# เอกสารแนบ 15

## เอกสารอนุญาตห้องปฏิบัติการ

MM-C17

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท ตรวจวัดสิ่งแวดล้อม จำกัด เลขทะเบียน ว-๓๐๑
ที่ อก ๐๓๑๐(๑)/ ๒๖๔๓ ลงวันที่ ๓๑ มกราคม ๒๕๖๖

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๔ รายการ

<u>น้ำเสีย จำนวน 4 รายการ</u>

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 1 | Biochemical Oxygen Demand | 5-Day BOD Test, Membrane Electrode Method |
| 2 | pH | Electrometric Method |
| 3 | Total Dissolved Solids | Dried at 180 °C |
| 4 | Total Suspended Solids | Dried at [redacted] |

<u>เอกสารอ้างอิง</u>

APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 23rd ed. Washington, DC: APHA, 2017.

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ที่ อก ๐๓๑๐(๑)/ ๒๖๔๓

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๓๑ มกราคม ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท ตรวจวัดสิ่งแวดล้อม จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๘ ธันวาคม ๒๕๖๕

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท ตรวจวัดสิ่งแวดล้อม จำกัด จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท ตรวจวัดสิ่งแวดล้อม จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๓๐๑ สถานที่ตั้งเลขที่ ๕/๔๕ หมู่บ้าน บ้านกลางกรุง บิซทาวน์ ซอยศรีนครินทร์ ๔๖/๑ (ปราโมทย์) แขวงหนองบอน เขตประเวศ กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท ตรวจวัดสิ่งแวดล้อม จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

[redacted] อ

รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

[redacted]

ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

[redacted] า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”

MM-C17

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

CLC Accredited ISO/IEC 17025

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NSC-TISI-TIS 17025 CALIBRATION 0059 CLC

# REPORT OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | BALANCE |
| MANUFACTURER | : | METTLER TOLEDO |
| MODEL / TYPE | : | MS204TS/00 |
| SERIAL NO. | : | B935191252[LA-002] |
| LOCATION SITE | : | LABORATORY - BALANCE ROOM |
| DATE OF CALIBRATION | : | 27 February 2025 |

**ENVIRONMENT CONDITIONS :**

Temperature : 23 °C to 24 °C Relative Humidity : 49 % to 51 %

**PROCEDURE USED :**

This instrument was calibrated under procedure No. **WI-305-46** based on **EURAMET cg-18 Version 4.0 (11/2015).**

The calibration was performed by Comparison with Weight Set which maintained by the Calibration Laboratory Co., Ltd.

**REFERENCE STANDARD USED :**

Weight Set, Mettler Toledo Class E2 S/N. 158850.

**TRACEABILITY :**

The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).

Certificate No. MM-0165-23, Due Date 21 December 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)"

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NSC-TISI-TIS 17025 CALIBRATION 0059 CLC

# CERTIFICATE OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | BALANCE |
| MANUFACTURER | : | METTLER TOLEDO |
| MODEL / TYPE | : | MS204TS/00 |
| SERIAL NO. | : | B935191252[LA-002] |
| CLID. NO. | : | 362200356 |
| JOB CONTROL NO. | : | 250215018254 |
| CALIBRATION SERVICE | : | ☐ IN-LABORATORY ☑ ON-SITE |

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 15 February 2025 DATE OF ISSUED : 04 March 2025

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

Calibrated By : Chonvit Thongnat

Approved By : [redacted]

This Calibration Certificate d[redacted]e the units of measurement according to the



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CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
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ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17025 CALIBRATION AND DIMENSIONAL MEASUREMENT ACDM-2814

# CERTIFICATE OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | PRIMARY FLOW CALIBRATOR |
| MANUFACTURER | : | MESALABS |
| MODEL / TYPE | : | DEFENDER 510-M |
| SERIAL NO. | : | 172525 |
| CLID. NO. | : | 212401789 |
| JOB CONTROL NO. | : | 241010108770 |
| CALIBRATION SERVICE | : | ☑ IN-LABORATORY ☐ ON-SITE |

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 10 October 2024 DATE OF ISSUED : 15 October 2024

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

Calibrated By : Supphakit Sakuntaharn

[redacted]

This Calib [redacted] nt according to



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2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
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CLC Accredited ISO/IEC 17025

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NSC-TISI-TIS 17025 CALIBRATION 0059 CLC

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

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

## CALIBRATION DATA

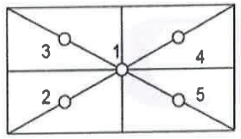
**1. Error of indications**

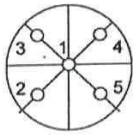
| Nominal Test Value ( g ) | Conventional mass ( g ) | Display Value ( g ) | Error of Balance ( g ) | Uncertainty ± ( mg ) | Coverage factor *k* |
|---|---|---|---|---|---|
| Unload | 0.0000 | 0.0000 | 0.0000 | 0.06 | 2,00 |
| 0.1000 | 0.1000 | 0.1000 | 0.0000 | 0.14 | 2,00 |
| 0.5000 | 0.5000 | 0.5000 | 0.0000 | 0.15 | 2,00 |
| 1.0000 | 1.0000 | 1.0001 | +0.0001 | 0.15 | 2,00 |
| 2.0000 | 2.0000 | 2.0001 | +0.0001 | 0.15 | 2,00 |
| 5.0000 | 5.0000 | 5.0000 | 0.0000 | 0.15 | 2,00 |
| 10.0000 | 10.0000 | 10.0001 | +0.0001 | 0.15 | 2,00 |

**2. Repeatability of indications**

| Nominal Test Value ( g ) | Standard Deviation of Reading ( g ) |
|---|---|
| 200.0000 | 0.00004 |

**3. Effect of eccentric application of a load on the indication**

☐ 


☑ 


| Nominal Test Value ( g ) | Display Value ( g ) | | | | | Maximum Difference of Center Value ( g ) |
|---|---|---|---|---|---|---|
| | Position 1 | Position 2 | Position 3 | Position 4 | Position 5 | |
| 100.0000 | 99.9999 | 100.0001 | 99.9999 | 99.9998 | 99.9998 | 0.0002 |

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

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

**### End of Certificate ###**



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ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17025 CALIBRATION AND DIMENSIONAL MEASUREMENT ACDM-2814

MM-C17

**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 primary flow calibrator.

**CALIBRATION DATA**

| DUC Setting ( L / min ) | STD Reading ( L / min ) | Correction ( L / min ) | Uncertainty ± ( L/min ) |
|---|---|---|---|
| 0.500 | 0.51828 | +0.01828 | 0.57735 |
| 1.000 | 1.0326 | +0.0326 | 0.5774 |
| 2.000 | 2.0561 | +0.0561 | 0.5774 |
| 5.000 | 5.1183 | +0.1183 | 0.5781 |

Technical Note. Media of Gas : Air

Setting Temperature 23 ° C ; Pressure 101.3 kPa

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 012 Page 48 of 67

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

**### End of Certificate ###**



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ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17025 CALIBRATION AND DIMENSIONAL MEASUREMENT ACDM-2814

# REPORT OF CALIBRATION

## FOR

| | | |
|---|---|---|
| **NOMENCLATURE** | : | **PRIMARY FLOW CALIBRATOR** |
| **MANUFACTURER** | : | **MESALABS** |
| **MODEL / TYPE** | : | **DEFENDER 510-M** |
| **SERIAL NO.** | : | **172525** |
| **DATE OF CALIBRATION** | : | **11 October 2024** |

**ENVIRONMENT CONDITIONS :**

**Temperature :** **(23 ± 2 ) °C** **Relative Humidity :** **(55 ± 10) % RH**

**PROCEDURE USED :**

This instrument was calibrated under procedure No. **CLC-CPPF-03.** The calibration was performed by comparison with Gas Flow Meter which refers to the standard condition of 101.325 kPa and 0 °C.

**REFERENCE STANDARD USED :**

Gas Flow Meter, Alicat Scientific Model M-5SLPM-D-DB15 S/N. 261330.

**TRACEABILITY :**

The measurements are traceable to International System of Units (SI), through Chell Intrument Ltd.

Certificate No. N037064, Due Date 26 February 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)"

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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. 344/23

3 October, 2023



| Standard | HOOK GAGE NO. 1425 | | | TESTED ANEMOMETER | |
|---|---|---|---|---|---|
| Ultrasonic Anemometer | Pressure | Vacumm | Velocity | Velocity | Correction |
| m/sec | inches H2O | inches H2O | m/sec | m/sec | m/sec |
| 1.00 | - | - | - | 0.95 | 0.05 |
| 3.02 | - | - | - | 2.85 | 0.17 |
| 5.00 | - | - | - | 4.95 | 0.05 |
| 7.00 | - | - | - | 6.85 | 0.15 |
| 9.02 | - | - | - | 8.95 | 0.07 |
| 11.01 | - | - | - | 10.85 | 0.16 |
| 13.01 | - | - | - | 12.99 | 0.02 |
| 15.01 | - | - | - | 15.10 | -0.09 |
| 17.02 | - | - | - | 16.98 | 0.04 |
| 20.02 | - | - | - | 20.13 | -0.11 |

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

Calibr [redacted]

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*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 3 October, 2023

Certification No. 344/23



Object : Wind speed and wind direction

Manufacturer : Sensor : NRG
Basic Datalogger : Symphonie

Type : Sensor : 40C Basic Datalogger : LR20

Serial No. : Sensor : 1795-00135858 Basic Datalogger : 309013229

Customer : Environmental Measurements Co.,Ltd.
5/45 Baan Klang Krung Biz Town, Soi Srinagarindra 46/1 (Pramote),
Nong Bon Sub-District, Prawet District, Bangkok 10250.

Calibration Condition : Temperature 25.1 °C Barometric Pressure 1011.3 hPa

NATIONAL STANDARD WIND TUNNEL :
: Thermal Anemometer 642 S/N 91563
: HOOK GAGE NO 1425 Pitot Tube Theodor Friedrichs Type 0800.0000 serial 9023
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

[redacted]

MM-C17

*Certificate No.: C2409-0836*

| | Pressure: | Temperature: | Relative humidity: |
|---|---|---|---|
| Environmental conditions: | | | |
| Reference conditions: | 101.325 kPa | 23.0 °C | 50 %RH |
| Measurement conditions: | 100.90 ± 0.01 kPa | 23.2 ± 1.1 °C | 58.2 ± 2.3 %RH |

**1. Sound pressure level**

| Specified sound pressure level (dB) | Measured sound pressure level (dB) | Deviated value (dB) | Tolerance limit IEC60942:2017 Class 1 (dB) |
|---|---|---|---|
| Reference microphone 40AU S/N 309231 | | | |
| 94.00 | 93.93 | 0.07 | ±0.25 |
| 114.00 | 114.01 | 0.01 | ±0.25 |

**2. Frequency**

| Specified Frequency (Hz) | Measured Frequency (Hz) | Deviated value (%) | Tolerance limit IEC60942:2017 Class 1 (%) |
|---|---|---|---|
| Reference microphone 40AU S/N 309231 | | | |
| 1000.00 | 1000.30 | 0.03 | ±0.7 |
| 1000.00 | 1000.18 | 0.02 | ±0.7 |

**3. Total distortion + Noise**

| Specified sound pressure level (dB) | Measured Distortion (%) | Tolerance limit IEC60942:2017 Class 1 (%) |
|---|---|---|
| Reference Sound Analyser Nor140 S/N 1405248 | | |
| 94.00 | 0.50 | ±2.5 |
| 114.00 | 1.10 | ±2.5 |

**Uncertainty of measurement**

| Parameters | Uncertainty |
|---|---|
| Sound pressure level | 0.10 dB |
| Frequency | 0.020 % |
| Total distortion + Noise | 0.10 % |

**Date of calibration:** 2024-09-30
**Date of issue :** 2024-10-02

[redacted]



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**Acoustic Laboratory (Thailand) Co., Ltd.**
6/57 Soi Phoem Sin 42, Sai Mai, Sai Mai, Bangkok 10220
Tel: (+66) 02-1296780 Email: info@altbkk.com

# *Certificate of Calibration*

*Certificate No.: C2409-0836*

**Customer:** ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 Baan Klang Krung Biz Town, Soi Srinagarindra
46/1 (Pramote), NONG BON Sub-district,
PRAWET District, BANGKOK 10250

**Date of calibration:** 2024-09-30
**Date of issue:** 2024-10-02
**Instrument Calibrated:** Sound Calibrator
**Manufacturer:** BSWA
**Type:** CA111
**Serial no:** 550482

**Calibration and verification performed:**
The performed tests refer to IEC 60942 (2017): Electro-acoustics - Sound Calibrators. The calibrator has been tested as described in Annex B of the same standard.

**Preconditioning:**
The equipment was preconditioned for more than 16 hours at the specified calibration temperature and humidity

**Instruments and Program:**
A complete list of instruments, hardware, and software, that has been used for this calibration is separately available from the calibration laboratory.

**Equipment standards used:**
-Sound Measuring Equipment Calibration Unit 483B S/N31083
-Digital Multimeter Keysight S/N HP34401A
-Ultra-low Distortion Function Generator Stanford SRS DS360 S/N123625
-Acoustic Sound Calibrator Class 0 Nor1253 S/N32941
-Reference Microphone Condenser G.R.A.S. 40AU-1 S/N309231
-Sound Analyser Nor140 S/N1405248
-Combined Pressure, Humidity and Temperature Transmitter PTU300 S/NM2520568

**Traceability**
The measured values are traceable to following the ISO/IEC 17025 laboratories:
Sound Pressure Level: NCL, Norway
Reference microphone: NCL, Norway
Voltage: TPA, Thailand
Frequency: TPA, Thailand
Reference Pressure, Humidity and Temperature: TPA, Thailand
Distortion Meter: EEI,Thailand

This certificate of calibration is issued by Acoustic Laboratory Thailand (ALT). It also states that the laboratory has a satisfactory quality assurance system and traceability to accredited or national calibration laboratories. This certificate may not be reproduced other than in full.

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**Acoustic Laboratory (Thailand) Co., Ltd.**
6/57 Soi Phoem Sin 42, Sai Mai, Sai Mai, Bangkok 10220
Tel: (+66) 02-1296780 Email: info@altbkk.com

# *Certificate of Calibration*

*Certificate No.: S2409-0833*

**Customer:** ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 Baan Klang Krung Biz Town, Soi Srinagarindra
46/1 (Pramote), NONG BON Sub-district,
PRAWET District, BANGKOK 10250

**Date of calibration:** 2024-10-01
**Date of issue:** 2024-10-02
**Instrument Calibrated:** Noise Dosimeter
**Manufacturer:** SOUNDTEK
**Model:** ST-130
**Serial no:** 170800130

**Calibration and verification performed:**
Acoustical levels are stated relative to 20μPa. Other dB levels are relative values.
The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k, which with the reported effective degree of freedom corresponds to coverage probability of approximately 95%.
The sound level meter instrument submitted for periodic testing following the periodic tests of IEC 61672-3 : 2013.

**Preconditioning:**
The equipment was preconditioned for more than 16 hours at the specified calibration temperature and humidity.

**Instruments and Program:**
A complete list of instruments, hardware, and software, that has been used for this calibration is separately available from the calibration laboratory.

**Equipment standards used:**
- Sound measuring equipment calibration unit Nor140 S/N1405248
- Acoustic sound calibrator class 1 Nor1256 S/N125626542
- Combined Pressure, Humidity and Temperature Transmitter PTU300 S/NM2520568

**Traceability**
The measured values are traceable to following the ISO/IEC 17025 laboratories:
Sound Pressure Level: EEI, Thailand
Reference Pressure, Humidity and Temperature: TPA, Thailand

This certificate of calibration is issued by Acoustic Laboratory Thailand (ALT). It also states that the laboratory has a satisfactory quality assurance system and traceability to accredited or national calibration laboratories. This certificate may not be reproduced other than in full.



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*Certificate No.: C2409-0836*

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

Calibı [redacted] .....

**Date of**
**Date of**

-------- **End of Calibration Certificate** -------

[redacted]

MM-C17

ALT Acoustic Laboratory Thailand

*Certificate No.: S2409-0833*

**C-Weighting acoustic frequency response meter free-field acoustic response at a level of 80.0 dB**

| Frequency Weighting (Hz) | Deviation from various frequency weighting response curve | | |
|---|---|---|---|
| | C-Weighting (dB) | Uncertainty (dB) | Acceptance limit (dB) |
| 125 | 0.4 | 0.20 | ±1.5 |
| 1000 | 0.0 | 0.20 | ±1.0 |
| 8000 | 1.3 | 0.20 | ±5.0 |

**Note: Acoustical signal test of frequency weightings are not accredited**

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

Calibra [redacted]

**Date of calibration :** 2024-10-01
**Date of issue :** 2024-10-02

-------- End of Calibration Certificate -------

[redacted]



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ALT Acoustic Laboratory Thailand

*Certificate No.: S2409-0833*

| Environmental conditions: | Pressure: | Temperature: | Relative humidity: |
|---|---|---|---|
| Reference conditions: | 101.325 kPa | 23.0 °C | 50 %RH |
| Measurement conditions: | 100.78 ± 0.10 kPa | 22.9 ± 0.5 °C | 52.5 ± 5.0 %RH |

**1. Indication at the calibration check frequency**

| Reference Acoustic Signal (dB) | Measured value (dB) | | Deviated value (dB) | Uncertainty (dB) | Acceptant limit (dB) |
|---|---|---|---|---|---|
| | Before adjust | After adjust | | | |
| 93.9 | 94.1 | 93.9 | 0.0 | 0.12 | ±1.0 |

Note: Indication at the checked calibration frequency was adjusted to 93.9 dB by the sound calibrator BSWA model:CA111 S/N:550482

**2. Frequency Weighting at 1 kHz**

| Frequency Weighting | Measured value (dB) | Deviated value (dB) | Uncertainty (dB) | Acceptance limit (dB) |
|---|---|---|---|---|
| A-Weighting | 94.0 | 0.0 | 0.20 | ±0.3 |
| C-Weighting | 94.0 | 0.0 | 0.20 | ±0.3 |

**Note: Frequency weighting at 1 kHz are not accredited**

**3. Time Weighting at 1 kHz**

| Time Weighting | Measured value (dB) | Deviated value (dB) | Uncertainty (dB) | Acceptance limit (dB) |
|---|---|---|---|---|
| Fast | 94.0 | 0.0 | 0.20 | ±0.3 |
| Slow | 94.0 | 0.0 | 0.20 | ±0.3 |

**Note: Time Weighting at 1 kHz are not accredited**

**4. Acoustical signal test of frequency weightings**

**A-Weighting acoustic frequency response meter free-field acoustic response at a level of 80.0 dB**

| Frequency Weighting (Hz) | Deviation from various frequency weighting response curve | | |
|---|---|---|---|
| | A-Weighting (dB) | Uncertainty (dB) | Acceptance limit (dB) |
| 125 | 0.2 | 0.20 | ±1.5 |
| 1000 | 0.0 | 0.20 | ±1.0 |
| 8000 | 0.6 | 0.20 | ±5.0 |

**Note: Acoustical signal test of frequency weightings are not accredited**

**Date of calibration :** 2024-10-01
**Date of issue :** 2024-10-02

[redacted]

MM-C17

Acoustic Laboratory Thailand

*Certificate No.: S2409-0834*

| Environmental conditions: | Pressure: | Temperature: | Relative humidity: |
|---|---|---|---|
| Reference conditions: | 101.325 kPa | 23.0 °C | 50 %RH |
| Measurement conditions: | 100.38 ± 0.50 kPa | 23.0 ± 0.5 °C | 53.4 ± 5.0 %RH |

**1. Indication at the calibration check frequency**

| Reference Acoustic Signal (dB) | Measured value (dB) | | Deviated value (dB) | Uncertainty (dB) | Acceptant limit (dB) |
|---|---|---|---|---|---|
| | Before adjust | After adjust | | | |
| 93.9 | 94.1 | 93.9 | 0.0 | 0.12 | ±1.0 |

Note: Indication at the checked calibration frequency was adjusted to 93.9 dB by the sound calibrator BSWA model:CA111 S/N:550482

**2. Frequency Weighting at 1 kHz**

| Frequency Weighting | Measured value (dB) | Deviated value (dB) | Uncertainty (dB) | Acceptance limit (dB) |
|---|---|---|---|---|
| A-Weighting | 94.0 | 0.0 | 0.20 | ±0.3 |
| C-Weighting | 93.9 | 0.0 | 0.20 | ±0.3 |

**Note: Frequency weighting at 1 kHz are not accredited**

**3. Time Weighting at 1 kHz**

| Time Weighting | Measured value (dB) | Deviated value (dB) | Uncertainty (dB) | Acceptance limit (dB) |
|---|---|---|---|---|
| Fast | 94.0 | 0.0 | 0.20 | ±0.3 |
| Slow | 94.0 | 0.0 | 0.20 | ±0.3 |

**Note: Time Weighting at 1 kHz are not accredited**

**4. Acoustical signal test of frequency weightings**

**A-Weighting acoustic frequency response meter free-field acoustic response at a level of 80.0 dB**

| Frequency Weighting (Hz) | Deviation from various frequency weighting response curve | | |
|---|---|---|---|
| | A-Weighting (dB) | Uncertainty (dB) | Acceptance limit (dB) |
| 125 | 0.1 | 0.20 | ±1.5 |
| 1000 | 0.0 | 0.20 | ±1.0 |
| 8000 | 1.9 | 0.20 | ±5.0 |

**Note: Acoustical signal test of frequency weightings are not accredited**

**Date of calibration :** 2024-10-01
**Date of Issue :** 2024-10-02

[redacted]



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Acoustic Laboratory Thailand

**Acoustic Laboratory (Thailand) Co., Ltd.**
6/57 Soi Phoem Sin 42, Sai Mai, Sai Mai, Bangkok 10220
Tel: (+66) 02-1296780 Email: info@altbkk.com

# *Certificate of Calibration*

*Certificate No.: S2409-0834*

**Customer:** ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 Baan Klang Krung Biz Town, Soi Srinagarindra
46/1 (Pramote), NONG BON Sub-district,
PRAWET District, BANGKOK 10250

**Date of calibration:** 2024-10-01
**Date of issue:** 2024-10-02
**Instrument Calibrated:** Noise Dosimeter
**Manufacturer:** SOUNDTEK
**Model:** ST-130
**Serial no:** 170800167

**Calibration and verification performed:**
Acoustical levels are stated relative to 20μPa. Other dB levels are relative values.
The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k, which with the reported effective degree of freedom corresponds to coverage probability of approximately 95%.
The sound level meter instrument submitted for periodic testing following the periodic tests of IEC 61672-3 : 2013.

**Preconditioning:**
The equipment was preconditioned for more than 16 hours at the specified calibration temperature and humidity.

**Instruments and Program:**
A complete list of instruments, hardware, and software, that has been used for this calibration is separately available from the calibration laboratory.

**Equipment standards used:**
- Sound measuring equipment calibration unit Nor140 S/N1405248
- Acoustic sound calibrator class 1 Nor1256 S/N125626542
- Combined Pressure, Humidity and Temperature Transmitter PTU300 S/NM2520568

**Traceability**
The measured values are traceable to following the ISO/IEC 17025 laboratories:
Sound Pressure Level: EEI, Thailand
Reference Pressure, Humidity and Temperature: TPA, Thailand

This certificate of calibration is issued by Acoustic Laboratory Thailand (ALT). It also states that the laboratory has a satisfactory quality assurance system and traceability to accredited or national calibration laboratories. This certificate may not be reproduced other than in full.

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**Acoustic Laboratory (Thailand) Co., Ltd.**
6/57 Soi Phoem Sin 42, Sai Mai, Sai Mai, Bangkok 10220
Tel: (+66) 02-1296780 Email: info@altbkk.com

# *Certificate of Calibration*

*Certificate No.: S2409-0835*

**Customer:** ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 Baan Klang Krung Biz Town, Soi Srinagarindra
46/1 (Pramote), NONG BON Sub-district,
PRAWET District, BANGKOK 10250

**Date of calibration:** 2024-10-01
**Date of issue:** 2024-10-02
**Instrument Calibrated:** Noise Dosimeter
**Manufacturer:** SOUNDTEK
**Model:** ST-130
**Serial no:** 170800266

**Calibration and verification performed:**
Acoustical levels are stated relative to 20μPa. Other dB levels are relative values.
The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k, which with the reported effective degree of freedom corresponds to coverage probability of approximately 95%.
The sound level meter instrument submitted for periodic testing following the periodic tests of IEC 61672-3 : 2013.

**Preconditioning:**
The equipment was preconditioned for more than 16 hours at the specified calibration temperature and humidity.

**Instruments and Program:**
A complete list of instruments, hardware, and software, that has been used for this calibration is separately available from the calibration laboratory.

**Equipment standards used:**
- Sound measuring equipment calibration unit Nor140 S/N1405248
- Acoustic sound calibrator class 1 Nor1256 S/N125626542
- Combined Pressure, Humidity and Temperature Transmitter PTU300 S/NM2520568

**Traceability**
The measured values are traceable to following the ISO/IEC 17025 laboratories:
Sound Pressure Level: EEI, Thailand
Reference Pressure, Humidity and Temperature: TPA, Thailand

This certificate of calibration is issued by Acoustic Laboratory Thailand (ALT). It also states that the laboratory has a satisfactory quality assurance system and traceability to accredited or national calibration laboratories. This certificate may not be reproduced other than in full.

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*Certificate No.: S2409-0834*

**C-Weighting acoustic frequency response meter free-field acoustic response at a level of 80.0 dB**

| Frequency Weighting (Hz) | Deviation from various frequency weighting response curve | | |
|---|---|---|---|
| | C-Weighting (dB) | Uncertainty (dB) | Acceptance limit (dB) |
| 125 | 1.0 | 0.20 | ±1.5 |
| 1000 | -0.1 | 0.20 | ±1.0 |
| 8000 | 2.5 | 0.20 | ±5.0 |

**Note: Acoustical signal test of frequency weightings are not accredited**

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

Cali [redacted]

**Date of calibration :** 2024-10-01
**Date of issue :** 2024-10-02

**------- End of Calibration Certificate -------**

[redacted]

MM-C17

ALT Acoustic Laboratory Thailand

*Certificate No.: S2409-0835*

**C-Weighting acoustic frequency response meter free-field acoustic response at a level of 80.0 dB**

| Frequency Weighting (Hz) | Deviation from various frequency weighting response curve | | |
|---|---|---|---|
| | C-Weighting (dB) | Uncertainty (dB) | Acceptance limit (dB) |
| 125 | 0.5 | 0.20 | ±1.5 |
| 1000 | 0.3 | 0.20 | ±1.0 |
| 8000 | 4.5 | 0.20 | ±5.0 |

**Note: Acoustical signal test of frequency weightings are not accredited**

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

Calibr [redacted]

**Date of c**[redacted]

**Date of issue :** 2024-10-02

**-------- End of Calibration Certificate -------**

[redacted]



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ALT Acoustic Laboratory Thailand

*Certificate No.: S2409-0835*

| | | | |
|---|---|---|---|
| Environmental conditions: | Pressure: | Temperature: | Relative humidity: |
| Reference conditions: | 101.325 kPa | 23.0 °C | 50 %RH |
| Measurement conditions: | 100.38 ± 0.50 kPa | 23.0 ± 0.5 °C | 53.4 ± 5.0 %RH |

**1. Indication at the calibration check frequency**

| Reference Acoustic Signal (dB) | Measured value (dB) | | Deviated value (dB) | Uncertainty (dB) | Acceptant limit (dB) |
|---|---|---|---|---|---|
| | Before adjust | After adjust | | | |
| 93.9 | 94.1 | 93.9 | 0.0 | 0.12 | ±1.0 |

Note: Indication at the checked calibration frequency was adjusted to 93.9 dB by the sound calibrator BSWA model:CA111 S/N:550482

**2. Frequency Weighting at 1 kHz**

| Frequency Weighting | Measured value (dB) | Deviated value (dB) | Uncertainty (dB) | Acceptance limit (dB) |
|---|---|---|---|---|
| A-Weighting | 94.0 | 0.0 | 0.20 | ±0.3 |
| C-Weighting | 94.1 | 0.0 | 0.20 | ±0.3 |

**Note: Frequency weighting at 1 kHz are not accredited**

**3. Time Weighting at 1 kHz**

| Time Weighting | Measured value (dB) | Deviated value (dB) | Uncertainty (dB) | Acceptance limit (dB) |
|---|---|---|---|---|
| Fast | 94.0 | 0.0 | 0.20 | ±0.3 |
| Slow | 94.0 | 0.0 | 0.20 | ±0.3 |

**Note: Time Weighting at 1 kHz are not accredited**

**4. Acoustical signal test of frequency weightings**

**A-Weighting acoustic frequency response meter free-field acoustic response at a level of 80.0 dB**

| Frequency Weighting (Hz) | Deviation from various frequency weighting response curve | | |
|---|---|---|---|
| | A-Weighting (dB) | Uncertainty (dB) | Acceptance limit (dB) |
| 125 | 0.9 | 0.20 | ±1.5 |
| 1000 | 0.2 | 0.20 | ±1.0 |
| 8000 | 3.3 | 0.20 | ±5.0 |

**Note: Acoustical signal test of frequency weightings are not accredited**

**Date of calibration :** 2024-10-01
**Date of Issue :** 2024-10-02

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www.altbkk.com

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ALT Acoustic Laboratory Thailand

*Certificate No.: S2409-0831*

| | | | |
|---|---|---|---|
| Environmental conditions: | Pressure: | Temperature: | Relative humidity: |
| Reference conditions: | 101.325 kPa | 23.0 °C | 50 %RH |
| Measurement conditions: | 100.38 ± 0.50 kPa | 23.0 ± 0.5 °C | 53.4 ± 5.0 %RH |

**1. Indication at the calibration check frequency**

| Reference Acoustic Signal (dB) | Measured value (dB) | | Deviated value (dB) | Uncertainty (dB) | Acceptant limit (dB) |
|---|---|---|---|---|---|
| | Before adjust | After adjust | | | |
| 93.9 | 93.8 | 93.9 | 0.0 | 0.12 | ±1.0 |

Note: Indication at the checked calibration frequency was adjusted to 93.9 dB by the sound calibrator BSWA model:CA111 S/N:550482

**2. Frequency Weighting at 1 kHz**

| Frequency Weighting | Measured value (dB) | Deviated value (dB) | Uncertainty (dB) | Acceptance limit (dB) |
|---|---|---|---|---|
| A-Weighting | 94.0 | 0.0 | 0.20 | ±0.3 |
| C-Weighting | 94.0 | 0.0 | 0.20 | ±0.3 |

**Note: Frequency weighting at 1 kHz are not accredited**

**3. Time Weighting at 1 kHz**

| Time Weighting | Measured value (dB) | Deviated value (dB) | Uncertainty (dB) | Acceptance limit (dB) |
|---|---|---|---|---|
| Fast | 94.0 | 0.0 | 0.20 | ±0.3 |
| Slow | 94.0 | 0.0 | 0.20 | ±0.3 |

**Note: Time Weighting at 1 kHz are not accredited**

**4. Acoustical signal test of frequency weightings**

**A-Weighting acoustic frequency response meter free-field acoustic response at a level of 80.0 dB**

| Frequency Weighting (Hz) | Deviation from various frequency weighting response curve | | |
|---|---|---|---|
| | A-Weighting (dB) | Uncertainty (dB) | Acceptance limit (dB) |
| 125 | -0.7 | 0.20 | ±1.5 |
| 1000 | 0.0 | 0.20 | ±1.0 |
| 8000 | -0.4 | 0.20 | ±5.0 |

**Note: Acoustical signal test of frequency weightings are not accredited**

**Date of calibration :** 2024-10-02
**Date of issue :** 2024-10-03

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ALT Acoustic Laboratory Thailand

**Acoustic Laboratory (Thailand) Co., Ltd.**
6/57 Soi Phoem Sin 42, Sai Mai, Sai Mai, Bangkok 10220
Tel: (+66) 02-1296780 Email: info@altbkk.com

ilac-MRA NSC-TISI-TIS 17025 CALIBRATION 0468

# *Certificate of Calibration*

*Certificate No.: S2409-0831*

**Customer:** ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 Baan Klang Krung Biz Town, Soi Srinagarindra
46/1 (Pramote), NONG BON Sub-district,
PRAWET District, BANGKOK 10250

**Date of calibration:** 2024-10-02
**Date of issue:** 2024-10-03
**Instrument Calibrated:** Noise Dosimeter
**Manufacturer:** SOUNDTEK
**Model:** ST-130
**Serial no:** 170800271

**Calibration and verification performed:**
Acoustical levels are stated relative to 20μPa. Other dB levels are relative values.
The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k, which with the reported effective degree of freedom corresponds to coverage probability of approximately 95%.
The sound level meter instrument submitted for periodic testing following the periodic tests of IEC 61672-3 : 2013.

**Preconditioning:**
The equipment was preconditioned for more than 16 hours at the specified calibration temperature and humidity.

**Instruments and Program:**
A complete list of instruments, hardware, and software, that has been used for this calibration is separately available from the calibration laboratory.

**Equipment standards used:**
- Sound measuring equipment calibration unit Nor140 S/N1405248
- Acoustic sound calibrator class 1 Nor1256 S/N125626542
- Combined Pressure, Humidity and Temperature Transmitter PTU300 S/NM2520568

**Traceability**
The measured values are traceable to following the ISO/IEC 17025 laboratories:
Sound Pressure Level: EEI, Thailand
Reference Pressure, Humidity and Temperature: TPA, Thailand

This certificate of calibration is issued by Acoustic Laboratory Thailand (ALT). It also states that the laboratory has a satisfactory quality assurance system and traceability to accredited or national calibration laboratories. This certificate may not be reproduced other than in full.

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**Acoustic Laboratory (Thailand) Co., Ltd.**
6/57 Soi Phoem Sin 42, Sai Mai, Sai Mai, Bangkok 10220
Tel: (+66) 02-1296780 Email: info@altbkk.com

# *Certificate of Calibration*

*Certificate No.: S2409-0832*

**Customer:** ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 Baan Klang Krung Biz Town, Soi Srinagarindra
46/1 (Pramote), NONG BON Sub-district,
PRAWET District, BANGKOK 10250

**Date of calibration:** 2024-10-01
**Date of issue:** 2024-10-02
**Instrument Calibrated:** Noise Dosimeter
**Manufacturer:** SOUNDTEK
**Model:** ST-130
**Serial no:** 170800288

**Calibration and verification performed:**
Acoustical levels are stated relative to 20μPa. Other dB levels are relative values.
The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k, which with the reported effective degree of freedom corresponds to coverage probability of approximately 95%.
The sound level meter instrument submitted for periodic testing following the periodic tests of IEC 61672-3 : 2013.

**Preconditioning:**
The equipment was preconditioned for more than 16 hours at the specified calibration temperature and humidity.

**Instruments and Program:**
A complete list of instruments, hardware, and software, that has been used for this calibration is separately available from the calibration laboratory.

**Equipment standards used:**
- Sound measuring equipment calibration unit Nor140 S/N1405248
- Acoustic sound calibrator class 1 Nor1256 S/N125626542
- Combined Pressure, Humidity and Temperature Transmitter PTU300 S/NM2520568

**Traceability**
The measured values are traceable to following the ISO/IEC 17025 laboratories:
Sound Pressure Level: EEI, Thailand
Reference Pressure, Humidity and Temperature: TPA, Thailand

This certificate of calibration is issued by Acoustic Laboratory Thailand (ALT). It also states that the laboratory has a satisfactory quality assurance system and traceability to accredited or national calibration laboratories. This certificate may not be reproduced other than in full.

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*Certificate No.: S2409-0831*

**C-Weighting acoustic frequency response meter free-field acoustic response at a level of 80.0 dB**

| Frequency Weighting (Hz) | Deviation from various frequency weighting response curve | | |
|---|---|---|---|
| | C-Weighting (dB) | Uncertainty (dB) | Acceptance limit (dB) |
| 125 | -0.1 | 0.20 | ±1.5 |
| 1000 | 0.0 | 0.20 | ±1.0 |
| 8000 | -0.3 | 0.20 | ±5.0 |

**Note: Acoustical signal test of frequency weightings are not accredited**

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

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**Date of calibration :** 2024-10-02
**Date of issue :** 2024-10-03

**------- End of Calibration Certificate -------**

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ALT Acoustic Laboratory Thailand

*Certificate No.: S2409-0832*

**C-Weighting acoustic frequency response meter free-field acoustic response at a level of 80.0 dB**

| Frequency Weighting (Hz) | Deviation from various frequency weighting response curve | | |
|---|---|---|---|
| | C-Weighting (dB) | Uncertainty (dB) | Acceptance limit (dB) |
| 125 | 0.1 | 0.20 | ±1.5 |
| 1000 | 0.1 | 0.20 | ±1.0 |
| 8000 | 3.0 | 0.20 | ±5.0 |

**Note: Acoustical signal test of frequency weightings are not accredited**

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

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**Date of calibration :** 2024-10-01
**Date of issue :** 2024-10-02

-------- End of Calibration Certificate -------

[redacted]



ALT Acoustic Laboratory Thailand

*Certificate No.: S2409-0832*

| Environmental conditions: | Pressure: | Temperature: | Relative humidity: |
|---|---|---|---|
| Reference conditions: | 101.325 kPa | 23.0 °C | 50 %RH |
| Measurement conditions: | 100.38 ± 0.50 kPa | 23.0 ± 0.5 °C | 53.4 ± 5.0 %RH |

**1. Indication at the calibration check frequency**

| Reference Acoustic Signal (dB) | Measured value (dB) | | Deviated value (dB) | Uncertainty (dB) | Acceptant limit (dB) |
|---|---|---|---|---|---|
| | Before adjust | After adjust | | | |
| 93.9 | 93.6 | 93.9 | 0.0 | 0.12 | ±1.0 |

Note: Indication at the checked calibration frequency was adjusted to 93.9 dB by the sound calibrator BSWA model:CA111 S/N:550482

**2. Frequency Weighting at 1 kHz**

| Frequency Weighting | Measured value (dB) | Deviated value (dB) | Uncertainty (dB) | Acceptance limit (dB) |
|---|---|---|---|---|
| A-Weighting | 94.0 | 0.0 | 0.20 | ±0.3 |
| C-Weighting | 94.1 | 0.0 | 0.20 | ±0.3 |

**Note: Frequency weighting at 1 kHz are not accredited**

**3. Time Weighting at 1 kHz**

| Time Weighting | Measured value (dB) | Deviated value (dB) | Uncertainty (dB) | Acceptance limit (dB) |
|---|---|---|---|---|
| Fast | 94.0 | 0.0 | 0.20 | ±0.3 |
| Slow | 94.1 | 0.1 | 0.20 | ±0.3 |

**Note: Time Weighting at 1 kHz are not accredited**

**4. Acoustical signal test of frequency weightings**

**A-Weighting acoustic frequency response meter free-field acoustic response at a level of 80.0 dB**

| Frequency Weighting (Hz) | Deviation from various frequency weighting response curve | | |
|---|---|---|---|
| | A-Weighting (dB) | Uncertainty (dB) | Acceptance limit (dB) |
| 125 | 0.0 | 0.20 | ±1.5 |
| 1000 | -0.2 | 0.20 | ±1.0 |
| 8000 | 2.2 | 0.20 | ±5.0 |

**Note: Acoustical signal test of frequency weightings are not accredited**

**Date of calibration :** 2024-10-01
**Date of Issue :** 2024-10-02

[redacted]



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CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
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NSC-TISI-TIS 17025 CALIBRATION 0059 CLC

MM-C17

# REPORT OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | pH METER |
| MANUFACTURER | : | APERA |
| MODEL / TYPE | : | PH700/201T-F |
| SERIAL NO. | : | PH700X1019061009/N/A [LA-008/PH-02] |
| DATE OF CALIBRATION | : | 11 April 2025 |

**ENVIRONMENT CONDITIONS :**

Temperature : (25 ± 2.5 ) °C Relative Humidity : (50 ± 15) % RH

**PROCEDURE USED :**

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

**REFERENCE STANDARD USED :**

1. pH Standard Solution, NIMT TRM CODE TRM-S-2003, TRM CODE TRM-S-2007.
2. pH Standard Solution, Control Company Catalog Number 06664260,11754256, Lot Number CC787362.
3. Calibration Bath, Kambic Model OB-22/2 ULT S/N. 17115653.
4. Precision Thermometer, ASL Model F250 S/N. 1334023800.
5. IPRT, Wika Model CTP5000-250-D S/N. PO00043543-1-10-1.

Certificate No. Q25042961

F3-011-05/12-23



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CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
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NSC-TISI-TIS 17025 CALIBRATION 0059 CLC

# CERTIFICATE OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | pH METER |
| MANUFACTURER | : | APERA |
| MODEL / TYPE | : | PH700/201T-F |
| SERIAL NO. | : | PH700X1019061009/N/A [LA-008/PH-02] |
| CLID. NO. | : | 272401000 |
| JOB CONTROL NO. | : | 250410042961 |
| CALIBRATION SERVICE | : | ☑ IN-LABORATORY ☐ ON-SITE |

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 10 April 2025 DATE OF ISSUED : 18 April 2025

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

Calibrated By : [redacted]

Approved By :

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

Certificate No. Q25042961

F3-011-05/12-23



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2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
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CLC Accredited ISO/IEC 17025
NSC-TISI-TIS 17025 CALIBRATION 0059 CLC

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

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

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

**CALIBRATION DATA**

**1. pH METER RESULT @ 25 °C**

| Standard pH Buffer Solution ( pH ) | pH Meter Reading ( pH ) | pH Meter Reading ( mV ) | Correction ( pH ) | Uncertainty of Measurement (± pH) | *k* Factor |
|---|---|---|---|---|---|
| 4.003 | 4.01 | 134 | -0.007 | 0.014 | 2,00 |
| 7.005 | 7.00 | -43 | +0.005 | 0.014 | 2,00 |
| 10.015 | 10.01 | -208 | +0.005 | 0.100 | 2,05 |

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

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

***2. TEMPERATURE RESULT**

| Immersion depth (mm) | Actual Temperature ( °C ) | DUC Reading ( °C ) | Correction ( °C ) | Uncertainty ± ( °C ) |
|---|---|---|---|---|
| 100 | 25.01 | 24.9 | +0.11 | 0.07 |

Technical Note. Type of sensor : pH Probe

Probe ∅ 12 mm

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of $k = 2,00$.

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

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

**### End of Certificate ###**



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NSC-TISI-TIS 17025 CALIBRATION 0059 CLC

**TRACEABILITY :**

1. The measurements are traceable to International System of Units (SI) , through National Institute of Metrology (Thailand). Lot Number. 080124 , 120124. Due Date 23 January 2026.
2. The measurements are traceable to International System of Units (SI) , through Control Company. Certificate No. 4281-14495731 , Due Date 27 September 2025.
3. The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd. Certificate No. Q24120999, Due Date 26 November 2025.
4. The measurements are traceable to International System of Units (SI) , through Thailand Institute of Scientific and Technological Research (TISTR). Certificate No. PSL-T 1042/67, Due Date 16 October 2025.
5. The measurements are traceable to International System of Units (SI) , through National Institute of Metrology (Thailand). Certificate No. TT-0146-24, Due Date 28 October 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)"

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ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17025 CALIBRATION AND DIMENSIONAL MEASUREMENT ACDM-2814

# REPORT OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | DO METER |
| MANUFACTURER | : | YSI |
| MODEL / TYPE | : | 5000-230V/5010 |
| SERIAL NO. | : | 16D101626/19D100367[DOM-01] |
| DATE OF CALIBRATION | : | 11 April 2025 |

**ENVIRONMENT CONDITIONS :**

Temperature : (25 ± 2.5) °C Relative Humidity : (50 ± 15) %RH

**PROCEDURE USED :**

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

**REFERENCE STANDARD USED :**

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

**TRACEABILITY :**

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 $k = 2{,}00$ 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. Q25042960

F3-011-05/12-23



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# CERTIFICATE OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | DO METER |
| MANUFACTURER | : | YSI |
| MODEL / TYPE | : | 5000-230V/5010 |
| SERIAL NO. | : | 16D10162 |
| CLID. NO. | : | 272100329 |
| JOB CONTROL NO. | : | 250410042960 |
| CALIBRATION SERVICE | : | ☑ IN-LABORATORY ☐ ON-SITE |

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 10 April 2025 DATE OF ISSUED : 18 April 2025

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

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T[redacted]ing to the International System of Units ( SI )

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# CERTIFICATE OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | DIGITAL THERMOMETER WITH PROBE |
| MANUFACTURER | : | LUTRON |
| MODEL / TYPE | : | MTM-380SD |
| SERIAL NO. | : | I.570147/N/A[LA-0013/LA-0013/A] |
| CLID. NO. | : | 232204019 |
| JOB CONTROL NO. | : | 250408041416 |
| CALIBRATION SERVICE | : | ☑ IN-LABORATORY ☐ ON-SITE |

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 08 April 2025 DATE OF ISSUED : 11 April 2025

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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. Q25041416

F3-011-05/12-23



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

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

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

**CALIBRATION DATA**

**DO METER RESULT @ 20 °C**

| Nominal Value ( mg/L ) | DUC Reading ( mg/L ) | Correction ( mg/L ) | Uncertainty ( mg/L ) |
|---|---|---|---|
| 8.18 | 8.2 | -0.02 | ± 0.38 |

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 5 of 68

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

### End of Certificate ###

Certificate No. Q25042960

F3-011-05/12-23



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

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

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

**CALIBRATION DATA**

**CORRECTION OF TEMPERATURE : T1**

| Immersion depth (mm) | Actual Temperature ( °C ) | DUC Reading ( °C ) | Correction ( °C ) | Uncertainty ± ( °C ) |
|---|---|---|---|---|
| 200 | 4.00 | 4.0 | 0.00 | 0.52 |
| | 20.02 | 20.1 | -0.08 | |
| | 95.02 | 96.1 | -1.08 | |
| | 104.02 | 105.1 | -1.08 | |
| | 180.00 | 181.6 | -1.60 | |

Technical Note. Type of sensor : Thermocouple Type K

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 57 of 68

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**### End of Certificate ###**



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# REPORT OF CALIBRATION

# FOR

| | | |
|---|---|---|
| **NOMENCLATURE** | : | **DIGITAL THERMOMETER WITH PROBE** |
| **MANUFACTURER** | : | **LUTRON** |
| **MODEL / TYPE** | : | **MTM-380SD** |
| **SERIAL NO.** | : | **I.570147/N/A[LA-0013/LA-0013/A]** |
| **DATE OF CALIBRATION** | : | **10 April 2025** |

**ENVIRONMENT CONDITIONS :**

**Temperature :** **(23 ± 2) °C** **Relative Humidity :** **(55 ± 10) % RH**

**PROCEDURE USED :**

This instrument was calibrated under procedure No. **CLC-CPTH-06** based on **ASTM E 220-86** as calibration guidelines. The calibration was performed by using Calibration Bath, Precision Thermometer and IPRT which maintained by the Calibration Laboratory Co., Ltd.

**REFERENCE STANDARD USED :**

1. Calibration Bath, Kambic Model OB-22/2 ULT, OB-22/2 S/N. 17115653, 17115654.
2. Precision Thermometer, ASL Model F250 S/N. 1334023800.
3. IPRT, Wika, ASL Model CTP5000-450-D, T100-250-1D S/N. PO00036374-1-10-12, PO106346-1-18.

**TRACEABILITY :**

1. The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd. Certificate No. Q24120999, Q24112862. Due Date 26 November 2025, 12 November 2025.
2. The measurements are traceable to International System of Units (SI) , through Thailand Institute of Scientific and Technological Research (TISTR). Certificate No. PSL-T 1042/67, Due Date 16 October 2025.
3. The measurements are traceable to International System of Units (SI) , through National Institute of Metrology (Thailand). Certificate No. TT-0147-24, TT-0110-24. Due Date 28 October 2025, 06 August 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)"

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# REPORT OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | DIGITAL THERMOHYGRO METER |
| MANUFACTURER | : | DIGICON |
| MODEL / TYPE | : | TH-02A |
| SERIAL NO. | : | 1919E0284991[DTH-01] |
| DATE OF CALIBRATION | : | 10 April 2025 |

**ENVIRONMENT CONDITIONS :**

Temperature : (23 ± 2) °C Relative Humidity : (55 ± 10) %RH

**PROCEDURE USED :**

This instrument was calibrated under procedure No. **CLC-CPTH-11.** The calibration was performed by using Chilled Mirror Hygrometer which maintained by the Calibration Laboratory Co., Ltd.

**REFERENCE STANDARD USED :**

Chilled Mirror Hygrometer, Edgetech Model Dew Master S/N. 44602.

Temperature & Humidity Chamber, PGC Model 9141-5116 S/N. 1304261.

**TRACEABILITY :**

The measurements are traceable to International System of Units (SI) , through Thunder Scientific Corporation.

Certificate No. 22724, Due Date 03 October 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. Q25041414**

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# CERTIFICATE OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | DIGITAL THERMOHYGRO METER |
| MANUFACTURER | : | DIGICON |
| MODEL / TYPE | : | TH-02A |
| SERIAL NO. | : | 1919E0284991[DTH-01] |
| CLID. NO. | : | 232100200 |
| JOB CONTROL NO. | : | 250408041414 |
| CALIBRATION SERVICE | : | ☑ IN-LABORATORY ☐ ON-SITE |

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
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DATE OF RECEIVED : 08 April 2025 DATE OF ISSUED : 11 April 2025

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# CERTIFICATE OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | DIGITAL THERMOHYGRO METER |
| MANUFACTURER | : | DIGICON |
| MODEL / TYPE | : | TH-02A |
| SERIAL NO. | : | 1919E0284980[DTH-02] |
| CLID. NO. | : | 232100201 |
| JOB CONTROL NO. | : | 250408041415 |
| CALIBRATION SERVICE | : | ☑ IN-LABORATORY ☐ ON-SITE |

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
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DATE OF RECEIVED : 08 April 2025 DATE OF ISSUED : 11 April 2025

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

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

The table in the following gives the calibration results and associated measurement uncertainties of the measuring digital thermohygro meter.

## CALIBRATION DATA

### 1. CORRECTION OF TEMPERATURE

| Test point (°C) | Actual Temperature (°C) | DUC Reading (°C) | Correction (°C) | Uncertainty ±(°C) |
|---|---|---|---|---|
| 20.0 | 20.00 | 19.6 | +0.40 | 0.27 |
| 25.0 | 25.00 | 24.5 | +0.50 | |
| 30.0 | 30.00 | 29.5 | +0.50 | |

### 2. CORRECTION OF HUMIDITY

| STD Temperature (°C) | STD Reading (%RH) | DUC Reading (%RH) | Correction (%RH) | Uncertainty ± (%RH) |
|---|---|---|---|---|
| 25 | 40.0 | 30 | +10.0 | 0.8 |
| 25 | 60.0 | 50 | +10.0 | 0.8 |

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 60 of 68

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

**### End of Certificate ###**

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

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

The table in the following gives the calibration results and associated measurement uncertainties of the measuring digital thermohygro meter.

**CALIBRATION DATA**

**1. CORRECTION OF TEMPERATURE**

| Test point (°C) | Actual Temperature (°C) | DUC Reading (°C) | Correction (°C) | Uncertainty ±(°C) |
|---|---|---|---|---|
| 20.0 | 20.00 | 19.7 | +0.30 | 0.27 |
| 25.0 | 25.00 | 24.6 | +0.40 | |
| 30.0 | 30.00 | 29.5 | +0.50 | |

**2. CORRECTION OF HUMIDITY**

| STD Temperature (°C) | STD Reading (%RH) | DUC Reading (%RH) | Correction (%RH) | Uncertainty ± (%RH) |
|---|---|---|---|---|
| 25 | 40.0 | 33 | +7.0 | 0.8 |
| 25 | 60.0 | 53 | +7.0 | 0.8 |

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 60 of 68

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

**### End of Certificate ###**



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# REPORT OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | DIGITAL THERMOHYGRO METER |
| MANUFACTURER | : | DIGICON |
| MODEL / TYPE | : | TH-02A |
| SERIAL NO. | : | 1919E0284980[DTH-02] |
| DATE OF CALIBRATION | : | 10 April 2025 |

**ENVIRONMENT CONDITIONS :**

**Temperature :** (23 ± 2) °C **Relative Humidity :** (55 ± 10) %RH

**PROCEDURE USED :**

This instrument was calibrated under procedure No. **CLC-CPTH-11.** The calibration was performed by using Chilled Mirror Hygrometer which maintained by the Calibration Laboratory Co., Ltd.

**REFERENCE STANDARD USED :**

Chilled Mirror Hygrometer, Edgetech Model Dew Master S/N. 44602.

Temperature & Humidity Chamber, PGC Model 9141-5116 S/N. 1304261.

**TRACEABILITY :**

The measurements are traceable to International System of Units (SI) , through Thunder Scientific Corporation. Certificate No. 22724, Due Date 03 October 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)"

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# REPORT OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | WATER BATH |
| MANUFACTURER | : | M-LAB |
| MODEL / TYPE | : | WBN 15 |
| SERIAL NO. | : | 0335[LA-007] |
| LOCATION SITE | : | LABORATORY - HOT ZONE |
| DATE OF CALIBRATION | : | 27 February 2025 |

**ENVIRONMENT CONDITIONS :**

**Temperature : 24 °C to 25 °C** **Relative Humidity : 49% to 51%**

**PROCEDURE USED :**

This instrument was calibrated under procedure No. **WI-305-135** based on **ASTM E 715-80:2016** as calibration guidelines.

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

**REFERENCE STANDARD USED :**

Hydra Data Logger, Fluke Model 2620 S/N. 5592550.

**TRACEABILITY :**

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

Certificate No. Q24120965, Due Date 13 May 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)"

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**Certificate No. Q25018258**

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



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# CERTIFICATE OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | WATER BATH |
| MANUFACTURER | : | M-LAB |
| MODEL / TYPE | : | WBN 15 |
| SERIAL NO. | : | 0335[LA-007] |
| CLID. NO. | : | 332300657 |
| JOB CONTROL NO. | : | 250215018258 |
| CALIBRATION SERVICE | : | ☐ IN-LABORATORY ☑ ON-SITE |

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.

5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),

NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 15 February 2025 DATE OF ISSUED : 04 March 2025

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CLC Accredited ISO/IEC 17025
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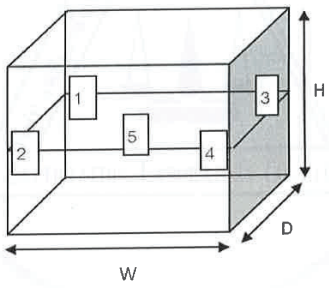
## CALIBRATION DATA

### 2. TEMPERATURE DISTRIBUTION

| Test Point (°C) | DUC Reading (°C) | STD Reading (°C) | | | | | Uncertainty ±(°C) |
|---|---|---|---|---|---|---|---|
| | | Probe No. 1 | Probe No. 2 | Probe No. 3 | Probe No. 4 | Probe No. 5 | |
| 85.0 | 85.0 | 85.15 | 84.79 | 84.96 | 84.89 | 85.06 | 0.58 |

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

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




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

**### End of Certificate ###**



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

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

The table in the following gives the calibration results and associated measurement uncertainties of the measuring water bath.

## CALIBRATION DATA

### 1. WATER BATH PERFORMANCE

| Test Point (°C) | DUC Reading (°C) | Uniformity (°C) | Stability (°C) |
|---|---|---|---|
| 85.0 | 85.0 | 0.40 | 0.28 |

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# REPORT OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | WATER BATH |
| MANUFACTURER | : | MEMMERT |
| MODEL / TYPE | : | WNB14 |
| SERIAL NO. | : | L418.0758[LA-004] |
| LOCATION SITE | : | LABORATORY - HOT ZONE |
| DATE OF CALIBRATION | : | 27 February 2025 |

**ENVIRONMENT CONDITIONS :**

**Temperature : 24 °C to 25 °C** **Relative Humidity : 49% to 51%**

**PROCEDURE USED :**

This instrument was calibrated under procedure No. **WI-305-135** based on **ASTM E 715-80:2016** as calibration guidelines.

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

**REFERENCE STANDARD USED :**

Hydra Data Logger, Fluke Model 2620 S/N. 5592550.

**TRACEABILITY :**

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

Certificate No. Q24120965, Due Date 13 May 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. Q25018257**

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



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NSC-TISI-TIS 17025 CALIBRATION 0059 CLC

# CERTIFICATE OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | WATER BATH |
| MANUFACTURER | : | MEMMERT |
| MODEL / TYPE | : | WNB14 |
| SERIAL NO. | : | L418.0758[LA-004] |
| CLID. NO. | : | 332100157 |
| JOB CONTROL NO. | : | 250215018257 |
| CALIBRATION SERVICE | : | ☐ IN-LABORATORY ☑ ON-SITE |

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.

5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),

NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

**DATE OF RECEIVED : 15 February 2025** **DATE OF ISSUED : 04 March 2025**

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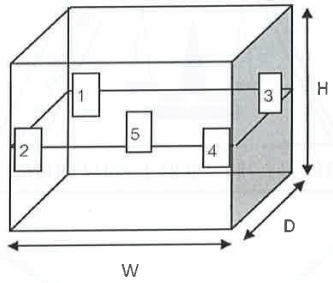
## CALIBRATION DATA

### 2. TEMPERATURE DISTRIBUTION

| Test Point (°C) | DUC Reading (°C) | STD Reading (°C) | | | | | Uncertainty ±(°C) |
|---|---|---|---|---|---|---|---|
| | | Probe No. 1 | Probe No. 2 | Probe No. 3 | Probe No. 4 | Probe No. 5 | |
| 95.0 | 95.0 | 96.45 | 96.30 | 96.22 | 96.04 | 96.26 | 0.51 |

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

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




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

**### End of Certificate ###**

**Certificate No. Q25018257**

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





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

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

The table in the following gives the calibration results and associated measurement uncertainties of the measuring water bath.

## CALIBRATION DATA

### 1. WATER BATH PERFORMANCE

| Test Point (°C) | DUC Reading (°C) | Uniformity (°C) | Stability (°C) |
|---|---|---|---|
| 95.0 | 95.0 | 0.39 | 0.17 |

[redacted]

# Calibration Report

Certificate Number : SPR25050011-3



## Reference Standards

| Equipment Name | Model | Serial No. | Certificate No. | Due. Date |
|---|---|---|---|---|
| Data Acquisition/Switch Unit | 34970A | MY44074688 | SPR24080102-24 | 07 Sep 2025 |

Traceability

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



69/29 Moo 1 Klongsi Klongluang Pathumthani 12120 Tel: (662) 193-2217-20 www.spmetrology.co.th www.สอบเทียบเครื่องมือวัด.com

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METROLOGY SYSTEM ( THAILAND ) CO.,LTD.
A Trescal company
ID LINE : IEC17025

# Certificate of Calibration

Certificate Number : SPR25050011-3



Customer : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 Baan Klang Krung Biz Town, Soi Srinagarindra 46/1 (Pramote),
Nongbon Sub-district, Prawet District, Bangkok 10250

Equipment Name : Refrigerator
Manufacturer : Medicool
Model : BB-117
Serial Number : BB117-190725001
ID. Number : LA-003

Environmental Conditions

| | | | |
|---|---|---|---|
| Ambient Temperature | : 25 °C ± 10 °C | Received Date | : 02 May 2025 |
| Relative Humidity | : 60 % ± 20 % | Calibration Date | : 06 May 2025 |
| Location of Calibration | : On-Site | Recommend Due Date | : N/A |
| Calibration Procedure | : SP-CPT-04-01 | Date of Issue | : 07 May 2025 |

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.

[redacted]

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CLC Accredited ISO/IEC 17025

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NSC-TISI-TIS 17025 CALIBRATION 0059 CLC

# CERTIFICATE OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | INCUBATOR |
| MANUFACTURER | : | ACCUPLUS |
| MODEL / TYPE | : | SMART i250 |
| SERIAL NO. | : | 2059-0718-0010[LA-002] |
| CLID. NO. | : | 332100155 |
| JOB CONTROL NO. | : | 250215018255 |
| CALIBRATION SERVICE | : | ☐ IN-LABORATORY ☑ ON-SITE |

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 15 February 2025 DATE OF ISSUED : 04 March 2025

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SP METROLOGY SYSTEM ( THAILAND ) CO.,LTD.
A Trescal company

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ID LINE : IEC17025

# Result of Calibration

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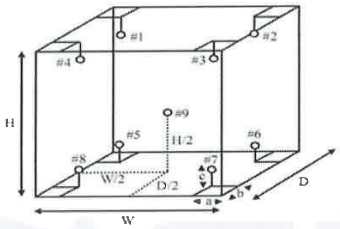
Certificate Number : SPR25050011-3






Temperature Accuracy in the Measurement Zone. Unit : °C

| UUC Setting | Measured Temperature (°C) @ Probe No. (Probe No. 9 is REF.) | | | | | | | | | Uncertainty ( ± ) |
|---|---|---|---|---|---|---|---|---|---|---|
| | # 1 | # 2 | # 3 | # 4 | # 5 | # 6 | # 7 | # 8 | # 9 | |
| 4.0 | 3.37 | 4.12 | 4.25 | 4.13 | 3.93 | 3.98 | 3.95 | 4.23 | 4.16 | 0.60 |

Temperature Uniformity, Stability,Overall Variation Unit : °C

| UUC Setting | UUC Reading | Temperature Stability | Temperature Uniformity | Overall Variation |
|---|---|---|---|---|
| 4.0 | 4.0 | 0.09 | 0.94 | 1.07 |

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 -

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NSC-TISI-TIS 17025 CALIBRATION 0059 CLC

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

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

The table in the following gives the calibration results and associated measurement uncertainties of the measuring incubator.

**CALIBRATION DATA**

**1. INCUBATOR PERFORMANCE**

| DUC | | Measured Uniformity | Measured Stability | Measured Overall |
|---|---|---|---|---|
| Setting ( °C ) | Indicating ( °C ) | ( °C ) | ( °C ) | Variation ( °C ) |
| 20.0 | 20.0 | 0.43 | 0.34 | 0.98 |



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# REPORT OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | INCUBATOR |
| MANUFACTURER | : | ACCUPLUS |
| MODEL / TYPE | : | SMART i250 |
| SERIAL NO. | : | 2059-0718-0010[LA-002] |
| LOCATION SITE | : | LABORATORY |
| DATE OF CALIBRATION | : | 27 February 2025 |

**ENVIRONMENT CONDITIONS :**

**Temperature : 24 °C to 25 °C** **Relative Humidity : 49 % to 51 %**

**PROCEDURE USED :**

This instrument was calibrated under procedure No. **WI-305-165** based on **TLAS G-20-1/02-08** as calibration guidelines.

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

**REFERENCE STANDARD USED :**

Hydra Series II, Fluke Model 2635A S/N. 8209003.

**TRACEABILITY :**

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

Certificate No. Q24052151, Due Date 27 May 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)"

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# CERTIFICATE OF CALIBRATION

## FOR

| | | |
|---|---|---|
| NOMENCLATURE | : | BALANCE |
| MANUFACTURER | : | SHIMADZU |
| MODEL / TYPE | : | AP225WD |
| SERIAL NO. | : | D316300692[LA-001] |
| CLID. NO. | : | 362100172 |
| JOB CONTROL NO. | : | 250215018253 |
| CALIBRATION SERVICE | : | ☐ IN-LABORATORY ☑ ON-SITE |

CUSTOMER : ENVIRONMENTAL MEASUREMENTS CO., LTD.
5/45 BAAN KLANG KRUNG BIZ TOWN, SOI SRINAGARINDRA 46/1 (PRAMOTE),
NONG BON SUB-DISTRICT, PRAWET DISTRICT, BANGKOK 10250

DATE OF RECEIVED : 15 February 2025 DATE OF ISSUED : 04 March 2025

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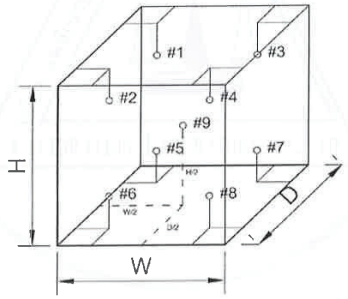
## CALIBRATION DATA

### 2. TEMPERATURE DISTRIBUTION

| DUC | | Measured Temperature ( °C )@Probe No.9 is Ref. | | | | | | | | | Uncertainty ±( °C ) | Coverage factor *k* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Setting ( °C ) | Indicating ( °C ) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
| 20.0 | 20.0 | 20.55 | 20.53 | 20.57 | 20.51 | 20.59 | 20.52 | 20.40 | 20.47 | 20.27 | 0.58 | 2,00 |

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

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




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

### End of Certificate ###

Certificate No. Q25018255

F3-011-05/12-23



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

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

**CALIBRATION DATA**

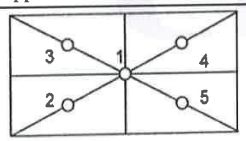
**1. Error of indications**

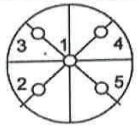
| Nominal Test Value ( g ) | Conventional mass ( g ) | Display Value ( g ) | Error of Balance ( g ) | Uncertainty ± ( mg ) | Coverage factor *k* |
|---|---|---|---|---|---|
| Unload | 0.0000 | 0.0000 | 0.0000 | 0.07 | 2,00 |
| 5.0000 | 5.0000 | 5.0001 | +0.0001 | 0.11 | 2,00 |
| 10.0000 | 10.0000 | 10.0000 | 0.0000 | 0.11 | 2,00 |
| 20.0000 | 20.0000 | 20.0000 | 0.0000 | 0.12 | 2,00 |
| 40.0000 | 40.0000 | 39.9999 | -0.0001 | 0.14 | 2,00 |
| 60.0000 | 59.9999 | 59.9999 | 0.0000 | 0.15 | 2,00 |
| 80.0000 | 79.9999 | 80.0000 | +0.0001 | 0.19 | 2,00 |
| 100.0000 | 99.9999 | 100.0000 | +0.0001 | 0.17 | 2,00 |
| 120.0000 | 119.9999 | 120.0000 | +0.0001 | 0.21 | 2,00 |
| 140.0000 | 139.9999 | 139.9999 | 0.0000 | 0.25 | 2,00 |
| 160.0000 | 159.9998 | 159.9998 | 0.0000 | 0.26 | 2,00 |
| 180.0000 | 179.9998 | 179.9998 | 0.0000 | 0.30 | 2,00 |
| 200.0000 | 199.9997 | 199.9996 | -0.0001 | 0.26 | 2,00 |

**2. Repeatability of indications**

| Nominal Test Value ( g ) | Standard Deviation of Reading ( g ) |
|---|---|
| 200.0000 | 0.00006 |

**3. Effect of eccentric application of a load on the indication**

☐ 


☑ 


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

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 02 Page 116,117 of 138

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

**### End of Certificate ###**

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# REPORT OF CALIBRATION

## FOR

| | | |
|---|---|---|
| **NOMENCLATURE** | : | **BALANCE** |
| **MANUFACTURER** | : | **SHIMADZU** |
| **MODEL / TYPE** | : | **AP225WD** |
| **SERIAL NO.** | : | **D316300692[LA-001]** |
| **LOCATION SITE** | : | **LABORATORY-BALANCE ROOM** |
| **DATE OF CALIBRATION** | : | **27 February 2025** |

**ENVIRONMENT CONDITIONS :**

**Temperature : 23 °C to 24 °C** **Relative Humidity : 49 % to 51 %**

**PROCEDURE USED :**

This instrument was calibrated under procedure No. **WI-305-46** based on **EURAMET/cg-18/Version 4.0 (11/2015).**

The calibration was performed by Comparison with Weight Set which maintained by the Calibration Laboratory Co., Ltd.

**REFERENCE STANDARD USED :**

Weight Set, Mettler Toledo Class E2 S/N. 158850.

**TRACEABILITY :**

The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).

Certificate No. MM-0165-23, Due Date 21 December 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. Q25018253**

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



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MM-C17

Request No. : 22-68 / 0059

MTC No. : PSL-P 0019 / 68

Serial No. : A.067438

**Results :**

| UUC Range (lux) | Standard (lux) | *UUC Reading Before Adj.(lux) | UUC Reading After Adj.(lux) | Uncertainty of Measurement ± (lux) |
|---|---|---|---|---|
| 2000 | 100 | 103 | 104 | 2.0 |
| | 500 | 502 | 505 | 10 |
| | 1000 | 992 | 1000 | 20 |
| | 1500 | 1486 | 1497 | 30 |
| | 2000 | 1972 | 1994 | 40 |
| 20000 (×10) | 2000 | 197 | 200 | 40 |
| | 3000 | 296 | 300 | 60 |
| | 4000 | 391 | 397 | 80 |
| | 5000 | 490 | 497 | 100 |

Note : *UUC = Unit Under Calibration.

**...end of certificate...**

[redacted]



The results relate only to the items tested/calibrated or value assigned.
Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

[redacted]

Request No. : 22-68 / 0059

MTC No. : PSL-P 0019 / 68

# CERTIFICATE OF CALIBRATION

Nomenclature : Digital Lux Meter

Serial No. : A.067438

Maker : EXTECH Instruments

Model : 407026

Customer : **ENVIRONMENTAL MEASUREMENTS CO., LTD.**

Address : 5/45 Baan Klang Krung Biz Town, Soi Srinagarindra 46/1 (Pramote), Nong Bon Sub-District Prawet District, Bangkok 10250

Date of receipt : 28 October 2024

Date of calibration : 4 November 2024

Place of calibration : Photometry and Temperature Standards Laboratory, MTC. (Bangpoo)

Basis of calibration : calibration at 0 ~ 5000 lux.

Condition of calibration : - Ambient temperature : (25 ± 2) °C

- Relative humidity : (60 ± 20) %

Reference Standard : Working Standard Luminous Intensity Lamp, Serial No.: FEL003 and 3501, can be traceable to international system of units (SI), through calibration certificate MTC No. PSL-P 0151/67 and PSL-P 0152/67, date of calibration 10 May 2024.

Traceability : This certificate is traceable to SI units through the National Institute of Metrology (Thailand) calibration certificate No. TP-1010-23, TP-1011-23 and TP-1012-23

Support Equipment : 1. Photometric bench , 3.0 meter long

2. DC power supply, Serial No.: BC - 341006035007/2

3. Digital Multimeter , Model : R 6551 , S/N : 92041186 and 92041192

Calibration Procedure : The measurement was done in accordance with WI.CP.10.

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



[redacted]

ที่ อก ๐๓๑๐(๑)/ ๑๐๘๙

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๐๗ กุมภาพันธ์ ๒๕๖๘

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๓ ธันวาคม ๒๕๖๗

สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๔๐ ราย
๒. รายชื่อเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑๔๑ ราย
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม

ตามคำขอที่อ้างถึง บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๑๔๕ สถานที่ตั้งเลขที่ ๓ ซอยอุดมสุข ๔๑ ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๔๐ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑๔๑ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำ/น้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กุมภาพันธ์ ๒๕๗๒ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๖๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

จึงเรียนมาเพื่อทราบ

[redacted]

ที่ อก ๐๓๑๐(๑)/ ๑๔๙๑

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๔ กุมภาพันธ์ ๒๕๖๘

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๘ กุมภาพันธ์ ๒๕๖๘

ตามคำขอที่อ้างถึง บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๑๔๕ สถานที่ตั้งเลขที่ ๓ ซอยอุดมสุข ๔๑ ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร ขอยกเลิกบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๓ ราย ได้แก่

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ทะเบียนเลขที่ ว-๑๔๕-ค-๐๐๔๐
ทะเบียนเลขที่ ว-๑๔๕-ค-๐๐๔๑
ทะเบียนเลขที่ ว-๑๔๕-ค-๐๐๔๒
ทะเบียนเลขที่ ว-๑๔๕-ค-๐๐๔๓
ทะเบียนเลขที่ ว-๑๔๕-ค-๐๐๔๔

คุณฎี

[redacted]

สิ่งที่ส่งมาด้วย ๑

เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด เลขทะเบียน ว-๑๔๕
ที่ อก ๐๓๑๐(๑)/ ๑ ๐ ๘ ๙ ลงวันที่ ๐๗ กุมภาพันธ์ ๒๕๖๘

ก. ผู้ควบคุมห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๔๐ ราย

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ทะเบียนเลขที่ ว-๑๔๕-ค-๐๐๐๑
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NALYST AND ENG
TANT COMPANY LIMITED

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ทะเบียนเลขที่ ว-๑๔๕-จ-๐๐๔๗
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ทะเบียนเลขที่ ว-๑๔๕-จ-๐๐๕๑
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ทะเบียนเลขที่ ว-๑๔๕-จ-๐๐๙๗
ทะเบียนเลขที่ ว-๑๔๕-จ-๐๐๙๘
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เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด เลขทะเบียน ว-๑๔๕
ที่ อก ๐๓๑๐(๑)/ ๑๐๘๙ ลงวันที่ ๐๗ กุมภาพันธ์ ๒๕๖๘

ข. เจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๘๑ ราย

[redacted]

ทะเบียนเลขที่ ว-๑๔๕-จ-๐๐๐๑
ทะเบียนเลขที่ ว-๑๔๕-จ-๐๐๐๓
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ทะเบียนเลขที่ ว-๑๔๕-จ-๐๑๖๐
ทะเบียนเลขที่ ว-๑๔๕-จ-๐๑๖๑
ทะเบียนเลขที่ ว-๑๔๕-จ-๐๑๖๒
ทะเบียนเลขที่ ว-๑๔๕-จ-๐๑๖๓
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UNITED ANALYST AND ENG
COMBULTANT COMPANY



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ทะเบียนเลขที่ ว-๑๔๕-จ-๐๑๑๑
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IT COMPANY LIMIT

| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 25 | Endrin aldehyde | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 26 | Formaldehyde | Distillation, Colorimetric Method[2] |
| 27 | Free Chlorine | 1) Iodometric Method[4]<br>2) DPD Ferrous Titrimetric Method[4] |
| 28 | Heptachlor | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 29 | Heptachlor Epoxide | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 30 | Hexavalent Chromium | Colorimetric Method[4] |
| 31 | Lead | 1) Digestion, Direct Air-Acetylene Flame Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |
| 32 | Manganese | 1) Digestion, Direct Air-Acetylene Flame Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |
| 33 | Mercury | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[4] |
| 34 | Methoxychlor | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 35 | Nickel | 1) Digestion, Direct Air-Acetylene Flame Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |
| 36 | Oil & Grease | 1) Liquid-Liquid, Partition-Gravimetric Method[4]<br>2) Soxhlet Extraction Method[4] |
| 37 | pH | Electrometric Method[4] |
| 38 | Phenols | 1) Distillation, Chloroform Extraction Method[4]<br>2) Distillation, Direct Photometric Method[4] |
| 39 | Selenium | 1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |
| 40 | Sulfide | 1) Iodometric Method[4]<br>2) Methylene Blue Method[4] |
| 41 | Temperature | Laboratory and Field Methods[4] |
| 42 | Total Dissolved Solids | Dried at 180 °C[4] |
| 43 | Total Kjeldahl Nitrogen | Semi-Micro-Kjeldahl Method[4] |
| 44 | Total Suspended Solids | Dried from 103 to 105 °C[4] |
| 45 | Trivalent Chromium | 1) Digestion, Direct Air-Acetyler<br>Colorimetric Method; Calculati<br>2) Digestion, Inductively Coupl<br>Colorimetric Method; Calculati |
| 46 | Zinc | 1) Digestion, Direct Air-Acetyler<br>2) Digestion, Inductively Coupl |

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เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ เอ็นจิเนียริ่ง คอนซัลแตนท์ จำกัด เลขทะเบียน ว-๑๔๕
ที่ อก ๐๓๑๐(๑)/ ๑๐๘๙ ลงวันที่ ๐๗ กุมภาพันธ์ ๒๕๖๘

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๕๗ รายการ

น้ำ/น้ำเสีย จำนวน 46 รายการ

| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 1 | Aldrin | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 2 | Arsenic | 1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |
| 3 | Barium | Digestion, Inductively Coupled Plasma Method[4] |
| 4 | α-BHC | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 5 | β-BHC | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 6 | δ-BHC | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 7 | γ-BHC | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 8 | Biochemical Oxygen Demand | 1) 5-Day BOD Test, Azide Modification Method[4]<br>2) 5-Day BOD Test, Membrane Electrode Method[4] |
| 9 | Cadmium | 1) Digestion, Direct Air-Acetylene Flame Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |
| 10 | Chemical Oxygen Demand | 1) Closed Reflux, Titrimetric Method[4]<br>2) Closed Reflux, Colorimetric Method[4]<br>3) Open Reflux, Titrimetric Method[4] |
| 11 | Chlordane | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 12 | Chromium | 1) Digestion, Direct Air-Acetylene Flame Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |
| 13 | Color | ADMI Weighted-Ordinate Spectrophotometric Method[4] |
| 14 | Copper | 1) Digestion, Direct Air-Acetylene Flame Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |
| 15 | Cyanide | 1) Distillation, Colorimetric Method[4]<br>2) Total Cyanide after Distillation, by Flow Injection Analysis Method[4] |
| 16 | o,p'-DDT | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 17 | 4,4'-DDD | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 18 | 4,4'-DDE | Liquid-Liquid Extraction, Gas Chr |
| 19 | 4,4'-DDT | Liquid-Liquid Extraction, Gas Chr |
| 20 | Dieldrin | Liquid-Liquid Extraction, Gas Chr |
| 21 | Endosulfan I | Liquid-Liquid Extraction, Gas Chr |
| 22 | Endosulfan II | Liquid-Liquid Extraction, Gas Chr |
| 23 | Endosulfan sulfate | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 24 | Endrin | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |

[redacted]

25 Endrin aldehyde...

| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 14 | Benzo(a)pyrene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 15 | Benzo(g,h,i)perylene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 16 | Beryllium | Digestion, Inductively Coupled Plasma Method[4] |
| 17 | Bis(2-chloroethyl)ether | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 18 | Bis(2-ethylhexyl)phthalate | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 19 | Bromodichloromethane | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 20 | Bromoform | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 21 | Butanol | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 22 | Butyl benzyl phthalate | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 23 | Cadmium | 1) Digestion, Direct Air-Acetylene Flame Method[4]<br>2) Digestion, Electrothermal Atomic Absorption Spectrometric Method[4]<br>3) Digestion, Inductively Coupled Plasma Method[4] |
| 24 | Carbazole | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 25 | Carbon disulfide | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 26 | Carbon tetrachloride | Purge and Trap Gas Chromatogra[redacted]<br>Spectrometric Method[4] |
| 27 | Chlordane | 1) Liquid-Liquid Extraction, Gas C[redacted]<br>Method[4]<br>2) Liquid-Liquid Extraction, Gas C[redacted]<br>Spectrometric Method[4] |
| 28 | p-Chloroaniline | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |

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UAE UNITED ANALYST AND ENGINEERING CONSULTANT COMPANY LIMITED



น้ำใต้ดิน จำนวน 126 รายการ

| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 1 | Acenaphthene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 2 | Acetone | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 3 | Aldrin | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 4 | Anthracene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 5 | Antimony | Digestion, Inductively Coupled Plasma Method[4] |
| 6 | Arsenic | 1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |
| 7 | Atrazine | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 8 | Barium | Digestion, Inductively Coupled Plasma Method[4] |
| 9 | Benz(a)anthracene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 10 | Benzene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 11 | Benzo(b)fluoranthene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 12 | Benzo(k)fluoranthene | 1) Liquid-Liquid Extraction, Ga[redacted]<br>Method[4]<br>2) Liquid-Liquid Extraction, Ga[redacted]<br>Spectrometric Method[4] |
| 13 | Benzoic acid | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |

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UAE UNITED ANALYST AND ENGINEER

| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 43 | Di-n-butyl phthalate | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 44 | 1,2-Dichlorobenzene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 45 | 1,3-Dichlorobenzene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 46 | 1,4-Dichlorobenzene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 47 | 3,3′-Dichlorobenzidine | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 48 | 1,1-Dichloroethane | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 49 | 1,2-Dichloroethane | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 50 | 1,1-Dichloroethylene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 51 | cis-1,2-Dichloroethylene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 52 | trans-1,2-Dichloroethylene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 53 | 2,4-Dichlorophenol | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 54 | 1,2-Dichloropropane | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 55 | 1,3-Dichloropropane | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 56 | 1,3-Dichloropropene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 57 | Dieldrin | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 58 | Diethyl phthalate | Liquid-Liquid Extraction, Ga<br>Spectrometric Method[4] |
| 59 | 2,4-Dimethylphenol | Liquid-Liquid Extraction, Ga<br>Spectrometric Method[4] |
| 60 | 2,4-Dinitrophenol | Liquid-Liquid Extraction, Ga<br>Spectrometric Method[4] |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 29 | Chlorobenzene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 30 | Chlorodibromomethane | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 31 | Chloroform | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 32 | 2-Chlorophenol | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 33 | Chromium | 1) Digestion, Direct Air-Acetylene Flame Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |
| 34 | Chromium (III) | 1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation[4]<br>2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation[4] |
| 35 | Chromium (VI) | Colorimetric Method[4] |
| 36 | Chrysene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 37 | Cyanide | Distillation, Colorimetric Method[4] |
| 38 | 2,4-D | Liquid-Liquid Extraction, Gas Chromatographic Method[4] |
| 39 | DDD | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 40 | DDE | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 41 | DDT | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 42 | Dibenz(a,h)anthracene | 1) Liquid-Liquid Extraction,<br>Method[4]<br>2) Liquid-Liquid Extraction,<br>Spectrometric Method[4] |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 74 | α-HCH | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 75 | β-HCH | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 76 | γ-HCH | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 77 | Hexachlorocyclopentadiene | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 78 | Hexachloroethane | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 79 | Indeno(1,2,3-cd)pyrene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 80 | Isophorone | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 81 | Lead | 1) Digestion, Direct Air-Acetylene Flame Method[4]<br>2) Digestion, Electrothermal Atomic Absorption Spectrometric Method[4]<br>3) Digestion, Inductively Coupled Plasma Method[4] |
| 82 | Manganese | 1) Digestion, Direct Air-Acetylene Flame Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |
| 83 | Mercury | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[4] |
| 84 | Methanol | Purge and Trap Gas Chr<br>Spectrometric Method[4 |
| 85 | Methoxychlor | 1) Liquid-Liquid Extracti<br>Method[4]<br>2) Liquid-Liquid Extracti<br>Spectrometric Method[4 |
| 86 | Methyl bromide | Purge and Trap Gas Chr<br>Spectrometric Method[4 |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 61 | 2,4-Dinitrotoluene | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 62 | 2,6-Dinitrotoluene | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 63 | Di-n-Octyl phthalate | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 64 | Endosulfan | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 65 | Endrin | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 66 | Ethylbenzene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 67 | Fluoranthene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 68 | Fluorene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 69 | Heptachlor | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 70 | Heptachlor epoxide | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[ |
| 71 | Hexachlorobenzene | Liquid-Liquid Extraction<br>Spectrometric Method[ |
| 72 | Hexachloro-1,3-butadiene | Purge and Trap Gas Chr<br>Spectrometric Method[ |
| 73 | n-Hexane | Purge and Trap Gas Chr<br>Spectrometric Method[ |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 100 | Phenol | 1) Distillation, Chloroform Extraction Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 101 | Pyrene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 102 | Selenium | 1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |
| 103 | Silver | Digestion, Inductively Coupled Plasma Method[4] |
| 104 | Styrene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 105 | 1,1,2,2-Tetrachloroethane | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 106 | Tetrachloroethylene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 107 | Toluene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 108 | Toxaphene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 109 | TPH ($C_5$ - $C_8$) | 1) Purge and Trap, Gas Chromatographic Method[12,22]<br>2) Purge and Trap, Gas Chromatographic/Mass spectrometric Method[12,27] |
| 110 | TPH ($C_{>8}$ – $C_{16}$) | Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[9,22] |
| 111 | TPH ($C_{>16}$ – $C_{35}$) | Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[9,22] |
| 112 | 1,2,4-Trichlorobenzene | Purge and Trap Gas Chromat[redacted]<br>Spectrometric Method[4] |
| 113 | 1,1,1-Trichloroethane | Purge and Trap Gas Chromat[redacted]<br>Spectrometric Method[4] |
| 114 | 1,1,2-Trichloroethane | Purge and Trap Gas Chromat[redacted]<br>Spectrometric Method[4] |
| 115 | Trichloroethylene | Purge and Trap Gas Chromat[redacted]<br>Spectrometric Method[4] |



| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 87 | Methylene chloride | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 88 | 2-Methylphenol | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 89 | 2-Methylnaphthalene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 90 | Methyl tert-butyl ether | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 91 | Naphthalene | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 92 | Nickel | 1) Digestion, Direct Air-Acetylene Flame Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |
| 93 | Nitrobenzene | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 94 | N-Nitrosodiphenylamine | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 95 | N-Nitrosodi-n-propylamine | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 96 | Polychlorinated Biphenyls<br>- PCB 1016<br>- PCB 1221<br>- PCB 1232<br>- PCB-1242<br>- PCB-1248<br>- PCB-1254<br>- PCB-1260 | 1) Liquid-Liquid Extraction, Gas Chromatographic Method[4]<br>2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 97 | Pentachlorophenol | Liquid-Liquid Extraction[redacted]<br>Spectrometric Method[ |
| 98 | pH | Electrometric Method[4 |
| 99 | Phenanthrene | 1) Liquid-Liquid Extract[redacted]<br>Method[4]<br>2) Liquid-Liquid Extract[redacted]<br>Spectrometric Method[ |

| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 116 | 2,4,5-Trichlorophenol | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 117 | 2,4,6-Trichlorophenol | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[4] |
| 118 | 1,3,5-Trimethylbenzene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 119 | Vanadium | Digestion, Inductively Coupled Plasma Method[4] |
| 120 | Vinyl acetate | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 121 | Vinyl chloride | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 122 | m-Xylene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 123 | o-Xylene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 124 | p-Xylene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 125 | Xylene (Total) | Purge and Trap Gas Chromatographic/Mass Spectrometric Method[4] |
| 126 | Zinc | 1) Digestion, Direct Air-Acetylene Flame Method[4]<br>2) Digestion, Inductively Coupled Plasma Method[4] |

<u>อากาศเสีย (ปล่องระบาย) จำนวน 25 รายการ</u>

| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 1 | Antimony | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] |
| 2 | Arsenic | 1) Isokinetic Sampling, Digestion, Hydride Generation/ Atomic Absorption Spectrometric Method[5]<br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] |
| 3 | Cadmium | 1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5]<br>2) Isokinetic Sampling, Dige<br>Plasma Method[5] |
| 4 | Carbon Monoxide | Instrumental Analyzer Meth |
| 5 | Chlorine | Isokinetic Sampling, Ion Ch |
| 6 | Chromium | 1) Isokinetic Sampling, Dige<br>Flame Method[5] |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 6 | Chromium (ต่อ) | 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] |
| 7 | Cobalt | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] |
| 8 | Copper | 1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5]<br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] |
| 9 | Cresol | Absorption Sampling, Gas Chromatographic Method[5] |
| 10 | Dioxins/Furans | Isokinetic Sampling[5] |
| 11 | Hydrogen Chloride | Isokinetic Sampling, Ion Chromatographic Method[5] |
| 12 | Hydrogen Fluoride | Isokinetic Sampling, Ion Chromatographic Method[5] |
| 13 | Hydrogen Sulfide | Absorption Sampling, Iodometric Method[5] |
| 14 | Lead | 1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5]<br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] |
| 15 | Manganese | 1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5]<br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] |
| 16 | Mercury | Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[5] |
| 17 | Nickel | 1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5]<br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] |
| 18 | Opacity | Ringelmann's Method[1] |
| 19 | Oxides of Nitrogen | 1) Absorption Sampling, Phenoldisulfonic acid Method[5]<br>2) Instrumental Analyzer Method[5] |
| 20 | Selenium | 1) Isokinetic Sampling, D<br>Atomic Absorption Spec<br>2) Isokinetic Sampling, D<br>Plasma Method[5] |
| 21 | Sulfur Dioxide | 1) Absorption Sampling,<br>Method[5]<br>2) Instrumental Analyze |
| 22 | Sulfuric Acid | Isokinetic Sampling, Bari |

[redacted]

| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 8 | Chromium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[3,6,15]<br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[3,6,14]<br>3) Digestion, Flame Atomic Absorption Spectrometric Method[7,15]<br>4) Digestion, Inductively Coupled Plasma Method[7,14] |
| 9 | Chromium (III) | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation[3,6,15,17]<br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation[3,6,14,17]<br>3) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation[7,8,15,17]<br>4) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation[7,8,14,17] |
| 10 | Chromium (VI) | 1) Waste Extraction, Colorimetric Method[3,17]<br>2) Alkaline Digestion, Colorimetric Method[8,17] |
| 11 | Cobalt | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[3,6,14]<br>2) Digestion, Inductively Coupled Plasma Method[7,14] |
| 12 | Copper | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[3,6,15]<br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[3,6,14]<br>3) Digestion, Flame Atomic Absorption Spectrometric Method[7,15]<br>4) Digestion, Inductively Coupled Plasma Method[7,14] |
| 13 | 2,4-D | 1) Waste Extraction, Gas Chromat[redacted]<br>2) Ultrasonic Extraction, Gas Chro[redacted]<br>Method[26] |
| 14 | DDD | 1) Waste Extraction, Separatory F[redacted]<br>Extraction, Gas Chromatographic [redacted]<br>2) Ultrasonic Extraction, Gas Chro[redacted]<br>Method[10,23] |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 23 | Total Suspended Particulate | Isokinetic Sampling, Gravimetric Method[5] |
| 24 | Vanadium | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5] |
| 25 | Xylene | 1) Bag Sampling, Gas Chromatographic Method[5]<br>2) Adsorption Sampling, Gas Chromatographic Method[5] |

<u>สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ</u>

| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 1 | Aldrin | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[3,9,23]<br>2) Ultrasonic Extraction, Gas Chromatographic Method[10,23] |
| 2 | Antimony | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[3,6,14]<br>2) Digestion, Inductively Coupled Plasma Method[7,14] |
| 3 | Arsenic | 1) Waste Extraction, Digestion, Hydride Generation/ Atomic Absorption Spectrometric Method[3,6,16]<br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[3,6,14]<br>3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[7,16]<br>4) Digestion, Inductively Coupled Plasma Method[7,14] |
| 4 | Barium | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[3,6,14]<br>2) Digestion, Inductively Coupled Plasma Method[7,14] |
| 5 | Beryllium | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[3,6,14]<br>2) Digestion, Inductively Coupled Plasma Method[7,14] |
| 6 | Cadmium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[3,6,15]<br>2) Waste Extraction, Digestion, In[redacted]<br>Plasma Method[3,6,14]<br>3) Digestion, Flame Atomic Abso[redacted]<br>Method[7,15]<br>4) Digestion, Inductively Coupled[redacted] |
| 7 | Chlordane | 1) Waste Extraction, Separatory F[redacted]<br>Extraction, Gas Chromatographic [redacted]<br>2) Ultrasonic Extraction, Gas Chro[redacted]<br>Method[10,23] |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 22 | Mercury (ต่อ) | 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method[20] |
| 23 | Methoxychlor | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[3,9,23]<br>2) Ultrasonic Extraction, Gas Chromatographic Method[10,23] |
| 24 | Molybdenum | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[3,6,14]<br>2) Digestion, Inductively Coupled Plasma Method[7,14] |
| 25 | Nickel | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[3,6,15]<br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[3,6,14]<br>3) Digestion, Flame Atomic Absorption Spectrometric Method[7,15]<br>4) Digestion, Inductively Coupled Plasma Method[7,14] |
| 26 | Polychlorinated Biphenyls<br>- Aroclor 1016<br>- Aroclor 1221<br>- Aroclor 1232<br>- Aroclor 1242<br>- Aroclor 1248<br>- Aroclor 1254<br>- Aroclor 1260<br>- 2-Chlorobiphenyl<br>- 2,3-Dichlorobiphenyl<br>- 2,2',5-Trichlorobiphenyl<br>- 2,4',5-Trichlorobiphenyl<br>- 2,2',3,5'-Tetrachlorobiphenyl<br>- 2,2',5,5'-Tetrachlorobiphenyl<br>- 2,3',4,4'-Tetrachlorobiphenyl<br>- 2,2',3,4,5'-Pentachlorobiphenyl<br>- 2,2',4,5,5'-Pentachlorobiphenyl<br>- 2,3,3',4',6-Pentachlorobiphenyl | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[3,9,24]<br>2) Ultrasonic Extraction, Gas Chromatographic Method[10,24] |

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[redacted]

Polychlorinated Biphenyls(ต่อ)...



| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 15 | DDE | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[3,9,23]<br>2) Ultrasonic Extraction, Gas Chromatographic Method[10,23] |
| 16 | DDT | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[3,9,23]<br>2) Ultrasonic Extraction, Gas Chromatographic Method[10,23] |
| 17 | Dieldrin | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[3,9,23]<br>2) Ultrasonic Extraction, Gas Chromatographic Method[10,23] |
| 18 | Endrin | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[3,9,23]<br>2) Ultrasonic Extraction, Gas Chromatographic Method[10,23] |
| 19 | Heptachlor | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[3,9,23]<br>2) Ultrasonic Extraction, Gas Chromatographic Method[10,23] |
| 20 | Lead | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[3,6,15]<br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[3,6,14]<br>3) Digestion, Flame Atomic Absorption Spectrometric Method[7,15]<br>4) Digestion, Inductively Coupled Plasma Method[7,14] |
| 21 | Lindane | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[3,9,23]<br>2) Ultrasonic Extraction, Gas Chromatographic Method[10,23] |
| 22 | Mercury | 1) Waste Extraction, Digestion, Absorption Spectrometric Met<br>2) Waste Extraction, Digestion, Plasma Method[3,6,14]<br>3) Digestion, Cold-Vapor Atom Spectrometric Method[19]<br>4) Digestion, Inductively Coupl |

[redacted]

| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 32 | Toxaphene | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[3,9,23]<br>2) Ultrasonic Extraction, Gas Chromatographic Method[10,23] |
| 33 | Trichloroethylene | 1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[3,12,27]<br>2) Waste Extraction, Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method[3,11,27]<br>3) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>4) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method[11,27] |
| 34 | Vanadium | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[3,6,14]<br>2) Digestion, Inductively Coupled Plasma Method[7,14] |
| 35 | Zinc | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[3,6,15]<br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[3,6,14]<br>3) Digestion, Flame Atomic Absorption Spectrometric Method[7,15]<br>4) Digestion, Inductively Coupled Plasma Method[7,14] |

<u>ดิน จำนวน 125 รายการ</u>

| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 1 | Acenaphthene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,25]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 2 | Acetone | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 3 | Aldrin | 1) Ultrasonic Extraction, Gas Method[10,23]<br>2) Ultrasonic Extraction, Gas Spectrometric Method[10,28] |
| 4 | Anthracene | 1) Ultrasonic Extraction, Gas Method[10,25] |

[redacted]

Anthracene (ต่อ)...



| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| | Polychlorinated Biphenyls(ต่อ)<br>- 2,2',3,4,4',5'-Hexachlorobiphenyl<br>- 2,2',3,4,5,5'-Hexachlorobiphenyl<br>- 2,2',3,5,5',6-Hexachlorobiphenyl<br>- 2,2',4,4',5,5'-Hexachlorobiphenyl<br>- 2,2',3,3',4,4',5-Heptachlorobiphenyl<br>- 2,2',3,4,4',5,5'-Heptachlorobiphenyl<br>- 2,2',3,4,4',5',6-Heptachlorobiphenyl<br>- 2,2',3,4',5,5',6-Heptachlorobiphenyl<br>- 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl | |
| 27 | Pentachlorophenol | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[3,9,28]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 28 | pH | Electrometric Method[31,32] |
| 29 | Selenium | 1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[3,6,21]<br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[3,6,14]<br>3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[7,21]<br>4) Digestion, Inductively Couple |
| 30 | Silver | 1) Waste Extraction, Digestion, I<br>Plasma Method[3,6,14]<br>2) Digestion, Inductively Couple |
| 31 | Thallium | 1) Waste Extraction, Digestion, I<br>Plasma Method[3,6,14]<br>2) Digestion, Inductively Couple |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 4 | Anthracene (ต่อ) | 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 5 | Antimony | Digestion, Inductively Coupled Plasma Method[7,14] |
| 6 | Arsenic | 1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[7,16]<br>2) Digestion, Inductively Coupled Plasma Method[7,14] |
| 7 | Atrazine | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 8 | Barium | Digestion, Inductively Coupled Plasma Method[7,14] |
| 9 | Benz(a)anthracene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,25]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 10 | Benzene | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method [11,27] |
| 11 | Benzo(b)fluoranthene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,25]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 12 | Benzo(k)fluoranthene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,25]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 13 | Benzoic acid | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 14 | Benzo(a)pyrene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,25]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 15 | Benzo(g,h,i)perylene | 1) Ultrasonic Extraction, Gas Ch<br>Method[10,25]<br>2) Ultrasonic Extraction, Gas Ch<br>Spectrometric Method[10,28] |
| 16 | Beryllium | Digestion, Inductively Coupled |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 17 | Bis(2-chloroethyl)ether | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 18 | Bis(2-ethylhexyl)phthalate | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 19 | Bromodichloromethane | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 20 | Bromoform | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 21 | Butanol | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 22 | Butyl benzyl phthalate | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 23 | Cadmium | 1) Digestion, Flame Atomic Absorption Spectrometric Method[7,15]<br>2) Digestion, Inductively Coupled Plasma Method[7,14] |
| 24 | Carbazole | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 25 | Carbon disulfide | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 26 | Carbon tetrachloride | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method[11,27] |
| 27 | Chlordane | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,23]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 28 | p-Chloroaniline | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 29 | Chlorobenzene | Purge and Trap, Gas Chromatograp<br>Spectrometric Method[13,27] |
| 30 | Chlorodibromomethane | Purge and Trap, Gas Chromatograp<br>Spectrometric Method[13,27] |
| 31 | Chloroform | Purge and Trap, Gas Chromatograp<br>Spectrometric Method[13,27] |
| 32 | 2-Chlorophenol | Ultrasonic Extraction, Gas Chromat<br>Spectrometric Method[10,28] |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 45 | 1,3-Dichlorobenzene | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 46 | 1,4-Dichlorobenzene | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 47 | 3,3′-Dichlorobenzidine | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 48 | 1,1-Dichloroethane | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method [11,27] |
| 49 | 1,2-Dichloroethane | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method [11,27] |
| 50 | 1,1-Dichloroethylene | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method [11,27] |
| 51 | cis-1,2-Dichloroethylene | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method [11,27] |
| 52 | trans-1,2-Dichloroethylene | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method [11,27] |
| 53 | 2,4-Dichlorophenol | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 54 | 1,2-Dichloropropane | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 55 | 1,3-Dichloropropane | Purge and Trap, Gas Chrom<br>Spectrometric Method[13,27 |
| 56 | 1,3-Dichloropropene | Purge and Trap, Gas Chrom<br>Spectrometric Method[13,27 |
| 57 | Dieldrin | 1) Ultrasonic Extraction, Ga<br>Method[10,23]<br>2) Ultrasonic Extraction, Ga<br>Spectrometric Method[10,28 |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 33 | Chromium | 1) Digestion, Flame Atomic Absorption Spectrometric Method[7,15]<br>2) Digestion, Inductively Coupled Plasma Method[7,14] |
| 34 | Chromium (III) | 1) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation[7,8,15,17]<br>2) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation[7,8,14,17] |
| 35 | Chromium (VI) | Alkaline Digestion, Colorimetric Method[8,17] |
| 36 | Chrysene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,25]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 37 | Cyanide | Extraction, Distillation, Colorimetric Method[29,30] |
| 38 | 2,4-D | Ultrasonic Extraction, Gas Chromatographic Method[26] |
| 39 | DDD | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,23]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 40 | DDE | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,23]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 41 | DDT | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,23]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 42 | Dibenz(a,h)anthracene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,25]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass<br>Spectrometric Method[1 |
| 43 | Di-n-butyl phthalate | Ultrasonic Extraction, Ga<br>Spectrometric Method[1 |
| 44 | 1,2-Dichlorobenzene | Purge and Trap, Gas Chr<br>Spectrometric Method[1 |

[redacted]

| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 70 | Heptachlor epoxide (ต่อ) | 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 71 | Hexachlorobenzene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,23]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 72 | Hexachloro-1,3-butadiene | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 73 | n-Hexane | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 74 | α-HCH | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,23]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 75 | β-HCH | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,23]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 76 | γ-HCH | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,23]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 77 | Hexachlorocyclopentadiene | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 78 | Hexachloroethane | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 79 | Indeno(1,2,3-cd)pyrene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,25]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 80 | Isophorone | Ultrasonic Extraction, Gas Ch[redacted]<br>Spectrometric Method[10,28] |
| 81 | Lead | 1) Digestion, Flame Atomic [redacted]<br>Method[7,15]<br>2) Digestion, Inductively Cou[redacted] |
| 82 | Manganese | 1) Digestion, Flame Atomic [redacted]<br>Method[7,15]<br>2) Digestion, Inductively Cou[redacted] |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 58 | Diethyl phthalate | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 59 | 2,4-Dimethylphenol | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 60 | 2,4-Dinitrophenol | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 61 | 2,4-Dinitrotoluene | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 62 | 2,6-Dinitrotoluene | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 63 | Di-n-Octyl phthalate | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 64 | Endosulfan | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,23]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 65 | Endrin | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,23]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 66 | Ethylbenzene | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method [11,27] |
| 67 | Fluoranthene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,25]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 68 | Fluorene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,25]<br>2) Ultrasonic Extracti[redacted]<br>Spectrometric Metho[redacted] |
| 69 | Heptachlor | 1) Ultrasonic Extracti[redacted]<br>Method[10,23]<br>2) Ultrasonic Extracti[redacted]<br>Spectrometric Metho[redacted] |
| 70 | Heptachlor epoxide | 1) Ultrasonic Extracti[redacted]<br>Method[10,23] |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 96 | Polychlorinated Biphenyls(ต่อ)<br>- Aroclor 1221<br>- Aroclor 1232<br>- Aroclor 1242<br>- Aroclor 1248<br>- Aroclor 1254 | 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| | - Aroclor 1260 | Ultrasonic Extraction, Gas Chromatographic Method[10,24] |
| | Polychlorinated Biphenyls<br>- 2-Chlorobiphenyl<br>- 2,3-Dichlorobiphenyl<br>- 2,2',5-Trichlorobiphenyl<br>- 2,4',5-Trichlorobiphenyl<br>- 2,2',3,5'-Tetrachlorobiphenyl<br>- 2,2',5,5'-Tetrachlorobiphenyl<br>- 2,3',4,4'-Tetrachlorobiphenyl<br>- 2,2',3,4,5'-Pentachlorobiphenyl<br>- 2,2',4,5,5'-Pentachlorobiphenyl<br>- 2,3,3',4',6-Pentachlorobiphenyl<br>- 2,2',3,4,4',5'-Hexachlorobiphenyl<br>- 2,2',3,4,5,5'-Hexachlorobiphenyl<br>- 2,2',3,5,5',6-Hexachlorobiphenyl<br>- 2,2',4,4',5,5'-Hexachlorobiphenyl<br>- 2,2',3,3',4,4',5-Heptachlorobiphenyl<br>- 2,2',3,4,4',5,5'-Heptachlorobiphenyl<br>- 2,2',3,4,4',5',6-Heptachlorobiphenyl<br>- 2,2',3,4',5,5',6-Heptachlorobiphenyl<br>- 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl | [redacted] |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 83 | Mercury | 1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[19]<br>2) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method[20] |
| 84 | Methanol | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 85 | Methoxychlor | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,23]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 86 | Methyl bromide | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 87 | Methylene chloride | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method [11,27] |
| 88 | 2-Methylphenol | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 89 | 2-Methylnaphthalene | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 90 | Methyl tert-butyl ether | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 91 | Naphthalene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,25]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 92 | Nickel | 1) Digestion, Flame Atomic Absorption Spectrometric Method[7,15]<br>2) Digestion, Inductively Coupled Plasma Method[7,14] |
| 93 | Nitrobenzene | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 94 | N-Nitrosodiphenylamine | Ultrasonic Extraction, Gas Ch<br>Spectrometric Method[10,28] |
| 95 | N-Nitrosodi-n-propylamine | Ultrasonic Extraction, Gas Ch<br>Spectrometric Method[10,28] |
| 96 | Polychlorinated Biphenyls<br>- Aroclor 1016 | 1) Ultrasonic Extraction, Gas<br>Method[10,24] |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 111 | 1,2,4-Trichlorobenzene | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 112 | 1,1,1-Trichloroethane | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 113 | 1,1,2-Trichloroethane | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 114 | Trichloroethylene | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method[11,27] |
| 115 | 2,4,5-Trichlorophenol | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 116 | 2,4,6-Trichlorophenol | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 117 | 1,3,5-Trimethylbenzene | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 118 | Vanadium | Digestion, Inductively Coupled Plasma Method[7,14] |
| 119 | Vinyl acetate | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 120 | Vinyl chloride | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 121 | m-Xylene | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method[11,27] |
| 122 | o-Xylene | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method[11,27] |
| 123 | p-Xylene | 1) Purge and Trap, Gas [redacted]<br>2) Equilibrium Headspa[redacted] |
| 124 | Xylene (Total) | 1) Purge and Trap, Gas [redacted]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method[11,27] |

[redacted]

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 97 | Pentachlorophenol | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 98 | Phenanthrene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,25]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 99 | Phenol | Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 100 | Pyrene | 1) Ultrasonic Extraction, Gas Chromatographic Method[10,25]<br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28] |
| 101 | Selenium | 1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[7,21]<br>2) Digestion, Inductively Coupled Plasma Method[7,14] |
| 102 | Silver | Digestion, Inductively Coupled Plasma Method[7,14] |
| 103 | Styrene | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method[11,27] |
| 104 | 1,1,2,2-Tetrachloroethane | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27] |
| 105 | Tetrachloroethylene | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method[11,27] |
| 106 | Toluene | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[13,27]<br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method[11,27] |
| 107 | Toxaphene | Ultrasonic Extraction, Gas Chromatographic Method[10,23] |
| 108 | TPH ($C_5$-$C_8$) | 1) Purge and Trap, Gas Chrom[redacted]<br>2) Purge and Trap, Gas Chrom[redacted]<br>Spectrometric Method[redacted] |
| 109 | TPH ($C_{>8}$-$C_{16}$) | Ultrasonic Extraction, Gas Chr[redacted] |
| 110 | TPH ($C_{>16}$-$C_{35}$) | Ultrasonic Extraction, Gas Chr[redacted] |

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| ลำดับ | สารมลพิษ | วิธีวิเคราะห์ |
|---|---|---|
| 125 | Zinc | 1) Digestion, Flame Atomic Absorption Spectrometric Method[7,15]<br>2) Digestion, Inductively Coupled Plasma Method[7,14] |

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