Adjustment

Resolution of UUC : 1 %RH

Calibration Point ( %RH )	Calculated Standard Reading ( %RH )	UUC Reading ( %RH )	Correction ( %RH )	Uncertainty ± ( %RH )
40	40.46	36	+ 4.46	1.6
50	50.05	45	+ 5.05	1.6
65	65.63	59	+ 6.63	1.7

Note : 1. Process calibration humidity measurement Reference temperature control at 25°C

2. Calculated STD humidity refer to dew-point temperature and convert to humidity by magnus's Equation

3. Calibrate items it good condition and this report customer request and accepted in certificate

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

The 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%.



**CRYSTAL CALIBRATION SALES AND SERVICE CO., LTD.**

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**Statements of conformity report**

Refer to Certificate No. : 24-1179-007

Issue Date : 11 September 2024

Work Order No. : 24/1179

**Detail of Equipment**

Description : Digital Thermo hygrometer

Manufacturer : EXTECH

Serial no. : PONPE5816745

Model : 445814

ID No. : TNP.LAB.04

**Result of Calibration**

This result of calibration : Without adjustment

MPE part Temp. 3 °C

Resolution : 0.1 °C

Calibration point	STD value	UUC reading	Correction	Uncertainty	Uncertainty + Absolute correc.	Evaluation
17	17.066	17.0	0.066	0.30	0.366	Pass
23	23.050	23.3	-0.250	0.30	0.550	Pass
30	30.050	30.5	-0.450	0.30	0.750	Pass

MPE part Humid 15 %RH

Resolution : 1 %RH

Calibration point	STD value	UUC reading	Correction	Uncertainty	Uncertainty + Absolute correc.	Evaluation
40	40.46	36	4.46	1.6	6.06	Pass
50	50.05	45	5.05	1.6	6.65	Pass
65	65.63	59	6.63	1.7	8.33	Pass

The conformity certificate documents validity following ISO/IEC Guide 98-4 : Role of measurement uncertainty in conformity assessment based on statement with guard band refer to specification tolerance limit of customer consider expanded measurement uncertainty (k=95%)

**The tolerance and decision rules ;**

MPE of Customer = Measurement uncertainty + Absolute error ; ≤ MPE is pass , &gt; MPE is Fail

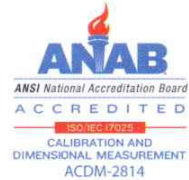
Statements of conformity decision by :

Laboratory Manager



# CALIBRATION LABORATORY Co., LTD.

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



## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : HOT AIR OVEN  
MANUFACTURER : MEMMERT  
MODEL / TYPE : UF75  
SERIAL NO. : B320.0251  
CLID. NO. : 332402706  
JOB CONTROL NO. : 241212132142  
CALIBRATION SERVICE : ☐ IN-LABORATORY ☒ ON-SITE

CUSTOMER : TNP ENVIRONMENT CO., LTD.  
332/173 MOO 3 TAMBON BANG RAK PHATTANA,  
AMPHOE BANG BUA THONG, NONTHABURI 11110

DATE OF RECEIVED : 12 December 2024

DATE OF ISSUED : 23 December 2024

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

Calibrated By :

Wenick Inchaisri

Calibration Engineer

Approved By :

Authorized Signatory

23 December 2024

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

Certificate No. Q24132142

F3-011-05/12-23

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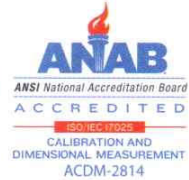


@clccalibration



# CALIBRATION LABORATORY Co., LTD.

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## REPORT OF CALIBRATION

### FOR

**NOMENCLATURE** : **HOT AIR OVEN**  
**MANUFACTURER** : **MEMMERT**  
**MODEL / TYPE** : **UF75**  
**SERIAL NO.** : **B320.0251**  
**LOCATION SITE** : **LABORATORY ROOM 2 FLOOR 3**  
**DATE OF CALIBRATION** : **17 December 2024**

---

#### ENVIRONMENT CONDITIONS :

Temperature : 25 °C to 26 °C

Relative Humidity : 52% to 54 %

#### PROCEDURE USED :

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

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

#### REFERENCE STANDARD USED :

Hydra Data Logger, Fluke Model 2635A S/N. 5499551.

#### TRACEABILITY :

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

Certificate No. Q24099493, Due Date 25 September 2025.

#### UNCERTAINTY :

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

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

Certificate No. **Q24132142**

**F3-011-05/12-23**

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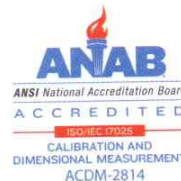


@clccalibration



# CALIBRATION LABORATORY CO., LTD.

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



**CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION**

**MEASUREMENT RESULTS : ( X ) without adjustment ( ) adjustment**

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

## CALIBRATION DATA

### 1. HOT AIR OVEN PERFORMANCE

DUC		Measured Uniformity	Measured Stability	Measured Overall
Setting ( °C )	Indicating ( °C )	( °C )	( °C )	Variation ( °C )
85.0	85.0	0.33	0.07	0.53
104.0	104.0	0.38	0.10	0.62
180.0	180.0	0.58	0.17	0.98

Certificate No. Q24132142

F3-011-05/12-23

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@clccalibration



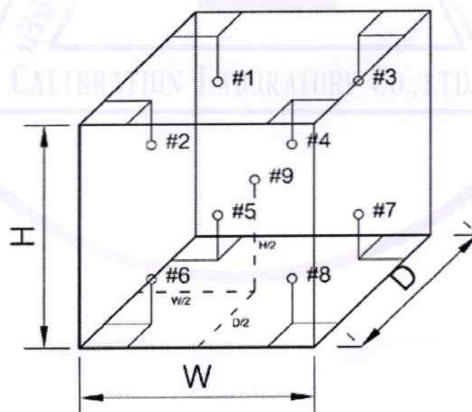
## CALIBRATION DATA

### 2. TEMPERATURE DISTRIBUTION

DUC		Measured Temperature ( °C )@Probe No.9 is Ref.									Uncertainty $\pm$ ( °C )	Coverage factor <i>k</i>
Setting ( °C )	Indicating ( °C )	1	2	3	4	5	6	7	8	9		
85.0	85.0	84.77	85.05	84.96	84.74	84.81	84.84	85.04	84.64	84.77	0.25	2,00
104.0	104.0	103.64	104.00	103.85	103.60	103.77	103.83	104.05	103.61	103.72	0.43	2,00
180.0	180.0	179.20	179.83	179.33	179.09	179.56	179.67	179.93	179.41	179.45	0.47	2,00

Technical Note : W = 40 cm, D = 33 cm, H = 56 cm.

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



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

### End of Certificate ###

Certificate No. Q24132142

F3-011-05/12-23

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45/48 Soi Salathammasop31, Salathammasop Rd.,  
Salathammasop, Thawewatthana, Bangkok 10170 Thailand  
Tel : 0-2408-8474-5 Fax : 0-2408-8477 Email : info@crystalcal.com www.crystalcal.com



## CERTIFICATE OF CALIBRATION

Issue Date : 12 June 2025

Certificate No. : 25-0753-025  
Work Order No. : 25/0753

Customer Name : TNP ENVIRONMENT CO.,LTD.  
332/173 Moo 3 Bang Rak Phatthana,  
Bang Bua Thong, Nonthaburi 11110

Date of Received : 12 June 2025

Date of Calibration : 12 June 2025

Instrument Details : Description : Electronic Balance  
Manufacturer : SHIMADZU  
Model : AP225WD  
Serial No. : D316301848  
ID No. : TNP.LAB.30  
Resolution : 0.00001 g / 0.0001 g  
Capacity : 102 g / 220 g  
Location : ห้องปฏิบัติการ 2 ชั้น 3

Calibration Method : This calibration was conducted by using in-house method according to calibration procedure no. CWI-B-01 based on UKAS LAB14 edition 6, October 2019

### Environmental Condition

Temperature : Maximum 25.5°C / Minimum 25.2°C  
Humidity : Maximum 48%R.H. / Minimum 45%R.H.  
Air Pressure : Maximum 999.2hPa / Minimum 999.1hPa

### Traceability of Measurement

: This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI)

Calibrated by : Mr. Itsara Sawanbancha  
Calibration Engineer

Approved by :



Asst. Laboratory Manager

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Crystal Calibration Sales and Service Co., Ltd.

45/48 Salathammasop 31, Salathammasop Rd., Salathammasop, Thawewatthana, Bangkok 10170

Phone : 0-2408-8474 Fax : 0-2408-8477 <http://www.crystalcal.com> Email : info@crystalcal.com



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## CERTIFICATE OF CALIBRATION

Certificate No. : 25-0753-025

Issue Date : 12 June 2025

Work Order No. : 25/0753

### Details of Calibration

#### 1. Reference Standards Instrument

Instrument	Capacity of Weight	Serial No. / ID No.	Certificate No.	Due date
Weight Set E2	1mg to 200g	B744909236	22-130801	6 December 2025

2. Certificate traceable : This certificate traceable to The International System of Unit refer to  
Asia Medical and Agricultural Laboratory and Research center Co., Ltd. , NSC-ONSC Calibration  
No. 0152
3. Condition of item : Used
4. Calibration site : On-site

### Result of Calibration

#### 1. Calibration result : Check performance before calibration

Applied Weight g	Balance Reading g	Correction Value g	Uncertainty ( $\pm$ ) g	Coverage Factor (k)
50.00005	50.00009	-0.00004	0.000080	2.00
99.99996	100.00004	-0.00008	0.00016	2.00
200.0000	200.0007	-0.0007	0.00032	2.00

#### 2. The result of check performance in frist step has to Reset span

#### 3. Calibration result : After set span by External Reset span by weight 100 g ID No. WE2-02

3.1 Repeatability number of repeatability is 10 times

Norminal Value ( g )	Standard Deviation of Reading ( g )
50	0.00000480
100	0.00000480
200	0.0000422

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

The 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%.





# CERTIFICATE OF CALIBRATION

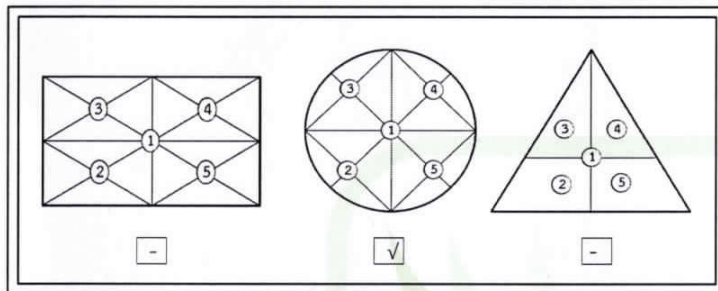
Certificate No. : 25-0753-025

Issue Date : 12 June 2025

Work Order No. : 25/0753

### 3. Calibration result : After set span by External Reset span by weight 100 g ID No. WE2-02 (continued)

3.2 Eccentric or Off-center Error A mass of 100 g was placed and moved to various position on pan.



Result of Eccentric Error		
Position 1	99.99997	g
Position 2	100.00001	g
Position 3	100.00002	g
Position 4	99.99999	g
Position 5	99.99998	g
(Maximum Difference)	0.00005	g

### 3.3 Departure of indication from nominal value

Applied Weight g	Balance Reading g	Correction Value g	Uncertainty (±) g	Coverage Factor (k)
Unload	0.00000	0.00000	0.000020	2.00
0.10001	0.10001	0.00000	0.000020	2.00
0.50001	0.50003	-0.00002	0.000020	2.00
1.00001	1.00000	0.00001	0.000020	2.00
5.00002	5.00001	0.00001	0.000020	2.00
10.00001	10.00001	0.00000	0.000040	2.00
19.99999	19.99997	0.00002	0.000050	2.00
50.00005	50.00005	0.00000	0.000080	2.00
99.99996	99.99997	-0.00001	0.00016	2.00
200.0000	200.0000	0.0000	0.00032	2.00

### Note

Calibrate items in good condition and this report customer request and accepted in certificate

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

The 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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Salathammasop, Thawewatthana, Bangkok 10170 Thailand  
Tel : 0-2408-8474-5 Fax : 0-2408-8477 Email : info@crystalcal.com www.crystalcal.com

## Statements of conformity report

Refer to Certificate No. : 25-0753-025

Issue Date : 12 June 2025

Work Order No. : 25/0753

**Detail of Equipment**

Description : Electronic Balance

Manufacturer : SHIMADZU

ID No. : TNP.LAB.30

Model : AP225WD

Resolution : 0.00001 g / 0.0001 g

Serial no. : D316301848

Capacity : 102 g / 220 g

**Result of Calibration**

This result of calibration : Adjustment

Unit : g

Applied Weight	Balance Reading	Correction Value	Uncertainty	Uncertainty + Correction	Limit of performance	Evaluation
0.10001	0.10001	0.00000	0.000020	0.000020	0.000051	Pass
0.50001	0.50003	-0.00002	0.000020	0.000040	0.000051	Pass
1.00001	1.00000	0.00001	0.000020	0.000030	0.000051	Pass
5.00002	5.00001	0.00001	0.000020	0.000030	0.000051	Pass
10.00001	10.00001	0.00000	0.000040	0.000040	0.000071	Pass
19.99999	19.99997	0.00002	0.000050	0.000070	0.000081	Pass
50.00005	50.00005	0.00000	0.000080	0.000080	0.00011	Pass
99.99996	99.99997	-0.00001	0.00016	0.00017	0.00019	Pass
200.0000	200.0000	0.0000	0.00032	0.00032	0.00035	Pass

The conformity certificate documents validity following ISO/IEC Guide 98-4 : Role of measurement uncertainty in conformity assessment based on statement with guard band refer to NATA User checks and maintenance of laboratory balances consider expanded measurement uncertainty (k=95%)

**The tolerance and decision rules ;**Limit of performance (LoP) =  $2.26 \text{ sw} + |\text{Corr}| + U(\text{Cal})$ Evaluation of decision = Measurement uncertainty + Absolute correction ;  $\leq \text{LoP}$  is pass ,  $> \text{LoP}$  is Fail

Statements of conformity decision by :

Asst. Laboratory Manager



CRYSTAL CALIBRATION SALES AND SERVICE CO., LTD.

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Salathammasop, Thawewatthana, Bangkok 10170 Thailand  
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## CERTIFICATE OF CALIBRATION

Certificate No. : 25-0753-026

Work Order No. : 25/0753

Issue Date : 12 June 2025

Customer Name : TNP ENVIRONMENT CO.,LTD.  
332/173 Moo 3 Bang Rak Phatthana,  
Bang Bua Thong, Nonthaburi 11110

Date of Received : 12 June 2025

Date of Calibration : 12 June 2025

Instrument Details : Description : Electronic Balance  
Manufacturer : sartorius  
Model : SECURA224-1S  
Serial No. : 0041305301  
ID No. : TNP.LAB.31  
Resolution : 0.0001 g  
Capacity : 220 g  
Location : ห้องปฏิบัติการ 2 ชั้น 3

Calibration Method : This calibration was conducted by using in-house method according to calibration procedure no. CWI-B-01 based on UKAS LAB14 edition 6, October 2019

### Environmental Condition

Temperature : Maximum 25.6°C / Minimum 25.2°C  
Humidity : Maximum 48%R.H. / Minimum 44%R.H.  
Air Pressure : Maximum 999.3hPa / Minimum 999.2hPa

### Traceability of Measurement

: This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI)

Calibrated by : Mr. Itsara Sawanbancha  
Calibration Engineer

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

Asst. Laboratory Manager

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Crystal Calibration Sales and Service Co., Ltd.

45/48 Salathammasop 31, Salathammasop Rd., Salathammasop, Thawewatthana, Bangkok 10170

Phone : 0-2408-8474 Fax : 0-2408-8477 <http://www.crystalcal.com> Email : info@crystalcal.com





## CERTIFICATE OF CALIBRATION

Issue Date : 12 June 2025

Certificate No. : 25-0753-026

Work Order No. : 25/0753

### Details of Calibration

#### 1. Reference Standards Instrument

Instrument	Capacity of Weight	Serial No. / ID No.	Certificate No.	Due date
Weight Set E2	1mg to 200g	B744909236	22-130801	6 December 2025

2. Certificate traceable : This certificate traceable to The International System of Unit refer to  
Asia Medical and Agricultural Laboratory and Research center Co., Ltd. , NSC-ONSC Calibration  
No. 0152

3. Condition of item : Used

4. Calibration site : On-site

### Result of Calibration

#### 1. Calibration result : Check performance before calibration

Applied Weight g	Balance Reading g	Correction Value g	Uncertainty ( $\pm$ ) g	Coverage Factor (k)
100.0000	100.0000	0.0000	0.00019	2.00
200.0000	200.0000	0.0000	0.00032	2.00

2. The result of check performance in first step has to Reset span

#### 3. Calibration result : After set span by Internal Calibration

3.1 Repeatability number of repeatability is 10 times

Normal Value ( g )	Standard Deviation of Reading ( g )
100	0.0000316
200	0.0000316

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

The 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%.





## CERTIFICATE OF CALIBRATION

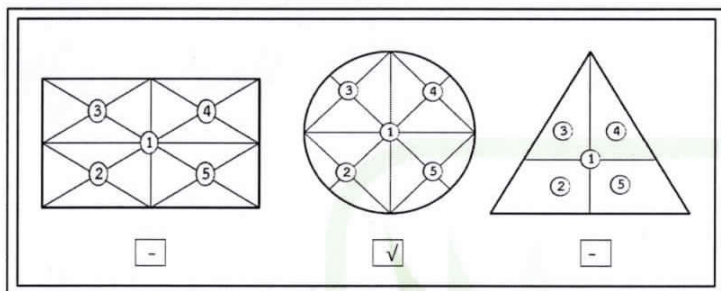
Certificate No. : 25-0753-026

Issue Date : 12 June 2025

Work Order No. : 25/0753

### 3. Calibration result : After set span by Internal Calibration (continued)

3.2 Eccentric or Off-center Error A mass of 100 g was placed and moved to various position on pan.



Result of Eccentric Error		
Position 1	100.0000	g
Position 2	100.0000	g
Position 3	100.0000	g
Position 4	99.9999	g
Position 5	100.0000	g
(Maximum Difference)	0.0001	g

### 3.3 Departure of indication from nominal value

Applied Weight g	Balance Reading g	Correction Value g	Uncertainty (±) g	Coverage Factor (k)
Unload	0.0000	0.0000	0.000090	2.00
0.1000	0.1000	0.0000	0.000090	2.00
0.5000	0.5000	0.0000	0.000090	2.00
1.0000	1.0000	0.0000	0.000090	2.00
5.0000	5.0000	0.0000	0.000090	2.00
10.0000	10.0000	0.0000	0.00010	2.00
20.0000	20.0000	0.0000	0.00010	2.00
50.0000	50.0000	0.0000	0.00012	2.00
100.0000	100.0000	0.0000	0.00019	2.00
200.0000	200.0000	0.0000	0.00032	2.00

#### Note

Calibrate items in good condition and this report customer request and accepted in certificate

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

The 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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Salathammasop, Thawewatthana, Bangkok 10170 Thailand

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**Statements of conformity report**

Refer to Certificate No. : 25-0753-026

Issue Date : 12 June 2025

Work Order No. : 25/0753

**Detail of Equipment**

Description : Electronic Balance

Manufacturer : sartorius

ID No. : TNP.LAB.31

Model : SECURA224-1S

Resolution : 0.0001 g

Serial no. : 0041305301

Capacity : 220 g

**Result of Calibration**

This result of calibration : Adjustment

Unit : g

Applied Weight	Balance Reading	Correction Value	Uncertainty	Uncertainty + Correction	Limit of performance	Evaluation
0.1000	0.1000	0.0000	0.000090	0.000090	0.00016	Pass
0.5000	0.5000	0.0000	0.000090	0.000090	0.00016	Pass
1.0000	1.0000	0.0000	0.000090	0.000090	0.00016	Pass
5.0000	5.0000	0.0000	0.000090	0.000090	0.00016	Pass
10.0000	10.0000	0.0000	0.00010	0.00010	0.00017	Pass
20.0000	20.0000	0.0000	0.00010	0.00010	0.00017	Pass
50.0000	50.0000	0.0000	0.00012	0.00012	0.00019	Pass
100.0000	100.0000	0.0000	0.00019	0.00019	0.00026	Pass
200.0000	200.0000	0.0000	0.00032	0.00032	0.00039	Pass

The conformity certificate documents validity following ISO/IEC Guide 98-4 : Role of measurement uncertainty in conformity assessment based on statement with guard band refer to NATA User checks and maintenance of laboratory balances consider expanded measurement uncertainty (k=95%)

**The tolerance and decision rules ;**Limit of performance (LoP) =  $2.26 \text{ sw} + |\text{Corr}| + U(\text{Cal})$ Evaluation of decision = Measurement uncertainty + Absolute correction ;  $\leq \text{LoP}$  is pass ,  $> \text{LoP}$  is Fail

Statements of conformity decision by :

Asst. Laboratory Manager

CERT.No.: HS-V050G

Calibration Date : 17 Jul 25  
 Submitted by : TNP ENVIRONMENT COMPANY LIMITED  
 332/173 Moo.3, Tambon Bang Rak Phatthana,  
 Amphoe Bang Bua Thong, Nonthaburi 11110

Avg Room Temp : 20 °C  
 Avg Water Temp : 20 °C  
 Air Pressure : 760.00 mmHg  
 Salinity : 0 ppt

Model : HI 5421  
 S/N : 07210004101  
 Probe : HI 76408W  
 S/N : KC1N32W9P  
 ID NO. :  
 Air Temp ref : S/N. F8065C26  
 Barometric ref : S/N. F8065C26  
 Water Temp ref : -  
 HS001  
 Technician : Kittipong M.

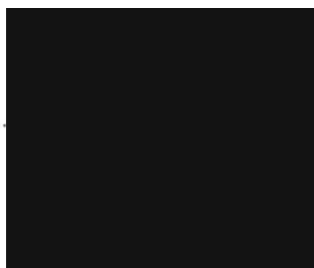
#### Calibration Details

Calibration Point	100% air sat. (@20 °C, DO = 9.08 mg/l)	(status)	(status)	(status)
Measurement 1 (mg/l)	9.05	(PASS)	-	-
Measurement 2 (mg/l)	9.04	(PASS)	-	-
Measurement 3 (mg/l)	9.04	(PASS)	-	-
Measurement 4 (mg/l)	9.05	(PASS)	-	-
Measurement 5 (mg/l)	9.06	(PASS)	-	-
Measurement 6 (mg/l)	9.05	(PASS)	-	-
Measurement 7 (mg/l)	9.06	(PASS)	-	-
Measurement 8 (mg/l)	9.07	(PASS)	-	-
Measurement 9 (mg/l)	9.05	(PASS)	-	-
Measurement 10 (mg/l)	9.05	(PASS)	-	-
Mean Measurement	9.05	mg/l	-	-
Inaccuracy	0.03	mg/l	-	-
Overall Status	(PASS)			

#### Manufacturer Specification

Accuracy = +/- 0.15 mg/l

- 1) This certificate is issued based on the result that are found as shown on date and place of test only.
- 2) The calibration procedure followed in accordance with Harikul Science Co., Ltd.
- 3) This result shall not be used for advertising purpose.





# CALIBRATION LABORATORY CO., LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230

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



## CERTIFICATE OF CALIBRATION

### FOR

NOMENCLATURE : WATER QUALITY METER  
MANUFACTURER : DIGICON  
MODEL / TYPE : WA-48SD  
SERIAL NO. : T.075714/TF43846/T.075695/11-05[TNP.LAB.46]  
CLID. NO. : 272500210  
JOB CONTROL NO. : 250127009952  
CALIBRATION SERVICE : ☒ IN-LABORATORY ☐ ON-SITE

CUSTOMER : TNP ENVIRONMENT CO., LTD.  
332/173 MOO 3 TAMBON BANG RAK PHATTANA,  
AMPHOE BANG BUA THONG, NONTHABURI 11110

DATE OF RECEIVED : 27 January 2025

DATE OF ISSUED : 01 March 2025

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

Calibrated By : Sukgasem Seehanart  
Calibration Engineer

Approved By :

Authorized Signatory

01 March 2025

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

Certificate No. Q25009952

F3-011-05/12-23

page 1 of 4



@clccalibration





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



## REPORT OF CALIBRATION FOR

**NOMENCLATURE** : **WATER QUALITY METER**  
**MANUFACTURER** : **DIGICON**  
**MODEL / TYPE** : **WA-48SD**  
**SERIAL NO.** : **T.075714/TF43846/T.075695/11-05[TNP.LAB.46]**  
**DATE OF CALIBRATION** : **29 January 2025**

### ENVIRONMENT CONDITIONS :

Temperature :  $(25 \pm 2.5) ^\circ\text{C}$

Relative Humidity :  $(50 \pm 15) \% \text{ RH}$

### PROCEDURE USED :

This instrument was calibrated under procedure No. **CLC-CPCH-01** [ pH Meter ]. The calibration was performed by direct measurement with Certified Reference Material (CRM).

This instrument was calibrated under procedure No. **CLC-CPCH-02** [ Conductivity Meter ].

The calibration was performed by direct measurement with Certified Reference Material (CRM).

This instrument [ Sodium chloride ] was calibrated by direct measurement with Sodium chloride which maintained by the Calibration Laboratory Co., Ltd.

This instrument was calibrated under procedure No. **CLC-CPCH-06** [ Oxygen Meter ].

The calibration was performed by direct measurement with Certified Reference Material (CRM).

### REFERENCE STANDARD USED :

1. pH Standard Solution, NIMT TRM CODE TRM-S-2003, TRM CODE TRM-S-2007.
2. pH Standard Solution, Control Company Catalog Number 06664263,11784256, Lot Number CC788789.
3. Potassium Chloride Solution ( nominal 0.147 mS/cm , nominal 1.41 mS/cm , nominal 12.8 mS/cm )
4. Sodium chloride, Code 82089719 Lot Number 948692.
5. Dissolved Oxygen, Sigma-Alorich Product ID QC3077-500ML .

Certificate No. **Q25009952**

**F3-011-05/12-23**

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# CALIBRATION LABORATORY CO., LTD.

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



## TRACEABILITY :

1. The measurements are traceable to International System of Units (SI) , through National Institute of Metrology (Thailand).  
Lot Number. 040822 , 120124. Due Date 04 March 2025.
2. The measurements are traceable to International System of Units (SI) , through Control Company.  
Certificate No. 4288-14548619 , Due Date 17 October 2025.
3. The measurements are traceable to International System of Units (SI) , through Sigma-Aldrich Canada Co.  
Certificate No. HC31089557, HC30595403, HC20111554. Due Date 31 January 2026 , 31 January 2026, 30 September 2025.
4. The measurements are traceable to International System of Units (SI), through CPA chem Ltd.  
Ref. No. PSNACLC.50G, Due Date 12 January 2027.
5. The measurements are traceable to International System of Units (SI) , through Merck Co., Ltd.  
Lot LRAD8571 , Due Date April 2026.

## UNCERTAINTY :

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

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

Certificate No. Q25009952

F3-011-05/12-23

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@clccalibration

## CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

### MEASUREMENT RESULTS : ( X ) without adjustment ( ) adjustment

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

#### CALIBRATION DATA

##### 1. pH METER RESULT @ 25 °C

Standard pH Buffer Solution (pH)	pH Meter Reading (pH)	pH Meter Reading (mV)	Correction (pH)	Uncertainty of pH Measurement ( $\pm$ pH)	k Factor
4.003	4.00	-	+0.003	0.013	2,15
7.005	7.00	-	+0.005	0.015	2,06
10.015	10.02	-	-0.005	0.016	2,05

Technical Note. Setting function CAL 1 point ( 4 ).

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 014 Page 4 of 68

##### 2. CONDUCTIVITY SOLUTION TEST @ 25 °C

Standard Conductivity Solution	DUC Reading	Uncertainty of Measurement	k Factor
146.00 $\mu$ S/cm	146.1 $\mu$ S/cm	$\pm$ 2.10 $\mu$ S/cm	2,00
1.414 mS/cm	1.415 mS/cm	$\pm$ 0.021 mS/cm	2,00
12.83 mS/cm	12.84 mS/cm	$\pm$ 0.19 mS/cm	2,00

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 014 Page 4 of 68

##### \*3. SODIUM CHLORIDE RESULT

STD Applied (%NaCl)	Nominal Value (Pcnt)	DUC Reading (Pcnt)	Correction (Pcnt)	Uncertainty $\pm$ (Pcnt)	Coverage factor k
5.00	5.00	5.01	-0.01	0.010	2,05

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

##### 4. OXYGEN SOLUTION RESULT @ 25°C

Nominal Value (mg/L)	DUC Reading (mg/L)	Correction (mg/L)	Uncertainty (mg/L)	Coverage factor k
8.18	8.20	-0.02	$\pm$ 0.38	2,00

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 014 Page 5 of 68

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

### End of Certificate ###

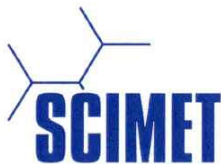
Certificate No. Q25009952

F3-011-05/12-23

page 4 of 4







**SCIMET Co., Ltd.**  
818/124 Udomsuk Rd., Bangna-Nuea,  
Bangna, Bangkok 10260 Thailand  
Email: scimet2022@gmail.com, Tel: 02 460 9239  
<https://www.scimet.co.th>



**Certificate No. C07250018**

## Calibration Certificate

**Equipment:** SPECTROPHOTOMETER  
**Model:** T6U  
**Serial No.(or ID):** 31-1654-01-1055 (TNP.LAB.48)  
**Manufacturer:** PG Instrument  
**Condition:** In Condition

**Job No.:** KSMT2500582  
**Received Date:** 17 February 2025  
**Issued Date:** 17 February 2025  
**Page:** 1 of 3

### Customer

TNP ENVIRONMENT CO., LTD.  
332/173 Village No. 3, Bangrak Phatthana Subdistrict,  
Bang Bua Thong District, Nonthaburi Province 11110

### Calibration Place

TNP ENVIRONMENT CO., LTD. (ห้องปฏิบัติการ 2)  
332/173 Village No. 3, Bangrak Phatthana Subdistrict,  
Bang Bua Thong District, Nonthaburi Province 11110

### Calibration Date

17 February 2025

### Environment Condition

**Temperature:** 27.1 °C ± 0.3 °C  
**Humidity:** 50.3 %RH ± 2.9 %RH

### The Method used

In-house method, WI07, based on ASTM E 275-08 and  
ASTM E 387-04

### Traceability

This certificate is traceable to the CRM maintained by National Institute  
of Standards and Technology (NIST) through Starna Scientific Limited.

The standard for Wavelength Certificate No. 125472 and 125471

The standard for Photometric Certificate No. 125567 and 125517

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ( $k=2$ ) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.



**Condition of reference standards Instruments / CRM:**

<u>Instruments</u>	<u>Set No.</u>	<u>Certificate No.</u>	<u>Due date</u>
Didymium Oxide Glass Reference	131033	125472	16-Sep-26
Holmium Oxide Glass Reference	136650	125471	16-Sep-26
Neutral Density Filter Reference	45329	125567	17-Sep-26
Potassium Dichromate Solution References	45328	125517	17-Sep-26

**Calibration Results:**
**Without Adjustment**

Wavelength Accuracy (nm), The spectral bandwidth of Std at 2 nm and UUC at 2 nm

Standard Wavelength (nm)	Unit Under Calibration (nm)	Correction (nm)	Uncertainty of Measurement ( ± nm)
219.30	219.8	-0.50	0.14
241.29	241.8	-0.51	0.14
287.62	287.8	-0.18	0.14
360.43	360.4	0.03	0.14
417.72	418.4	-0.68	0.14
431.57	431.0	0.57	0.14
472.47	473.0	-0.53	0.14
513.41	513.8	-0.39	0.14
528.83	528.6	0.23	0.14
537.13	537.2	-0.07	0.14
573.33	573.6	-0.27	0.14
585.29	585.6	-0.31	0.14
640.94	641.0	-0.06	0.14
684.49	684.8	-0.31	0.14
740.18	739.8	0.38	0.14
748.48	748.8	-0.32	0.14
807.03	806.6	0.43	0.14
879.27	879.4	-0.13	0.14

**Photometric Accuracy (Absorbance)**

Wavelength	Standard absorbance (Abs)	Unit Under Calibration (Abs)	Correction (Abs)	Uncertainty of Measurement( ± Abs)
235 nm	0.0000	0.000	0.0000	0.0080
	0.7328	0.733	-0.0002	0.0080
257 nm	0.0000	0.000	0.0000	0.0080
	0.8537	0.852	0.0017	0.0080
313 nm	0.0000	0.000	0.0000	0.0080
	0.2855	0.287	-0.0015	0.0080
350 nm	0.0000	0.000	0.0000	0.0080
	0.6338	0.633	0.0008	0.0080



### Calibration Results:

Without Adjustment

#### Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance (Abs)	Unit Under Calibration (Abs)	Correction (Abs)	Uncertainty of Measurement( $\pm$ Abs)
420 nm	0.0000	0.000	0.0000	0.0045
	0.2352	0.236	-0.0008	0.0045
	0.5716	0.573	-0.0014	0.0045
	0.7146	0.716	-0.0014	0.0045
	1.0179	1.020	-0.0021	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.2314	0.232	-0.0006	0.0045
	0.5566	0.558	-0.0014	0.0045
	0.7028	0.703	-0.0002	0.0045
	1.0016	1.003	-0.0014	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.2107	0.212	-0.0013	0.0045
	0.5192	0.521	-0.0018	0.0045
	0.6638	0.664	-0.0002	0.0045
	0.9447	0.944	0.0007	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.2187	0.220	-0.0013	0.0045
	0.5207	0.522	-0.0013	0.0045
	0.7002	0.700	0.0002	0.0045
	1.0001	1.000	0.0001	0.0045
590 nm	0.0000	0.000	0.0000	0.0045
	0.2430	0.243	0.0000	0.0045
	0.5546	0.555	-0.0004	0.0045
	0.7756	0.775	0.0006	0.0045
	1.1117	1.112	-0.0003	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.2635	0.264	-0.0005	0.0045
	0.5622	0.563	-0.0008	0.0045
	0.7651	0.765	0.0001	0.0045
	1.0974	1.097	0.0004	0.0045

The End of Certificate

**Statements of conformity:**

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The error of temperature determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, ASTM E 275-08 and ASTM E 387-04. Therefore, those parameters have not been assessed separately.

**Tolerance and Decision rules:**

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule :** ☐ Choice A Binary Statement for Simple Acceptance Rule ( $w = 0$ ), Specific Risk < 50% PFA.
- ☒ Choice B Non-binary statement with guard band ( $w = 1 U$ ), Pass or Fail Specific Risk < 2.5% PFA and Condition Pass or Condition Fail Specific Risk < 50% PFA.
- ☐ Choice C Customer defined, Customers may define arbitrary multiple of  $r$  to have applied as guard band ( $w = r U$ ) .
- ; PFA – Probability of False Accept



Authorized signatory

### Without Adjustment

#### Wavelength Accuracy (nm), The spectral bandwidth of Std at 2 nm and UUC at 2 nm

Unit Under Calibration	Correction	Guard Band (w)	Tolerance ( $\pm$ )	Conformity
219.8	-0.50	0.14	1.5	Pass
241.8	-0.51	0.14	1.5	Pass
287.8	-0.18	0.14	1.5	Pass
360.4	0.03	0.14	1.5	Pass
418.4	-0.68	0.14	1.5	Pass
431.0	0.57	0.14	1.5	Pass
473.0	-0.53	0.14	1.5	Pass
513.8	-0.39	0.14	1.5	Pass
528.6	0.23	0.14	1.5	Pass
537.2	-0.07	0.14	1.5	Pass
573.6	-0.27	0.14	1.5	Pass
585.6	-0.31	0.14	1.5	Pass
641.0	-0.06	0.14	1.5	Pass
684.8	-0.31	0.14	1.5	Pass
739.8	0.38	0.14	1.5	Pass
748.8	-0.32	0.14	1.5	Pass
806.6	0.43	0.14	1.5	Pass
879.4	-0.13	0.14	1.5	Pass

#### Photometric Accuracy (Absorbance)

Wavelength	Unit Under Calibration	Correction	Guard Band (w)	Tolerance ( $\pm$ )	Conformity
235 nm	0.000	0.0000	0.0080	0.02	Pass
	0.733	-0.0002	0.0080	0.02	Pass
257 nm	0.000	0.0000	0.0080	0.02	Pass
	0.852	0.0017	0.0080	0.02	Pass
313 nm	0.000	0.0000	0.0080	0.02	Pass
	0.287	-0.0015	0.0080	0.02	Pass
350 nm	0.000	0.0000	0.0080	0.02	Pass
	0.633	0.0008	0.0080	0.02	Pass

**Without Adjustment**
**Photometric Accuracy (Absorbance)**

Wavelength	Unit Under Calibration	Correction	Guard Band (w)	Tolerance ( $\pm$ )	Conformity
420 nm	0.000	0.0000	0.0045	0.015	Pass
	0.236	-0.0008	0.0045	0.015	Pass
	0.573	-0.0014	0.0045	0.015	Pass
	0.716	-0.0014	0.0045	0.015	Pass
	1.020	-0.0021	0.0045	0.02	Pass
440 nm	0.000	0.0000	0.0045	0.015	Pass
	0.232	-0.0006	0.0045	0.015	Pass
	0.558	-0.0014	0.0045	0.015	Pass
	0.703	-0.0002	0.0045	0.015	Pass
	1.003	-0.0014	0.0045	0.015	Pass
465 nm	0.000	0.0000	0.0045	0.015	Pass
	0.212	-0.0013	0.0045	0.015	Pass
	0.521	-0.0018	0.0045	0.015	Pass
	0.664	-0.0002	0.0045	0.015	Pass
	0.944	0.0007	0.0045	0.015	Pass
546.1 nm	0.000	0.0000	0.0045	0.015	Pass
	0.220	-0.0013	0.0045	0.015	Pass
	0.522	-0.0013	0.0045	0.015	Pass
	0.700	0.0002	0.0045	0.015	Pass
	1.000	0.0001	0.0045	0.015	Pass
590 nm	0.000	0.0000	0.0045	0.015	Pass
	0.243	0.0000	0.0045	0.015	Pass
	0.555	-0.0004	0.0045	0.015	Pass
	0.775	0.0006	0.0045	0.015	Pass
	1.112	-0.0003	0.0045	0.015	Pass
635 nm	0.000	0.0000	0.0045	0.015	Pass
	0.264	-0.0005	0.0045	0.015	Pass
	0.563	-0.0008	0.0045	0.015	Pass
	0.765	0.0001	0.0045	0.015	Pass
	1.097	0.0004	0.0045	0.015	Pass

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

**The End of Statements of Conformity**





## ใบตรวจสอบสภาพเครื่อง Spectrophotometer

เลขที่ใบงาน: KSMT2500582

ชนิดเครื่องมือ: SPECTROPHOTOMETER

รุ่น: T6U

หมายเลขเครื่อง: 31-1654-01-1055

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
17 Feb 2025			17 Feb 2025		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด ( ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิทช์ ปิด – เปิด เครื่อง (On-Off Swicth)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. ความยาวคลื่น (Wavelength Check)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. แหล่งกำเนิดแสง (UV < 3,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. แหล่งกำเนิดแสง (Visible < 5,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. ช่องวัดหลายตัวอย่าง (Carousel Module)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

เพิ่มเติม/ข้อแนะนำ :

Mr. Hattapong Pumnil

Service Engineer

## Calibration Certificate

**Certificate No.:** 2502859-003-01  
**Client name:** TNP ENVIRONMENT CO., LTD.  
**Address:** 332/173 Moo 3 Tambon Bang Rak Phatthana,  
Amphone Bang Bua Thong, Nonthaburi 11110

Page 1 of 3

**Equipment:** pH Meter  
**Manufacturer:** EUTECH INSTRUMENTS  
**Model:** pH 700  
**Serial No.:** 3178920  
**ID No.:** TNP.LAB.57  
**Order No.:** 2502859  
**Operation No.:** 2502859-003  
**Date of Receipt:** 8 May 2025  
**Date of Calibration:** 8 May 2025

**Calibrated by** Mr.Manas Somsak  
Specialist

**Approved by**   
Manager, Division of Calibration Laboratory

**Date of Issue:** 13 May 2025

Responsible for the Technical Management Team

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

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 01 Date: 20-04-65



## Calibration Report

**Certificate No.:** 2502859-003-01

**Equipment:**

pH Meter

**Resolution:** 0.01 pH : 0.1 mV

**Manufacturer:** EUTECH INSTRUMENTS

**Model:** pH 700

**Serial No.:** 3178920

**Type:** Bench top

**ID No.:** TNP.LAB.57

**Date of Calibration:** 8 May 2025

Page 2 of 3

**Location:** Laboratory 1, TNP ENVIRONMENT CO., LTD.

**Environment Condition:** **Ambient Temperature:** ( 23.4 ± 1.5 ) °C **Relative Humidity:** ( 55 ± 3 ) %

**Condition of Equipment:** Good Condition

**Condition of this Results of Calibration**

1. Calibration Method W-CC-002 : In house method based on direct measurement by using standard voltage calibrator and certified reference material (CRM)

2. Reference Standards / Certified Reference Material

<u>Instruments</u>	<u>Serial / ID No.</u>	<u>Manufacturer</u>	<u>Certificate No.</u>	<u>Due Date</u>
2.1 DC Voltage Calibrator	2709007	Fluke	24E1752	30 May 2025
2.2 Digital Thermometer	2709007	Fluke	2500376-002-01	29 October 2025
2.3 Thermo-Hygro Meter	NFI.BTH 013/23	testo	CC 670420-01	21 May 2025
<u>Certified Reference Material</u>	<u>Lot. No.</u>	<u>Manufacturer</u>	<u>Ref N</u>	<u>Expire Date</u>
2.4 pH buffer 4.008 (Primary pH buffer Solution)	1016435	CPAchem	PH216.L5	25 July 2026
2.5 pH buffer 6.865 (Primary pH buffer Solution)	949186	CPAchem	PH217.L5	30 November 2025
2.6 pH buffer 10.01 (Primary pH buffer Solution)	1016437	CPAchem	PH220.L5	25 July 2025
2.7 pH buffer 7.00 (Standard pH buffer Solution)	C03109	HACH LANGE GmbH	S11M004	16 October 2025

3. This certification is traceable to The International System of Unit (SI Unit)

3.1 Instruments No.2.1	through	NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.0008
3.2 Instruments No.2.2 to 2.3	through	NSC-TISI-TIS 17025 Laboratory Accreditation of Calibration No.0061
3.3 Certified Reference Material No.2.4 to 2.6	traceable to	Primary measurement method- Harned cell using calibrated thermometer, barometer, and nanovoltmeter. The Standard Solution preparation and certified by CPAchem Ltd is accredited to ISO 17034 and ISO/IEC 17025
3.4 Certified Reference Material No.2.7	traceable to	PTB Certificate Nr. PTB-PHOA-563/30504/23 and Certificate Nr. PTB-PHOB-555/30620/22 (PTB: Physikalisch-Technische Bundesanstalt, Braunschweig, Germany)

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

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

F-CS-012 Revision: 01 Date: 20-04-65

## Calibration Report

**Certificate No.:** 2502859-003-01

**Equipment:** pH Meter **Resolution:** 0.01 pH ; 0.1 mV

**Manufacturer:** EUTECH INSTRUMENTS **Model:** pH 700

**Serial No.:** 3178920 **Type:** Bench top

**ID No.:** TNP.LAB.57

**Date of Calibration:** 8 May 2025

Page 3 of 3

### Calibration Results:

#### 1. Calibration of pH Meter ( Manual Temperature Compensation at 25 °C )

Nominal pH	DC Voltage Standard ( mV )	Average Indicator Reading		Uncertainty ( ±mV )	Coverage Factor ( k )
		mV	pH		
0	414.122	414	0.00	0.58	2.00
2	295.815	296	2.00	0.58	2.00
4	177.463	177.6	4.00	0.063	2.00
6	59.160	59.3	6.00	0.063	2.00
7	0.001	0.2	7.00	0.063	2.00
8	-59.159	-59.0	8.00	0.063	2.00
10	-177.462	-177.3	10.00	0.063	2.00
12	-295.813	-296	12.00	0.58	2.00
14	-414.121	-414	14.00	0.58	2.00

#### 2. Calibration of pH Meter with Electrode ( Manual Temperature Compensation at 25 °C )

**Equipment:** pH Electrode **Type:** Combined Electrode

**Manufacturer:** EUTECH INSTRUMENTS **Model:** 93X218814

**Serial No.:** 3231404 (ECFG7350401B) **ID.No.:** N/A

**Performance of Electrode system** (Three-Point Calibration at pH 4, 7 and 10)

Certified Value @25 °C (pH)	Average Indicator Reading		Relative Slope (%)	Uncertainty ( ± pH )	Coverage Factor ( k )
	pH	mV			
4.008	4.01	176.2	-	0.0071	2.00
7.001	7.00	0.0	99.6	0.0086	2.00
10.010	10.01	-172.4	96.8	0.0086	2.00
6.876	6.88	8.0	-	0.0074	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 %.

----- End -----

F-CS-012 Revision: 01 Date: 20-04-65



## Calibration Certificate

**Certificate No.:** 2502859-004-01  
**Client name:** TNP ENVIRONMENT CO., LTD.  
**Address:** 332/173 Moo 3 Tambon Bang Rak Phatthana,  
Amphone Bang Bua Thong, Nonthaburi 11110

Page 1 of 3

**Equipment:** Water Bath  
**Manufacturer:** MEMMERT  
**Model:** WTB24  
**Serial No.:** LD23.0297  
**ID No.:** TNP.LAB.58  
**Order No.:** 2502859  
**Operation No.:** 2502859-004  
**Date of Receipt:** 8 May 2025  
**Date of Calibration:** 8 May 2025

**Calibrated by** Mr. Worapob Sookthong  
Scientist

**Approved by**

Manager, Division of Calibration Laboratory

**Date of Issue:** 13 May 2025

Responsible for the Technical Management Team

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

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 01 Date: 20-04-65



## Calibration Report

**Certificate No.:** 2502859-004-01

**Equipment:** Water Bath

Model: WTB24 Serial No.: LD23.0297

Resolution: 0.1 °C ID No.: TNP.LAB.58

Manufacturer: MEMMERT

**Date of Calibration:** 8 May 2025

Page 2 of 3

**Location:** Floor 3, Laboratory, TNP ENVIRONMENT CO., LTD.

**Environment Condition:**

Ambient Temperature ( 23 ± 1 ) °C

Relative Humidity ( 40 ± 2 ) %

Line Voltage ( 230 ± 1 ) Volt

### Condition of this results of Calibration:

- This instrument was calibrated by insert 5 standard thermometer into its liquid bath and calibration according to W-TE-011 based on ASTM E715-80 (Re-approved-2016): Standard Specification for Gravity-Convection and Forced-Circulation Water Baths.
  - The temperature scale used is ITS - 90.
  - All data show below were final values and the initial data may be obtained upon request.

### 2. Reference Standard Instrument :

Instrument	Model	Serial No./ ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY49016894	2502528-001-01	19-Apr-26	NATIONAL FOOD INSTITUTE
	RTD	RTD#201-205 / CH#201-205			

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

UUC Description:

Time of Record 1 Hour 9 Minute At 44.5 °C

7. Result of Calibration :
- ☒ Without adjustment
- ☐ After adjustment

# Calibration Report

**Certificate No.:** 2502859-004-01

**Equipment:** Water Bath

Model: WTB24

Serial No.: LD23.0297

Resolution: 0.1 °C

ID No.: TNP.LAB.58

Manufacturer: MEMMERT

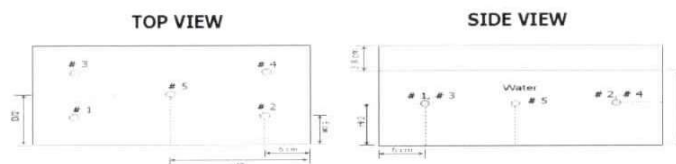
**Date of Calibration:** 8 May 2025

Page 3 of 3

**Calibration point:** 44.5 °C

**Calibration result:**

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
Min	23.0	38.5	229.3
Max	23.5	41.6	231.4



**Table1 : Reporting of Temperature**

**Sensor Installation Location**

Calibration Point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.5 is REF)					Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	
44.5	44.49	44.52	44.49	44.53	44.51	0.17

**Table 2 : Reporting of Characterization Result**

UUC* Setting (°C)	UUC* Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
44.5	44.5	44.5	44.5	0.050	0.022	0.15

**Note** The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity)"

UUC\* = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors,  
for at least half an hour after reaching steady state.

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.

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

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

----- End -----





## Calibration Certificate

**Certificate No.:** 2502859-005-01  
**Client name:** TNP ENVIRONMENT CO., LTD.  
**Address:** 332/173 Moo 3 Tambon Bang Rak Phatthana,  
Amphone Bang Bua Thong, Nonthaburi 11110

Page 1 of 3

**Equipment:** CHAMBER (Incubator)

**Manufacturer:** BIOBASE

**Model:** BJPX-M100B

**Serial No.:** BJPXM1002301016

**ID No.:** TNP.LAB.59

**Order No.:** 2502859

**Operation No.:** 2502859-005

**Date of Receipt:** 8 May 2025

**Date of Calibration:** 8 May 2025

**Calibrated by** Mr. Worapob Sookthong  
Scientist

**Approved by**

Manager, Division of Calibration Laboratory

**Date of Issue:** 13 May 2025

Responsible for the Technical Management Team

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

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 01 Date: 20-04-65





## Calibration Report

**Certificate No.:** 2502859-005-01

**Equipment:** CHAMBER (Incubator)

Model: BJPX-M100B Serial No.: BJPXM1002301016

Resolution: 0.1 °C ID No.: TNP.LAB.59

Manufacturer: BIOBASE

**Date of Calibration:** 8 May 2025

Page 2 of 3

**Location:** Floor 3, Laboratory, TNP ENVIRONMENT CO., LTD.

**Environment Condition:**

Ambient Temperature ( 22.4 ± 1 ) °C

Relative Humidity ( 41 ± 1 ) %

Line Voltage ( 232 ± 2 ) Volt

### Condition of this results of Calibration:

- This instrument was calibrated by insert 9 standard thermometer into its chamber and calibration according to W-TE-014 Based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
  - The temperature scale used was based on ITS - 90.
  - All data show below were final values and the initial data may be obtained upon request.

### 2. Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY49016894	2502528-001-01	19 April 2026	NATIONAL FOOD INSTITUTE
	RTD	CH#101-109/ RTD#101-109			

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good

### UUC Description :

Time of Record 1 Hour 9 Minute At 35.0, 37.0, 41.5 and 42.0 °C

Fresh air Damper ☐ Open Position ☐

☒ Close Fan ☐ 100%

☐ Not Available

7. Result of Calibration : ☒ Without adjustment ☐ After adjustment

## Calibration Report

**Certificate No.:** 2502859-005-01

**Equipment:** CHAMBER (Incubator)

Model: BJPX-M100B Serial No.: BJPXM1002301016

Resolution: 0.1 °C ID No.: TNP.LAB.59

Manufacturer: BIOBASE

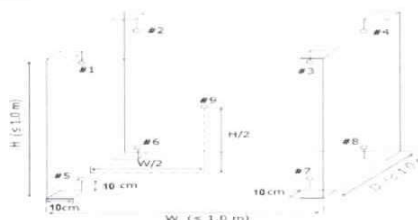
**Date of Calibration:** 8 May 2025

Page 3 of 3

**Calibration point:** 35.0, 37.0, 41.5 and 42.0 °C

**Calibration result:**

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	21.8	40.3	230.5
MAX	22.7	42.5	233.9



**Table1 : Reporting of Temperature**

Calibration point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
35.0	36.49	35.70	34.90	35.13	36.07	35.87	35.35	35.35	35.04	0.56
37.0	38.61	37.85	36.83	37.08	38.15	37.90	37.39	37.38	36.96	0.60
41.5	42.98	42.31	41.31	41.49	42.76	42.42	41.83	41.79	41.40	0.62
42.0	43.74	42.85	41.66	42.02	43.26	42.94	42.35	42.33	41.91	0.65

**Table 2 : Reporting of Characterization Result**

UUC* Setting (°C)	UUC* Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
35.0	35.0	35.0	35.0	0.31	1.45	2.08
37.0	37.0	37.0	37.0	0.33	1.65	2.41
41.2	41.2	41.2	41.2	0.36	1.58	2.34
41.7	41.7	41.7	41.7	0.36	1.83	2.64

**Note** The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity) "

UUC\* = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

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.

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

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

----- End -----







CRYSTAL CALIBRATION SALES AND SERVICE CO., LTD.

45/48 Soi Salathammasop31, Salathammasop Rd.,  
Salathammasop, Thawewatthana, Bangkok 10170 Thailand  
Tel : 0-2408-8474-5 Fax : 0-2408-8477 Email : info@crystalcal.com www.crystalcal.com



## CERTIFICATE OF CALIBRATION

Certificate No. : 25-0753-006

Work Order No. : 25/0753

Issue Date : 16 June 2025

Customer Name : TNP ENVIRONMENT CO.,LTD.  
332/173 Moo 3 Bang Rak Phatthana,  
Bang Bua Thong, Nonthaburi 11110

Date of Received : 12 June 2025

Date of Calibration : 16 June 2025

Instrument Details : Description : Volumetric flask  
Manufacturer : DARAN  
Model : N/A  
Serial No. : N/A  
ID No. : TNP-LAB-G.39  
Capacity : 25 ml  
Class : A  
Location : Volumetric and Mass Calibration Laboratory, CCS

Calibration Method : This instrument was calibrated by Gravimetric methods for the determination of measurement error according to calibration procedure no. CWI-V-02 follow up to ASTM E542-01 (2012) Standard Practice for Calibration of Laboratory Volumetric Apparatus

### Environmental Condition

Ambient Temperature : Control at  $20\text{ }^{\circ}\text{C} \pm 2.5\text{ }^{\circ}\text{C}$   
Relative humidity : Control at  $50\text{ \%RH} \pm 10\text{ \%RH}$   
Atmospheric pressure : Monitoring at  $1013\text{ hPa} \pm 8\text{ hPa}$

### Traceability of Measurement

: This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI)

Calibrated by : Miss Lalitphat Thiankaew  
Calibration Engineer

Approved by :



Asst. Laboratory Manager

This certificate may not be reproduced other than in full except with the prior written approval of Crystal Calibration Sales and Service co., Ltd.

Crystal Calibration Sales and Service Co., Ltd.

45/48 Salathammasop 31, Salathammasop Rd., Salathammasop, Thawewatthana, Bangkok 10170

Phone : 0-2408-8474 Fax : 0-2408-8477 <http://www.crystalcal.com> Email : info@crystalcal.com



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## CERTIFICATE OF CALIBRATION

Certificate No. : 25-0753-006

Issue Date : 16 June 2025

Work Order No. : 25/0753

### Details of Calibration

#### 1. Reference Standards Instrument

Instrument	ID No.	Certification	Due Date
1.1 Electronic Balance	BAL-11	25--0164-008	14 March 2026
1.2 Digital thermometer with sensor	RTD-10	25-0164-010	28 February 2026
1.3 Thermo-Hygrometer	TH-07	25-01644-016	28 February 2026
1.4 Barometer	BM-05	L202410225-0001	18 October 2025

#### 2. Certificate traceable : This certificate traceable to The International System of Unit refer to

- 1.1 Crystal Calibration Sales and Service Co., Ltd., NSC-ONSC Calibration No. 0260
- 1.2-1.3 Crystal Calibration Sales and Service Co., Ltd., NSC-ONSC Calibration No. 0260
- 1.4 Miracle international Technology Co., Ltd., NSC-ONSC Calibration No. 0052

#### 3. Condition of item : Used

#### 4. Calibration site : Permanent

### Other detail of volumetric ware

Type of calibration : To Contain

Designation of standard : N/A

Tolerance :  $\pm 0.04$  ml

### Result of Calibration

Caibration result without adjustment

Normalinal value ( ml )	Mean Volume ( ml )	Error ( ml )	Standard deviation ( ml )	Uncertainty ( $\pm$ ml )	Coverage factor ( k )
25	25.00714	-0.00714	0.000065	0.0065	2.00

#### Note :

1. The result of repeat the test 10 measurements
2. The standard uncertainty of measurement has been determined in accordance with ISO/TR 20461:2000 and UKAS M3003
3. This report customer request and accepted in detail and data in certificate
4. Calibrate items it good condition and this report customer request and accepted in certificate

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

The 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%.





# CRYSTAL CALIBRATION SALES AND SERVICE CO., LTD.

45/48 Soi Salathammasop31, Salathammasop Rd.,

Salathammasop, Thawewatthana, Bangkok 10170 Thailand

Tel : 0-2408-8474-5 Fax : 0-2408-8477 Email : info@crystalcal.com www.crystalcal.com

## Statements of conformity report

Refer to Certificate No. : 25-0753-006

Issue Date : 16 June 2025

Work Order No. : 25/0753

### Detail of Equipment

Description : Volumetric flask

Manufacturer : DARAN

ID No. : TNP-LAB-G.39

Model : N/A

Capacity : 25 ml

Serial no. : N/A

Sub Deviation : 1 ml

Type of calibration : To Contain

Designation of standard : N/A

Tolerance :  $\pm 0.04$  ml

### Result of Calibration

This result of calibration : Without adjustment

Tolerance	0.0400	ml
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Volumetric glassware class : A

Norminal volume	Mean volume	Absolute Volume Error	Uncertainty	Uncertainty + volume error	Evaluation
25	25.00714	0.0071	0.0065	0.014	Pass

The conformity certificate documents validity following ISO/IEC Guide 98-4 : Role of measurement uncertainty in conformity assessment based on statement with guard band refer to specification tolerance limit mark on glassware consider expanded measurement uncertainty (k=95%)

### The tolerance and decision rules ;

MPE of Glassware = Measurement uncertainty + Absolute error ;  $\leq$  MPE is pass ,  $>$  MPE is Fail

Statements of conformity decision by :

Asst. Laboratory Manager



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.: 25CG465

Page.: 1 of 2

Equipment :	Burette
Capacity :	50 mL
Serial No. :	-
ID. No. :	BUR-001
Manufacturer :	Witeg
Made in :	Germany
Submitted by :	Environment & Laboratory Co.,Ltd. 40 Soi Liangmueangnonthaburi 13 Talad Kwan, Mueang, Nonthaburi 11000
Ambient Temperature :	$(20 \pm 2.5) ^\circ\text{C}$
Relative Humidity :	$(50 \pm 10) \%$
Barometric Pressure :	756 mmHg
Calibration Procedure :	ASTM E 542 - 01
Calibrated by :	Natcha Chayingcheiw

Approved by :

Approved Signatory

(✓) Srisuda Khamtha  
( ) Ponpan Paipim

Issue Date :

6 February 2025

**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 head of Corporate Services 3 : Equipment Calibration and Testing Services.



**Equipment :** Burette  
**Received Date :** 4 February 2025  
**Condition As-Received :** Used Item  
**Calibration Date :** 6 February 2025  
**Reference :** 2502-0076DC-6

**Cert.No.:** 25CG465

**Page.:** 2 of 2

**Condition of this result of calibration**

1. Reference Standard Instruments :

<u>Instruments</u>	<u>Model</u>	<u>Serial No.</u>	<u>ID. No.</u>	<u>Certificate No.</u>	<u>Traceability</u>	<u>Due date</u>
1) Balance	XP205DR	1126143764	140RC004	24MM602/1	TPA	17 Sep 2025
2) Thermo-Hygrograph	THDX-CE	00016540	140EC001	24H1153	TPA	10 June 2025
3) Thermometer	-	1594592	140EC010	24I175	TPA	20 Feb 2025

This certification is traceable to SI Unit

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

3. True value is converted to true volume at the standard temperature of 20 °C

**Calibration result :**

<b>Nominal capacity ( mL )</b>	<b>Reading ( mL )</b>	<b>Uncertainty ( ± mL )</b>	<b>k Factor</b>
50	49.9874	0.010	2.00

**Remark** mL = cm<sup>3</sup>

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 %.

-oOo-