

ภาคผนวก ช

เอกสารสอบเทียบเครื่องมือที่ใช้ในการวิเคราะห์



CERTIFICATE OF CALIBRATION

Certificate No.: C0-1608001/24 Page 1 of total 4 pages

Customer: WATER ANALYSIS CENTER CO., LTD.
1/94 Moo 5, T. Kanham,
A. U-dai, Ayutthaya 13210

Equipment: pH Meter
Manufacturer: METTLER TOLEDO Model: SevenCompact S220
Serial No.: B327527211 ID No.: WWL 0068
Description: Range: 0 - 14 pH, Resolution: 0.01 pH

Environmental Conditions: Ambient Temperature: (20 ± 2) °C
Relative Humidity: (50 ± 10) %
Atmospheric Pressure: -

Calibration Location: Jayhawk Laboratory (CL&GL)

Received Date: 16 August 2024

Calibration Date: 16 August 2024

Date of Issue: 19 August 2024

Condition of Artifacts: Used conditions but can be calibrated

Checked by:

Act as Technical Manager

Approved by:

Representative of Managing Director

() (Krisyot K.) () (Sakda V.)
() (Paliphan K.) () (Omnara P.)
() (Pongsak H.) () (Nitiphong K.)
() (Kanung C.) () (Nonthachai K.)
() (Pramong P.) () (Noppol P.)

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FE-169

REV.02 02/24/21



Certificate No.: C0-1608001/24

Page 3 of total 4 pages

Measurement Results (Cont.):

2. Calibration of pH Electrode (Serial No.: 3222623)

| pH Standard Solution (pH) | Measured Value | | Uncertainty (± pH) |
|------------------------------|----------------|--------|-----------------------|
| | (pH) | (mV) | |
| 4.01 | 4.01 | 186.1 | 0.013 |
| 7.01 | 7.01 | 9.3 | 0.013 |
| 10.01 | 10.00 | -164.5 | 0.013 |

Note: Adjust Curve to Buffer Solution pH (4.7, 10)

Temperature stability of micro bath: 21 ± 0.2 °C

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

FE-169

Calibrated by: Athipat
REV.02 02/24/21

การตรวจวัด



Certificate No.: C0-1608001/24

Page 2 of total 4 pages

Reference Method:

- The calibration method used was CP-178 based on an in-house method.

- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard:

| Type | pH Value | Lot No. | Due Date | Traceability |
|----------------------|----------|---------|---------------|--------------|
| pH Standard Solution | 4.01 | 150823 | Feb. 9, 2025 | NIMT |
| | 7.01 | 180723 | Jan. 12, 2025 | |
| | 10.01 | 160823 | Jan. 16, 2025 | |

| Type | Serial No. | Certificate No. | Due Date | Traceability |
|---------------------------------|-----------------------|-----------------|---------------|--------------|
| Documenting Process Calibrator | 2630521 | 10-2312001/23 | Dec. 24, 2024 | THC |
| Digital Thermometer with Sensor | 1709138 / 4605984-005 | 10-0806001/24 | Jun. 7, 2025 | |

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- NIMT, National Institute of Metrology (Thailand).

- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

I. Function Simulated pH Meter

| Standard Applied (mV) | Nominal Value (pH) | UUC Reading | | Uncertainty (± mV) |
|--------------------------|-----------------------|-------------|--------|-----------------------|
| | | pH | mV | |
| 177.48 | 4.00 | 4.01 | 177.3 | 0.060 |
| 0.00 | 7.00 | 7.00 | -0.1 | 0.060 |
| -177.48 | 10.00 | 10.01 | -177.4 | 0.060 |

UUC: Unit Under Calibration

Note: Adjust Curve to simulate pH (4.7, 10)

Calibrated by: Athipat

REV.02 02/24/21



Certificate No.: C0-1608001/24

Page 4 of total 4 pages

Reference Method:

- The calibration method used was CP-096 based on an in-house method.

- The temperature scale used was an ITS-90.

- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

| Type | Serial No. | Cert. No. | Due Date | Traceability |
|---------------------------------|------------|---------------|---------------|--------------|
| Thermometer Readout | B7C853 | 10-0911001/23 | Nov. 8, 2024 | THC |
| Platinum Resistance Thermometer | 4854 | CDA30047 | Oct. 22, 2025 | FLUKE |
| Liquid Bath | XO111019 | 10-2405001/23 | May 25, 2025 | THC |

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- THC, Thai Heart Calibration Co., Ltd.

- FLUKE, Fluke Corporation, U.S.A.

Measurement Results:

(X) Without Adjustment

Dimension of probe: Diameter 4 mm. Sensor Type: RTD (PT100)

| Immersion Depth (mm.) | Standard Reading (°C) | UUC Reading (°C) | Correction (°C) | Uncertainty (± °C) |
|-----------------------|-----------------------|------------------|-----------------|--------------------|
| 120 | 22.00 | 22.2 | -0.20 | 0.065 |
| 120 | 25.00 | 25.2 | -0.20 | 0.065 |
| 120 | 28.00 | 28.2 | -0.20 | 0.065 |

UUC: Unit Under Calibration

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -

Calibrated by: Pongsak

REV.02 02/24/21



THAI HEART CALIBRATION CO., LTD.

112/1 Moo 3, Phrak Sa, Muang, Samet Prakan, Nong
Tel. 02384 2163, 02387 4435, 02371 9994, 02371 4307

CERTIFICATE OF CALIBRATION

Certificate No.: C0-1607004/24 Page 1 of total 2 pages

Customer WATER ANALYSIS CENTER CO., LTD.

1/94 Moo 5, T.Kanhani,
A-Udai, Ayuthaya 13210

Equipment Conductivity Meter

Manufacturer EUTECH

Model

CON 2700

Serial No. 2657889

ID No.

WW1. 0136

Description

Environmental Conditions Ambient Temperature: (20 ± 2) °C

Relative Humidity: (50 ± 10) %

Atmospheric Pressure: -

Calibration Location Jayhawk Laboratory (CL&GL)

Received Date 16 July 2024

Calibration Date 18 July 2024

Date of Issue 18 July 2024

Condition of Artifacts Used conditions but can be calibrated

Checked by

Act as Technical Manager

Approved by

Representative of Managing Director

() (Krisyosi K.) () (Sakda Y.)
() (Patiphan K.) () (Onnapa P.)
() (Pongsak H.) () (Nitiphong K.)
() (Kanung C.) () (Nonthachai K.)
() (Pramong P.) () (Noppol P.)

(Dr. Ekachai Puttawong)

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REV.02 02/24/21



THAI HEART CALIBRATION CO., LTD.

112/1 Moo 3, Phrak Sa, Muang, Samet Prakan, Nong
Tel. 02384 2163, 02387 4435, 02371 9994, 02371 4307

Certificate No.: C0-1607004/24

Page 2 of total 2 pages

Reference Method:

- The calibration method used was CP-177 based on an in-house method.

- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard :

| Material | Batch Value | Lot Number | Due Date | Traceability |
|--------------------------------|-------------|------------|--------------|--------------|
| Conductivity Standard Solution | 147.1 µS/cm | S230330005 | Nov. 9, 2024 | SCP Science |
| | 1,423 mS/cm | S231129006 | May 13, 2025 | SCP Science |

Remark: This certificate is traceable to the International System of Unit (SI Unit) through:

- SCP Science.

Measurement Results: (Probe Serial No.: 93X219065)

| Conductivity Standard Solution | Measured Value | Correction | Uncertainty (±) |
|--------------------------------|----------------|--------------|-------------------|
| 147.1 µS/cm | 149.0 µS/cm | +1.9 µS/cm | 2.5 µS/cm |
| 1,423 mS/cm | 1,425 mS/cm | -0.002 mS/cm | 0.0052 mS/cm |

Note : Adjustment points: 147.1µS/cm 1.423mS/cm

The above reported uncertainty of measurement is the expanded uncertainty obtained by multiplying the standard uncertainty with the coverage factor $k = 2.00$, providing a level of confidence approximately 95%.

- End of Certificate -

Calibrated by Athipat
REV.02 02/24/21

Intech Metrological Center Co.,Ltd.

39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,
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Intech Metrological Center Co.,Ltd.

39/1 Soi 82, Sukhapiban 5 Rd., O ngoen,
Salmal, Bangkok 10220, Thailand
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Certificate of Calibration

Certificate No. : MT24-7016

Page : 1 of 2

Customer : Water Analysis Center Co.,Ltd.
Address : 1/94 Moo 5, Rojana Industrial Park, T.Kanhani, A-Udai, Ayuthaya 13210Description : Refrigerator
Manufacturer : B.T.Metrology Co.,Ltd
Model : REF 940L
Serial No. : BT-03-06-09
Identification No. : WWW 0043
Calibration Place : Customer LaboratoryOrder No. : 2601/24
Received date : Aug 02, 2024
Calibration date : Aug 02, 2024
Environment Condition :
Temperature : (25±10) °C
Humidity : (50±10) %RH

Calibration Method : Calibration were conducted using in-house calibration procedure CP-MT-006 According to companion with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No 20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures

Reference Standard Instruments :

| Instrument | Model | Serial No. | Certificate No. | Due Date |
|--|--------|------------|-----------------|--------------|
| LXI Data Acquisition Switch Unit with Sensor | 34972A | MY49020096 | MT23-7163 | Nov 30, 2024 |

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied coverage factor $k = 2$, providing a level of confidence of not less than 95%

Calibrated by : Mr.Yuttakorn Jannearani

Approved by :
(Mr.Panuwat Phukian)
Issue date : Aug 08, 2024

This calibration certificate shall not be reproduced other than in full except with the prior written approval of Intech Metrological Center Co.,Ltd

Rev.03 / Feb 2024

FM-MT-013

Rev.03 / Feb 2024

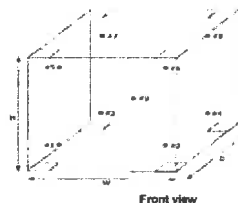
FM-MT-013

ภาคผนวก ข-2

Function : Temperature measurement
Calibration point : 20 °CCertificate No. : MT24-7016
Page : 2 of 2
Result : Without adjustment
Resolution : 0.1 °C

| Calibration point (°C) | Temperature of UUC* at each position (°C) | | | | | | | | | Uncertainty of measurement (±, °C) |
|--------------------------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------------------------------------|
| | Ch.1 | Ch.2 | Ch.3 | Ch.4 | Ch.5 | Ch.6 | Ch.7 | Ch.8 | Ch.9 | |
| 20 | 20.344 | 20.098 | 20.405 | 20.375 | 20.193 | 20.010 | 20.245 | 20.090 | 20.037 | 0.41 |

| Setting temperature (°C) | Indicating Temperature (°C) | Measured stability (±, °C) | Measured uniformity (°C) | Overall variation (°C) |
|----------------------------|-------------------------------|------------------------------|----------------------------|--------------------------|
| 20.0 | 20.0 | 0.30 | 0.68 | 0.66 |

#1 Lower Left Front
#2 Lower Right Front
#3 Lower Left Rear
#4 Lower Right Rear
#5 Upper Left Front
#6 Upper Right Front
#7 Upper Left Rear
#8 Upper Right Rear
#9 Geometric Center

UUC* = Unit under calibration

Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time

Overall Variation = Difference of temperature value between the maximum and minimum any time

Stability = One half of the maximum difference of measured temperatures at any one probe

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Professional Calibration & Services Co., Ltd.
50/88, 50/89 Moo 2, Pongthasakornnong Rd., Bangyethu, Thanyaburi,
Pathumthani 12130 Thailand
Tel : (+66)2150-6611 (Autotone)
Email : info@pcsl.com www.pcsl.com



Certificate of Calibration

Certificate Number : PL61070/24 Page 1 of 3
Control Number : PCAL174170
Customer Control : WWL 0073
Description : Dissolved Oxygen Meter
Manufacturer : YSI
Model : YSI 5000
Serial Number : 14C100917
Customer : Water Analysis Center Co., Ltd.
1/94 Moo 5 T.Kanham A.U-Thai Ayutthaya 13210 Thailand



Date of Receipt : 02-Dec-24
Date of Calibration : 02-Dec-24
Environment : Temperature 20 °C ± 2 °C
Relative Humidity 50 % ± 20 %
Calibration Method : Calibration Procedure Number CP-PL93
Calibration Results : See data attached

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

This certificate is issued in accordance with ISO/IEC 17025 and the conditions of accreditation granted by the Accreditation Body 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. The results relate only to the item calibrated.

This certificate shall not be reproduced other than in full except without the prior written approval of the Head of Calibration Laboratory of Professional Calibration & Services Co., Ltd.

Calibrated By

Authorized Signature

06-Dec-24

Ms. Supattra Mungkasam

(Mr. Jumnong Junphong)

Issued Date

CALIBRATION REPORT

Professional Calibration & Services Co., Ltd.

Certificate No. : PL61070/24

Page: 3 of 3

Calibration Results

Dissolved Oxygen Calibration

Description of Meter : Range : 0 to 60 mg/l
Resolution : 0.01 mg/l
Description of Electrode : Manufacturer : YSI
Model : 5010
Serial No : 13C160067
Type : Electrochemical (Membrane)

| Calibration Point | Standard Value | UUC Reading | UUC Error | Uncertainty (u) |
|-------------------|----------------|-------------|------------|-----------------|
| 0 mg/l | 0.000 mg/l ** | 0.00 mg/l | 0.00 mg/l | 0.03 mg/l |
| 8 mg/l | 8.454 mg/l | 8.43 mg/l | -0.02 mg/l | 0.05 mg/l |
| 9 mg/l | 9.820 mg/l | 9.07 mg/l | -0.09 mg/l | 0.40 mg/l |

Notes :

- 1) Calibration results that carry the double asterisk (**) are not accredited. Calibrations marked as such on this Certificate have been included for completeness.

...End...

CALIBRATION REPORT

Professional Calibration & Services Co., Ltd.

Certificate Number : PL61070/24

Page 2 of 3

Equipment Standards Used

| Description | Serial No. | Traceability to | Certificate No. | Cal. Due Date |
|--------------------------|------------|-----------------|-----------------|---------------|
| Zero Oxygen Solution Set | - | NIST | SC050023 | 01-May-25 |

Condition as received : Normal

Definitions :-

* NIST - National Institute of Standard and Technology



Inctech Metrological Center Co., Ltd.
39/1 Soi 62, Sukhapiban 5 Rd., O ngoen,
Sakmai, Bangkok 10220, Thailand
Tel. (662) 909-8820 (Auto 10 lines) www.imcinstrument.com



Certificate of Calibration

Certificate No. : MT25-3161

Page : 1 of 2

Customer : Water Analysis Center Co., Ltd.
Address : 1/94 Moo 5, Rojana Industrial Park, T.Kanham, A.U-Thai, Ayutthaya 13210

Description : Hot Air Oven
Manufacturer : Memmert
Model : UP260
Serial No. : B620.0814
Identification No. : WWL 0212
Calibration Place : Customer Laboratory

Order No. : 1011/25
Received date : Mar 25, 2025
Calibration date : Mar 20, 2025
Environment Condition :
Temperature : (25±10) °C
Humidity : (60±10) %RH

Calibration Method : Calibration were conducted using In-house calibration procedure CP-MT-006 According to comparison with LXI Data Acquisition Switch Unit with sensor. The calibration methods based on Euramet Calibration Guide No.20 - guidelines on the Calibration of Temperature and/or Humidity Controlled Enclosures.

Reference Standard Instruments :

| Instrument | Model | Serial No. | Certificate No. | Due Date |
|--|--------|------------|-----------------|--------------|
| LXI Data Acquisition Switch Unit with Sensor | 34972A | MY48028922 | MT24-8770 | Nov 22, 2025 |

The effect that the result relate only to the items calibrated. It was found accurate as shown on date and place of calibration only.

Traceability : This measurement are traceable to the International System of Unit (SI), through National Institute of Metrology Thailand (NIMT)

The reported expanded uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of not less than 95%

Calibrated by : Mr. Yuttakorn Jamneansri

Approved by :

(Mr. Parinwit Phukhan)
Issue date : Mar 28, 2025

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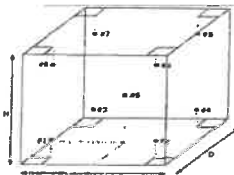


Function : Temperature measurement
Calibration point : 104, 180 °C

Certificate No. : MT25-3161
Page : 2 of 2
Result : Without adjustment
Resolution : 0.1 °C

| Calibration point (°C) | Temperature of UUC* at each position (°C) | | | | | | | | Uncertainty of measurement (°C) | |
|---------------------------|---|---------|---------|---------|---------|---------|---------|---------|------------------------------------|------|
| | Ch.1 | Ch.2 | Ch.3 | Ch.4 | Ch.5 | Ch.6 | Ch.7 | Ch.8 | | |
| 104 | 103.767 | 103.648 | 104.174 | 103.966 | 104.090 | 104.047 | 104.160 | 103.691 | 104.264 | 0.32 |
| 180 | 179.673 | 179.787 | 179.762 | 179.808 | 179.691 | 179.615 | 179.520 | 179.806 | 179.752 | 0.50 |

| Setting temperature (°C) | Indicating Temperature (°C) | Measured stability (°C) | Measured uniformity (°C) | Overall variation (°C) |
|--------------------------|-----------------------------|-------------------------|--------------------------|------------------------|
| 104.0 | 104.0 to 104.2 | 0.13 | 0.75 | 0.80 |
| 180.0 | 180.0 to 180.3 | 0.39 | 0.68 | 0.81 |



Front view

UUC* = Unit under calibration

Uniformity = Maximum and Minimum difference of measured temperature at any probes and the measured temperature at the reference and same time.

Overall Variation = Difference of temperature value between the maximum and minimum any time.

Stability = One half of the maximum difference of measured temperatures at any one probe.

-0.00-



Certificate of Calibration

Equipment: Balance
Model: BL210S
Serial No. (or ID.): 15808131 (WWL 0022)
Manufacturer: Sartorius
Condition: In condition

Certificate No.: C01243793
Issued Date: 06 December 2024
Job No.: WO-00053758
Page: 1 of 2

Customer: Water Analysis Center Co., Ltd.
1/34 Moo 5, Rojana Industrial Park, Rojana Road,
Tambol Kanham, Amphur U-Thai, Ayuthaya 13210 Thailand

Environment Condition: Temperature 24 °C ± 0.9 °C
Humidity 53 %RH ± 1.3 %RH

Calibration Place: Water Analysis Center Co., Ltd. (ห้องเครื่อง)
1/34 Moo 5, Rojana Industrial Park, Rojana Road,
Tambol Kanham, Amphur U-Thai, Ayuthaya 13210 Thailand

Calibration By: Mr. Apiwit Chaosap
Calibration Date: 04 December 2024
The Method used: In-house method, CAL-WI-47, based on UKAS Lab 14
Traceability: This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through DKSH Technology Co., Ltd. Certificate No. C02241786

(Mr. Apiwit Chaosap)
Person in charge

(Mr. Adisai Maknoi)
Authorized signatory

This certificate is issued in accordance with the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized reference laboratory.
The measurement uncertainty stated in the reported 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 listed, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

DKSH Technology Limited
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2533 Sukhumvit Road, Bangkok, Thailand 10260
Phone +66 2839 1900 Email info@dksh.com Website www.dksh.com

Delivering Growth - In Asia and Beyond.

CAL-FM-C01-14, 12 Sep 2022

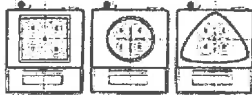


Certificate No.: C01243793 Page: 2 of 2

Calibration Results:

Without Adjustment

Eccentric Error: Weights to be 1/3 or 1/2 of Maximum capacity, taken from the center of the pan as a zero reference.



| Nominal Test Value | Reference Points (g) | | | | |
|--------------------|----------------------|--------|--------|---------|---------|
| | A | B | C | D | E |
| 100 (g) | - | 0.0001 | 0.0000 | -0.0002 | -0.0001 |

Repeatability: Determination of the standard deviation of weighing balance., Readability 0.0001 (g)

| Nominal test value (g) | Standard Deviation |
|------------------------|--------------------|
| 20 | 0.00005 |
| 200 | 0.00006 |

Error of Indication from nominal or conventional mass value., Readability 0.0001 (g)

| Nominal Value (g) | Conventional Mass (g) | Displayed Value (g) | Error of Indication (g) | Uncertainty (g) | k |
|-------------------|-----------------------|---------------------|-------------------------|-----------------|------|
| 1 | 1.00001 | 1.0000 | 0.0000 | 0.00011 | 2.04 |
| 2 | 2.00001 | 2.0000 | 0.0000 | 0.00011 | 2.04 |
| 5 | 5.00001 | 5.0000 | 0.0000 | 0.00011 | 2.04 |
| 10 | 10.00001 | 10.0000 | 0.0000 | 0.00011 | 2.04 |
| 20 | 20.00001 | 20.0000 | 0.0000 | 0.00012 | 2.03 |
| 50 | 50.00000 | 50.0000 | 0.0000 | 0.00013 | 2.02 |
| 70 | 70.00001 | 70.0001 | 0.0001 | 0.00016 | 2.01 |
| 100 | 99.99998 | 100.0001 | 0.0001 | 0.00017 | 2.01 |
| 120 | 119.99997 | 120.0001 | 0.0001 | 0.00021 | 2.00 |
| 150 | 149.99996 | 150.0002 | 0.0002 | 0.00024 | 2.00 |
| 200 | 199.99989 | 200.0007 | 0.0008 | 0.00030 | 2.00 |

The End of Certificate



บริษัท ไทยยูนิค จำกัด THAI UNIQUE CO., LTD.

80-82 ถนนพหลโยธิน แขวงจตุจักร เขตจตุจักร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkokthipat, Prachathipat, Bangkok 10200
Tel. 0-2824-0181-6, 0-2280-1781, Fax. 0-2280-1788, E-mail: thaiunique@thaiunique.com, Website: www.thaiunique.com

PREVENTATIVE MAINTENANCE (PM) CHECK LIST FOR ATOMIC ABSORPTION SPECTROMETER

Model & Serial Number: 240 FS AA & M418250004
Customer: Water analysis center Co., Ltd.
Date: 25 Apr 2024

- Safety
- ☒ Flame, inspect/replace o-ring nebulizer, spray chamber and burner
 - ☒ Flame, Clean nebulizer, spray chamber and burner
 - ☒ Flame, Check liquid trap interlock, burner interlock, pressure relief bong interlock and shield interlock
 - ☐ Furnace, Clean work head, electrode and shroud N/A
 - ☐ Furnace, Clean PSD and PSD tray N/A
 - ☐ Furnace, Check water pressure N/A
 - ☒ Check drain tube
 - ☒ Check exhaust system
 - ☒ Check gas pressure sensor interlock
 - ☒ Check and all gas hoses for SpectraAA
 - ☒ Clean computer control

- Optics
- ☒ Inspect/Replace flat external optics surfaces
 - ☒ Check Wavelength Accuracy the copper line at 323.0-326.0 nm = 324.7 nm
 - ☒ Check that PMT % Gain the copper at 324.8 nm, 4.0 mA, 0.5 nm slit width, Gain = 2.9% (should be ≤ 64% or ≤ 380V)
 - ☒ Flame, Check D2 lamp is work



บริษัท ไทยยูนิค จำกัด THAI UNIQUE CO., LTD.

80-82 ถนนประชาวิทย์ แขวงบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkokphrom, Pranakorn, Bangkok 10200
Tel: 0-2629-0191-6, 0-2280-1787, Fax: 0-2280-1788, E-mail: thauai@thaiunique.com, Website: www.thaiunique.com

Electronics

- ☒ Check power supply voltage
- ☒ Check cables and connectors
- ☒ Check/Clean all boards in the instrument
- ☐ Furnace, Check camera and align** N/A

**Option for Graphite Zeeman only

Mechanisms

- ☒ Flame, Check the burner adjuster
- ☐ Furnace, Check PSD accessories N/A

Analytical performance

- ☒ Clear the sample compartment
- ☒ Flame, Check uptake rate form 7.2-10.6 mL per minute = 8.5 mL/min
- ☒ Test Photometric noise, STDV = 0.0001 Abs (should be ≤ 0.00050 Abs)
- ☒ Flame, Test high solids nebulizer setting use
- Al/acet Cu 5 ppm = 0.79 Abs, and Precision
- (%RSD) = 0.4 % (should be ≥ 0.55 Abs and $\leq 0.5\%$ RSD)
- or
- N2O/acet Cu 5 ppm = _____ Abs, and Precision
- (%RSD) = _____ % (should be ≥ 0.3 Abs and $\leq 0.5\%$ RSD)
- ☐ Furnace, Characteristic mass and sensitivity Cu 25 ppb = _____ Abs, and
- Precision (%RSD) = _____ % (should be ≥ 0.15 Abs and $\leq 4.0\%$ RSD)

SIGN:

Engineer: Suniga Noharoon Customer: Water Analysis Center Co., Ltd.

2/2



บริษัท ไทยยูนิค จำกัด THAI UNIQUE CO., LTD.

80-82 ถนนประชาวิทย์ แขวงบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkokphrom, Pranakorn, Bangkok 10200
Tel: 0-2629-0191-6, 0-2280-1787, Fax: 0-2280-1788, E-mail: thauai@thaiunique.com, Website: www.thaiunique.com

PREVENTATIVE MAINTENANCE (PM) CHECK LIST

FOR ATOMIC ABSORPTION SPECTROMETER

Model & Serial Number: AA200S & M918230004
Customer: Water Analysis Center Co., Ltd.
Date: 26 Apr 2024

Safety

- ☐ Flame, Inspect/replace o-ring nebulizer, spray chamber and burner N/A
- ☐ Flame, Clean nebulizer, spray chamber and burner N/A
- ☐ Flame, Check liquid trap interlock, burner interlock, pressure relief bung N/A
- interlock and shield interlock
- ☒ Furnace, Clean work head, electrode and shroud
- ☒ Furnace, Clean PSD and PSD tray
- ☒ Furnace, Check water pressure
- ☒ Check drain tube
- ☒ Check exhaust system
- ☒ Check gas pressure sensor interlock
- ☒ Check and all gas hoses for SpectraA
- ☒ Clean computer control

Optics

- ☒ Inspect/Replace that external optics surfaces
- ☒ Check Wavelength Accuracy the copper line at 323.0-326.0 nm = 324.7 nm
- ☒ Check that PMT % Gain the copper at 324.8 nm, 4 mA, 0.5 nm slit width, Gain = 50 % (should be $\leq 64\%$ or $\leq 380V$)
- ☐ Flame, Check D2 lamp is work N/A

1/2



บริษัท ไทยยูนิค จำกัด THAI UNIQUE CO., LTD.

80-82 ถนนประชาวิทย์ แขวงบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
80-82 Prachathipat Rd., Bangkokphrom, Pranakorn, Bangkok 10200
Tel: 0-2629-0191-6, 0-2280-1787, Fax: 0-2280-1788, E-mail: thauai@thaiunique.com, Website: www.thaiunique.com

Electronics

- ☒ Check power supply voltage
- ☒ Check cables and connectors
- ☒ Check/Clean all boards in the instrument
- ☒ Furnace, Check camera and align**

**Option for Graphite Zeeman only

Mechanisms

- ☐ Flame, Check the burner adjuster N/A
- ☒ Furnace, Check PSD accessories

Analytical performance

- ☒ Clear the sample compartment
- ☒ Flame, Check uptake rate form 7.2-10.6 mL per minute = _____ mL/min N/A
- ☒ Test Photometric noise, STDV = 0.0002 Abs (should be ≤ 0.00050 Abs)
- ☐ Flame, Test high solids nebulizer setting use N/A
- Al/acet Cu 5 ppm = _____ Abs, and Precision
- (%RSD) = _____ % (should be ≥ 0.55 Abs and $\leq 0.5\%$ RSD)
- or
- N2O/acet Cu 5 ppm = _____ Abs, and Precision
- (%RSD) = _____ % (should be ≥ 0.3 Abs and $\leq 0.5\%$ RSD)
- ☒ Furnace, Characteristic mass and sensitivity Cu 25 ppb = 0.16 Abs, and
- Precision (%RSD) = 3 % (should be ≥ 0.15 Abs and $\leq 4.0\%$ RSD)

SIGN:

Engineer: Suniga Noharoon Customer: Water Analysis Center Co., Ltd.

2/2



บริษัท ไทยยูนิค จำกัด THAI UNIQUE CO., LTD.

80-82 ถนนประชาวิทย์ แขวงบางขุนพรหม เขตพระนคร กรุงเทพฯ 10200
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Tel: 0-2629-0191-6, 0-2280-1787, Fax: 0-2280-1788, E-mail: thauai@thaiunique.com, Website: www.thaiunique.com

PREVENTATIVE MAINTENANCE (PM) CHECK LIST

FOR ATOMIC ABSORPTION SPECTROMETER

Model & Serial Number: AA200S & AA 09110073
Customer: Water Analysis Center Co., Ltd.
Date: 11 Feb 2025

Safety

- ☒ Flame, Inspect/replace o-ring nebulizer, spray chamber and burner
- ☒ Flame, Clean nebulizer, spray chamber and burner
- ☒ Flame, Check liquid trap interlock, burner interlock, pressure relief bung
- interlock and shield interlock
- ☐ Furnace, Clean work head, electrode and shroud N/A
- ☐ Furnace, Clean PSD and PSD tray N/A
- ☐ Furnace, Check water pressure N/A
- ☒ Check drain tube
- ☒ Check exhaust system
- ☒ Check gas pressure sensor interlock
- ☒ Check and all gas hoses for SpectraA
- ☒ Clean computer control

Optics

- ☒ Inspect/Replace that external optics surfaces
- ☒ Check Wavelength Accuracy the copper line at 323.0-326.0 nm = 324.7 nm
- ☒ Check that PMT % Gain the copper at 324.8 nm, 4 mA, 0.5 nm slit width, Gain = 54 % (should be $\leq 64\%$ or $\leq 380V$)
- ☒ Flame, Check D2 lamp is work

1/2



บริษัท ไทยยูนิค จำกัด THAI UNIQUE CO., LTD.

89-82 ถนนปรางค์กู่ กรุงเทพมหานคร เขตพระนคร กรุงเทพมหานคร 10200
80-82 Prachathipatani Rd., Bangkokthrom, Pranakorn, Bangkok 10200
Tel: 0-2629-8191-6, 0-2280-1787, Fax: 0-2280-1788, E-mail: thauunique@thauunique.com, Website: www.thauunique.com

Electronics

- ☒ Check power supply voltage
- ☒ Check cables and connectors
- ☒ Check/Clean all boards in the instrument
- ☐ Furnace, Check camera and align** N/A

**Option for Graphite Zeeman only

Mechanics

- ☒ Flame, Check the burner adjuster
- ☐ Furnace, Check PSD accessories N/A

Analytical performance

- ☒ Clear the sample compartment
- ☒ Flame, Check uptake rate form 7.2-10.6 mL per minute = 9.5 mL/min
- ☒ Test Photometric noise, STDV = 0.0001 Abs (should be ≤ 0.00050 Abs)
- ☒ Flame, Test high solids nebulizer setting use
- Air/Laer Cu 5 ppm = 0.80 Abs, and Precision
- (%RSD) = 0.2 % (should be ≥ 0.55 Abs and $< 0.5\%$ RSD)
- or
- N20/Acet Cu 5 ppm = Abs, and Precision
- (%RSD) = % (should be > 0.3 Abs and $< 0.5\%$ RSD)
- ☐ Furnace, Characteristic mass and sensitivity Cu 25 ppb = Abs, and N/A
- Precision (%RSD) = % (should be ≥ 0.15 Abs and $\leq 4.0\%$ RSD)

SIGN:

Engineer: Saniga Mecharuon Customer: Mr. Kridsada Thinhutol

22



MEGAFIL CO., LTD.

99/183 Moo 3 Tambon Bang Rak Noi Amphur Muang Nonthaburi 11000
Tel: 0-2528-6081-2 Fax: 0-2528-6083, 0-2525-7034
www.megafil.co.th E-mail: megafil.group@gmail.com

BSC Certification Test Report

Page 1 of 6

Certificate No.: M1439/24

Customer Name: LABORATORY WATER ANALYSIS CENTER COMPANY LIMITED

Customer Address: 1/94 Moo 5 Khan Ham Subdistrict,
Uthai District, Phra Nakhon Si Ayutthaya 13210

Equipment: Biological Safety Cabinet Class II Type A2

Manufacturer: Microtech

Model: V6-T

Serial No.: 0972k097272

ID No.: WWL 0084

Were in accordance with ☒ EN 12469 ☐ NSF 49 ☐ Manufacturer's specification

Test Date: 15/10/2024

Due Date: 15/10/2025 or after HEPA filters are replaced or unit is moved

Test by: Mr. Pawut Wongnarakornkul

Approved by:

(Mr. Kridsada Thinhutol)

Authorized Signatory

Issued Date: 16/10/2024

This calibration certificate documents the traceability to national standards, which realises the unit of measurement according to the International System of Units (SI).

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

Megafil Co., Ltd.

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



MEGAFIL CO., LTD.

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Page 2 of 6

Certificate No.: M1439/24

Procedure Used: European Standard EN12469: 2000 has the status of British Standard, Biotechnology Performance criteria for microbiological safety cabinets.
NSF International Standard / American National Standard NSF / ANSI 49-2008 Biosafety Cabinet: Design, Construction, Performance and Field Certification.
Australian Standard: AS 1807.23-2000 Determination of intensity of radiation from germicidal ultraviolet lamps.
Manufacturer's specification.

1. Downflow velocity test.

Measurement Information

| No. of Rows | No. of Readings | Grid Spacing Front-Back | Grid Spacing Side-Side | Probe height Above sash |
|-------------|-----------------|-------------------------|------------------------|-------------------------|
| 2 | 8 | 1/4, 3/4 | 1/8, 3/8 | 100mm |

Measurement Data (m/s.)

| | | | |
|------|------|------|------|
| 0.37 | 0.43 | 0.41 | 0.39 |
| 0.36 | 0.35 | 0.32 | 0.34 |

Average velocity 0.37 m/s (73 FPM.) Velocity range 0.35-0.50 m/s (69-98 FPM.)

Uniformity(EN: +/-20%avg.) 0.30 - 0.44 m/s (58 - 88 FPM.)

Supply filter dimension 24 x 72 (inch x inch) Supply filter area 10.69 SQ.FT

Downflow volume (Q) 780 CFM.

Result Summary ☒ Pass ☐ Fail

Equipment used: Thermo Anemometer Model 425 S/N: 02968605 Calibration date: 10/05/2024

Megafil Co., Ltd.

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

ภาคผนวก ข-6



MEGAFIL CO., LTD.

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Page 3 of 6

Certificate No.: M1439/24

2. Inflow velocity test.

Select method: ☐ DIM ☒ Exhaust velocity. ☐ MFG's Specifications

MFG's Specifications method

| | | | | |
|------|------|------|------|------|
| 0.54 | 0.57 | 0.55 | 0.54 | 0.55 |
| 0.56 | 0.55 | 0.56 | 0.57 | 0.54 |
| 0.59 | 0.53 | 0.54 | 0.57 | 0.56 |
| 0.53 | 0.6 | 0.56 | 0.55 | 0.58 |
| 0.55 | 0.58 | 0.54 | 0.53 | 0.55 |

Average Inflow velocity 0.47 m/s (93 FPM.) Velocity range 0.40 m/s (79 FPM.)

Inflow dimension 8 x 72 (inch x inch) Inflow area 4.00 SQ.FT

Inflow volume(Q) 372 CFM

Result Summary ☒ Pass ☐ Fail

Adjustments Required ☐ Fan Speed ☐ Damper

Equipment used: Thermo Anemometer Model 425 S/N: 02968605 Calibration date: 10/05/2024

3. HEPA filter leak test.

Measurement Data

| HEPA Filter | PAO Upstream Conc.(calculated) | Specification | Measured leak penetration |
|---------------------|--------------------------------|---------------|---------------------------|
| Supply HEPA Filter | 18 µg/L | <0.01% | <0.01% |
| Exhaust HEPA Filter | 18 µg/L | <0.01% | <0.01% |

Megafil Co., Ltd.

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

Certificate No. : M1439/24

Leak location

Supply HEPA Filter
Back



Exhaust HEPA Filter
Back



Result Summary ☒ Pass ☐ Fail

Equipment used : Aerosol Photometer Model TDA-2H S/N : 20138 Calibration date : 08/05/2024

Equipment used : Smoke Generator Model TDA-6C S/N : 20192

4. Airflow smoke patterns test

Measurement Information

1. Downflow Pattern test : Smoke shall be passed from one end of the cabinet to the other, along the centerline of the work surface, at a height of 4 inch (10 cm) above the top of the access opening
2. View screen retention test : Smoke shall be passed from one end of the cabinet to the other, 1.0 in (2.5 cm) behind the view screen, at a height 6.0 inch (15 cm) above the top of the access opening.
3. Work opening edge retention test : Smoke shall be passed along the entire perimeter of the work opening. Particular attention should be paid to corners and vertical edges.
4. Sash/window seal test : Smoke shall be passed up the inside of the window 2 in (5 cm) from the sides and along the top of the work area.

Certificate No. : M1439/24

Result Summary

| | | |
|----------------------------------|--|---|
| Downflow Pattern test | <input checked="" type="checkbox"/> Accept | <input type="checkbox"/> Non-Conforming |
| View screen retention test | <input checked="" type="checkbox"/> Accept | <input type="checkbox"/> Non-Conforming |
| Work opening edge retention test | <input checked="" type="checkbox"/> Accept | <input type="checkbox"/> Non-Conforming |
| Sash/window seal test | <input checked="" type="checkbox"/> Accept | <input type="checkbox"/> Non-Conforming |

5. Site installation

| | | | |
|----------------------------|-------------------------------|-------------------------------|---|
| Sash Alarm. | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| Interlock System. | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |
| Exhaust System Performance | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail | <input checked="" type="checkbox"/> N/A |

Remark / Recommendation

ระบบ Site installation ไม่มีการตรวจสอบ เนื่องจากไม่มีฟังก์ชันนี้

6. Illumination Test (Lighting) : Option

Lighting should be adequate for safe working within the cabinet. Illumination measured at the work surface.

Lux

| | | | |
|-----|------|------|-----|
| 585 | 936 | 917 | 514 |
| 849 | 1400 | 1465 | 755 |

Equipment used : Digital Light Meter Model Easy View 31 S/N : 160404993 Calibration date : 08/05/2024

Remark :

Certificate No. : M1439/24

7. Ultraviolet Lamp Test (UV) : Option

Ultraviolet radiation where UV Lamp are fitted, the intensity of radiation at a wavelength of 254 nm. Shall be not less than 400 mW/m² when measures at work floor surface.

mW/m²

| | | | |
|-----|------|------|-----|
| 630 | 1450 | 1480 | 690 |
| 380 | 920 | 930 | 390 |

Equipment used : UVC LIGHT METER Model UVC-254SD S/N : Q879819 Calibration date : 08/05/2024

Remark :

Certificate of Calibration

LIQUID BATH



Page 1 of 3

Certificate No. : MC 2413808

Customer : Water Analysis Center Co., Ltd.
1/94 Moo 5, T.Kantham, A.U.-Thai, Ayutthaya 13210.

| | | | |
|--------------------------|---|---------------|------------------|
| Reference Job No. | 24-2841 | Received Date | 16 December 2024 |
| Description | Water Bath | Resolution | 0.1 °C |
| Manufacturer | ESSTEEL | Model | EWB-122D |
| Serial No. | 20180508122 | ID. No. | WWL 0214 |
| Marking | Additionally for the purpose of identification by this laboratory a label marked with this certificate number (MC 2413808) has been attached to the case. | | |
| Method | In-House calibration procedure MWL-T-029 this method is base on ASTM E 715-2007 "Liquid Bath". | | |
| Location of Calibration | Water Analysis Center Co., Ltd. ; Laboratory. | | |
| Environmental Conditions | Ambient Temperature : (25.2 to 25.6) °C Relative Humidity : (49.0 to 51.0) % | | |
| Date of Calibration | 16 December 2024 | Date of Issue | 18 December 2024 |

Checked by : Chalermkit Rakphada
(Calibration Engineer)

Approved by : Aittipong Kanjanavajest
(Technical Manager)

The uncertainties are for a confidence probability of approximately 95%

This certificate is issued in accordance with the conditions of accreditation granted by the National Standardization Council of Thailand-Office of the National Standardization Council that 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 Master Calibration Co., Ltd.

Certificate No.: MC 2413808

Page 2 of 3

Reference Standard Instrument :

| Description | Certificate No. | Serial No. | Due date | Traceable thru |
|--|-----------------|------------|-------------|----------------|
| Data Acquisition/Switch Unit | MC 2403566 | MY44020009 | 13 Mar 2025 | MCAL |
| With Thermocouple Type "T" ID. No.27/1 to 27/5 | | | | |

Traceability :

The measurement standard traceable to the international system of units (SI) through certificate as mentioned above

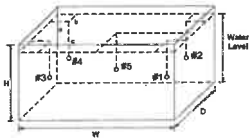
1. Calibration Procedure:

This Instrument was calibration according to ASTM E715 - 2007 by comparison with calibrated sensor under no load condition. The sensor were placed on five points and located one sensor in each of the eight corners of the chamber and was away from the each wall of 5 cm to 10 cm. And placed the five sensor within 2.5 cm of the geometric center of the chamber.

Temperature Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady state conditions. The reference sensor should preferably be located at the geometric center of the chamber.

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

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



- Overall Ambient Temperature around the Chamber variation : 1.1 °C
- Overall Line Voltage variation : 0.0 V
- Chamber Size (W*H*D) : 50 cm x 12 cm x 30 cm
- Water Level : 7 cm

Checked by: *Chalermit*

[MCP-Q-077 ; Rev.6 ; Date : 22/04/2021]

Certificate No.: MC 2413808

Page 3 of 3

2. Result of calibration :

Temperature Measurement Accuracy Test

| Indicating Temperature (°C) | Measured Temperature (°C) at Spread Locations | | | | | Uncertainty of measurement (±°C) |
|-----------------------------|---|------|------|------|---------|----------------------------------|
| | #1 | #2 | #3 | #4 | Ref. #5 | |
| 45.0 | 44.6 | 44.6 | 44.5 | 44.5 | 44.4 | 0.86 |

Chamber Characterization Result

| Desired Temperature (°C) | Controller Temperature (°C) | Indicating Temperature (°C) | Temperature Stability (±°C) | Temperature Uniformity (°C) | Overall Variation (°C) |
|--------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------|
| 44.5 | 45.0 | 45.0 | 0.85 | 0.75 | 1.9 |

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.0$, providing a level of confidence of approximately 95 %.

This certificate will certify of the calibrated equipment only.

End of Certificate

Checked by: *Chalermit*

[MCP-Q-077 ; Rev.6 ; Date : 22/04/2021]

Master Calibration Co.,Ltd.

547 Soi Ratthadaniwatt, Kwang Samseuk, Khet Huaykwang, Bangkok 10310
Tel.: (02) 274 2978-9, (02) 2742987-8 Fax: (02) 274 2518, (02) 274 2989
Website: www.mastercalibration.com E-mail: calibrate@mastercalibration.com

Certificate of Calibration

**TEMPERATURE
CONTROLLER ENCLOSURES**



Page 1 of 3

Certificate No.: MC 2413810

Customer : Water Analysis Center Co., Ltd.
1/94 Moo 5, T.Kantham, A.U-Thai, Ayutthaya 13210.

Reference Job No. : 24-2841 Received Date : 16 December 2024
Description : Incubator Resolution : 0.1 °C
Manufacturer : Memmert Model : IN260
Serial No. : D619.0170 ID. No. : WWL 0192
Marking : Additionally for the purpose of identification by this laboratory a label marked with this certificate number (MC 2413810) has been attached to the case.
Method : In-house calibration procedure MWL-T-033 this method Base on TLAS G-20-1/02-08 "Temperature Controlled Enclosures".
Location of Calibration : Water Analysis Center Co., Ltd. ; Laboratory.
Environmental Conditions : Ambient Temperature : (23.3 to 24.1) °C
Relative Humidity : (54.8 to 64.8) %
Date of Calibration : 16 December 2024 Date of Issue : 18 December 2024

Checked by: *Chalermit*
Chalermit Rakphada
(Calibration Engineer)

Approved by: *Aittipong*
Aittipong Kanjaisit
(Technical Manager)

The uncertainties are for a confidence probability of approximately 95%

This certificate is issued in accordance with the conditions of accreditation granted by the National Standardization Council of Thailand-Office of the National Standardization Council that 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 Master Calibration Co.,Ltd.

[MCP-Q-077 ; Rev.6 ; Date : 22/04/2021]

ภาคผนวก ข-8

Certificate No.: MC 2413810

Page 2 of 3

Reference Standard Instrument :

| Description | Certificate No. | Serial No. | Due date | Traceable thru |
|------------------------------|-----------------|------------|-------------|----------------|
| Data Acquisition/Switch Unit | MC 2400121 | MY59002240 | 18 Mar 2025 | MCAL |
| With RTD ID. No.10/1 to 10/9 | | | | |

Traceability :

The measurement standard traceable to the international system of units (SI) through certificate as mentioned above

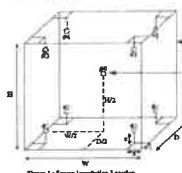
1. Calibration Procedure:

This Instrument was calibration according to TLAS G-20 by comparison with calibrated thermocouple type T under no load condition. The Thermocouples were placed on nine points and located one thermocouple in each of the eight corners of the chamber and was away from the each wall of 5 cm to 10 cm. And placed the ninth thermocouple within 2.5 cm of the geometric center of the chamber.

Temperature Uniformity - the maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady state conditions. The reference sensor should preferably be located at the geometric center of the chamber.

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

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



- Overall Ambient Temperature around the Chamber variation : 1.2 °C
- Overall Line Voltage variation : 0.1 V
- Chamber Size (W*H*D) : 65 cm x 80 cm x 50 cm

Checked by: *Chalermit*

[MCP-Q-077 ; Rev.6 ; Date : 22/04/2021]

Certificate No.: MC 2413810

Page 3 of 3

2. Result of calibration :

Temperature Measurement Accuracy Test

| Indicating Temperature (°C) | Measured Temperature (°C) at Spread Locations | | | | | | | | | Uncertainty (±°C) | * Uncertainty does not include stability, (±°C) |
|-----------------------------|---|-------|-------|-------|-------|-------|-------|-------|---------|-------------------|---|
| | #1 | #2 | #3 | #4 | #5 | #6 | #7 | #8 | Ref. #9 | | |
| 35.0 | 35.00 | 35.20 | 35.00 | 35.20 | 34.90 | 35.00 | 34.80 | 34.90 | 35.00 | 0.22 | 0.16 |

(*) : Non Accredited

Chamber Characterization Result

| Desired Temperature (°C) | Controller Temperature (°C) | Indicating Temperature (°C) | Temperature Stability (±°C) | Temperature Uniformity (°C) | Overall Variation (°C) |
|--------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------|
| 35.0 | 35.0 | 35.0 | 0.08 | 0.25 | 0.50 |

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.0$, providing a level of confidence of approximately 95 %.

This certificate will certify of the calibrated equipment only.

End of Certificate

Checked by : *Chalermk*

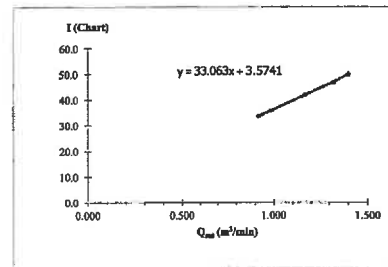
[MCF-Q-077 ; Rev.6 ; Date : 22/04/2021]

High Volume Air Sampler Calibration Worksheet

Page 1 of 1

| | |
|------------------------------|-----------------------------------|
| Project Site : | สวนพฤกษศาสตร์โรงเรียน (โครงการ 4) |
| Location : | วัดบางนา |
| Date of measurement : | 02/05/2025 |
| Worksheet No. : | C-028525-WWL0093 |
| High Volume ID : | WWL0093 |
| High Volume Model : | TE-S170 (TSP) |
| High Volume S/N : | 2729 |
| Ambient Condition | |
| Temperature (°C) : | 26 |
| Barometric Pressure (mmHg) : | 756 |
| Calibration Office | |
| Calibrator ID : | WWL0103 |
| Calibrator Model : | TE-S028A |
| Calibrator S/N : | 3271 |
| Calibrate Date : | 26/03/2025 |
| Quality Standard Slope : | 1.59569 |
| Quality Standard Intercept : | -0.02154 |

| Test No. | delta H ₂ O (inch) | Q _{del} (m ³ /min) | I (Chart) | IC (Corrected) | Linear Regression |
|----------|-------------------------------|--|-----------|----------------|----------------------------------|
| 1 | 4.90 | 1.395 | 50.0 | 49.80 | Slope : 32.93 |
| 2 | 4.40 | 1.323 | 47.0 | 46.81 | Intercept : 3.560 |
| 3 | 3.40 | 1.164 | 42.0 | 41.83 | Correlation Coefficient : 0.9995 |
| 4 | 2.40 | 0.980 | 36.0 | 35.85 | |
| 5 | 2.10 | 0.918 | 34.0 | 33.86 | |



Calibrated by : *Mr. JITTAWEE WONGMAKHEB*

Approved by : *Mr. RUNGSASIKORN KOSUM*

PO.LAB 5-5-1/23

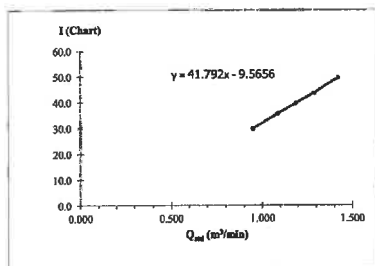
แก้ไขครั้งที่ : 1 วันที่แก้ไข : 1 ธ.ค. 2560 หน้า : 1 ของ 1

High Volume Air Sampler Calibration Worksheet

Page 1 of 1

| | |
|------------------------------|-----------------------------------|
| Project Site : | สวนพฤกษศาสตร์โรงเรียน (โครงการ 4) |
| Location : | วัดบางนา |
| Date of measurement : | 02/05/2025 |
| Worksheet No. : | C-028525-WWL0098 |
| High Volume ID : | WWL0098 |
| High Volume Model : | TE-6070 (PM10) |
| High Volume S/N : | 2734 |
| Ambient Condition | |
| Temperature (°C) : | 26 |
| Barometric Pressure (mmHg) : | 756 |
| Calibration Office | |
| Calibrator ID : | WWL0103 |
| Calibrator Model : | TE-S028A |
| Calibrator S/N : | 3271 |
| Calibrate Date : | 26/03/2025 |
| Quality Standard Slope : | 0.99945 |
| Quality Standard Intercept : | -0.01346 |

| Test No. | delta H ₂ O (inch) | Q _{del} (m ³ /min) | I (Chart) | IC (Corrected) | Linear Regression |
|----------|-------------------------------|--|-----------|----------------|----------------------------------|
| 1 | 5.00 | 1.420 | 50.0 | 31.44 | Slope : 26.28 |
| 2 | 4.10 | 1.287 | 44.0 | 27.67 | Intercept : -6.015 |
| 3 | 3.50 | 1.191 | 40.0 | 25.15 | Correlation Coefficient : 0.9996 |
| 4 | 2.90 | 1.085 | 36.0 | 22.64 | |
| 5 | 2.20 | 0.947 | 30.0 | 18.87 | |



Calibrated by : *Mr. JITTAWEE WONGMAKHEB*

Approved by : *Mr. RUNGSASIKORN KOSUM*

PO.LAB 5-5-1/23

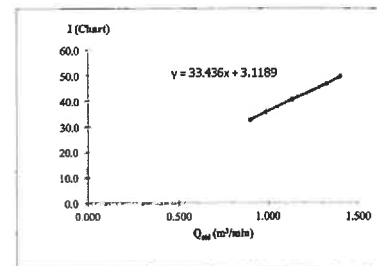
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High Volume Air Sampler Calibration Worksheet

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| | |
|------------------------------|-----------------------------------|
| Project Site : | สวนพฤกษศาสตร์โรงเรียน (โครงการ 4) |
| Location : | สวนพฤกษศาสตร์โรงเรียน |
| Date of measurement : | 02/05/2025 |
| Worksheet No. : | C-028525-WWL0097 |
| High Volume ID : | WWL0097 |
| High Volume Model : | TE-S170 (TSP) |
| High Volume S/N : | 2725 |
| Ambient Condition | |
| Temperature (°C) : | 26 |
| Barometric Pressure (mmHg) : | 756 |
| Calibration Office | |
| Calibrator ID : | WWL0103 |
| Calibrator Model : | TE-S028A |
| Calibrator S/N : | 3271 |
| Calibrate Date : | 26/03/2025 |
| Quality Standard Slope : | 1.59569 |
| Quality Standard Intercept : | -0.02154 |

| Test No. | delta H ₂ O (inch) | Q _{del} (m ³ /min) | I (Chart) | IC (Corrected) | Linear Regression |
|----------|-------------------------------|--|-----------|----------------|----------------------------------|
| 1 | 4.90 | 1.395 | 50.0 | 49.80 | Slope : 33.30 |
| 2 | 4.40 | 1.323 | 47.0 | 46.81 | Intercept : 3.106 |
| 3 | 3.20 | 1.130 | 41.0 | 40.83 | Correlation Coefficient : 0.9997 |
| 4 | 2.40 | 0.980 | 36.0 | 35.85 | |
| 5 | 2.00 | 0.896 | 33.0 | 32.87 | |



Calibrated by : *Mr. JITTAWEE WONGMAKHEB*

Approved by : *Mr. RUNGSASIKORN KOSUM*

PO.LAB 5-5-1/23

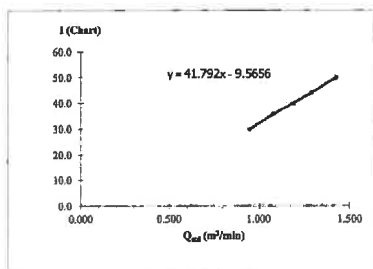
แก้ไขครั้งที่ : 1 วันที่แก้ไข : 1 ธ.ค. 2560 หน้า : 1 ของ 1



High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุบลราชธานี (โครงการ 4) Page 1 of 1
Location : บ้านวังน้ำเย็น
Date of measurement : 02/05/2025
Worksheet No. : C-420525-WWL0102 Calibration Office
High Volume ID : WWL0102 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 2731 Calibrator S/N : 3271
Ambient Condition : 26/03/2025
Temperature (°C) : 26 Quality Standard Slope : 0.99945
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01346

| Test No. | delta H ₂ O (inch) | Q _{std} (m³/min) | I (Chart) | IC (Corrected) | Linear Regression |
|----------|-------------------------------|---------------------------|-----------|----------------|---|
| 1 | 5.00 | 1.420 | 50.0 | 31.44 | Slope : 26.28 Intercept : -4.015 Correlation Coefficient : 0.9998 |
| 2 | 4.10 | 1.287 | 44.0 | 27.67 | |
| 3 | 3.50 | 1.191 | 40.0 | 25.15 | |
| 4 | 2.90 | 1.085 | 36.0 | 22.64 | |
| 5 | 2.20 | 0.947 | 30.0 | 18.87 | |



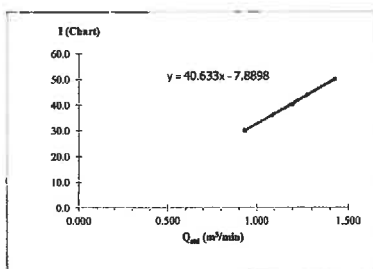
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Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
POLAB 5.5-1/25 วันที่รับใช้ : วันที่รับใช้ : 1 พ.ค. 2560 หน้า : 1 ของ 1



High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุบลราชธานี (โครงการ 4) Page 1 of 1
Location : บ้านวังน้ำเย็น
Date of measurement : 02/05/2025
Worksheet No. : C-420525-WWL0100 Calibration Office
High Volume ID : WWL0100 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 2735 Calibrator S/N : 3271
Ambient Condition : 26/03/2025
Temperature (°C) : 26 Quality Standard Slope : 0.99945
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01346

| Test No. | delta H ₂ O (inch) | Q _{std} (m³/min) | I (Chart) | IC (Corrected) | Linear Regression |
|----------|-------------------------------|---------------------------|-----------|----------------|---|
| 1 | 5.00 | 1.420 | 50.0 | 31.44 | Slope : 25.55 Intercept : -4.961 Correlation Coefficient : 0.9991 |
| 2 | 4.00 | 1.272 | 44.0 | 27.67 | |
| 3 | 3.50 | 1.191 | 40.0 | 25.15 | |
| 4 | 2.90 | 1.085 | 36.0 | 22.64 | |
| 5 | 2.10 | 0.925 | 30.0 | 18.87 | |



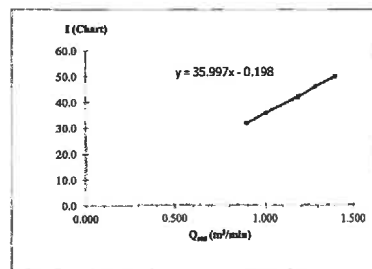
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Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
POLAB 5.5-1/25 วันที่รับใช้ : วันที่รับใช้ : 1 พ.ค. 2560 หน้า : 1 ของ 1



High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุบลราชธานี (โครงการ 4) Page 1 of 1
Location : บ้านวังน้ำเย็น
Date of measurement : 02/05/2025
Worksheet No. : C-420525-WWL0096 Calibration Office
High Volume ID : WWL0096 Calibrator ID : WWL0103
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 2730 Calibrator S/N : 3271
Ambient Condition : 26/03/2025
Temperature (°C) : 26 Quality Standard Slope : 1.59569
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.02154

| Test No. | delta H ₂ O (inch) | Q _{std} (m³/min) | I (Chart) | IC (Corrected) | Linear Regression |
|----------|-------------------------------|---------------------------|-----------|----------------|---|
| 1 | 4.90 | 1.395 | 50.0 | 49.80 | Slope : 35.85 Intercept : -0.197 Correlation Coefficient : 0.9996 |
| 2 | 4.10 | 1.277 | 46.0 | 45.81 | |
| 3 | 3.50 | 1.181 | 42.0 | 41.83 | |
| 4 | 2.50 | 1.000 | 36.0 | 35.85 | |
| 5 | 2.00 | 0.896 | 32.0 | 31.87 | |



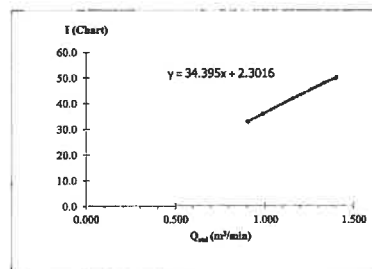
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Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
POLAB 5.5-1/25 วันที่รับใช้ : วันที่รับใช้ : 1 พ.ค. 2560 หน้า : 1 ของ 1



High Volume Air Sampler Calibration Worksheet

Project Site : สวนอุตสาหกรรมโรจนะอุบลราชธานี (โครงการ 4) Page 1 of 1
Location : บ้านวังน้ำเย็น
Date of measurement : 02/05/2025
Worksheet No. : C-420525-WWL0223 Calibration Office
High Volume ID : WWL0222 Calibrator ID : WWL0103
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 2738 Calibrator S/N : 3271
Ambient Condition : 26/03/2025
Temperature (°C) : 26 Quality Standard Slope : 1.59569
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.02154

| Test No. | delta H ₂ O (inch) | Q _{std} (m³/min) | I (Chart) | IC (Corrected) | Linear Regression |
|----------|-------------------------------|---------------------------|-----------|----------------|--|
| 1 | 4.90 | 1.395 | 50.0 | 49.80 | Slope : 34.26 Intercept : 2.292 Correlation Coefficient : 0.9995 |
| 2 | 4.40 | 1.323 | 48.0 | 47.81 | |
| 3 | 3.30 | 1.147 | 42.0 | 41.83 | |
| 4 | 2.40 | 0.980 | 36.0 | 35.85 | |
| 5 | 2.00 | 0.896 | 33.0 | 32.87 | |



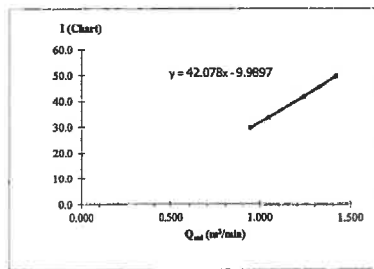
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Mr. JITTAWEE WONGMAKHEB Mr. RUNGSASIKORN KOSUM
POLAB 5.5-1/25 วันที่รับใช้ : วันที่รับใช้ : 1 พ.ค. 2560 หน้า : 1 ของ 1



High Volume Air Sampler Calibration Worksheet

Project Site : งานอุตสาหกรรมโรงงานกระดาษ (โครงการ 4) Page 1 of 1
Location : บ้านวังสมบูรณ์
Date of measurement : 02/05/2025
Worksheet No. : C-028525-WWL0224 Calibration Office
High Volume ID : WWL0224 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 2739 Calibrator S/N : 3271
Ambient Condition : Calibrate Date : 26/03/2025
Temperature (°C) : 26 Quality Standard Slope : 0.99945
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01346

| Test No. | delta H ₂ O (inch) | Q _{as} (m³/min) | I (Chart) | IC (Corrected) | Linear Regression |
|----------|-------------------------------|--------------------------|-----------|----------------|---|
| 1 | 5.00 | 1.420 | 50.0 | 31.44 | Slope : 26.46 Intercept : -6.282 Correlation Coefficient : 0.9998 |
| 2 | 4.40 | 1.333 | 46.0 | 28.93 | |
| 3 | 3.80 | 1.240 | 42.0 | 26.41 | |
| 4 | 2.70 | 1.047 | 34.0 | 21.38 | |
| 5 | 2.20 | 0.947 | 30.0 | 18.87 | |



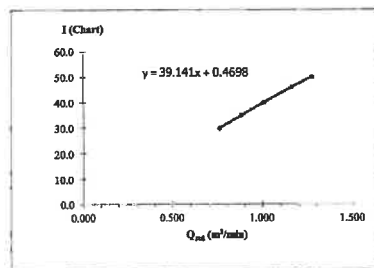
Calibrated by : Approved by :
Mr. JITTAWEE WONGMAKHEEB Mr. RUNGRASAKORN KOSUM
POLAB 5.5-1/25 แก้ไขครั้งที่ : วันที่รับใช้ : 1 ธ.ค. 2560 หน้า : 1 ของ 1



High Volume Air Sampler Calibration Worksheet

Project Site : งานอุตสาหกรรมโรงงานกระดาษ (โครงการ 4) Page 1 of 1
Location : พื้นที่อาศัยด้านทิศตะวันออกของโครงการ
Date of measurement : 02/05/2025
Worksheet No. : C-028525-WWL0101 Calibration Office
High Volume ID : WWL0101 Calibrator ID : WWL0103
High Volume Model : TE-6070 (PM10) Calibrator Model : TE-5028A
High Volume S/N : 2733 Calibrator S/N : 3271
Ambient Condition : Calibrate Date : 26/03/2025
Temperature (°C) : 26 Quality Standard Slope : 0.99945
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.01346

| Test No. | delta H ₂ O (inch) | Q _{as} (m³/min) | I (Chart) | IC (Corrected) | Linear Regression |
|----------|-------------------------------|--------------------------|-----------|----------------|--|
| 1 | 4.00 | 1.272 | 50.0 | 31.44 | Slope : 24.61 Intercept : 0.295 Correlation Coefficient : 0.9997 |
| 2 | 3.30 | 1.156 | 46.0 | 28.93 | |
| 3 | 2.50 | 1.008 | 40.0 | 25.15 | |
| 4 | 1.90 | 0.881 | 35.0 | 22.01 | |
| 5 | 1.40 | 0.758 | 30.0 | 18.87 | |



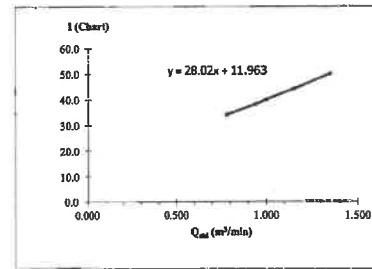
Calibrated by : Approved by :
Mr. JITTAWEE WONGMAKHEEB Mr. RUNGRASAKORN KOSUM
POLAB 5.5-1/25 แก้ไขครั้งที่ : วันที่รับใช้ : 1 ธ.ค. 2560 หน้า : 1 ของ 1



High Volume Air Sampler Calibration Worksheet

Project Site : งานอุตสาหกรรมโรงงานกระดาษ (โครงการ 4) Page 1 of 1
Location : พื้นที่อาศัยด้านทิศตะวันออกของโครงการ
Date of measurement : 02/05/2025
Worksheet No. : C-028525-WWL0095 Calibration Office
High Volume ID : WWL0095 Calibrator ID : WWL0103
High Volume Model : TE-5170 (TSP) Calibrator Model : TE-5028A
High Volume S/N : 2727 Calibrator S/N : 3271
Ambient Condition : Calibrate Date : 26/03/2025
Temperature (°C) : 26 Quality Standard Slope : 1.59569
Barometric Pressure (mmHg) : 756 Quality Standard Intercept : -0.02154

| Test No. | delta H ₂ O (inch) | Q _{as} (m³/min) | I (Chart) | IC (Corrected) | Linear Regression |
|----------|-------------------------------|--------------------------|-----------|----------------|---|
| 1 | 4.60 | 1.352 | 50.0 | 49.80 | Slope : 27.91 Intercept : 11.915 Correlation Coefficient : 0.9994 |
| 2 | 3.30 | 1.147 | 44.0 | 43.82 | |
| 3 | 2.50 | 1.000 | 40.0 | 39.84 | |
| 4 | 2.20 | 0.939 | 38.0 | 37.85 | |
| 5 | 1.50 | 0.778 | 34.0 | 33.86 | |



Calibrated by : Approved by :
Mr. JITTAWEE WONGMAKHEEB Mr. RUNGRASAKORN KOSUM
POLAB 5.5-1/25 แก้ไขครั้งที่ : วันที่รับใช้ : 1 ธ.ค. 2560 หน้า : 1 ของ 1

INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
7/139 MOO 13, SOI SINTHAKORN 11 TAMBON BANG KAEU,
AMPHOE BANG PHU SAMUT PRAKARN PROVINCE 10540 THAILAND
111 1650-2116-5860-1 FAX: 06-0-2116-7140



Certificate of Calibration

Customer : WATER ANALYSIS CENTER CO., LTD. Certificate No : 25-BLA-062
Name : Address : 104 Moo 5, T.Bangna In, A.U-Thai, Ayutthaya 13210. Request No : Req-2025-0456

Unit Under Calibration Details
Measurement Item : Sound Level Meter Microphone Class : 2
Manufacturer : RION Microphone Model : UC-52
Model : NL-42 Microphone S/N : 180583
Serial Number : 00396801 Preamp/Filter Model : NH-24
ID : WWL0159 Preamp/Filter S/N : 87936
Resolution : 0.1 dB Instrument Status : Used

Calibration Environment and Details
Temperature : 23 °C ± 2 °C
Humidity : 50 % RH ± 10 % RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 19 February 2025
Calibrated Date : 24 February 2025
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-3 : 2013 Electroacoustics - Sound level meters - Part 3: Periodic tests
Location of Calibration : Lab Acoustic

| Instrument | Brand | Model | S/N | Due calibration | Traceability |
|---------------------|---------------|---------|---------|-----------------|--------------|
| Standard Microphone | Briel & Kjaer | 4192 | 2294985 | 25 June 2025 | NIMT |
| Audio Generator | Svetsch | Svsm401 | 131 | 15 October 2025 | WK Electric |

Note
The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibrated By : Approved By :
Mr. Nopadol Lamsart Mr. Pasi Methavorn
Service Calibration Engineer Calibration Engineer Supervisor
Issue Date : 24 February 2025

Certificate No : 25-SLM-062
Request No : Req-2025-0456

1. Indication at the calibration check frequency

| UUC Setting | Nominal | Before Adjust | After Adjust | UNCERTAINTY | Acceptance | Result |
|--------------------|---------|---------------|--------------|-------------|------------|--------|
| FAST / A / 30-130 | Level | UUC (dB) | ERR (dB) | UUC (dB) | ERR (dB) | (± dB) |
| Calibrator Setting | (dB) | (dB) | (dB) | (dB) | (dB) | (± dB) |
| 1000 Hz 114 dB | 113.76 | 113.8 | 0.04 | 113.8 | +0.04 | 0.30 |

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVANTEK, Model SV 35A, SN18079

2. Self-generated noise, Microphone installed

| UUC Setting | Measured | UNCERTAINTY |
|---------------|----------|-------------|
| FAST / 30-130 | | |
| UUC Weighting | (dB) | (± dB) |
| A | 19.3 | 0.10 |

3. Self-generated noise, Microphone replaced by the electrical input signal device

| UUC Setting | Measured | UNCERTAINTY |
|---------------|----------|-------------|
| FAST / 30-130 | | |
| UUC Weighting | (dB) | (± dB) |
| A | 16.4 | 0.10 |
| C | 18.4 | 0.10 |
| Z | 22.4 | 0.10 |

4. Acoustic signal test of frequency weightings (Without Windscreen)

| UUC Setting | Deviation from various Frequency | UNCERTAINTY | Acceptance | Result |
|---------------|----------------------------------|-------------|------------|--------|
| FAST / 30-130 | Weighting Response curve | | Limit | |
| STD Setting | A (dB) C (dB) Z (dB) | (± dB) | (± dB) | |
| 125 Hz | 0.9 1.1 1.0 | 0.60 | 1.3 | Pass |
| 1000 Hz | 0.0 0.0 0.0 | 0.50 | 1.0 | Pass |
| 4000 Hz | -0.1 -0.1 -0.1 | 0.50 | 3.0 | Pass |
| 8000 Hz | -0.9 -0.9 -0.9 | 0.70 | 5.0 | Pass |

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

PM-708-SLM-02 Rev.04 Issue date 5/6/24

Certificate No : 25-SLM-062
Request No : Req-2025-0456

5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz

| UUC Setting | Deviation from various Frequency | UNCERTAINTY | Acceptance | Result |
|---------------|----------------------------------|-------------|------------|--------|
| FAST / 30-130 | Weighting Response curve | | Limit | |
| STD Setting | A (dB) C (dB) Z (dB) | (± dB) | (± dB) | |
| 63 Hz | -0.2 0.0 -0.1 | 0.20 | 2.0 | Pass |
| 125 Hz | -0.1 0.0 0.0 | | 1.5 | Pass |
| 250 Hz | 0.0 0.0 0.1 | | 1.5 | Pass |
| 500 Hz | 0.0 0.1 0.0 | | 1.5 | Pass |
| 1000 Hz | 0.0 0.0 0.0 | | 1.0 | Pass |
| 2000 Hz | 0.0 0.1 0.0 | | 2.0 | Pass |
| 4000 Hz | 0.0 0.0 0.0 | | 3.0 | Pass |
| 8000 Hz | 0.1 0.1 0.0 | | 5.0 | Pass |
| 16000 Hz | -1.3 -1.3 0.1 | | +5, -20% | Pass |

6. Frequency and time weightings at 1kHz

| UUC Setting | STD | Measured | UNCERTAINTY | Acceptance | Result |
|---------------|--------|-------------------|-------------|------------|--------|
| FAST / 30-130 | REF | UUC (dB) ERR (dB) | (± dB) | Limit | |
| UUC Weighting | | | | (± dB) | |
| A | 114.00 | 114.0 0.0 | 0.20 | 0.20 | Pass |
| C | 114.00 | 114.0 0.0 | | 0.20 | Pass |
| Z | 114.00 | 114.0 0.0 | | 0.20 | Pass |

| UUC Setting | STD | Measured | UNCERTAINTY | Acceptance | Result |
|-------------------|--------|-------------------|-------------|------------|--------|
| 30-130 / A | REF | UUC (dB) ERR (dB) | (± dB) | Limit | |
| UUC Time Response | | | | (± dB) | |
| Fast | 114.00 | 114.0 0.0 | 0.20 | 0.10 | Pass |
| Slow | 114.00 | 114.0 0.0 | | 0.10 | Pass |
| Lin | 114.00 | 114.0 0.0 | | 0.10 | Pass |

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

PM-708-SLM-01 Rev.04 Issue date 5/6/24

Certificate No : 25-SLM-062
Request No : Req-2025-0456

7. Long Term Stability

| UUC Setting | Measured | UNCERTAINTY | Acceptance | Result |
|-------------------|----------|-------------|------------|--------|
| FAST / A / 30-130 | UUC | (± dB) | Limit | |
| STD Setting | (dB) | | (± dB) | |
| Initial | 114.0 | 0.10 | 0.30 | Pass |
| Final | 114.0 | | | |
| Deviated | 0.0 | | | |

8. Level linearity on the reference level range

| UUC Setting | Anticipated | Deviation | UNCERTAINTY | Acceptance | Result |
|-------------------|-------------|-------------------|-------------|------------|--------|
| FAST / A / 30-130 | REF | UUC (dB) ERR (dB) | (± dB) | Limit | |
| STD 40 | | | | | |
| 138.00 | 138 | 137.9 | -0.1 | 1.1 | Pass |
| 134.00 | 134 | 133.9 | -0.1 | 1.1 | Pass |
| 129.00 | 129 | 128.9 | -0.1 | 1.1 | Pass |
| 124.00 | 124 | 123.9 | -0.1 | 1.1 | Pass |
| 119.00 | 119 | 119.0 | 0.0 | 1.1 | Pass |
| 114.00 | 114 | 114.0 | 0.0 | 1.1 | Pass |
| 109.00 | 109 | 109.0 | 0.0 | 1.1 | Pass |
| 104.00 | 104 | 104.0 | 0.0 | 1.1 | Pass |
| 99.00 | 99 | 99.0 | 0.0 | 1.1 | Pass |
| 94.00 | 94 | 94.0 | 0.0 | 1.1 | Pass |
| 89.00 | 89 | 89.0 | 0.0 | 1.1 | Pass |
| 84.00 | 84 | 84.0 | 0.0 | 1.1 | Pass |
| 79.00 | 79 | 79.0 | 0.0 | 1.1 | Pass |
| 74.00 | 74 | 74.0 | 0.0 | 1.1 | Pass |
| 69.00 | 69 | 69.0 | 0.0 | 1.1 | Pass |
| 64.00 | 64 | 64.0 | 0.0 | 1.1 | Pass |
| 59.00 | 59 | 59.0 | 0.0 | 1.1 | Pass |
| 54.00 | 54 | 54.0 | 0.0 | 1.1 | Pass |
| 49.00 | 49 | 49.0 | 0.0 | 1.1 | Pass |
| 44.00 | 44 | 44.0 | 0.0 | 1.1 | Pass |
| 39.00 | 39 | 39.1 | 0.1 | 1.1 | Pass |
| 34.00 | 34 | 34.2 | 0.2 | 1.1 | Pass |
| 29.00 | 29 | 29.8 | 0.8 | 1.1 | Pass |
| 24.00 | 24 | 25.0 | 1.0 | 1.1 | Pass |

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

PM-708-SLM-01 Rev.04 Issue date 5/6/24

Certificate No : 25-SLM-062
Request No : Req-2025-0456

9. Level linearity including the level range control

| UUC Setting | STD | Measured | UNCERTAINTY | Acceptance | Result |
|-------------|-------|-------------------|-------------|------------|--------|
| FAST / A | REF | UUC (dB) ERR (dB) | (± dB) | Limit | |
| UUC Range | | | | (± dB) | |
| 30-130 | 30.50 | 30.6 0.1 | 0.30 | 1.1 | Pass |
| | 114 | 114.0 0.0 | | 1.1 | Pass |

10. Tone burst response

| UUC Setting | STD | Anticipated | Measured | UNCERTAINTY | Acceptance | Result |
|-------------------|-----------|-------------|-------------------|-------------|------------|--------|
| A / 30-130 | Toneburst | Ref | UUC (dB) ERR (dB) | (± dB) | Limit | |
| UUC Time Response | | | | | (± dB) | |
| Fast | 200 | 126.0 | 126.0 0.0 | 0.20 | 1.0 | Pass |
| | 2 | 109.0 | 109.0 0.0 | | +1.0, -2.5 | Pass |
| | 0.25 | 100.0 | 99.9 -0.1 | | +1.5, -5.0 | Pass |
| Slow | 200 | 119.6 | 119.6 0.0 | | 1.0 | Pass |
| | 2 | 100.0 | 100.0 0.0 | | +1.0, -5.0 | Pass |
| | 200 | 120.0 | 120.0 0.0 | | 1.0 | Pass |
| SEL | 2 | 100.0 | 100.0 0.0 | 0.1 | +1.0, -2.5 | Pass |
| | 0.25 | 91.0 | 90.9 -0.1 | | +1.5, -5.0 | Pass |

11. Peak C sound level

| UUC Setting | Anticipated | Measured | UNCERTAINTY | Acceptance | Result |
|---------------------|-------------|-------------------|-------------|------------|--------|
| FAST / C / 55-141 | REF | UUC (dB) ERR (dB) | (± dB) | Limit | |
| STD Setting | | | | (± dB) | |
| Complete cycle | 136.4 | 136.4 0.00 | 0.70 | 3.0 | Pass |
| Positive half cycle | 135.4 | 135.1 -0.30 | | 2.0 | Pass |
| Negative half cycle | 135.4 | 135.1 -0.30 | | 2.0 | Pass |

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

PM-708-SLM-01 Rev.04 Issue date 5/6/24

Certificate No : 25-SLM-002
Request No : Req-2023-0436

12. Overload indication

| UUC Setting | Measured | UNCERTAINTY | Acceptance Limit | Result |
|-------------------------|----------|-------------|------------------|--------|
| FAST / A / 30-130 | UUC | (± dB) | (± dB) | |
| STD Setting | (dB) | | | |
| Positive one-half cycle | 139.6 | | | |
| Negative one-half cycle | 139.3 | | | |
| Deviated | 0.3 | 0.20 | 1.5 | Pass |

13. High Level Stability

| UUC Setting | Measured | UNCERTAINTY | Acceptance Limit | Result |
|-------------------|----------|-------------|------------------|--------|
| FAST / A / 30-130 | UUC | (± dB) | (± dB) | |
| STD Setting | (dB) | | | |
| Initial | 129.0 | | | |
| Final | 129.0 | | | |
| Deviated | 0.0 | 0.10 | 0.30 | Pass |

Note :

| Function | Maximum-permitted Uncertainty of measurement |
|--|--|
| 1. Indication at the calibration check frequency | Not applicable |
| 2. Self-generated noise, Microphone installed | Not applicable |
| 3. Self-generated noise, Microphone replaced by the electrical input signal device | Not applicable |
| 4. Acoustic signal test of frequency weightings at 10 Hz to 4 kHz | 0.60 dB |
| 5. Acoustic signal test of frequency weightings at >4 kHz to 10 kHz | 0.70 dB |
| 6. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz | 0.20 dB |
| 7. Frequency and time weightings at 1 kHz | 0.20 dB |
| 8. Long Term Stability | 0.10 dB |
| 9. Level linearity on the reference level range | 0.30 dB |
| 10. Level linearity including the level range control | 0.30 dB |
| 11. Tone burst response | 0.30 dB |
| 12. Peak C Sound level | 0.35 dB |
| 13. Overload indication | 0.25 dB |
| 14. High Level Stability | 0.10 dB |

- Acceptance Limit and Maximum-permitted Uncertainty was IEC 61672-1:2013

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.
F04-708-SLM-01 Rev.04 Issue date 3/6/24

Certificate No : 25-SLM-002
Request No : Req-2023-0436

Decision Rule for Statements of Conformity

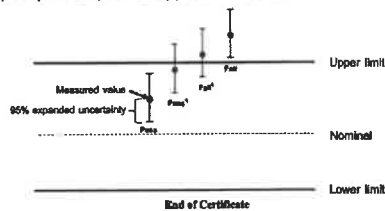
The standard decision rule employed for the statements of conformity to each calibration result will be applied using IAC-08-09/2015; **Out-of-limit** on the Reporting of Compliance with Specification as following Fig. and statement

Pass - The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

Pass¹ - The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit.

Fail¹ - The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement at 95% is within the limit.

Fail - The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.
F04-708-SLM-01 Rev.04 Issue date 3/6/24

| W | PO.LAB 6.4-1/28 | แก้ไขครั้งที่: 0 | วันที่บังคับใช้: 1 มี.ค. 2562 | หน้า: 1 ของ 1 |
|---|-----------------|------------------|-------------------------------|---------------|
|---|-----------------|------------------|-------------------------------|---------------|

แบบบันทึกการทวนสอบเครื่อง Sound Level Meter

| | |
|---|-------------------------------------|
| เครื่อง CA111 Sound Calibrator S/N 520272 วันที่สอบเทียบ 09/05/67 | วันที่สอบเทียบเครื่องต่อไป 08/05/68 |
| เครื่อง Digital Thermohygro Meter S/N 385011742 | วันที่สอบเทียบเครื่องต่อไป 15/05/69 |
| วันที่สอบเทียบ 27/09/67 | วันที่สอบเทียบเครื่องต่อไป 26/09/68 |
| เครื่อง Sound Level Meter S/N 00396801 | วันที่สอบเทียบเครื่องต่อไป 24/02/70 |
| วันที่สอบเทียบ 25/02/68 | |

การทวนสอบก่อนออกจำหน่าย

| | |
|-------------------------|--------------------------|
| อุณหภูมิ (°C) 25 | เกณฑ์การยอมรับ 23.0±3.0 |
| ความชื้นสัมพัทธ์ (%) 58 | เกณฑ์การยอมรับ 50.0±15.0 |
| วันที่ทวนสอบ 30/04/68 | |

การทวนสอบหลังจกออกจำหน่าย

| | |
|------------------------|------------------|
| อุณหภูมิ (°C) - | เกณฑ์การยอมรับ - |
| ความชื้นสัมพัทธ์ (%) - | เกณฑ์การยอมรับ - |
| วันที่ทวนสอบ - | |

| Item | ระดับเสียงที่วัดได้ (dB) (ความถี่ที่ 94.0dB) | ระดับเสียงที่วัดได้ (dB) (ความถี่ที่ 114.0dB) | Item | ระดับเสียงที่วัดได้ (dB) (ความถี่ที่ 94.0dB) | ระดับเสียงที่วัดได้ (dB) (ความถี่ที่ 114.0dB) |
|-----------------|---|--|-----------------|---|--|
| 1 | 93.8 | 113.8 | 1 | - | - |
| 2 | 93.8 | 113.8 | 2 | - | - |
| 3 | 93.8 | 113.8 | 3 | - | - |
| 4 | 93.8 | 113.8 | 4 | - | - |
| 5 | 93.8 | 113.8 | 5 | - | - |
| 6 | 93.8 | 113.8 | 6 | - | - |
| 7 | 93.8 | 113.8 | 7 | - | - |
| 8 | 93.8 | 113.8 | 8 | - | - |
| 9 | 93.8 | 113.8 | 9 | - | - |
| 10 | 93.8 | 113.8 | 10 | - | - |
| X | 93.80 | 113.80 | X | - | - |
| SD | 0.00 | 0.00 | SD | - | - |
| %RSD (≤ 10) | 0.00 | 0.00 | %RSD (≤ 10) | - | - |
| ผลการ ทวนสอบ | ผ่าน | ผ่าน | ผลการ ทวนสอบ | - | - |

ผู้บันทึก ฉ.ก.ค.
ผู้ตรวจสอบ ฉ.ก.ค.

ผู้บันทึก
ผู้ตรวจสอบ

| W | PO.LAB 6.4-1/28 | แก้ไขครั้งที่: 0 | วันที่บังคับใช้: 1 มี.ค. 2562 | หน้า: 1 ของ 1 |
|---|-----------------|------------------|-------------------------------|---------------|
|---|-----------------|------------------|-------------------------------|---------------|

แบบบันทึกการทวนสอบเครื่อง Sound Level Meter

| | |
|---|-------------------------------------|
| เครื่อง CA111 Sound Calibrator S/N 520272 วันที่สอบเทียบ 09/05/67 | วันที่สอบเทียบเครื่องต่อไป 08/05/68 |
| เครื่อง Digital Thermohygro Meter S/N 385011742 | วันที่สอบเทียบเครื่องต่อไป 15/05/69 |
| วันที่สอบเทียบ 27/09/67 | วันที่สอบเทียบเครื่องต่อไป 26/09/68 |
| เครื่อง Sound Level Meter S/N 00396801 | วันที่สอบเทียบเครื่องต่อไป 24/02/70 |
| วันที่สอบเทียบ 25/02/68 | |

การทวนสอบก่อนออกจำหน่าย

| | |
|------------------------|------------------|
| อุณหภูมิ (°C) - | เกณฑ์การยอมรับ - |
| ความชื้นสัมพัทธ์ (%) - | เกณฑ์การยอมรับ - |
| วันที่ทวนสอบ - | |

การทวนสอบหลังจกออกจำหน่าย

| | |
|-------------------------|--------------------------|
| อุณหภูมิ (°C) 25 | เกณฑ์การยอมรับ 23.0±3.0 |
| ความชื้นสัมพัทธ์ (%) 56 | เกณฑ์การยอมรับ 50.0±15.0 |
| วันที่ทวนสอบ 17/05/68 | |

| Item | ระดับเสียงที่วัดได้ (dB) (ความถี่ที่ 94.0dB) | ระดับเสียงที่วัดได้ (dB) (ความถี่ที่ 114.0dB) | Item | ระดับเสียงที่วัดได้ (dB) (ความถี่ที่ 94.0dB) | ระดับเสียงที่วัดได้ (dB) (ความถี่ที่ 114.0dB) |
|-----------------|---|--|-----------------|---|--|
| 1 | - | - | 1 | 93.8 | 113.8 |
| 2 | - | - | 2 | 93.8 | 113.8 |
| 3 | - | - | 3 | 93.8 | 113.8 |
| 4 | - | - | 4 | 93.8 | 113.8 |
| 5 | - | - | 5 | 93.8 | 113.8 |
| 6 | - | - | 6 | 93.8 | 113.8 |
| 7 | - | - | 7 | 93.8 | 113.8 |
| 8 | - | - | 8 | 93.8 | 113.8 |
| 9 | - | - | 9 | 93.8 | 113.8 |
| 10 | - | - | 10 | 93.8 | 113.8 |
| X | - | - | X | 93.80 | 113.80 |
| SD | - | - | SD | 0.00 | 0.00 |
| %RSD (≤ 10) | - | - | %RSD (≤ 10) | 0.00 | 0.00 |
| ผลการ ทวนสอบ | - | - | ผลการ ทวนสอบ | ผ่าน | ผ่าน |

ผู้บันทึก
ผู้ตรวจสอบ

ผู้บันทึก ฉ.ก.ค.
ผู้ตรวจสอบ ฉ.ก.ค.

| | | | | |
|---|----------------|-------------------|-------------------------------|----------------|
| W | FOJLAB 64-1/28 | แก้ไขครั้งที่ : 0 | วันที่บังคับใช้ : 1 ม.ค. 2562 | หน้า : 1 ของ 1 |
|---|----------------|-------------------|-------------------------------|----------------|

แบบบันทึกการทวนสอบเครื่อง Sound Level Meter

| | | |
|---|-----------------------------------|--|
| เครื่อง CA111 Sound Calibrator S/N 520272 | รหัสดำเนินงาน SR004 | เกณฑ์การยอมรับ 93.77 ± 0.3, 113.88 ± 0.3 |
| วันที่สอบเทียบ 09/05/67 | วันที่สอบเทียบครั้งต่อไป 08/05/68 | |
| เครื่อง Digital Thermohygro Meter S/N 385011742 | รหัสดำเนินงาน พ.พ.ล.01.85 | |
| วันที่สอบเทียบ 27/09/67 | วันที่สอบเทียบครั้งต่อไป 26/09/68 | |
| เครื่อง Sound Level Meter S/N 820956 | รหัสดำเนินงาน พ.พ.ล.02.25 | |
| วันที่สอบเทียบ 25/02/68 | วันที่สอบเทียบครั้งต่อไป 24/02/70 | |
| การทวนสอบก่อนออกจำหน่าย | | |
| อุณหภูมิ (°C) 25 | เกณฑ์การยอมรับ 23.0±3.0 | |
| ความชื้นสัมพัทธ์ (%) 58 | เกณฑ์การยอมรับ 50.0±15.0 | |
| วันที่ทวนสอบ 30/04/68 | วันที่ทวนสอบ - | |

| Item | ระดับเสียงที่วัดได้ (dB) (ความดังที่ 94.0dB) | ระดับเสียงที่วัดได้ (dB) (ความดังที่ 114.0dB) | Item | ระดับเสียงที่วัดได้ (dB) (ความดังที่ 94.0dB) | ระดับเสียงที่วัดได้ (dB) (ความดังที่ 114.0dB) |
|-----------------|---|--|-----------------|---|--|
| 1 | 93.8 | 113.8 | 1 | - | - |
| 2 | 93.8 | 113.8 | 2 | - | - |
| 3 | 93.8 | 113.8 | 3 | - | - |
| 4 | 93.8 | 113.8 | 4 | - | - |
| 5 | 93.8 | 113.8 | 5 | - | - |
| 6 | 93.8 | 113.8 | 6 | - | - |
| 7 | 93.8 | 113.8 | 7 | - | - |
| 8 | 93.8 | 113.8 | 8 | - | - |
| 9 | 93.8 | 113.8 | 9 | - | - |
| 10 | 93.8 | 113.8 | 10 | - | - |
| X | 93.80 | 113.80 | X | - | - |
| SD | 0.00 | 0.00 | SD | - | - |
| %RSD (≤ 10) | 0.00 | 0.00 | %RSD (≤ 10) | - | - |
| ผลการ ทวนสอบ | ผ่าน | ผ่าน | ผลการ ทวนสอบ | - | - |

ผู้บันทึก : วิชาญ
ผู้ตรวจสอบ : [Signature]

ผู้บันทึก :
ผู้ตรวจสอบ :

| | | | | |
|---|----------------|-------------------|-------------------------------|----------------|
| W | FOJLAB 64-1/28 | แก้ไขครั้งที่ : 0 | วันที่บังคับใช้ : 1 ม.ค. 2562 | หน้า : 1 ของ 1 |
|---|----------------|-------------------|-------------------------------|----------------|

แบบบันทึกการทวนสอบเครื่อง Sound Level Meter

| | | |
|---|-----------------------------------|--|
| เครื่อง CA111 Sound Calibrator S/N 520272 | รหัสดำเนินงาน SR004 | เกณฑ์การยอมรับ 93.73 ± 0.3, 113.82 ± 0.3 |
| วันที่สอบเทียบ 16/05/68 | วันที่สอบเทียบครั้งต่อไป 15/05/69 | |
| เครื่อง Digital Thermohygro Meter S/N 385011742 | รหัสดำเนินงาน พ.พ.ล.01.85 | |
| วันที่สอบเทียบ 27/09/67 | วันที่สอบเทียบครั้งต่อไป 26/09/68 | |
| เครื่อง Sound Level Meter S/N 820956 | รหัสดำเนินงาน พ.พ.ล.02.25 | |
| วันที่สอบเทียบ 25/02/68 | วันที่สอบเทียบครั้งต่อไป 24/02/70 | |
| การทวนสอบก่อนออกจำหน่าย | | |
| อุณหภูมิ (°C) - | เกณฑ์การยอมรับ - | |
| ความชื้นสัมพัทธ์ (%) - | เกณฑ์การยอมรับ - | |
| วันที่ทวนสอบ - | วันที่ทวนสอบ - | |

| Item | ระดับเสียงที่วัดได้ (dB) (ความดังที่ 94.0dB) | ระดับเสียงที่วัดได้ (dB) (ความดังที่ 114.0dB) | Item | ระดับเสียงที่วัดได้ (dB) (ความดังที่ 94.0dB) | ระดับเสียงที่วัดได้ (dB) (ความดังที่ 114.0dB) |
|-----------------|---|--|-----------------|---|--|
| 1 | - | - | 1 | 93.8 | 113.8 |
| 2 | - | - | 2 | 93.8 | 113.8 |
| 3 | - | - | 3 | 93.8 | 113.8 |
| 4 | - | - | 4 | 93.8 | 113.8 |
| 5 | - | - | 5 | 93.8 | 113.8 |
| 6 | - | - | 6 | 93.8 | 113.8 |
| 7 | - | - | 7 | 93.8 | 113.8 |
| 8 | - | - | 8 | 93.8 | 113.8 |
| 9 | - | - | 9 | 93.8 | 113.8 |
| 10 | - | - | 10 | 93.8 | 113.8 |
| X | - | - | X | 93.80 | 113.80 |
| SD | - | - | SD | 0.00 | 0.00 |
| %RSD (≤ 10) | - | - | %RSD (≤ 10) | 0.00 | 0.00 |
| ผลการ ทวนสอบ | - | - | ผลการ ทวนสอบ | ผ่าน | ผ่าน |

ผู้บันทึก :
ผู้ตรวจสอบ :

ผู้บันทึก : วิชาญ
ผู้ตรวจสอบ : [Signature]



Certificate of Calibration

WL-21 Wireless Anemometer

Scarlet Tech Ltd. hereby certifies that the WL-21 wireless anemometer listed below was thoroughly calibrated, tested and inspected following the standard calibration procedure (st-wl-21) and is within manufacturer's specification at the time when the calibration is done

Client: Water Analysis Center Co., Ltd.
Serial: 2302DR0081 Sensor 2302DT0081
Calibration Date: 2025/3/28
Calibration Expiry Date: 2026/3/27

The Result of Calibration

| The Results Generation | | | | | |
|---------------------------------|--------------------|-----------|-----------|--------|--|
| Velocity | | | | | |
| Measured Value (m/s) | Actual Value (m/s) | Deviation | Tolerance | Result | |
| 1.0 | 0.9 | 0.1 | 0.9-1.1 | Pass | |
| 1.9 | 1.9 | 0.0 | 1.8-2.0 | Pass | |
| 4.9 | 5.0 | 0.1 | 4.7-5.3 | Pass | |
| 7.0 | 7.1 | 0.1 | 6.9-7.0 | Pass | |
| 10.0 | 10.0 | 0.0 | 9.5-10.5 | Pass | |
| 19.6 | 19.9 | 0.3 | 19.0-21.0 | Pass | |
| Wind direction | | | | | |
| Measured Value (m/s) | Actual Value (m/s) | Deviation | Tolerance | Result | |
| 49° | 49° | 0 | 42-48 | Pass | |
| 135° | 135° | 0 | 132-138 | Pass | |
| 226° | 226° | 0 | 222-228 | Pass | |
| 315° | 315° | 0 | 312-318 | Pass | |
| 359° | 0° | 0 | 357-3 | Pass | |
| Inspection Room Temp | Actual Value | Deviation | Tolerance | Result | |
| 22.2°C | 22.5 | 0.3 | 21.5-23.5 | Pass | |
| Atmospheric Pressure Inspection | Actual Value | Deviation | Tolerance | Result | |
| 1007 | 1004 | -3 | 1001-1019 | Pass | |

Environment Conditions:
Air temperature: 22 °C
Relative humidity: 55 %
Static pressure: 102.2 kPa

Performed by: [Signature]



This certificate may not be published or reproduced, except in full, unless obtaining permission in writing from Scarlet Tech Ltd.
4F-3, No. 347, 2nd Sec., Heping E. Rd., Daan Dist. Taipei City 106, Taiwan



Certificate of Calibration

WL-21 Wireless Anemometer

Scarlet Tech Ltd. hereby certifies that the WL-21 wireless anemometer listed below was thoroughly calibrated, tested and inspected following the standard calibration procedure (st-wl-21) and is within manufacturer's specification at the time when the calibration is done

Client: Water Analysis Center Co., Ltd.
Serial: 2302DR0083 Sensor 2302DT0083
Calibration Date: 2025/3/28
Calibration Expiry Date: 2026/3/27

The Result of Calibration

| Velocity | | | | | |
|---------------------------------|--------------------|-----------|-----------|--------|--|
| Measured Value (m/s) | Actual Value (m/s) | Deviation | Tolerance | Result | |
| 1.0 | 0.9 | 0.1 | 0.9-1.1 | Pass | |
| 1.9 | 2.0 | 0.1 | 1.8-2.2 | Pass | |
| 4.9 | 5.0 | 0.1 | 4.7-5.3 | Pass | |
| 7.0 | 7.1 | 0.1 | 6.9-7.0 | Pass | |
| 10.0 | 10.0 | 0.0 | 9.5-10.5 | Pass | |
| 19.6 | 20.0 | 0.4 | 19.0-21.0 | Pass | |
| Wind Direction | | | | | |
| Measured Value (m/s) | Actual Value (m/s) | Deviation | Tolerance | Result | |
| 49° | 49° | 0 | 43-48 | Pass | |
| 135° | 135° | 0 | 132-138 | Pass | |
| 226° | 226° | 0 | 222-228 | Pass | |
| 315° | 315° | 0 | 312-318 | Pass | |
| 359° | 0° | 0 | 357-3 | Pass | |
| Inspection Room Temp | Actual Value | Deviation | Tolerance | Result | |
| 22.2°C | 22.5 | 0.3 | 21.5-23.5 | Pass | |
| Atmospheric Pressure Inspection | Actual Value | Deviation | Tolerance | Result | |
| 1007 | 1005 | -2 | 1001-1019 | Pass | |

Environment Conditions:
Air temperature: 22 °C
Relative humidity: 55 %
Static pressure: 102.2 kPa

Performed by: [Signature]



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Certificate of Calibration

WL-21 Wireless Anemometer

Scarlet Tech Ltd. hereby certifies that the WL-21 wireless anemometer listed below was thoroughly calibrated, test and inspected following the standard calibration procedure (st-wt-21) and is within manufacture's specification at the time when the calibration is don

Client: Water Analysis Center Co., Ltd.
Serial: 2302DR0090 Sensor 2302DT0090
Calibration Date: 2025/3/28
Calibration Expiry Date: 2026/3/27

The Result of Calibration

| Velocity | | | | |
|----------------------|--------------------|-----------|-----------|--------|
| Measured Value (m/s) | Actual Value (m/s) | Deviation | Tolerance | Result |
| 1.0 | 1.0 | 0.0 | 0.0-1.1 | Pass |
| 1.9 | 1.9 | 0.0 | 1.0-2.2 | Pass |
| 4.9 | 5.0 | 0.1 | 4.7-5.3 | Pass |
| 7.0 | 7.1 | 0.1 | 6.0-8.0 | Pass |
| 10.0 | 10.0 | 0.0 | 9.5-10.5 | Pass |
| 19.6 | 19.9 | 0.3 | 19.0-20.9 | Pass |

| Wind Direction | | | | |
|----------------------|--------------------|-----------|-----------|--------|
| Measured Value (m/s) | Actual Value (m/s) | Deviation | Tolerance | Result |
| 49° | 49° | 1 | 42-48 | Pass |
| 135° | 135° | 0 | 133-138 | Pass |
| 226° | 226° | 0 | 222-228 | Pass |
| 316° | 315° | 1 | 312-318 | Pass |
| 359° | 0° | 1 | 357-3 | Pass |

| Inspection Room Temp | Actual Value | Deviation | Tolerance | Result |
|----------------------|--------------|-----------|-----------|--------|
| 22.2°C | 22.5 | 0.3 | 21.5-23.5 | Pass |

| Atmospheric Pressure Inspection | Actual Value | Deviation | Tolerance | Result |
|---------------------------------|--------------|-----------|-----------|--------|
| 1007 | 1004 | 3 | 1001-1019 | Pass |

Environment Conditions:
Air temperature: 22.2 °C
Relative humidity: 55. %
Static pressure: 102.2 kPa



Performed by:

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ENVIR SERVICE CO., LTD.
42 Ramintra 14 Yeak 9, Tho Raeng, Bang Khen, Bangkok 10230
Tel. 02-943581 4-5 Fax. 02-9438201 www.envirservice.co.th

Calibration Test

Calibrated Date: 06 May 2025

Certificate No. 027/25

Instruments Information

Manufacturer: YOUNG Instrument Type: four blade helioid propeller
Model: 40C Serial Number: Logger 309018964

Environment: Temperature 25.5 °C Humidity: 51 %RH

NATIONAL STANDARD WIND TUNNEL : Thermal Anemometer 642 S/N 91563
: HOOK GAGE NO 1425 : Wind Aloft Plotting Board
N.I.S.T. Test Reference Number 731/241460
: Ultrasonic Anemometer Model DA-650-3TV (sensor IR-90AH)
Serial Number 110730029 (sensor 120629586) JAPAN QUALITY ASSURANCE ORGANIZATION

| Standard Ultrasonic Anemometer m/sec | HOOK GAGE NO 1425 | | TESTED ANEMOMETER | | | |
|--------------------------------------|-------------------|---------------|-------------------|--------------|----------------|----------------|
| | Pressure inches | Vacuum inches | Pressure hPa | Pressure hPa | Correction hPa | Velocity m/sec |
| 1.00 | - | - | - | - | - | 0.8 0.20 |
| 3.02 | - | - | - | - | - | 2.7 0.32 |
| 5.04 | - | - | - | - | - | 4.9 0.14 |
| 7.08 | - | - | - | - | - | 6.9 0.13 |
| 9.01 | - | - | - | - | - | 8.8 0.21 |
| 11.03 | - | - | - | - | - | 10.7 0.33 |
| 13.01 | - | - | - | - | - | 12.6 0.41 |
| 15.03 | - | - | - | - | - | 14.4 0.63 |
| 17.05 | - | - | - | - | - | 16.5 0.55 |
| 20.02 | - | - | - | - | - | 19.3 0.72 |

| Wind Aloft Plotting Board. U.S. DEPARTMENT OF COMMERCE WEATHER BUREAU | | | |
|--|-----------------------|-----------|--------|
| WIND DIRECTION | TESTED WIND DIRECTION | Deviation | Result |
| 0 | 0 | 0 | Pass |
| 90 | 90 | 0 | Pass |
| 180 | 180 | 0 | Pass |
| 270 | 270 | 0 | Pass |

Calibrate By:
MR. KITTISAK JANSANGWATTANA

Approve by:
MR. PASAGORN SAMOL



Certificate of Calibration

WL-21 Wireless Anemometer

Scarlet Tech Ltd. hereby certifies that the WL-21 wireless anemometer listed below was thoroughly calibrated, test and inspected following the standard calibration procedure (st-wt-21) and is within manufacture's specification at the time when the calibration is don

Client: Water Analysis Center Co., Ltd.
Serial: 2311DR0044 Sensor 2311DT0044
Calibration Date: 2025/3/28
Calibration Expiry Date: 2026/3/27

The Result of Calibration

| Velocity | | | | |
|----------------------|--------------------|-----------|-----------|--------|
| Measured Value (m/s) | Actual Value (m/s) | Deviation | Tolerance | Result |
| 1.0 | 1.0 | 0.0 | 0.0-1.1 | Pass |
| 1.9 | 1.9 | 0.0 | 1.0-2.2 | Pass |
| 4.9 | 5.0 | 0.1 | 4.7-5.3 | Pass |
| 7.0 | 7.1 | 0.1 | 6.0-8.0 | Pass |
| 10.0 | 10.0 | 0.0 | 9.5-10.5 | Pass |
| 19.6 | 19.9 | 0.3 | 19.0-21.0 | Pass |

| Wind Direction | | | | |
|----------------------|--------------------|-----------|-----------|--------|
| Measured Value (m/s) | Actual Value (m/s) | Deviation | Tolerance | Result |
| 49° | 49° | 1 | 42-48 | Pass |
| 135° | 135° | 0 | 133-138 | Pass |
| 226° | 226° | 0 | 222-228 | Pass |
| 316° | 315° | 1 | 312-318 | Pass |
| 359° | 0° | 1 | 357-3 | Pass |

| Inspection Room Temp | Actual Value | Deviation | Tolerance | Result |
|----------------------|--------------|-----------|-----------|--------|
| 22.2°C | 22.5 | 0.3 | 21.5-23.5 | Pass |

| Atmospheric Pressure Inspection | Actual Value | Deviation | Tolerance | Result |
|---------------------------------|--------------|-----------|-----------|--------|
| 1007 | 1004 | 3 | 1001-1019 | Pass |

Environment Conditions:
Air temperature: 22 °C
Relative humidity: 55. %
Static pressure: 102.2 kPa



Performed by:

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