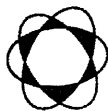


ภาคผนวก จ

เอกสารสอบเทียบเครื่องมือที่ใช้ใน
การตรวจวิเคราะห์



Thai Environmental Technic Limited
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

ตารางการสอบเทียบเครื่องมือที่ใช้ในการตรวจวัดและวิเคราะห์

| Item | Description | Parameter | List of Equipment | Equipment No. | Calibration | Next Calibration |
|------|-------------|-------------|--|------------------|-------------|------------------|
| 1. | Water | Temperature | pH Meter (Temperature)/Horiba | S/N B06D0012 | 11/07/2022 | July 2023 |
| | | pH | pH Meter/Horiba | S/N B06D0012 | 11/07/2022 | July 2023 |
| | | Turbidity | Turbidity Meter/EUTECH TN-100 | S/N 2655003 | 31/10/2022 | October 2023 |
| | | TSS | Electronic Balance/METTLER TOLEDO | S/N 1116392227 | 22/04/2022 | April 2023 |
| | | TDS | Electronic Balance/METTLER TOLEDO | S/N 1116392227 | 22/04/2022 | April 2023 |
| | | Sulfate | Spectrophotometer/PerkinElmer | S/N 365K9042909 | 01/11/2022 | November 2023 |
| | | As | Atomic Absorption Spectrophotometer Model/AAAnalyst 100 | S/N 040S0110503 | 30/03/2023 | September 2023 |
| | | Cd, Pb | Atomic Absorption Spectrophotometer Model/AAAnalyst 600 (Graphite) | S/N 600S5070101 | 20/01/2023 | July 2023 |
| | | Total Iron | ICP394/PerkinElmer/OPTIMA8000 | S/N 078N1310024C | 03/04/2023 | October 2023 |
| | | | | | | |



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert.No.: 22CHO410

Page.: 1 of 2

Certificate of Calibration

Equipment : pH Meter
Manufacturer : Horiba
Model : LAQUA-PH1300
Serial No. : B06D0012
ID No. : -
Condition As-Received: Used Item
Received Date : 11 July 2022
Calibration Date : 11 July 2022
Reference : 2207-0243OC-7
Submitted by : Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145
Khwaeng/Khet Saphan Sung,
Bangkok 10240

Calibration Place : Laboratory (Thai Environment Technic Limited)
Ambient Temperature : (25.2 - 25.4) °C
Relative Humidity : (50.8 - 51.3) %
Calibration Procedure : In - house method :
- CP-OCH2 by direct measurement with standard
voltage calibrator and direct measurement
with certified reference material (CRM)

Calibrated by : Krisda Malee

Approved by :

Approved Signatory

(☒) Malee Butkruea

(☐) Saithip Meangmai

Issue Date : 19 July 2022

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0042417



Cert. No.: 22CHO410

Page.: 2 of 2

Condition of this calibration result

1. Reference Standard Instrument :-

| <u>Instrument</u> | <u>Serial No.</u> | <u>ID No.</u> | <u>Cert. No.</u> | <u>Due Date</u> |
|--------------------------------|-------------------|---------------|------------------|-----------------|
| 1) Document Process Calibrator | 46530031 | 130RC098 | 21E3245 | 07 Oct 2022 |
| 2) Digital Thermometer | - | 130RC112 | 21T2118 | 16 Nov 2022 |

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

- Traceable to National Institute of Metrology (Thailand), NIMT

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

| <u>Buffer Solution</u> | <u>Manufacturer</u> | <u>Lot No.</u> | <u>Exp. date</u> |
|------------------------|---------------------|----------------|------------------|
| pH 1.681 | CPA chem | 754027 | 28 Jun 2023 |
| pH 4.008 | CPA chem | 794120 | 14 Feb 2024 |
| pH 6.866 | CPA chem | 754029 | 28 Jun 2023 |
| pH 9.181 | CPA chem | 766823 | 04 Sep 2022 |
| *pH 12.44 | Hach Lenge GmbH | C02796 | 15 Dec 2022 |

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

Calibration Results**Function : mV Measurement****Performing standard curve by Fluke at pH (1.68,4,7,10)**

| <u>Unit Under Calibration</u> | <u>Nominal Value</u> | <u>Standard Voltage Input</u> | <u>Actual Reading</u> | | <u>Uncertainty of Measurement (±mV)</u> | <u>Coverage factor k</u> |
|-------------------------------|----------------------|-------------------------------|-----------------------|-----------|---|--------------------------|
| | <u>pH</u> | <u>mV</u> | <u>mV</u> | <u>pH</u> | | |
| pH Meter S/N.: B06D0012 | 1.680 | 314.73 | 314.7 | 1.694 | 0.058 | 2.00 |
| | 4.000 | 177.48 | 177.5 | 4.008 | 0.058 | 2.00 |
| | 6.860 | 8.28 | 8.3 | 6.860 | 0.058 | 2.00 |
| | 7.000 | 0.0 | 0.0 | 7.000 | 0.058 | 2.00 |
| | 9.180 | -128.97 | -128.9 | 9.188 | 0.058 | 2.00 |
| | 10.000 | -177.48 | -177.4 | 10.011 | 0.058 | 2.00 |

Function : pH Measurement**Performing four buffers standard curve by using buffer nominal pH (1.68,4,7,9)**

| <u>Unit Under Calibration</u> | <u>Standard pH Buffer Solution</u> | <u>Actual pH Reading</u> | <u>Actual mV Reading (mV)</u> | <u>Uncertainty of pH measurement (±)</u> | <u>Coverage factor k</u> |
|--------------------------------|------------------------------------|--------------------------|---------------------------------|--|--------------------------|
| pH Electrode S/N.: 9X9M0055 | 1.681 | 1.681 | 295.6 | 0.0050 | 2.00 |
| | 4.008 | 4.007 | 159.9 | 0.0047 | 2.00 |
| | 6.866 | 6.866 | -6.9 | 0.0084 | 2.00 |
| | 9.181 | 9.181 | -139.9 | 0.014 | 2.00 |
| | *12.44 | 12.440 | -314.5 | 0.056 | 2.00 |

Remark: * : Not NSC-ONSC AccreditedThe reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k , providing a level of confidence of approximately 95 %.

-o0o-

Mali



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CALIBRATION AND TESTING EQUIPMENT SERVICES

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

TEL. 0-2717-3000-24 FAX. 0-2719-9484

Cert.No.: 22CH1490

Page.: 1 of 2

Certificate of Calibration

Equipment : Turbidity Meter
Manufacturer : Thermo Scientific
Model : EUTECH TN-100
Serial No. : 2655003
ID. No. : -
Condition As-Received: Used Item
Received Date : 27 October 2022
Calibration Date : 31 October 2022
Reference : 2210-0875WSC-3
Submitted by : Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145,
Khwaeng/Khet Saphan Sung, Bangkok 10240
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 20) %
Calibration Procedure : In - house method : CP-CH11
based on direct measurement by
using Formazin standard solution

Calibrated by : Walalak Sirithean

Approved by :

Approved Signatory

- (✓) Malee Butkruea
() Saithip Meangmai
() Warakorn Lerngagtrakul

Issue Date : 1 November 2022

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

This certificate may not be reproduced other than in full, except with the prior written
approval of the head of Calibration and Testing Equipment Services.

A 0009939



Cert.No. : 22CH1490

Page. : 2 of 2

Condition of this calibration result

1. Reference Standard Instruments :

This certification is traceable to the International System of unit (SI unit) through Technology Promotion Association (Thailand-Japan).

| <u>Instruments</u> | <u>Serial No.</u> | <u>ID No.</u> | <u>Certificate No.</u> | <u>Due date</u> |
|-----------------------|-------------------|---------------|------------------------|-----------------|
| 1) Thermo-Hygrograph | 1103328 | 130EC010 | 22H1313 | 12 June 2023 |
| 2) Electronic Balance | B134206712 | 140RC007 | 22MM181 | 22 Feb 2023 |

2. Standard Material : The Formazin suspension has been prepared gravimetric from

| <u>Material</u> | <u>Manufacturer</u> | <u>Lot No.</u> | <u>Assay</u> |
|---------------------------|---------------------|----------------|--------------|
| 1) Hexamethylenetetramine | HIMEDIA | 0000493947 | 99.65% |
| 2) Hydrazinium Sulfate | HIMEDIA | 0000522014 | 99.40% |

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

Calibration result

Performing three - Formazin suspension standard curve by using 20,100,800 NTU
Turbidity Meter Serial Number : 2655003

| Standard Formazine suspension (NTU) | UUC* Reading (NTU) | Uncertainty of Measurement (\pm NTU) | Coverage Factor k |
|---|-------------------------|--|---------------------------|
| 0.1 | 0.18 | 0.026 | 2.06 |
| 20 | 20.1 | 0.39 | 2.00 |
| 100 | 100 | 0.74 | 2.00 |
| 800 | 799 | 2.1 | 2.00 |

Remark

- UUC* = Unit Under Calibration
- NTU = Nephelometric Turbidity Units

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

-o0o-

Melu

a 1133333



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert.No.: 22MM27

Page.: 1 of 3

Certificate of Calibration

Equipment : Electronic Balance

Manufacturer : Mettler Toledo

Model : AB204

Serial No. : 1116392227

ID No. : TET.LAB.BAL01

Submitted by : Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145,
Khwaeng/Khet Saphan Sung,
Bangkok 10240

Location : Balance Room


Received order : 20 April 2022

Calibration Date : 22 April 2022

Ambient Temperature : 15 °C to 40 °C

Relative Humidity : 30 % to 90 %

Calibrated by : Uthen Kankawi

Approved by : 
Approved Signatory

() Pornthippa Tameyakul
(✓) Malee Butkruea
() Suwit Imjai

Issue Date : 6 May 2022

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0040784



Equipment : Electronic Balance
Condition As-Received : Used Item
Reference : 2204-0369OC-16
Procedure used :-

Cert.No.: 22MM27

Page: 2 of 3

Calibration were conducted using in-house calibration procedure CP-OB01 according to direct measurement method against standard weight.

Condition of this result of calibration

1. Reference standard instruments:-

| <u>Instruments</u> | <u>Model</u> | <u>Serial No.</u> | <u>ID No.</u> | <u>Test report No.</u> | <u>Due date</u> |
|-----------------------------|--------------|-------------------|---------------|------------------------|-----------------|
| 1) Standard Weight Set (E2) | 15884 | - | 70RC138 | MM-0009-21 | 3 Feb 2023 |

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This result of calibration was made on requested at the point specified by customer.
4. This certificate is not certified for any commercial transaction.
5. This certification is traceable to the International System of Unit.

Result of calibration () Without Adjustment (*) After Adjustment by External Calibration

Range capacity : 0 g to 210 g **Resolution** 0.0001 g

Before Adjustment :

| <u>Applied Weight</u> (g) | <u>Balance Reading</u> (g) | <u>Correction</u> (g) | <u>Measurement Uncertainty</u> (\pm mg) | <u>Coverage Factor</u> (k) |
|--------------------------------|---------------------------------|----------------------------|--|---------------------------------|
| 100 | 99.9981 | +0.0019 | 0.22 | 2.00 |
| 200 | 199.9957 | +0.0043 | 0.35 | 2.00 |

After Adjustment :

1. **Determination of the standard deviation of weighing machine** (n = 10)

| <u>Applied Weight</u> (g) | <u>Standard Deviation of Reading (g)</u> |
|--------------------------------|--|
| 100 | 0.00006 |
| 200 | 0.00007 |

Malu.



Equipment : Electronic Balance
 Condition As-Received : Used Item
 Reference : 2204-0369OC-16

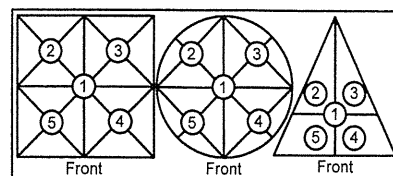
Cert.No.: 22MM27

Page: 3 of 3

Result of calibration

2. Effect of off center loading

A mass of 100 g was placed to various position on the pan.
 The weighing machine reading error obtained is given in the table



Maximum difference between
 off-center and central loading

| Position 1 (g) | Position 2 (g) | Position 3 (g) | Position 4 (g) | Position 5 (g) | (g) |
|---------------------|---------------------|---------------------|---------------------|---------------------|--------|
| -0.0003 | -0.0003 | -0.0003 | -0.0004 | 0.0000 | 0.0003 |

3. Departure from nominal value

| Applied Weight (g) | Balance Reading (g) | Correction (g) | Measurement Uncertainty (\pm mg) | Coverage Factor (k) |
|-------------------------|-----------------------------|---------------------|--|-----------------------------|
| Unload | 0.0000 | 0.0000 | 0.13 | 2.09 |
| 0.01 | 0.0099 | +0.0001 | 0.13 | 2.09 |
| 0.1 | 0.0999 | +0.0001 | 0.13 | 2.09 |
| 0.5 | 0.5000 | 0.0000 | 0.13 | 2.09 |
| 1 | 1.0001 | -0.0001 | 0.13 | 2.09 |
| 5 | 5.0001 | -0.0001 | 0.13 | 2.09 |
| 10 | 10.0000 | 0.0000 | 0.13 | 2.09 |
| 25 | 24.9998 | +0.0002 | 0.15 | 2.06 |
| 50 | 49.9998 | +0.0002 | 0.15 | 2.05 |
| 100 | 99.9998 | +0.0002 | 0.22 | 2.00 |
| 200 | 199.9997 | +0.0003 | 0.35 | 2.00 |

Note : This instrument was adjusted before calibration by weight of Mettler Toledo F1 200. g S/N.: 11119517
 Certificate No.: 21M1956

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

-o0o-

Malu.

a 1105868



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert.No.: 22CHO625

Page.: 1 of 3

Certificate of Calibration

Equipment : Spectrophotometer
Manufacturer : PerkinElmer
Model : Lambda 365
Serial No. : 365K9042909
ID No. : -
Condition As-Received: Used Item
Received Date : 01 November 2022
Calibration Date : 01 November 2022
Reference : 2211-0001OC-5
Submitted by : Thai Environmental Technic Limited
1/6 Soi Ramkhamhaeng 145,
Khwaeng/Khet Saphan Sung,
Bangkok 10240

Calibration Place : Laboratory (Thai Environment Technic Limited)
Ambient Temperature : (24.9 - 24.4) °C (On-Site)
Relative Humidity : (54 - 52) % (On-Site)
Calibration Procedure : In - house method :
CP-OCH4 based on ASTM E 275-01

Calibrated by : Uthen Kankawi

Approved by :

Malee

Approved Signatory

- (☒) Malee Butkruea
(☐) Saithip Meangmai
(☐) Warakorn Lerngagtrakul

Issue Date :

10 November 2022

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0047052



Cert. No. : 22CHO625

Page : 2 of 3

Condition of calibration result

1. Reference Standard Material :

| <u>Material</u> | <u>Serial No.</u> | <u>Certificate No.</u> | <u>Due date</u> |
|-----------------------------|-------------------|------------------------|-----------------|
| 1. Absorbance Standard set | 39130 | 106269 | 10 Oct 2024 |
| 2. Wavelength Standard set | 29829 | 94776 | 02 Sep 2023 |
| 3. Wavelength Standard set | 29829 | 94777 | 02 Sep 2023 |
| 4. Stray Light Standard set | 32629 | 9112980 | 03 Aug 2024 |

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

3. This certificate is traceable to the International System of Unit maintained at :

- National Physical Laboratory (NPL), The United Kingdom of Great Britain and Northern Ireland
- National Institute of Standards and Technology (NIST), The United States of America

4. Spectral BandWidth : 1 nm

Scan Speed : 30 nm/min

Calibration Results : without adjustment

Wavelength Accuracy

| Certified Values of Reference Material (nm) | UUC Reading (nm) | Uncertainty of Measurement (\pm nm) | Coverage Factor <i>k</i> |
|--|-------------------------------|---|---|
| 418.53 | 418.32 | 0.12 | 2.00 |
| 536.52 | 536.61 | 0.12 | 2.00 |
| 638.00 | 637.96 | 0.12 | 2.00 |
| 684.50 | 684.48 | 0.12 | 2.00 |
| 879.41 | 879.39 | 0.12 | 2.00 |

Malu

a 1134411



Cert. No. : 22CHO625

Page : 3 of 3

Calibration Results : without adjustment

Photometric Accuracy

| Wavelength (nm) | Certified Values of Reference Material (Abs) | UUC Reading (Abs) | Uncertainty of Measurement (\pm Abs) | Coverage Factor <i>k</i> |
|--------------------|--|------------------------|--|--------------------------------|
| 420.0 | Zero | 0.0000 | 0.0028 | 2.00 |
| | 0.5796 | 0.5788 | 0.0028 | 2.00 |
| | 0.7105 | 0.7095 | 0.0028 | 2.00 |
| | 1.0186 | 1.0179 | 0.0028 | 2.00 |
| 546.1 | Zero | 0.0000 | 0.0028 | 2.00 |
| | 0.5281 | 0.5258 | 0.0028 | 2.00 |
| | 0.6962 | 0.6945 | 0.0028 | 2.00 |
| | 0.9984 | 0.9956 | 0.0028 | 2.00 |
| 635.0 | Zero | 0.0000 | 0.0028 | 2.00 |
| | 0.5699 | 0.5684 | 0.0028 | 2.00 |
| | 0.7606 | 0.7590 | 0.0028 | 2.00 |
| | 1.0927 | 1.0904 | 0.0028 | 2.00 |

Stray Light

| * Straylight at 280.05 nm \pm 0.11 nm | Reading at 280.05 nm \pm 0.11 nm |
|--|------------------------------------|
| Abs | 2.0728 |
| %T | 0.8299 |

Remark

- Each individual filter is measured against the empty filter holder (blank) used to zero the spectrophotometer
- Cut-off wavelength of stray light reference material (Potassium Iodide) at wavelength 280.05 nm \pm 0.11 nm
- Result = Pass, If Absorbance > 2.00 Abs and Transmission < 1.0 %T at Wavelength 280.05 nm \pm 0.11 nm
- * : Not NSC-ONSC Accredited

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

-o0o-

Maler

a 1134410



MAINTENANCE REPORT

ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL

AAAnalyst 100

| | | | |
|-------------------|-----------------------------|---------------------------------------|-----------------------|
| Customer : | บริษัท เทคนิคสิ่งแวดล้อมไทย | Date Tested: | 30-มี.ค.-66 |
| | จำกัด | Recommendation Recertification | |
| Address : | 1/6 ซอยรามคำแหง 145, | Period | 6 Months |
| | แขวงสะพานสูง, เขตสะพานสูง, | Recertification Due: | 29-ก.ย.-66 |
| | กรุงเทพฯ 10240 TH | Date Last Certified: | 3-ต.ค.-65 |
| User Name: | คุณ กิตติศักดิ์ เมืองงาม | Visit Number: | 1 of 2 |
| Phone: | 02-3737799 | TH ONE SOURCE Phone: | 081-7316733 |
| E-mail: | phornvip.p@tet1995.com | E-mail: | thonesource@gmail.com |
| | ketsarin.c@tet1995.com | | |

| CONFIGURATION TESTED | | |
|----------------------|---------------|---------------|
| MODEL | SERIAL NUMBER | SOFTWARE |
| AAAnalyst 100 | 040S0110503 | AA WinLab 3.2 |
| | | |
| | | |
| | | |
| TEST STANDARD USED | PART NUMBER | |
| Copper | N9300183 | |
| Filter 0.2 % | MG0-057 | |
| | | |
| | | |
| | | |



MAINTENANCE REPORT

ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL

AAnalyst 100

SERIAL NUMBER 040S0110503
DATE TESTED
30-มี.ค.-66
1. OPTIC CHECKS

A. Optical alignment condition (if necessary)

☐ OK

B. Condition of Mirrors,Lenses etc.(if necessary)

☐ OK

C. D2,HCL beam adjust (if necessary)

☐ OK

2. GAS SYSTEM CHECKS

A. Leak test all internal and external gas box joints

☐ OK

B. All gas box safety features

☐ OK

C. Burner system including nebulizer and all o-ring and gasket

☐ OK

D. Drain system (safety)

☐ F

3. ELECTRONICS CHECKS

A. Power Supplies

 $+ 5.00 \text{ Vdc} \pm 0.2 \text{ Vdc}$
+ 5.02 Vdc

 $+ 11.50 \text{ Vdc} \pm 0.2 \text{ Vdc}$
+ 11.48 Vdc

 $+ 15.00 \text{ Vdc} \pm 1.0 \text{ Vdc}$
+14.99 Vdc

 $- 15.00 \text{ Vdc} \pm 1.0 \text{ Vdc}$
-15.06 Vdc

 $+ 35.00 \text{ Vdc} \pm 3.0 \text{ Vdc}$
+35.13 Vdc

4. WAVELENGTH ACCURACY TEST

 A. Zn Lamp wavelength $213.9 \text{ nm} \pm 0.3 \text{ nm}$.

213.78 nm.

 B. Fe Lamp wavelength $248.3 \text{ nm} \pm 0.3 \text{ nm}$.

248.20 nm.

 C. Cu Lamp wavelength $324.8 \text{ nm} \pm 0.3 \text{ nm}$.

324.83 nm.



MAINTENANCE REPORT

ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL

AAAnalyst 100

| | |
|--|---|
| SERIAL NUMBER <u>040S0110503</u> | DATE TESTED <u>30-มี.ค.-66</u> |
| 5. PERFORMANCE TESTS | SPEC. RESULTS |
| *A. Neutral density filter checks with Copper (324.8 nm) | |
| Neutral Density Filter 0.2 ± 10% | 0.180 <u>0.173</u> Abs. |
| | |
| B. AA Baseline noise test with Copper (324.8 nm) | |
| Integration time = 0.5 seconds | |
| Replicates = 99 times | |
| Standard Deviation ≤ 0.001 | <u>0.000</u> |
| C. Flame sensitivity with Copper (324.8nm) | |
| (5 mg/L Cu Standard a read time of 10 seconds | |
| 10 replicates, standard burner) | |
| Stainless steel nebulizer ≥ 0.25 | <u>0.285</u> Abs. |
| | |
| %RSD ≤ 0.3 | <u>0.18</u> % |



MAINTENANCE REPORT
ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL
AAAnalyst 100

SERIAL NUMBER 040S0110503

DATE TESTED

30-มี.ค.-66

Remarks :

This is to certify that the above tests have been performed and the configuration tested



meets



does not meet

This certificate does not modify PerkinElmer's standard terms and condition of sale,
including warranty terms.

Service Department TH ONE SOURCE CO., LTD.

Krungchai T.

(

Krungchai Treevichien

)

Customer Support Engineer



Certificate of Training

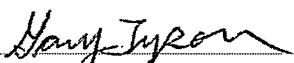
This is to certify that

Mr. Krungchai Treevichien

Has successfully completed

Atomic Absorption 100/300 Service Training

17 September, 2007 TO 21 September, 2007


Gary Tyson

INSTRUCTOR

21 September 2007

Date



MAINTENANCE REPORT

ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL

AAAnalyst 600

| | |
|--|---|
| Customer : THAI ENVIRONMENTAL | Date Tested: 20-ม.ค.-66 |
| TECHNIC LIMITED. | Recommendation Recertification |
| Address : 1/6 Soi Ramkhamheang 145, | Period 6 Months |
| Khwaeng/Khet Saphan Sung, | Recertification Due: 20-ก.ค.-66 |
| Bangkok 10240 | Date Last Certified: 22-ก.ค.-65 |
| User Name: คุณ กนกวรรณ เริ่มประชาธิปไตย | Visit Number: 1 OF 2 |
| Phone: 02-7353101-3, 02-3737799 | TH One Source Phone: 081-7316733 |
| E-mail: ketsarin.c@tet1995.com | E-mail thonecource@gmail.com |
| admin@tet1995.com | |

CONFIGURATION TESTED

| MODEL | SERIAL NUMBER | SOFTWARE |
|---------------|---------------|-----------------------|
| AAAnalyst 600 | 600S5070101 | AA WinLab Version 3.2 |
| AS 800 | 801S5070102 | |
| FIAS-100 | 2288 | |
| | | |
| | | |

| TEST STANDARD USED | PART NUMBER |
|----------------------|-------------|
| GFAAS Mixed standard | N9300244 |
| | |
| | |
| | |



MAINTENANCE REPORT

ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL

AAAnalyst 600

SERIAL NUMBER 600S5070101
DATE TESTED
20-ม.ค.-66
1. INSTRUMENT CHECKS

A. The Mirror and Lenses Condition

☐ OK

B. Grating Condition

☐ OK

C. Replace or Clean Dust Filter

☐ OK

D. Cleaning the Contact Cylinders

☐ OK

E. Cleaning the Furnace Windows

☐ OK

2. AUTOSAMPLE CHECK

A. Sampling and Arm

☐ OK

B. Sampling & Rinse Pump

☐ OK

C. Sample Position & Clean

☐ OK

D. Clean or Replace the Hall Sensor

☐ OK

3. COOLING SYSTEM CHECKS

A. Clean and Change Distill water

☐ OK

B. Themensor

☐ OK

4. FIAS CHECKS

A. Pump and 5 Port Valve

☐ OK

B. Chemifold and Tubing

☐ OK

C. Power Supply

☐ OK

D. Flow meter and Gas system

☐ OK



MAINTENANCE REPORT

ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL

AAAnalyst 600

| | | | |
|---|----------------------|---------------------|-----------------|
| SERIAL NUMBER | <u>600S5070101</u> | DATE TESTED | <u>20-11-66</u> |
| PARAMETER | SPECIFICATION | ACTUAL VAULE | |
| B. THGA Tests | | | |
| 1. Furnace Gas Flows | | | |
| Internal Flow | 250 ± 25 mL/min | <u>235</u> | mL/min |
| External Flow | 100 ± 10 mL/min | <u>110</u> | mL/min |
| 2. Chromium Baseline Noise | | | |
| (measure 5 furnace dry firings without any sample) | | | |
| Baseline | ≤ 0.005 Int.Abs | <u>0.0002</u> | Int.Abs |
| SD | ≤ 0.005 Int.Abs | <u>0.0002</u> | Int.Abs |
| 3. Chromium Characteristic Mass(m_0) and Precition | | | |
| (measure 5 furnace firing using 20 ul sample injections of 10 ug/L Cr standard) | | | |
| m_0 Results | 6.5 pg ± 1.5 pg | <u>5.7</u> | pg |
| Precision | ≤ 2.0% | <u>1.41</u> | % |
| 4. Copper Characteristic Mass(m_0) and Zeeman Ratio | | | |
| (measure 5 furnace firing using 20 ul sample injections of 25 ug/L Cu standard) | | | |
| m_0 Results | 17.0 pg ± 3.5 pg | <u>14.2</u> | pg |
| Zeeman Ratio | 0.58 ± 0.04 | <u>0.560</u> | |



MAINTENANCE REPORT

ATOMIC ABSORPTION SPECTROPHOTOMETER MODEL

AAAnalyst 600

SERIAL NUMBER 600S5070101 DATE TESTED 20-ม.ค.-66

Remarks :

Changed The Controller Bd. Atomizer (4 May 2015)

Replace The Contact Cylinder (27 July 2021)

Zeeman Ratio = Atomic Signal(peak area)

Atomic Signal(peak area)+Background Signal(peak area)

=

=

Changed the THGA Contact Cylinder on 22 July 2022

Copper blank = 0.0015

This is to certify that the above tests have been performed and the configuration tested



meets



does not meet

the PerkinElmer Specifications listed on this certificate.

This certificate does not modify PerkinElmer's standard terms and condition of sale,
including warranty terms.

Service Department TH ONE SOURCE CO., LTD.

Krungchai T.

(**Krungchai Treevichien**)

Customer Support Engineer



Certificate of Training

This is to certify that

Krungchai Treevichien

has successfully completed

Aanalyst 600/700/800 Service Training

09 to 13 February 2004



C S Lim
Service Specialist

13 Feb 2004



MAINTENANCE REPORT AND TEST CERTIFICATE OPTIMA 8000

| | |
|--|--|
| Customer : บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด Address : 1/6 ซอยรามคำแหง 145 แขวงสะพานสูง เขตสะพานสูง กรุงเทพมหานคร 10240 User Name: Khun Nattapong Phone: 02-3737799 Fax: | Date Tested: April 3, 2023 Recommendation Recertification Period 6 Months Recertification Due: October 3, 2023 Date Last Certified: October 4, 2022 Visit Number: 1 of 2 PerkinElmer Phone: 02-719-6420 ext 203 PerkinElmer Fax: 02-318-5597 |
|--|--|

CONFIGURATION TESTED

MODEL

OPTIMA 8000
S10

SERIAL NUMBER

078N1310024C

ACCESSORIES/COMPONENT NOT INCLUDED

TESTED EQUIPMENT

IPV Methods

CALIBRATION NUMBER

EXPIRATION

TEST STANDARD USED

Mixed standard 1/10
Mixed standard 1/100

PART NUMBER

N069-1579
N930-0221

EXPIRATION DATE

May 30, 2023
November 30, 2023

CUSTOMER SUPPLIED

2 % HNO3
10 % HNO3

COMMENTS

CUSTOMER INITIALS

MAINTENANCE REPORT AND TEST CERTIFICATE
OPTIMA 8000

SERIAL NUMBER : 078N1310024C

DATE TESTED : April 3, 2023

1. MECHANICAL CHECKS

A. Inspect and clean all fans and filters.

OK

B. Inspect and replace as necessary, all torch components including the RF coil.

OK

C. Inspect all tubing for sign of clacking or leaking.

OK

D. Adjust water and gas pressure regulator settings.

OK

E. Inspect and leak check pneumatics drawers.

OK

F. Clean the exterior of the instrument.

OK

2. OPTICAL CHECKS

A. Inspect and clean all optical components.

OK

B. As required, check and replace all purgefilters.

OK

C. Recheck optical alignment.

OK

3. COOLING SYSTEM CHECKS

A. Perform preventive maintenance on chiller.

OK

B. Flush out the chiller every six months.

OK

4. PERFORMANCE CHECKS

A. Torch View Alignment.

OK

B. Wavelength Calibration.

OK

MAINTENANCE REPORT AND TEST CERTIFICATE OPTIMA 8000

SERIAL NUMBER : 078N1310024C

DATE TESTED : April 3, 2023

| PARAMETER | SPECIFICATION | | | FINAL VALUE |
|---|---------------|-------------|--|----------------|
| Spectral Resolution : UV | As 193.696 nm | ≤ 0.009 | | <u>0.00702</u> |
| | Ni 231.604 nm | ≤ 0.011 | | <u>0.00790</u> |
| | Ni 341.476 nm | ≤ 0.015 | | <u>0.01192</u> |
| Spectral Resolution : VIS | Ba 455.403 nm | ≤ 0.020 | | <u>0.01500</u> |
| Precision | | | | |
| | Zn 206.200 nm | % RSD < 1.0 | | <u>0.58</u> |
| | Mg 280.271 nm | % RSD < 1.0 | | <u>0.28</u> |
| | Mg 285.213 nm | % RSD < 1.0 | | <u>0.39</u> |
| | Ba 455.403 nm | % RSD < 1.0 | | <u>0.39</u> |
| Detection Limits : Axial | As 193.696 nm | 3(SD) ppb | | <u>4.26</u> |
| | Se 196.026 nm | 3(SD) ppb | | <u>2.87</u> |
| | Tl 190.801 nm | 3(SD) ppb | | <u>3.73</u> |
| | Pb 220.353 nm | 3(SD) ppb | | <u>11.48</u> |
| Detection Limits : Radial | As 193.696 nm | 3(SD) ppb | | <u>2.60</u> |
| | Zn 213.857 nm | 3(SD) ppb | | <u>0.26</u> |
| | Mn 257.610 nm | 3(SD) ppb | | <u>1.49</u> |
| | La 379.478 nm | 3(SD) ppb | | <u>0.12</u> |
| | Ba 455.403 nm | 3(SD) ppb | | <u>2.86</u> |
| | Ba 493.408 nm | 3(SD) ppb | | <u>9.64</u> |
| BEC : Axial (IB X 1000)/(IS-IB) | Mn 257.610 nm | ≤ 30 ppb | | <u>15.70</u> |
| BEC : Radial (IB X 1000)/(IS-IB) | Mn 257.610 nm | ≤ 30 ppb | | <u>23.89</u> |

MAINTENANCE REPORT AND TEST CERTIFICATE
OPTIMA 8000

SERIAL NUMBER : 078N1310024C

DATE TESTED : April 3, 2023

Remarks :

Commissioning follow as commissioning performance sheets.

This is to certify that the above tests have been performed and the configuration tested



meets



does not meet

the PerkinElmer Specifications listed on this certificate.

This certificate does not modify PerkinElmer's standard terms and condition of sale,
including warranty terms.

Service Department PerkinElmer Ltd.

Authorized Representative :



(Wiphan Promlumda)

Service Engineer

=====

Align View XY Axial for analyte Mn 257.610

| X-position | Y-position | Intensity |
|------------|------------|-----------|
| -2.0 | 15.0 | 2920926.2 |
| -1.6 | 15.0 | 4117205.6 |
| -1.2 | 15.0 | 5581541.7 |
| -0.8 | 15.0 | 6990827.7 |
| -0.4 | 15.0 | 8176328.5 |
| 0.0 | 15.0 | 9075098.4 |
| 0.4 | 15.0 | 8960265.5 |
| 0.8 | 15.0 | 8360445.5 |
| 1.2 | 15.0 | 7467099.0 |
| 1.6 | 15.0 | 6255831.1 |
| 2.0 | 15.0 | 5030853.2 |
| 0.0 | 10.0 | 159365.9 |
| 0.0 | 10.5 | 241214.9 |
| 0.0 | 11.0 | 446309.1 |
| 0.0 | 11.5 | 964275.3 |
| 0.0 | 12.0 | 1659518.8 |
| 0.0 | 12.5 | 2781326.3 |
| 0.0 | 13.0 | 4117574.4 |
| 0.0 | 13.5 | 5863526.6 |
| 0.0 | 14.0 | 7007618.7 |
| 0.0 | 14.5 | 8248882.5 |
| 0.0 | 15.0 | 8915353.6 |
| 0.0 | 15.5 | 8830206.3 |
| 0.0 | 16.0 | 8476274.2 |
| 0.0 | 16.5 | 7574239.7 |
| 0.0 | 17.0 | 5916533.5 |
| 0.0 | 17.5 | 4806692.1 |
| 0.0 | 18.0 | 3470213.6 |
| 0.0 | 18.5 | 2459999.5 |
| 0.0 | 19.0 | 1409798.3 |
| 0.0 | 19.5 | 836888.1 |
| 0.0 | 20.0 | 457127.2 |
| -0.8 | 15.0 | 7399406.7 |
| -0.4 | 15.0 | 8255530.6 |
| 0.0 | 15.0 | 8767341.7 |
| 0.4 | 15.0 | 8902714.8 |
| 0.8 | 15.0 | 8341631.7 |
| 0.4 | 13.0 | 4448485.6 |
| 0.4 | 13.5 | 5980471.5 |
| 0.4 | 14.0 | 7305087.4 |
| 0.4 | 14.5 | 8079824.9 |
| 0.4 | 15.0 | 9038053.5 |
| 0.4 | 15.5 | 8965644.2 |
| 0.4 | 16.0 | 8519954.3 |
| 0.4 | 16.5 | 7478375.8 |
| 0.4 | 17.0 | 5956440.9 |

3/4/2566 10:51:07 aligned for analyte Mn 257.610

X viewing position set to 0.4 mm having Peak intensity 9038053.5 for Axial viewing

Y viewing position set to 15.0 mm having Peak intensity 9038053.5 for Axial viewing

=====

Align View X Radial for analyte Mn 257.610

| X-position | Y-position | Intensity |
|------------|------------|-----------|
| -7.0 | 15.0 | 23032.5 |
| -6.5 | 15.0 | 27006.7 |
| -6.0 | 15.0 | 35560.5 |
| -5.5 | 15.0 | 57821.4 |
| -5.0 | 15.0 | 90935.9 |
| -4.5 | 15.0 | 136105.4 |
| -4.0 | 15.0 | 206645.2 |
| -3.5 | 15.0 | 299882.1 |
| -3.0 | 15.0 | 428877.1 |
| -2.5 | 15.0 | 589771.2 |
| -2.0 | 15.0 | 706184.3 |
| -1.5 | 15.0 | 841150.2 |
| -1.0 | 15.0 | 1019788.8 |
| -0.5 | 15.0 | 1329407.6 |
| 0.0 | 15.0 | 1381151.1 |
| 0.5 | 15.0 | 1426400.1 |
| 1.0 | 15.0 | 1309824.4 |

| | | |
|-----|------|-----------|
| 1.5 | 15.0 | 1099234.2 |
| 2.0 | 15.0 | 784376.5 |
| 2.5 | 15.0 | 574061.3 |
| 3.0 | 15.0 | 437455.8 |
| 3.5 | 15.0 | 324105.7 |
| 4.0 | 15.0 | 264022.3 |
| 4.5 | 15.0 | 183005.6 |
| 5.0 | 15.0 | 117089.3 |
| 5.5 | 15.0 | 70743.1 |
| 6.0 | 15.0 | 40927.8 |
| 6.5 | 15.0 | 27379.1 |
| 7.0 | 15.0 | 20863.3 |

3/4/2566 10:54:00 aligned for analyte Mn 257.610

X viewing position set to 0.5 mm having Peak intensity 1426400.1 for Radial viewing
=====

=====
Method Loaded

Method Name: DLRL-Cal

Method Last Saved: 5/4/2565 10:59:28

IEC File:

MSF File:

Method Description: C8000-Calibration for later test
=====

Sequence No.: 1

Autosampler Location:

Sample ID: Calib Blank 1

Date Collected: 3/4/2566 11:18:12

Analyst:

Data Type: Reprocessed on 3/4/2566 11:32:52

Logged In Analyst (Original) : TET

Initial Sample Wt:

Initial Sample Vol:

Dilution:

Sample Prep Vol:

Wash Time:

Nebulizer Parameters: Calib Blank 1

Analyte

Back Pressure

Flow

All

197.0 kPa

0.50 L/min

Mean Data: Calib Blank 1

| Analyte | Mean Corrected Intensity | Std.Dev. | RSD | Calib Conc. Units |
|------------|-----------------------------|----------|-----|----------------------|
| As 193.696 | 96.5 | | | [0.00] mg/L |
| Zn 213.857 | 584.3 | | | [0.00] mg/L |
| Mn 257.610 | 1401.8 | | | [0.00] mg/L |
| La 379.478 | 352.7 | | | [0.00] mg/L |
| Ba 455.403 | 25802.4 | | | [0.00] mg/L |
| Ba 493.408 | 45750.3 | | | [0.00] mg/L |

=====

Sequence No.: 2

Autosampler Location:

Sample ID: Calib Std 1

Date Collected: 3/4/2566 10:55:27

Analyst:

Data Type: Reprocessed on 3/4/2566 11:32:52

Logged In Analyst (Original) : TET

Initial Sample Wt:

Initial Sample Vol:

Dilution:

Sample Prep Vol:

Wash Time:

Nebulizer Parameters: Calib Std 1

Analyte

Back Pressure

Flow

All

194.0 kPa

0.50 L/min

Mean Data: Calib Std 1

| Analyte | Mean Corrected Intensity | Std.Dev. | RSD | Calib Conc. Units |
|------------|-----------------------------|----------|-----|----------------------|
| As 193.696 | 13655.9 | | | [5.0] mg/L |
| Zn 213.857 | 149844.9 | | | [1.0] mg/L |
| Mn 257.610 | 1615840.4 | | | [1.0] mg/L |
| La 379.478 | 340770.3 | | | [1.0] mg/L |
| Ba 455.403 | 839940.7 | | | [0.1] mg/L |
| Ba 493.408 | 633243.6 | | | [0.1] mg/L |

Calibration Summary

| Analyte | Stds. | Equation | Intercept | Slope | Curvature | Corr. Coef. | Reslope |
|------------|-------|---------------|-----------|---------|-----------|-------------|---------|
| As 193.696 | 1 | Lin, Calc Int | 0.0 | 2731 | 0.00000 | 1.000000 | |
| Zn 213.857 | 1 | Lin, Calc Int | 0.0 | 149800 | 0.00000 | 1.000000 | |
| Mn 257.610 | 1 | Lin, Calc Int | 0.0 | 1616000 | 0.00000 | 1.000000 | |
| La 379.478 | 1 | Lin, Calc Int | 0.0 | 340800 | 0.00000 | 1.000000 | |
| Ba 455.403 | 1 | Lin, Calc Int | 0.0 | 8399000 | 0.00000 | 1.000000 | |
| Ba 493.408 | 1 | Lin, Calc Int | 0.0 | 6332000 | 0.00000 | 1.000000 | |

=====

Sequence No.: 3

Autosampler Location:

Sample ID: IDL-RL (2% HNO3)

Date Collected: 3/4/2566 11:19:52

Analyst:

Data Type: Reprocessed on 3/4/2566 11:32:52

Logged In Analyst (Original) : TET

Initial Sample Wt:

Initial Sample Vol:

Dilution: 3X

Sample Prep Vol:

Wash Time:

Nebulizer Parameters: IDL-RL (2% HNO3)

| Analyte | Back Pressure | Flow |
|---------|---------------|------------|
| All | 198.0 kPa | 0.50 L/min |

Mean Data: IDL-RL (2% HNO3)

| Analyte | Mean Corrected | Calib. | Std.Dev. | Sample | Std.Dev. | RSD |
|------------|----------------|-------------|----------|-------------|----------|---------|
| | Intensity | Conc. Units | | Conc. Units | | |
| As 193.696 | -32.0 | -0.0 mg/L | 0.00 | -35.2 µg/L | 2.60 | 7.40% |
| Zn 213.857 | 37.4 | 0.0 mg/L | 0.00 | 0.7 µg/L | 0.26 | 35.07% |
| Mn 257.610 | 475.9 | 0.0 mg/L | 0.00 | 0.9 µg/L | 1.49 | 168.85% |
| La 379.478 | -36.3 | -0.0 mg/L | 0.00 | -0.3 µg/L | 1.12 | 350.55% |
| Ba 455.403 | 26579.4 | 0.0 mg/L | 0.00 | 9.5 µg/L | 2.86 | 30.09% |
| Ba 493.408 | -20698.9 | -0.0 mg/L | 0.00 | -9.8 µg/L | 9.64 | 98.34% |

=====

Reprocessing Begun
Logged In Analyst: TET

Technique: ICP Continuous

Results Data Set (original): PM3APR23
Results Library (original): C:\Users\Public\PerkinElmer\IPV\Results.mdb
Results Data Set (reprocessed):
Results Library (reprocessed):

=====

Sequence No.: 1
Sample ID: Calib Blank 1
Analyst:
Logged In Analyst (Original) : TET
Initial Sample Wt:
Dilution:
Wash Time:Autosampler Location:
Date Collected: 3/4/2566 11:23:46
Data Type: Reprocessed on 3/4/2566 11:32:04

Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: Calib Blank 1
Analyte Back Pressure Flow
All 198.0 kPa 0.50 L/min

Mean Data: Calib Blank 1

| Analyte | Mean Corrected Intensity | Std.Dev. | RSD | Conc. | Units |
|------------|--------------------------|----------|-----|--------|-------|
| Tl 190.801 | -113.3 | | | [0.00] | µg/L |
| As 193.696 | 285.4 | | | [0.00] | µg/L |
| Se 196.026 | 99.6 | | | [0.00] | µg/L |
| Pb 220.353 | 1176.2 | | | [0.00] | µg/L |

=====

Sequence No.: 2
Sample ID: DL-Standard
Analyst:
Logged In Analyst (Original) : TET
Initial Sample Wt:
Dilution:
Wash Time:Autosampler Location:
Date Collected: 3/4/2566 11:29:24
Data Type: Reprocessed on 3/4/2566 11:32:04

Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: DL-Standard
Analyte Back Pressure Flow
All 199.0 kPa 0.50 L/min

Mean Data: DL-Standard

| Analyte | Mean Corrected Intensity | Std.Dev. | RSD | Conc. | Units |
|------------|--------------------------|----------|-----|--------|-------|
| Tl 190.801 | 19454.6 | | | [1000] | µg/L |
| As 193.696 | 17563.5 | | | [1000] | µg/L |
| Se 196.026 | 4574.6 | | | [500] | µg/L |
| Pb 220.353 | 31327.5 | | | [500] | µg/L |

Calibration Summary

| Analyte | Stds. | Equation | Intercept | Slope | Curvature | Corr. Coef. | Reslope |
|------------|-------|---------------|-----------|-------|-----------|-------------|---------|
| Tl 190.801 | 1 | Lin, Calc Int | 0.0 | 19.45 | 0.00000 | 1.000000 | |
| As 193.696 | 1 | Lin, Calc Int | -0.0 | 17.56 | 0.00000 | 1.000000 | |
| Se 196.026 | 1 | Lin, Calc Int | 0.0 | 9.149 | 0.00000 | 1.000000 | |
| Pb 220.353 | 1 | Lin, Calc Int | 0.0 | 62.65 | 0.00000 | 1.000000 | |

=====

Sequence No.: 3
Sample ID: IDL-XL (2% HNO3)
Analyst:
Logged In Analyst (Original) : TET
Initial Sample Wt:
Dilution: 3X
Wash Time:Autosampler Location:
Date Collected: 3/4/2566 11:25:37
Data Type: Reprocessed on 3/4/2566 11:32:04

Initial Sample Vol:
Sample Prep Vol:

Nebulizer Parameters: IDL-XL (2% HNO3)

| Analyte | Back Pressure | Flow |
|---------|---------------|------------|
| All | 198.0 kPa | 0.50 L/min |

Mean Data: IDL-XL (2% HNO3)

| Analyte | Mean Corrected | Calib. | Std.Dev. | Sample | Std.Dev. | RSD |
|------------|----------------|-------------|----------|-------------|----------|---------|
| | Intensity | Conc. Units | | Conc. Units | | |
| Tl 190.801 | 35.1 | 2 µg/L | 1.24 | 5 µg/L | 3.73 | 68.95% |
| As 193.696 | -14.0 | -1 µg/L | 1.42 | -2 µg/L | 4.26 | 177.97% |
| Se 196.026 | -6.5 | -1 µg/L | 0.96 | -2 µg/L | 2.87 | 134.85% |
| Pb 220.353 | -135.0 | -2 µg/L | 3.83 | -6 µg/L | 11.48 | 177.50% |

Method Loaded

Method Name: MnBEC

IEC File:

Method Description: C8000-XL and RL-Spec <or = 30 µg/L,Attn:Spec<or= 50µg/L

Method Last Saved: 15/10/2563 10:51:07

MSF File:

Sequence No.: 1

Sample ID: IB (2% HNO3)

Analyst:

Logged In Analyst (Original) : TET

Initial Sample Wt:

Dilution:

Wash Time:

Autosampler Location:

Date Collected: 3/4/2566 11:17:14

Data Type: Reprocessed on 3/4/2566 11:32:27

Initial Sample Vol:

Sample Prep Vol:

Nebulizer Parameters: IB (2% HNO3)

Analyte

Back Pressure

Flow

All

197.0 kPa

0.50 L/min

Mean Data: IB (2% HNO3)

| Analyte | Mean Corrected Intensity | Calib. Conc. Units | Std.Dev. | Sample Conc. Units | Std.Dev. | RSD |
|-----------|-----------------------------|-----------------------|----------|-----------------------|----------|-----|
| Mn 257 XN | 185358.1 | | | | | |
| Mn 257 RN | 39181.6 | | | | | |

Sequence No.: 2

Sample ID: IS (N069-1579/10)

Analyst:

Logged In Analyst (Original) : TET

Initial Sample Wt:

Dilution:

Wash Time:

Autosampler Location:

Date Collected: 3/4/2566 10:57:10

Data Type: Reprocessed on 3/4/2566 11:32:27

Initial Sample Vol:

Sample Prep Vol:

Nebulizer Parameters: IS (N069-1579/10)

Analyte

Back Pressure

Flow

All

194.0 kPa

0.50 L/min

Mean Data: IS (N069-1579/10)

| Analyte | Mean Corrected Intensity | Calib. Conc. Units | Std.Dev. | Sample Conc. Units | Std.Dev. | RSD |
|-----------|-----------------------------|-----------------------|----------|-----------------------|----------|-----|
| Mn 257 XN | 11636268.0 | | | | | |
| Mn 257 RN | 1679271.0 | | | | | |

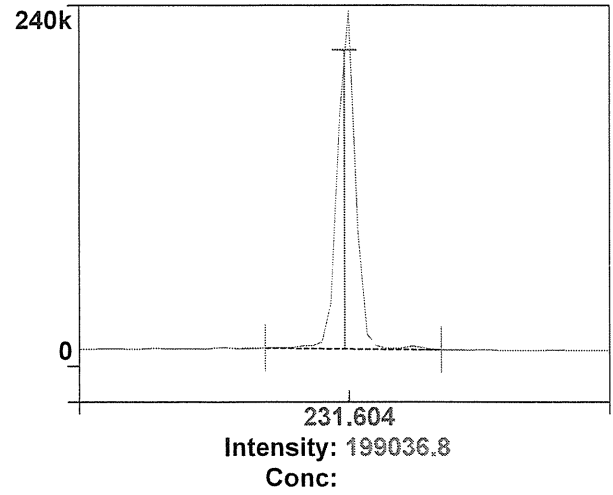
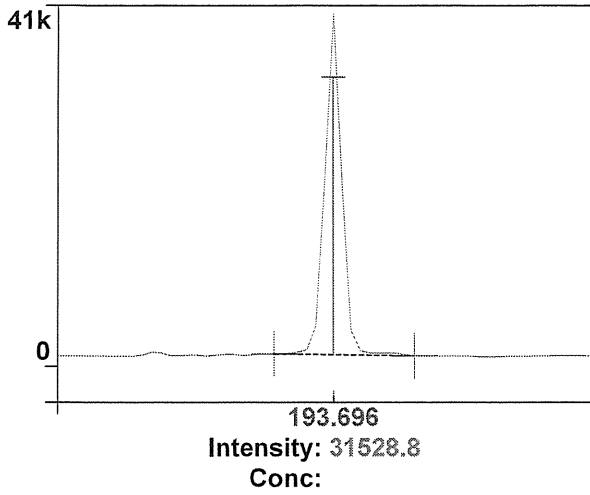
Analysis

| | | | | | | | |
|----------------|------------|---------|----------------|----------------|-------|--------------|----|
| R 10:59:16.638 | 04/03/2023 | ID: Res | (N069-1579/10) | AS 193.696-Res | Rep 1 | Res: 0.00701 | nm |
| R 10:59:23.206 | 04/03/2023 | ID: Res | (N069-1579/10) | AS 193.696-Res | Rep 2 | Res: 0.00702 | nm |
| R 10:59:29.648 | 04/03/2023 | ID: Res | (N069-1579/10) | AS 193.696-Res | Rep 3 | Res: 0.00702 | nm |
| R 10:59:38.634 | 04/03/2023 | ID: Res | (N069-1579/10) | Ni 231.604-Res | Rep 1 | Res: 0.00789 | nm |
| R 10:59:44.937 | 04/03/2023 | ID: Res | (N069-1579/10) | Ni 231.604-Res | Rep 2 | Res: 0.00790 | nm |
| R 10:59:51.130 | 04/03/2023 | ID: Res | (N069-1579/10) | Ni 231.604-Res | Rep 3 | Res: 0.00790 | nm |
| R 11:00:00.443 | 04/03/2023 | ID: Res | (N069-1579/10) | Ni 341.476-Res | Rep 1 | Res: 0.01192 | nm |
| R 11:00:07.822 | 04/03/2023 | ID: Res | (N069-1579/10) | Ni 341.476-Res | Rep 2 | Res: 0.01188 | nm |
| R 11:00:15.138 | 04/03/2023 | ID: Res | (N069-1579/10) | Ni 341.476-Res | Rep 3 | Res: 0.01169 | nm |
| R 11:00:27.681 | 04/03/2023 | ID: Res | (N069-1579/10) | Ba 455.403-Res | Rep 1 | Res: 0.01499 | nm |
| R 11:00:37.103 | 04/03/2023 | ID: Res | (N069-1579/10) | Ba 455.403-Res | Rep 2 | Res: 0.01495 | nm |
| R 11:00:46.448 | 04/03/2023 | ID: Res | (N069-1579/10) | Ba 455.403-Res | Rep 3 | Res: 0.01500 | nm |

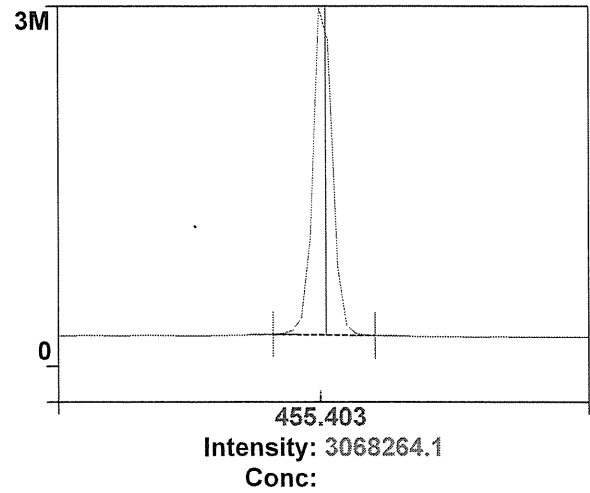
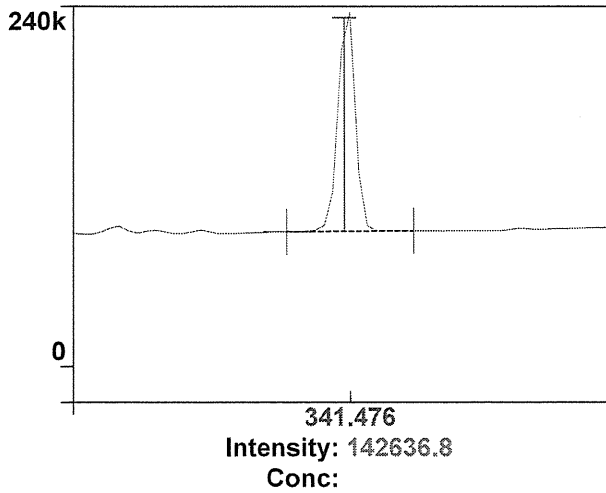
As 193.696-Res

Rep: 3 Ni 231.604-Res

Rep: 3

1
Ni 341.476-ResRep: 3 2
Ba 455.403-Res

Rep: 3



Method Loaded

Method Name: Precision

IEC File:

Method Description: C8000 -N=10- 1.0% RSD

Method Last Saved: 3/5/2554 12:31:51

MSF File:

Sequence No.: 4

Sample ID: RSD STD (N069-1579/10)

Analyst:

Initial Sample Wt:

Dilution:

Wash Time:

Autosampler Location:

Date Collected: 3/4/2566 11:02:43

Data Type: Original

Initial Sample Vol:

Sample Prep Vol:

Nebulizer Parameters: RSD STD (N069-1579/10)

Analyte

Back Pressure

Flow

All

195.0 kPa

0.50 L/min

Mean Data: RSD STD (N069-1579/10)

| Analyte | Mean Corrected Intensity | Calib. Conc. Units | Std.Dev. | Sample Conc. Units | Std.Dev. | RSD |
|------------|-----------------------------|-----------------------|----------|-----------------------|----------|-------|
| Zn 206.200 | 493474.3 | | | | 17093.12 | 3.46% |
| Mg 280.271 | 3275340.1 | | | | 23266.88 | 0.71% |
| Mg 285.213 | 196113.7 | | | | 11109.46 | 5.66% |
| Ba 455.403 | 7794526.3 | | | | 80474.48 | 1.03% |

Method Loaded

Method Name: Precision

IEC File:

Method Description: C8000 -N=10- 1.0% RSD

Method Last Saved: 3/4/2566 11:07:51

MSF File:

Sequence No.: 5

Sample ID: RSD STD (N069-1579/10)

Analyst:

Initial Sample Wt:

Dilution:

Wash Time:

Autosampler Location:

Date Collected: 3/4/2566 11:08:51

Data Type: Original

Initial Sample Vol:

Sample Prep Vol:

Nebulizer Parameters: RSD STD (N069-1579/10)

Analyte

Back Pressure

Flow

All

196.0 kPa

0.50 L/min

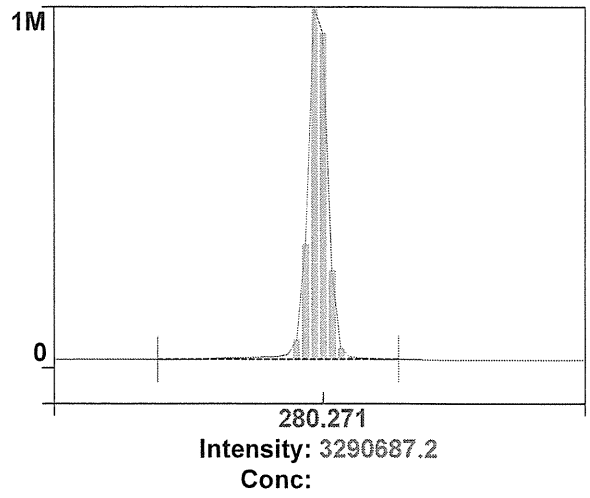
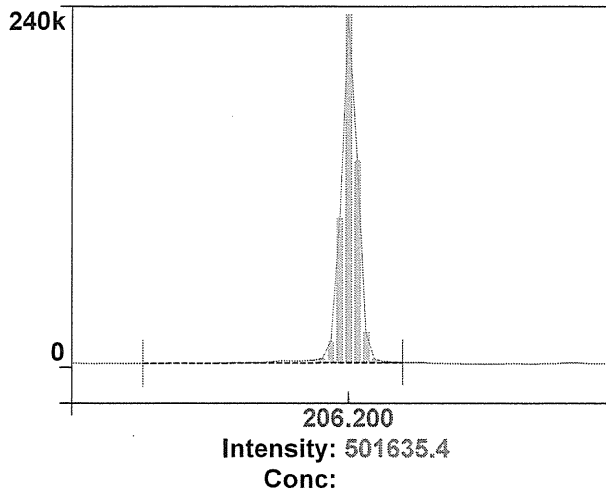
Mean Data: RSD STD (N069-1579/10)

| Analyte | Mean Corrected Intensity | Calib. Conc. Units | Std.Dev. | Sample Conc. Units | Std.Dev. | RSD |
|------------|-----------------------------|-----------------------|----------|-----------------------|----------|-------|
| Zn 206.200 | 515663.2 | | | | 2890.08 | 0.56% |
| Mg 280.271 | 3404809.8 | | | | 43469.63 | 0.28% |
| Mg 285.213 | 197460.0 | | | | 775.34 | 0.39% |
| Ba 455.403 | 8071203.3 | | | | 31631.19 | 0.39% |

Zn 206.200

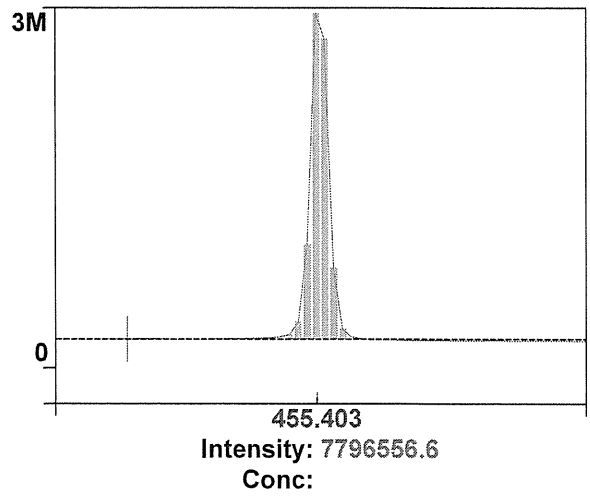
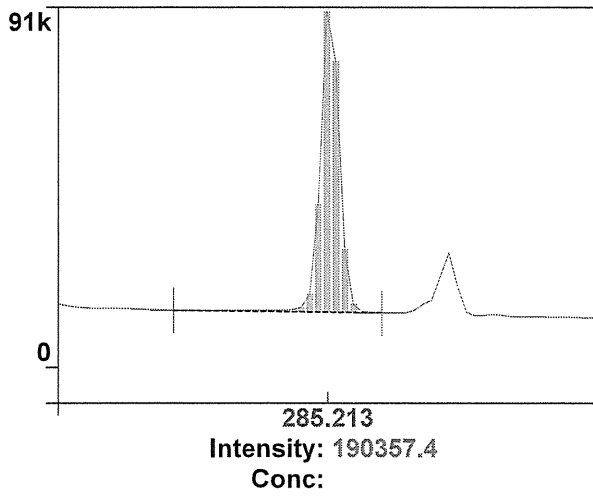
Rep: 5 Mg 280.271

Rep: 5

1
Mg 285.213

Rep: 5 Ba 455.403

Rep: 1



3

4

PerkinElmer TruQ

Atomic Spectroscopy Standard



Certificate of Analysis

PerkinElmer Number: N0691579
Description: Multi-Element Standard
Matrix: 2% HNO₃
Lot Number: 57-024CRX1

Certification Date: NOV -- 2021
Expiration Date: MAY 30 2023

* Instrumental Analysis using ICP Spectrometer:

| Analyte | Labeled | Measured | SRM | Analyte | Labeled | Measured | SRM |
|---------|------------|------------|--------|---------|------------|------------|--------|
| As | 50.0 µg/mL | 50.1 µg/mL | 3103a* | Ni | 10.0 µg/mL | 10.0 µg/mL | 3136* |
| K | 50.0 µg/mL | 50.3 µg/mL | 3141a* | Sr | 10.0 µg/mL | 10.0 µg/mL | 3153a* |
| La | 10.0 µg/mL | 10.0 µg/mL | 3127a* | Zn | 10.0 µg/mL | 10.0 µg/mL | 3168a* |
| Li | 10.0 µg/mL | 10.0 µg/mL | 3129a* | Ba | 1.00 µg/mL | 1.01 µg/mL | 3104a* |
| Mn | 10.0 µg/mL | 10.1 µg/mL | 3132* | Mg | 1.00 µg/mL | 1.01 µg/mL | 3131a* |

* - indicates NIST SRM

† - indicates CRM (when NIST SRM is not available)

Reference Multi: Lot# 2-84MJ, 3-168MJ, 4-39MJ

Refer to side 2 for details of certification.

Balances are calibrated with weight sets traceable to NIST.

We guarantee that our PerkinElmer TruQ Atomic Spectroscopy Standards are stable and accurate to $\pm 0.5\%$ of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type I water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.



Certifying Officer:

Y. Parikh

PerkinElmer®

PerkinElmer, Inc.

U.S.A. Tel: 1-203-925-4600

U.S.A. Toll Free: 1-800-762-4000

Visit www.perkinelmer.com/lasoffices for a complete listing of our global offices.

PerkinElmer TruQ

Atomic Spectroscopy Standard



Certificate of Analysis

PerkinElmer Number: N9300221

Description: Instrument Calibration Standard 4

Matrix: 5% HNO₃

Lot Number: 58-169CRY1

Certification Date: MAY - - 2022

Expiration Date: NOV 30 2023

* Instrumental Analysis using ICP Spectrometer:

| Analyte | Labeled | Measured | SRM | Analyte | Labeled | Measured | SRM |
|---------|------------|------------|--------|---------|------------|------------|-------|
| As | 100 µg/mL | 99.8 µg/mL | 3103a* | Pb | 50.0 µg/mL | 49.9 µg/mL | 3128* |
| Tl | 100 µg/mL | 99.4 µg/mL | 3158* | Se | 50.0 µg/mL | 49.8 µg/mL | 3149* |
| Cd | 50.0 µg/mL | 50.0 µg/mL | 3108* | | | | |

* - indicates NIST SRM

† - indicates CRM (when NIST SRM is not available)

Reference Multi: Lot# 57-156CR, 1-177YJ, 54-134CR

Refer to side 2 for details of certification.

Balances are calibrated with weight sets traceable to NIST.

We guarantee that our PerkinElmer TruQ Atomic Spectroscopy Standards are stable and accurate to $\pm 0.5\%$ of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type I water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.



Certifying Officer: Y. Parikh

PerkinElmer, Inc.

U.S.A. Tel: 1-203-925-4600

U.S.A. Toll Free: 1-800-762-4000

Visit www.perkinelmer.com/lasoffices for a complete listing of our global offices.



Global Service Training Department

Service Engineer Certification

Wiphan Promlumda

**This is to certify that the above mentioned
PerkinElmer representative has been trained to
service the instrument indicated below:**

ICP220B Optima 8300 & Optima 4X/5X/7X00 Series

Instructor:

A handwritten signature in black ink, appearing to read 'Geoff Cook'.

Geoff Cook

Date: July 20, 2012

Certified by:

A handwritten signature in black ink, appearing to read 'Fred Rubino'.

(Manager, Global Training Operations)



ภาคผนวก ฉ

หนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เลขทะเบียน ว-236



ที่ อก ๐๓๑๐(๑)/ ๙๘๗๖

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๒ มิถุนายน ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๓ มีนาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด จำนวน ๒๘ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๓๖ สถานที่ตั้งเลขที่ ๑/๖ ซอยรามคำแหง ๑๔๕ แขวงสะพานสูง
เขตสะพานสูง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด ต่ออายุหนังสือรับขึ้น
ทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

- | | |
|------------------------------|----------------------------|
| ๑) นายณัฐพงศ์ โคตะมา | ทะเบียนเลขที่ ว-๒๓๖-ค-๐๐๐๑ |
| ๒) นางสาววาริรัตน์ ประชุมแดง | ทะเบียนเลขที่ ว-๒๓๖-ค-๐๐๐๒ |
| ๓) นางพรทิพย์ เพชรชี | ทะเบียนเลขที่ ว-๒๓๖-ค-๐๐๐๓ |
| ๔) นายสมชาย ปิยะวรสกุล | ทะเบียนเลขที่ ว-๒๓๖-ค-๐๐๐๔ |
| ๕) นายประมวล มูลสาร | ทะเบียนเลขที่ ว-๒๓๖-ค-๐๐๐๕ |
| ๖) นายรัฐพล สุขดี | ทะเบียนเลขที่ ว-๒๓๖-ค-๐๐๐๖ |

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

- | | |
|-----------------------------------|----------------------------|
| ๑) นางสาวทอฝัน อัสวชัยสุภิกรม | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๐๑ |
| ๒) นางสาวกมลลักษณ์ ตีเมงค | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๐๒ |
| ๓) นางสาวกนกวรรณ เริ่มประชาธิปไตย | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๐๓ |
| ๔) นางสาวฐิติพรรณ ศรีสุวรรณ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๐๔ |
| ๕) นางสาวธนิดา กมฺพชาติ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๐๕ |
| ๖) นางสาวมาลินี มณีรัตน์ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๐๖ |
| ๗) นางสาวพัชราพรรณ สว่างภพ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๐๗ |
| ๘) นายสุริยะพงศ์ ยงยุทธ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๐๘ |
| ๙) นางสาวดอกรัก สีแท้ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๐๙ |
| ๑๐) นางสาวศิริพร กาจิ๊ด | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๑๐ |
| ๑๑) นายสุชาติ ศรีบุญ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๑๑ |
| ๑๒) นายเกียรติศักดิ์ วันดี | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๑๒ |

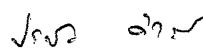
| | |
|---------------------------------|----------------------------|
| ๑๓) นายจิรวุฒิ อินทเสย์ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๑๓ |
| ๑๔) นางสาวนิตยา เย็นวัฒนา | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๑๔ |
| ๑๕) นางสาวณัฐธยาน์ สารแสง | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๑๕ |
| ๑๖) นายกิตติศักดิ์ เมืองงาม | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๑๖ |
| ๑๗) นายเทพพงศ์ เขยวัดเกาะ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๑๗ |
| ๑๘) นายเฉลิมวุฒิ พูลสงวน | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๑๘ |
| ๑๙) นางสาวนุชศิริ อรชร | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๑๙ |
| ๒๐) นางสาววรรณศิริ สุริยวงศ์ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๒๐ |
| ๒๑) นายวิฑูรย์ วลัยรัตน์ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๒๑ |
| ๒๒) นางสาวกัศดาล จอกสูงเนิน | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๒๒ |
| ๒๓) นางสาวสุภัคชญา อยู่นิม | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๒๓ |
| ๒๔) นางสาวลลิตา ตรัยโตมร | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๒๔ |
| ๒๕) นายเจอ แซ่หว่า | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๒๕ |
| ๒๖) นายอรรถพล วงศ์สวัสดิ์ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๒๖ |
| ๒๗) นายประหยัด จิวเดช | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๒๗ |
| ๒๘) นายเบญจพล กรีคงคา | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๒๘ |
| ๒๙) นายวีรพล บุคสา | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๒๙ |
| ๓๐) นายพิเชฐ อยู่ดีรัมย์ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๓๐ |
| ๓๑) นายณัฐดนัย ศรีรัตน์ชัชวาลย์ | ทะเบียนเลขที่ ว-๒๓๖-จ-๐๐๓๑ |

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว และดิน ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๓ มีนาคม ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายประสม ดำรงพงษ์)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
 บริษัท เทคนิคสิ่งแวดล้อมไทย จำกัด เลขทะเบียน ว-๒๓๖
 ที่ อก ๐๓๑๐(๑)/ ๙ ๘ ๗ ๖ ลงวันที่ ๒๒ มิถุนายน ๒๕๖๖

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๓๗ รายการ
น้ำเสีย จำนวน 40 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|---------------------------|--|
| 1 | Aldrin | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 2 | Arsenic | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4] |
| 3 | Barium | 1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] |
| 4 | α-BHC | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 5 | γ-BHC | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 6 | Biochemical Oxygen Demand | 5-Day BOD Test, Azide Modification Method ^[4] |
| 7 | Cadmium | 1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] |
| 8 | Chemical Oxygen Demand | Closed Reflux, Titrimetric Method ^[4] |
| 9 | Chlordane | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 10 | Chromium | 1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] |
| 11 | Color | ADMI Weighted-Ordinate Spectrophotometric Method ^[4] |
| 12 | Copper | 1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] |
| 13 | Cyanide | Distillation, Colorimetric Method ^[4] |
| 14 | 4,4'-DDE | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 15 | 4,4'-DDT | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 16 | Dieldrin | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|-------------------------|--|
| 17 | Endosulfan I | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 18 | Endosulfan II | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 19 | Endosulfan Sulfate | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 20 | Endrin | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 21 | Formaldehyde | Distillation, Colorimetric Method ^[3] |
| 22 | Free Chlorine | DPD Ferrous Titrimetric Method ^[4] |
| 23 | Heptachlor | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 24 | Heptachlor Epoxide | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 25 | Hexavalent Chromium | Colorimetric Method ^[4] |
| 26 | Lead | 1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] |
| 27 | Manganese | 1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] |
| 28 | Mercury | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[4] |
| 29 | Nickel | 1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] |
| 30 | Oil & Grease | 1) Liquid-Liquid, Partition-Gravimetric Method ^[4] 2) Soxhlet Extraction Method ^[4] |
| 31 | pH | Electrometric Method ^[4] |
| 32 | Phenols | Distillation, Direct Photometric Method ^[4] |
| 33 | Selenium | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4] |
| 34 | Sulfide | 1) Iodometric Method ^[4] 2) Methylene Blue Method ^[4] |
| 35 | Temperature | Laboratory and Field Methods ^[4] |
| 36 | Total Dissolved Solids | Dried at 180 °C ^[4] |
| 37 | Total Kjeldahl Nitrogen | Macro-Kjeldahl Method ^[4] |
| 38 | Total Suspended Solids | Dried at 103-105 °C ^[4] |

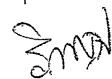
3mg/l

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|--------------------|---|
| 39 | Trivalent Chromium | Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[4] |
| 40 | Zinc | 1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] |

น้ำใต้ดิน จำนวน 122 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|----------------------|--|
| 1 | Acenaphthene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 2 | Acetone | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 3 | Aldrin | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 4 | Anthracene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 5 | Antimony | 1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] |
| 6 | Arsenic | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4] |
| 7 | Atrazine | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 8 | Barium | 1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] |
| 9 | Benz(a)anthracene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 10 | Benzene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 11 | Benzo(b)fluoranthene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 12 | Benzo(k)fluoranthene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |


| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|----------------------------|---|
| 13 | Benzoic acid | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 14 | Benzo(a)pyrene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 15 | Benzo(g,h,i)perylene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 16 | Beryllium | 1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 2) 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, Electrothermal Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4] |
| 24 | Carbazole | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 25 | Carbon disulfide | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 26 | Carbon tetrachloride | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 27 | Chlordane | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 28 | p-Chloroaniline | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 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] |

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|--------------------------|--|
| 32 | Chromium | 1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] |
| 33 | Chromium (III) | 1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation ^[4] 3) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[4] |
| 34 | Chromium (VI) | Colorimetric Method ^[4] |
| 35 | Chrysene | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 36 | Cyanide | Distillation, Colorimetric Method ^[4] |
| 37 | 2,4-D | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 38 | DDD | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 39 | DDE | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 40 | DDT | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 41 | Dibenz(a,h)anthracene | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 42 | Di-n-butyl phthalate | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 43 | 1,2-Dichlorobenzene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 44 | 1,3-Dichlorobenzene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 45 | 1,4-Dichlorobenzene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 46 | 1,1-Dichloroethane | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 47 | 1,2-Dichloroethane | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 48 | 1,1-Dichloroethylene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 49 | cis-1,2-Dichloroethylene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]  |

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|----------------------------|--|
| 50 | trans-1,2-Dichloroethylene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 51 | 1,2-Dichloropropane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 52 | 1,3-Dichloropropane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 53 | 1,3-Dichloropropene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 54 | Dieldrin | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 55 | Diethyl phthalate | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 56 | 2,4-Dimethylphenol | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 57 | 2,4-Dinitrophenol | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 58 | 2,4-Dinitrotoluene | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 59 | 2,6-Dinitrotoluene | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 60 | Di-n-Octyl phthalate | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 61 | Endosulfan | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 62 | Endrin | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 63 | Ethylbenzene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 64 | Fluoranthene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 65 | Fluorene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 66 | Heptachlor | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 67 | Heptachlor epoxide | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 68 | Hexachloro-1,3-butadiene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 69 | n-Hexane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 70 | α -HCH | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 71 | β -HCH | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 72 | γ -HCH | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 73 | Hexachlorocyclopentadiene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|-------------------------|---|
| 74 | Hexachloroethane | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 75 | Indeno(1,2,3-cd)pyrene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 76 | Isophorone | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 77 | Lead | 1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4] |
| 78 | Manganese | 1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] |
| 79 | Mercury | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[4] |
| 80 | Methanol | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 81 | Methoxychlor | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 82 | Methyl bromide | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 83 | Methylene chloride | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 84 | 2-Methylphenol | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 85 | 2-Methylnaphthalene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 86 | Methyl tert-butyl ether | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 87 | Naphthalene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 88 | Nickel | 1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4] |
| 89 | Nitrobenzene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 90 | N-Nitrosodiphenylamine | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |

Sm

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|---|---|
| 91 | N-Nitrosodi-n-propylamine | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 92 | Polychlorinated Biphenyls PCB-1016 PCB-1221 PCB-1232 PCB-1242 PCB-1248 PCB-1254 PCB-1260 | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 93 | Pentachlorophenol | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 94 | pH | Electrometric Method ^[4] |
| 95 | Phenanthrene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 96 | Phenol | 1) Distillation, Direct Photometric Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 97 | Pyrene | Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 98 | Selenium | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4] |
| 99 | Silver | 1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] |
| 100 | Styrene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 101 | 1,1,2,2-Tetrachloroethane | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 102 | Tetrachloroethylene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 103 | Toluene | Purge and Trap Gas Chromatographic/ Mass Spectrometric Method ^[4] |
| 104 | Toxaphene | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 105 | TPH (C ₅ -C ₈) | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[12,22]  |

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|---|--|
| 106 | TPH (C ₈ -C ₁₆) | Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[9,22] |
| 107 | TPH (C ₁₆ -C ₃₅) | Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[9,22] |
| 108 | 1,2,4-Trichlorobenzene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 109 | 1,1,1-Trichloroethane | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 110 | 1,1,2-Trichloroethane | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 111 | Trichloroethylene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 112 | 2,4,5-Trichlorophenol | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 113 | 2,4,6-Trichlorophenol | Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] |
| 114 | 1,3,5-Trimethylbenzene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 115 | Vanadium | 1) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4] |
| 116 | Vinyl acetate | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 117 | Vinyl chloride | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 118 | m-Xylene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 119 | o-Xylene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 120 | p-Xylene | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 121 | Xylene (Total) | Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] |
| 122 | Zinc | 1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4] |

Signature

อากาศเสีย (ปล่อยระบาย) จำนวน 18 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|--------------------|---|
| 1 | Antimony | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[5] |
| 2 | Arsenic | Isokinetic Sampling, Digestion, Hydride Generation/ Atomic Absorption Spectrometric Method ^[5] |
| 3 | Carbon monoxide | Instrumental Analyzer Method ^[5] |
| 4 | Chlorine | Absorption Sampling, Ion Chromatographic Method ^[5] |
| 5 | Copper | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] |
| 6 | Cresol | Adsorption Sampling, Gas Chromatographic Method ^[5] |
| 7 | Dioxins/Furans | Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory or Analysis by Department of Industrial Works Registered Laboratory (Dioxins/Furans Analysis Approved) ^[5] |
| 8 | Hydrogen Chloride | Absorption Sampling, Ion Chromatographic Method ^[5] |
| 9 | Hydrogen Fluoride | Absorption Sampling, Ion Chromatographic Method ^[5] |
| 10 | Hydrogen Sulfide | Absorption Sampling, Iodometric Method ^[5] |
| 11 | Lead | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 3) Isokinetic Sampling, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[5] |
| 12 | Mercury | Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[5] |
| 13 | Opacity | Ringelmann's Method ^[2] |
| 14 | Oxides of Nitrogen | 1) Absorption Sampling, Phenoldisulfonic acid Method ^[5] 2) Instrumental Analyzer Method ^[5] |

3m2

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|-----------------------------|---|
| 15 | Sulfur dioxide | 1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Instrumental Analyzer Method ^[5] |
| 16 | Sulfuric acid | Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5] |
| 17 | Total Suspended Particulate | Isokinetic Sampling, Gravimetric Method ^[5] |
| 18 | Xylene | Adsorption Sampling, Gas Chromatographic Method ^[5] |

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 36 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|----------|--|
| 1 | Aldrin | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 2 | Antimony | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 3 | Arsenic | 1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[1,6,17] 2) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,17] |
| 4 | Barium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] |



| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|-----------|--|
| 5 | Beryllium | 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 6 | Cadmium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 7 | Chlordane | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 8 | Chromium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] |

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|----------------|---|
| 9 | Chromium (III) | 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^[1,6,15,18] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^[1,6,16,18] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation ^[1,6,14,18] 4) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^[7,8,15,18] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^[7,8,16,18] 6) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^[7,8,14,18] |
| 10 | Chromium (VI) | 1) Waste Extraction, Colorimetric Method ^[1,18] 2) Alkaline Digestion, Colorimetric Method ^[8,18] |
| 11 | Cobalt | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|----------|--|
| 12 | Copper | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 13 | 2,4-D | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,24] 2) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 14 | DDD | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 15 | DDE | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 16 | DDT | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 17 | Dieldrin | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|--------------|--|
| 18 | Endrin | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 19 | Heptachlor | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 20 | Lead | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 21 | Lindane | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 22 | Mercury | 1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[1,6,19] 2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[20] |
| 23 | Methoxychlor | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] |

สมล

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|--|--|
| 24 | Mirex | 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,24] 2) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 25 | Molybdenum | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 26 | Nickel | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 27 | Polychlorinated Biphenyls Aroclor 1016 Aroclor 1221 Aroclor 1232 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 2,4,4'-Trichlorobiphenyl 2,2',5,5'-Tetrachlorobiphenyl | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,25] 2) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,25] 3) Soxhlet Extraction, Gas Chromatographic Method ^[11,25] |

Handwritten signature

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|--|---|
| 28 | 2,2',4,5,5'-Pentachlorobiphenyl 2,2',3,4,4',5'- Hexachlorobiphenyl 2,2',4,4',5,5'- Hexachlorobiphenyl 2,2',3,4,4',5,5'- Heptachlorobiphenyl Pentachlorophenol | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,24] 2) Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 29 | Selenium | 1) Waste Extraction, Digestion, Hydride Generation/ Atomic Absorption Spectrometric Method ^[1,6,21] 2) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,21] |
| 30 | Silver | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 31 | Thallium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |

Signature

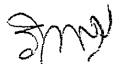
| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|-------------------|--|
| 32 | Toxaphene | 1) Waste Extraction, Solid-Phase Extraction, Gas Chromatographic Method ^[1,10,24] 2) Solid-Phase Extraction, Gas Chromatographic Method ^[10,24] 3) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27] |
| 33 | Trichloroethylene | 1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1,12,26] 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26] |
| 34 | Vanadium | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 35 | Vinyl chloride | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26] |
| 36 | Zinc | 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[1,6,16] 3) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 4) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 5) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 6) Digestion, Inductively Coupled Plasma Method ^[7,14] |

Signature

ดิน จำนวน 121 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|----------------------|--|
| 1 | Acenaphthene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 2 | Acetone | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 3 | Aldrin | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 4 | Anthracene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 5 | Antimony | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 6 | Arsenic | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,17] |
| 7 | Atrazine | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 8 | Barium | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 9 | Benz(a)anthracene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 10 | Benzene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 11 | Benzo(b)fluoranthene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 12 | Benzo(k)fluoranthene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 13 | Benzoic acid | Soxhlet Extraction, Gas Chromatographic Method ^[11,23] |
| 14 | Benzo(a)pyrene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 15 | Benzo(g,h,i)perylene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 16 | Beryllium | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] |

Signature

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|----------------------------|--|
| 17 | Bis(2-chloroethyl)ether | 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,14] Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 18 | Bis(2-ethylhexyl)phthalate | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 19 | Bromodichloromethane | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 20 | Bromoform | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 21 | Butanol | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 22 | Butyl benzyl phthalate | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 23 | Cadmium | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 24 | Carbazole | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 25 | Carbon disulfide | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 26 | Carbon tetrachloride | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 27 | Chlordane | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 28 | p-Chloroaniline | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 29 | Chlorobenzene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 30 | Chlorodibromomethane | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 31 | Chloroform | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 32 | Chromium | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15]  |

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|-----------------------|---|
| 33 | Chromium (III) | 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^[7,8,15,18] 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^[7,8,16,18] 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^[7,8,14,18] |
| 34 | Chromium (VI) | Alkaline Digestion, Colorimetric Method ^[8,18] |
| 35 | Chrysene | Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27] |
| 36 | Cyanide | 1) Extraction, Distillation, Titrimetric Method ^[28,29,30] 2) Extraction, Distillation, Colorimetric Method ^[28,29,30] |
| 37 | 2,4-D | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 38 | DDD | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 39 | DDE | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 40 | DDT | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 41 | Dibenz(a,h)anthracene | Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27] |
| 42 | Di-n-butyl phthalate | Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27] |
| 43 | 1,2-Dichlorobenzene | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26] |
| 44 | 1,3-Dichlorobenzene | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26] |
| 45 | 1,4-Dichlorobenzene | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26] |
| 46 | 1,1-Dichloroethane | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26] |
| 47 | 1,2-Dichloroethane | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26] |
| 48 | 1,1-Dichloroethylene | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26] |

3m

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|----------------------------|--|
| 49 | cis-1,2-Dichloroethylene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 50 | trans-1,2-Dichloroethylene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 51 | 1,2-Dichloropropane | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 52 | 1,3-Dichloropropane | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 53 | 1,3-Dichloropropene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 54 | Dieldrin | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 55 | Diethyl phthalate | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 56 | 2,4-Dimethylphenol | Soxhlet Extraction, Gas Chromatographic Method ^[11,23] |
| 57 | 2,4-Dinitrophenol | Soxhlet Extraction, Gas Chromatographic Method ^[11,23] |
| 58 | 2,4-Dinitrotoluene | Soxhlet Extraction, Gas Chromatographic Method ^[11,23] |
| 59 | 2,6-Dinitrotoluene | Soxhlet Extraction, Gas Chromatographic Method ^[11,23] |
| 60 | Di-n-Octyl phthalate | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 61 | Endosulfan | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 62 | Endrin | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 63 | Ethylbenzene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 64 | Fluoranthene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 65 | Fluorene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 66 | Heptachlor | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 67 | Heptachlor epoxide | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 68 | Hexachloro-1,3-butadiene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 69 | n-Hexane | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 70 | α -HCH | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 71 | β -HCH | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 72 | γ -HCH | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|---------------------------|--|
| 73 | Hexachlorocyclopentadiene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 74 | Hexachloroethane | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 75 | Indeno(1,2,3-cd)pyrene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 76 | Isophorone | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 77 | Lead | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 78 | Manganese | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 79 | Mercury | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[20] |
| 80 | Methanol | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 81 | Methoxychlor | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 82 | Methyl bromide | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 83 | Methylene chloride | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 84 | 2-Methylphenol | Soxhlet Extraction, Gas Chromatographic Method ^[11,23] |
| 85 | 2-Methylnaphthalene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 86 | Methyl tert-butyl ether | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 87 | Naphthalene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 88 | Nickel | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,14] |

5m

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|---|--|
| 89 | Nitrobenzene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 90 | N-Nitrosodiphenylamine | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 91 | N-Nitrosodi-n-propylamine | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 92 | Polychlorinated Biphenyls Aroclor 1016 Aroclor 1221 Aroclor 1232 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 2,2',5,5'-Tetrachlorobiphenyl 2,2',4,5,5'-Pentachlorobiphenyl 2,2',3,4,4',5'- Hexachlorobiphenyl 2,2',4,4',5,5'- Hexachlorobiphenyl 2,2',3,4,4',5,5'- Heptachlorobiphenyl | Soxhlet Extraction, Gas Chromatographic Method ^[11,25] |
| 93 | Pentachlorophenol | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 94 | Phenanthrene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 95 | Phenol | Soxhlet Extraction, Gas Chromatographic Method ^[11,23] |
| 96 | Pyrene | Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27] |
| 97 | Selenium | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,21] |
| 98 | Silver | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 99 | Styrene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |

Small

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|---|--|
| 100 | 1,1,2,2-Tetrachloroethane | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 101 | Tetrachloroethylene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 102 | Toluene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 103 | Toxaphene | Soxhlet Extraction, Gas Chromatographic Method ^[11,24] |
| 104 | TPH (C ₅ -C ₈) | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 105 | TPH (C ₈ -C ₁₆) | Soxhlet Extraction, Gas Chromatographic Method ^[11,22] |
| 106 | TPH (C ₁₆ -C ₃₅) | Soxhlet Extraction, Gas Chromatographic Method ^[11,22] |
| 107 | 1,2,4-Trichlorobenzene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 108 | 1,1,1-Trichloroethane | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 109 | 1,1,2-Trichloroethane | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 110 | Trichloroethylene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 111 | 2,4,5-Trichlorophenol | Soxhlet Extraction, Gas Chromatographic Method ^[11,23] |
| 112 | 2,4,6-Trichlorophenol | Soxhlet Extraction, Gas Chromatographic Method ^[11,23] |
| 113 | 1,3,5-Trimethylbenzene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 114 | Vanadium | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,14] |
| 115 | Vinyl acetate | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 116 | Vinyl chloride | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 117 | m-Xylene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 118 | o-Xylene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 119 | p-Xylene | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |

Signature

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์ |
|----------|----------------|--|
| 120 | Xylene (Total) | Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26] |
| 121 | Zinc | 1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Graphite Furnace Atomic Absorption Spectrometric Method ^[7,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,14] |

เอกสารอ้างอิง

- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2548. เรื่อง การกำจัดสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว.ราชกิจจานุเบกษา. 25 มกราคม 2549. เล่มที่ 123 ตอนพิเศษ 11ง.
- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้กลบเป็นเชื้อเพลิง.ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.
- สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.
- APHA, AWWA, WEF. **Standard Methods for the Examination of Water and Wastewater**. 23rd ed. Washington, DC: APHA, 2017.
- United States Environmental Protection Agency. **Standards of Performance for New Stationary Sources**. 40 CFR 60. Appendix A, 2022.
- United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. SW-846**, 1997.
- United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Acid Digestion of Sludges and Sediments and Soils. SW-846 Method 3050B**, 1996.
- United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Alkaline Digestion for Hexavalent Chromium. SW-846 Method 3060A**, 1996.
- United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Separatory Funnel Liquid-Liquid Extraction. SW-846 Method 3510C**, 1996.
- United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Solid Phase Extraction. SW-846 Method 3535A**, 2007.
- United States Environmental Protection Agency. **Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Soxhlet Extraction. SW-846 Method 3540C**, 1996. 3m
- United States...

12. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Purge-and-Trap for Aqueous Samples. SW-846 Method 5030C**, 2003.

13. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. SW-846 Method 5035A**, 2007.

14. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Inductively Coupled Plasma-Optical Emission Spectrometry. SW-846 Method 6010D**, 2018.

15. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Flame Atomic Absorption Spectrophotometry. SW-846 Method 7000B**, 2007.

16. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Graphite Furnace Atomic Absorption Spectrophotometry. SW-846 Method 7010**, 2007.

17. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Arsenic (Atomic Absorption, Gaseous Hydride). SW-846 Method 7061A**, 1992.

18. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Chromium, Hexavalent (Colorimetric). SW-846 Method 7196A**, 1992.

19. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Mercury in Liquid Waste (Manual Cold-Vapor Technique). SW-846 Method 7470A**, 1994.

20. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique). SW-846 Method 7471A**, 1994.

21. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Selenium (Atomic Absorption, Borohydride Reduction). SW-846 Method 7742**, 1994.

22. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Nonhalogenated Organics Using GC/FID. SW-846 Method 8015D**, 2003.

23. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Phenols by Gas Chromatography. SW-846 Method 8041**, 1996. *Small*

24. United States...

24. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Organochlorine Pesticides by Gas Chromatography. SW-846 Method 8081B**, 2007.

25. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Polychlorinate Biphenyls (PCBs) by Gas Chromatography. SW-846 Method 8082A**, 2007.

26. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). SW-846 Method 8260C**, 2006.

27. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry. SW-846 Method 8270D**, 2014.

28. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Total and Amenable Cyanide: Distillation. SW-846 Method 9010C**, 2004.

29. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Cyanide Extraction Procedure for Solids and Oil. SW-846 Method 9013A**, 1996.

30. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. **Cyanide in Waters and Extracts Using Titrimetric and Manual Spectrophotometric Procedures. SW-846 Method 9014**, 2014. 