

## ภาคผนวก

ภาคผนวก ก หนังสือรับรองผลการตรวจวิเคราะห์

- ภาคผนวก ข - สำเนาหนังสือรับรองห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอสจีเอส (ประเทศไทย) จำกัด
- สำเนาใบรับรองมาตรฐาน ISO 9001/2015

ภาคผนวก ค สำเนาใบรับรองการสอบเทียบเครื่องมือ

ภาคผนวก ก

หนังสือรับรองผลการตรวจวิเคราะห์



ภาคผนวก ก

หนังสือรับรองการตรวจวิเคราะห์



# คุณภาพอากาศในบรรยากาศ

**Report No. : 2022-5004051-1 / 001-1 (Page 1 of 5)**

**Issued date : May 25, 2022**

**CLIENT : BANGKOK AIRWAYS PUBLIC COMPANY LIMITED (SUKHOTHAI AIRPORT)**

**CONTACT :**

**ADDRESS :**

## Analysis Report

**SAMPLE DESIGNATED AS : Ambient Air Quality**

**MEASUREMENT DATE : May 3-5, 2022**

**MEASUREMENT LOCATION : วัดหนองชุมแสง**

**MEASURED BY :**

Sukhothai Airport, Sukhothai Province

| Time                  | NO <sub>2</sub> Concentration (ppm) |             |             |
|-----------------------|-------------------------------------|-------------|-------------|
|                       | May 3, 2022                         | May 4, 2022 | May 5, 2022 |
| 00:00-01:00           | 0.010                               | 0.004       | 0.007       |
| 01:00-02:00           | 0.007                               | 0.012       | 0.008       |
| 02:00-03:00           | 0.005                               | 0.009       | 0.009       |
| 03:00-04:00           | 0.003                               | 0.011       | 0.011       |
| 04:00-05:00           | 0.006                               | 0.008       | 0.006       |
| 05:00-06:00           | 0.005                               | 0.010       | 0.005       |
| 06:00-07:00           | 0.004                               | 0.011       | 0.004       |
| 07:00-08:00           | 0.007                               | 0.006       | 0.008       |
| 08:00-09:00           | 0.010                               | 0.009       | 0.011       |
| 09:00-10:00           | 0.007                               | 0.007       | 0.005       |
| 10:00-11:00           | 0.004                               | 0.006       | 0.007       |
| 11:00-12:00           | 0.008                               | 0.007       | 0.005       |
| 12:00-13:00           | 0.008                               | 0.003       | 0.007       |
| 13:00-14:00           | 0.004                               | 0.009       | 0.006       |
| 14:00-15:00           | 0.009                               | 0.011       | 0.009       |
| 15:00-16:00           | 0.006                               | 0.004       | 0.009       |
| 16:00-17:00           | 0.007                               | 0.006       | 0.007       |
| 17:00-18:00           | 0.010                               | 0.009       | 0.007       |
| 18:00-19:00           | 0.008                               | 0.003       | 0.010       |
| 19:00-20:00           | 0.010                               | 0.011       | 0.012       |
| 20:00-21:00           | 0.008                               | 0.012       | 0.010       |
| 21:00-22:00           | 0.008                               | 0.003       | 0.013       |
| 22:00-23:00           | 0.009                               | 0.009       | 0.006       |
| 23:00-00:00           | 0.008                               | 0.009       | 0.006       |
| 1 hr-Minimum          | 0.003                               | 0.003       | 0.004       |
| 1 hr-Maximum          | 0.010                               | 0.012       | 0.013       |
| Avg. 24 hr            | 0.007                               | 0.008       | 0.008       |
| Standard* (avg. 1 hr) | 0.17                                |             |             |

**Analytical Method : -** Chemiluminescence Method.

**Source : \*** The notification of the National Environment Board No. 33, B.E. 2552 (2009), subjected "The nitrogen dioxide in ambient air standards", published in the Royal Government Gazette, Vol. 126, Special part 114D, dated August 14, B.E. 2552 (2009).

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Technical Manager

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**Report No. : 2022-5004051-1 / 001-1 (Page 2 of 5)**

**Issued date : May 25, 2022**

**CLIENT : BANGKOK AIRWAYS PUBLIC COMPANY LIMITED (SUKHOTHAI AIRPORT)**

**CONTACT :**

**ADDRESS :**



## Analysis Report

**SAMPLE DESIGNATED AS : Ambient Air Quality**

**MEASUREMENT DATE : May 3-5, 2022**

**MEASUREMENT LOCATION : วัดหนองชุมแสง**

**MEASURED BY :**

Sukhothai Airport, Sukhothai Province

| Time                   | CO Concentration (ppm) |             |             |
|------------------------|------------------------|-------------|-------------|
|                        | May 3, 2022            | May 4, 2022 | May 5, 2022 |
| 00:00-01:00            | 0.586                  | 0.505       | 0.261       |
| 01:00-02:00            | 0.923                  | 0.546       | 0.131       |
| 02:00-03:00            | 0.479                  | 0.863       | 0.412       |
| 03:00-04:00            | 0.620                  | 0.530       | 0.583       |
| 04:00-05:00            | 0.168                  | 0.594       | 0.580       |
| 05:00-06:00            | 0.976                  | 0.898       | 0.413       |
| 06:00-07:00            | 0.237                  | 0.746       | 0.763       |
| 07:00-08:00            | 0.520                  | 0.517       | 0.120       |
| 08:00-09:00            | 0.551                  | 0.903       | 0.448       |
| 09:00-10:00            | 0.528                  | 0.738       | 0.771       |
| 10:00-11:00            | 0.468                  | 0.644       | 0.530       |
| 11:00-12:00            | 0.468                  | 0.876       | 0.525       |
| 12:00-13:00            | 0.307                  | 0.609       | 0.402       |
| 13:00-14:00            | 0.929                  | 0.689       | 0.355       |
| 14:00-15:00            | 0.626                  | 0.762       | 0.322       |
| 15:00-16:00            | 0.766                  | 0.717       | 0.288       |
| 16:00-17:00            | 0.349                  | 0.649       | 0.149       |
| 17:00-18:00            | 0.990                  | 0.823       | 0.253       |
| 18:00-19:00            | 0.852                  | 0.884       | 0.147       |
| 19:00-20:00            | 0.493                  | 0.695       | 0.318       |
| 20:00-21:00            | 0.709                  | 0.798       | 0.195       |
| 21:00-22:00            | 0.414                  | 0.791       | 0.607       |
| 22:00-23:00            | 0.613                  | 0.559       | 0.213       |
| 23:00-00:00            | 0.517                  | 0.720       | 0.273       |
| 1 hr-Minimum           | 0.168                  | 0.505       | 0.120       |
| 1 hr-Maximum           | 0.990                  | 0.903       | 0.771       |
| Avg.<br>8 hrs          | 00:00-08:00            | 0.564       | 0.650       |
|                        | 08:00-16:00            | 0.580       | 0.742       |
|                        | 16:00-00:00            | 0.617       | 0.740       |
| Standard* (avg. 1 hrs) |                        | 30          |             |
| Standard* (avg. 8 hr)  |                        | 9           |             |

**Analytical Method : -** UV Fluorescence Method.

**Sources :** \* The notification of the National Environment Board No.10, B.E. 2538 (1995), subjected "The ambient air standards", published in the Royal Government Gazette, Vol. 112, Part 71D, dated September 5, B.E. 2538 (1995)



Technical Manager

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**Report No. : 2022-5004051-1 / 001-1 (Page 3 of 5)**

**Issued date : May 25, 2022**

**CLIENT : BANGKOK AIRWAYS PUBLIC COMPANY LIMITED (SUKHOTHAI AIRPORT)**

**CONTACT :**

**ADDRESS :**

## Analysis Report

**SAMPLE DESIGNATED AS : Ambient Air Quality**

**MEASUREMENT DATE : May 3-5, 2022**

**MEASUREMENT LOCATION : วัดหนองชุมแสง**

**MEASURED BY :**

Sukhothai Airport, Sukhothai Province

| TIME        | May 3, 2022    |                  | May 4, 2022    |                  | May 5, 2022    |                  |
|-------------|----------------|------------------|----------------|------------------|----------------|------------------|
|             | Wind Direction | Wind Speed (m/s) | Wind Direction | Wind Speed (m/s) | Wind Direction | Wind Speed (m/s) |
| 00:00-01:00 | -              | CALM             | -              | CALM             | -              | CALM             |
| 01:00-02:00 | -              | CALM             | -              | CALM             | -              | CALM             |
| 02:00-03:00 | -              | CALM             | -              | CALM             | -              | CALM             |
| 03:00-04:00 | -              | CALM             | -              | CALM             | -              | CALM             |
| 04:00-05:00 | -              | CALM             | -              | CALM             | -              | CALM             |
| 05:00-06:00 | -              | CALM             | -              | CALM             | -              | CALM             |
| 06:00-07:00 | -              | CALM             | -              | CALM             | -              | CALM             |
| 07:00-08:00 | -              | CALM             | -              | CALM             | -              | CALM             |
| 08:00-09:00 | SSE            | 0.9              | -              | CALM             | -              | CALM             |
| 09:00-10:00 | SSE            | 1.3              | -              | CALM             | -              | CALM             |
| 10:00-11:00 | S              | 0.9              | -              | CALM             | -              | CALM             |
| 11:00-12:00 | SSE            | 0.9              | -              | CALM             | -              | CALM             |
| 12:00-13:00 | -              | CALM             | -              | CALM             | SE             | 0.9              |
| 13:00-14:00 | -              | CALM             | S              | 0.9              | SE             | 0.9              |
| 14:00-15:00 | -              | CALM             | SSE            | 0.9              | S              | 0.9              |
| 15:00-16:00 | -              | CALM             | S              | 0.9              | S              | 1.3              |
| 16:00-17:00 | -              | CALM             | SSE            | 1.3              | SSE            | 1.3              |
| 17:00-18:00 | -              | CALM             | SSE            | 0.9              | SSE            | 1.3              |
| 18:00-19:00 | SSE            | 0.9              | S              | 1.3              | SSE            | 0.9              |
| 19:00-20:00 | -              | CALM             | S              | 0.9              | S              | 0.9              |
| 20:00-21:00 | SSE            | 0.9              | -              | CALM             | -              | CALM             |
| 21:00-22:00 | SSE            | 0.9              | -              | CALM             | -              | CALM             |
| 22:00-23:00 | SSE            | 0.9              | -              | CALM             | -              | CALM             |
| 23:00-00:00 | -              | CALM             | -              | CALM             | -              | CALM             |

**Measurement Method :** - Wind Speed and Wind Direction recording meter

**Remarks :**

- WS = Wind Speed
- WD = Wind Direction



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**Report No.** : 2022-5004051-1 / 001-1 (Page 4 of 5)

**Issued date** : May 25, 2022

**CLIENT** : BANGKOK AIRWAYS PUBLIC COMPANY LIMITED (SUKHOTHAI AIRPORT)

**CONTACT** :

**ADDRESS** :

## Analysis Report

**SAMPLE DESIGNATED AS** : Ambient Air Quality

**MEASUREMENT DATE** : May 3-5, 2022

**MEASUREMENT LOCATION** : วัดหนองชุมแสง

**MEASURED BY** :

Sukhothai Airport, Sukhothai Province

| Wind Speed<br>Wind Direction | Percent of Wind Speed (%) |             |             |             |          |
|------------------------------|---------------------------|-------------|-------------|-------------|----------|
|                              | 0.5-1.0 m/s               | 1.1-2.0 m/s | 2.1-3.0 m/s | 3.1-4.0 m/s | >4.0 m/s |
| N                            | -                         | -           | -           | -           | -        |
| NNE                          | -                         | -           | -           | -           | -        |
| NE                           | -                         | -           | -           | -           | -        |
| ENE                          | -                         | -           | -           | -           | -        |
| E                            | -                         | -           | -           | -           | -        |
| ESE                          | -                         | -           | -           | -           | -        |
| SE                           | 2.8                       | -           | -           | -           | -        |
| SSE                          | 12.5                      | 5.6         | -           | -           | -        |
| S                            | 8.3                       | 2.8         | -           | -           | -        |
| SSW                          | -                         | -           | -           | -           | -        |
| SW                           | -                         | -           | -           | -           | -        |
| WSW                          | -                         | -           | -           | -           | -        |
| W                            | -                         | -           | -           | -           | -        |
| WNW                          | -                         | -           | -           | -           | -        |
| NW                           | -                         | -           | -           | -           | -        |
| NNW                          | -                         | -           | -           | -           | -        |
| <b>CALM</b>                  | <b>68.06</b>              |             |             |             |          |

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Report No. : 2022-5004051-1 / 001-1 (Page 5 of 5)

Issued date : May 25, 2022

CLIENT : BANGKOK AIRWAYS PUBLIC COMPANY LIMITED (SUKHOTHAI AIRPORT)  
CONTACT :  
ADDRESS :

## Analysis Report

SAMPLE DESIGNATED AS : Ambient Air Quality

MEASUREMENT DATE : May 3-5, 2022

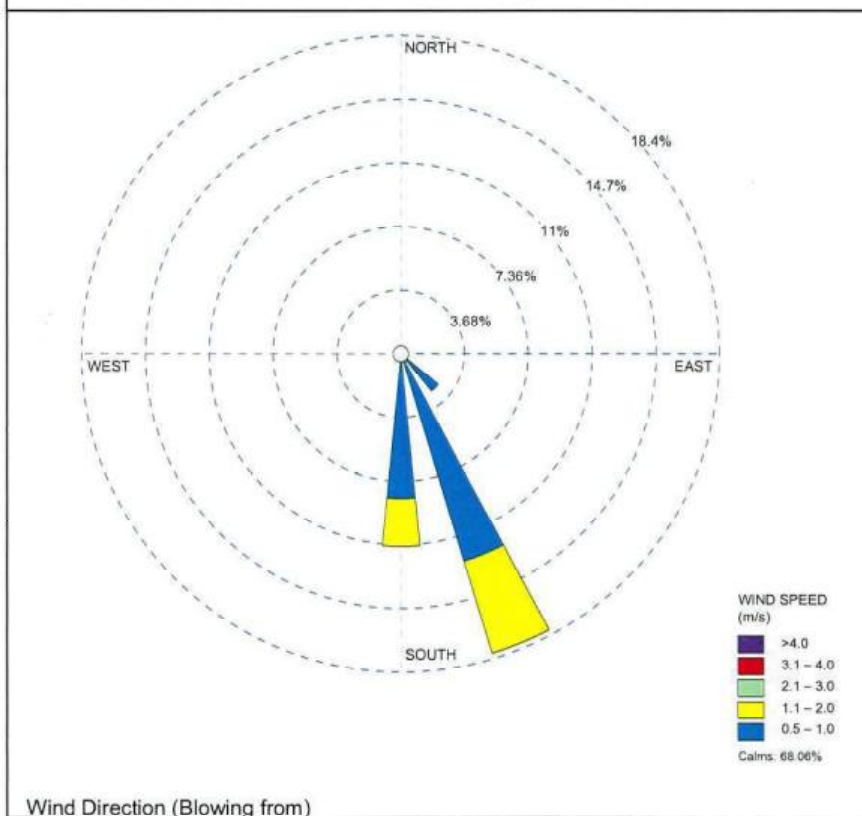
MEASUREMENT LOCATION : วัดหนองชุมแสง

MEASURED BY :

Sukhothai Airport, Sukhothai Province

### WIND ROSE PLOT

Measurement Location : วัดหนองชุมแสง  
Measurement Date : วันที่ 3-5 พฤษภาคม 2565



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**Report No. : 2022-5004051-1 / 001-2 (Page 1 of 5)**

**Issued date : May 25, 2022**

**CLIENT : BANGKOK AIRWAYS PUBLIC COMPANY LIMITED (SUKHOTHAI AIRPORT)**

**CONTACT :**

**ADDRESS :**

## Analysis Report

**SAMPLE DESIGNATED AS : Ambient Air Quality**

**MEASUREMENT DATE : May 3-5, 2022**

**MEASUREMENT LOCATION : โรงเรียนวัดไทรย้อย**

**MEASURED BY :**

Sukhothai Airport, Sukhothai Province

| Time                  | NO <sub>2</sub> Concentration (ppm) |             |             |
|-----------------------|-------------------------------------|-------------|-------------|
|                       | May 3, 2022                         | May 4, 2022 | May 5, 2022 |
| 00:00-01:00           | 0.001                               | 0.003       | 0.007       |
| 01:00-02:00           | 0.002                               | 0.003       | 0.006       |
| 02:00-03:00           | 0.007                               | 0.004       | 0.001       |
| 03:00-04:00           | 0.002                               | 0.006       | 0.001       |
| 04:00-05:00           | 0.001                               | 0.002       | 0.004       |
| 05:00-06:00           | 0.006                               | 0.007       | 0.004       |
| 06:00-07:00           | 0.005                               | 0.004       | 0.005       |
| 07:00-08:00           | 0.006                               | 0.004       | 0.008       |
| 08:00-09:00           | 0.003                               | 0.006       | 0.004       |
| 09:00-10:00           | 0.006                               | 0.007       | 0.002       |
| 10:00-11:00           | 0.004                               | 0.004       | 0.006       |
| 11:00-12:00           | 0.008                               | 0.006       | 0.001       |
| 12:00-13:00           | 0.005                               | 0.005       | 0.005       |
| 13:00-14:00           | 0.004                               | 0.002       | 0.001       |
| 14:00-15:00           | 0.006                               | 0.003       | 0.008       |
| 15:00-16:00           | 0.003                               | 0.004       | 0.007       |
| 16:00-17:00           | 0.002                               | 0.004       | 0.004       |
| 17:00-18:00           | 0.002                               | 0.002       | 0.003       |
| 18:00-19:00           | 0.007                               | 0.007       | 0.002       |
| 19:00-20:00           | 0.002                               | 0.005       | 0.002       |
| 20:00-21:00           | 0.006                               | 0.002       | 0.003       |
| 21:00-22:00           | 0.003                               | 0.001       | 0.001       |
| 22:00-23:00           | 0.008                               | 0.002       | 0.003       |
| 23:00-00:00           | 0.004                               | 0.005       | 0.003       |
| 1 hr-Minimum          | 0.001                               | 0.001       | 0.001       |
| 1 hr-Maximum          | 0.008                               | 0.007       | 0.008       |
| Avg. 24 hr            | 0.004                               | 0.004       | 0.004       |
| Standard* (avg. 1 hr) | 0.17                                |             |             |

**Analytical Method : -** Chemiluminescence Method.

**Source : \*** The notification of the National Environment Board No. 33, B.E. 2552 (2009), subjected "The nitrogen dioxide in ambient air standards", published in the Royal Government Gazette, Vol. 126, Special part 114D, dated August 14, B.E. 2552 (2009).



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**CONTACT :**  
**ADDRESS :**

## Analysis Report

**SAMPLE DESIGNATED AS : Ambient Air Quality**

**MEASUREMENT DATE : May 3-5, 2022**

**MEASUREMENT LOCATION : โรงเรียนวัดไพรน้อย**

**MEASURED BY :**

Sukhothai Airport, Sukhothai Province

| Time                   |             | CO Concentration (ppm) |             |             |
|------------------------|-------------|------------------------|-------------|-------------|
|                        |             | May 3, 2022            | May 4, 2022 | May 5, 2022 |
| 00:00-01:00            |             | 0.579                  | 0.535       | 0.492       |
| 01:00-02:00            |             | 0.447                  | 0.439       | 0.665       |
| 02:00-03:00            |             | 0.949                  | 0.132       | 0.518       |
| 03:00-04:00            |             | 0.534                  | 0.565       | 0.765       |
| 04:00-05:00            |             | 0.658                  | 0.382       | 0.732       |
| 05:00-06:00            |             | 0.707                  | 0.369       | 0.640       |
| 06:00-07:00            |             | 0.432                  | 0.406       | 0.647       |
| 07:00-08:00            |             | 0.867                  | 0.392       | 0.749       |
| 08:00-09:00            |             | 0.702                  | 0.581       | 0.639       |
| 09:00-10:00            |             | 0.916                  | 0.556       | 0.731       |
| 10:00-11:00            |             | 0.873                  | 0.260       | 0.725       |
| 11:00-12:00            |             | 0.556                  | 0.356       | 0.653       |
| 12:00-13:00            |             | 0.438                  | 0.234       | 0.429       |
| 13:00-14:00            |             | 0.641                  | 0.196       | 0.420       |
| 14:00-15:00            |             | 0.859                  | 0.376       | 0.464       |
| 15:00-16:00            |             | 0.558                  | 0.318       | 0.597       |
| 16:00-17:00            |             | 0.839                  | 0.401       | 0.771       |
| 17:00-18:00            |             | 0.748                  | 0.342       | 0.269       |
| 18:00-19:00            |             | 0.578                  | 0.382       | 0.752       |
| 19:00-20:00            |             | 0.664                  | 0.497       | 0.775       |
| 20:00-21:00            |             | 0.397                  | 0.364       | 0.295       |
| 21:00-22:00            |             | 0.779                  | 0.247       | 0.458       |
| 22:00-23:00            |             | 0.421                  | 0.593       | 0.460       |
| 23:00-00:00            |             | 0.389                  | 0.505       | 0.515       |
| 1 hr-Minimum           |             | 0.389                  | 0.132       | 0.269       |
| 1 hr-Maximum           |             | 0.949                  | 0.593       | 0.775       |
| Avg.<br>8 hrs          | 00:00-08:00 | 0.647                  | 0.403       | 0.651       |
|                        | 08:00-16:00 | 0.693                  | 0.360       | 0.582       |
|                        | 16:00-00:00 | 0.602                  | 0.416       | 0.537       |
| Standard* (avg. 1 hrs) |             | 30                     |             |             |
| Standard* (avg. 8 hr)  |             | 9                      |             |             |

**Analytical Method : -** UV Fluorescence Method.

**Sources : \*** The notification of the National Environment Board No.10, B.E. 2538 (1995), subjected "The ambient air standards", published in the Royal Government Gazette, Vol. 112, Part 71D, dated September 5, B.E. 2538 (1995).



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**Report No. : 2022-5004051-1 / 001-2 (Page 3 of 5)**

**Issued date : May 25, 2022**

**CLIENT : BANGKOK AIRWAYS PUBLIC COMPANY LIMITED (SUKHOTHAI AIRPORT)**  
**CONTACT :**  
**ADDRESS :**

## Analysis Report

**SAMPLE DESIGNATED AS : Ambient Air Quality**

**MEASUREMENT DATE : May 3-5, 2022**

**MEASUREMENT LOCATION : โรงเรียนวัดไพรน้อย**

**MEASURED BY :**

Sukhothai Airport, Sukhothai Province

| TIME        | May 3, 2022    |                  | May 4, 2022    |                  | May 5, 2022    |                  |
|-------------|----------------|------------------|----------------|------------------|----------------|------------------|
|             | Wind Direction | Wind Speed (m/s) | Wind Direction | Wind Speed (m/s) | Wind Direction | Wind Speed (m/s) |
| 00:00-01:00 | -              | Calm             | -              | Calm             | -              | Calm             |
| 01:00-02:00 | -              | Calm             | -              | Calm             | -              | Calm             |
| 02:00-03:00 | -              | Calm             | -              | Calm             | -              | Calm             |
| 03:00-04:00 | -              | Calm             | -              | Calm             | -              | Calm             |
| 04:00-05:00 | -              | Calm             | -              | Calm             | -              | Calm             |
| 05:00-06:00 | -              | Calm             | -              | Calm             | -              | Calm             |
| 06:00-07:00 | -              | Calm             | -              | Calm             | -              | Calm             |
| 07:00-08:00 | -              | Calm             | -              | Calm             | -              | Calm             |
| 08:00-09:00 | -              | Calm             | -              | Calm             | -              | Calm             |
| 09:00-10:00 | SSE            | 0.9              | -              | Calm             | -              | Calm             |
| 10:00-11:00 | ESE            | 0.9              | -              | Calm             | NE             | 0.9              |
| 11:00-12:00 | SE             | 0.9              | ENE            | 0.9              | NE             | 0.9              |
| 12:00-13:00 | ENE            | 0.9              | NE             | 0.9              | NE             | 0.9              |
| 13:00-14:00 | SE             | 0.9              | WSW            | 1.3              | SW             | 0.9              |
| 14:00-15:00 | SSW            | 0.9              | WSW            | 1.3              | WSW            | 1.3              |
| 15:00-16:00 | -              | Calm             | WSW            | 0.9              | SSW            | 1.3              |
| 16:00-17:00 | -              | Calm             | WSW            | 1.8              | SW             | 1.3              |
| 17:00-18:00 | -              | Calm             | WSW            | 1.3              | WSW            | 1.3              |
| 18:00-19:00 | SSE            | 0.9              | WSW            | 0.9              | WSW            | 1.3              |
| 19:00-20:00 | SSE            | 0.9              | WSW            | 0.9              | -              | Calm             |
| 20:00-21:00 | -              | Calm             | -              | Calm             | -              | Calm             |
| 21:00-22:00 | -              | Calm             | -              | Calm             | -              | Calm             |
| 22:00-23:00 | -              | Calm             | -              | Calm             | -              | Calm             |
| 23:00-00:00 | -              | Calm             | -              | Calm             | -              | Calm             |

**Measurement Method :** - Wind Speed and Wind Direction recording meter

**Remarks :**  
 - WS = Wind Speed  
 - WD = Wind Direction



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**Report No.** : 2022-5004051-1 / 001-2 (Page 4 of 5)

**Issued date** : May 25, 2022

**CLIENT** : BANGKOK AIRWAYS PUBLIC COMPANY LIMITED (SUKHOTHAI AIRPORT)

**CONTACT** :

**ADDRESS** :

## Analysis Report

**SAMPLE DESIGNATED AS** : Ambient Air Quality

**MEASUREMENT DATE** : May 3-5, 2022

**MEASUREMENT LOCATION** : โรงเรียนวัดไทรย้อย

**MEASURED BY** :

Sukhothai Airport, Sukhothai Province

| Wind Speed<br>Wind Direction | Percent of Wind Speed (%) |             |             |             |          |
|------------------------------|---------------------------|-------------|-------------|-------------|----------|
|                              | 0.5-1.0 m/s               | 1.1-2.0 m/s | 2.1-3.0 m/s | 3.1-4.0 m/s | >4.0 m/s |
| N                            | -                         | -           | -           | -           | -        |
| NNE                          | -                         | -           | -           | -           | -        |
| NE                           | 5.56                      | -           | -           | -           | -        |
| ENE                          | 2.78                      | -           | -           | -           | -        |
| E                            | -                         | -           | -           | -           | -        |
| ESE                          | 1.39                      | -           | -           | -           | -        |
| SE                           | 2.78                      | -           | -           | -           | -        |
| SSE                          | 4.17                      | -           | -           | -           | -        |
| S                            | -                         | -           | -           | -           | -        |
| SSW                          | 1.39                      | 1.39        | -           | -           | -        |
| SW                           | 1.39                      | 1.39        | -           | -           | -        |
| WSW                          | 4.17                      | 9.72        | -           | -           | -        |
| W                            | -                         | -           | -           | -           | -        |
| WNW                          | -                         | -           | -           | -           | -        |
| NW                           | -                         | -           | -           | -           | -        |
| NNW                          | -                         | -           | -           | -           | -        |
| <b>CALM</b>                  | <b>63.89</b>              |             |             |             |          |

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**Report No.** : 2022-5004051-1 / 001-2 (Page 5 of 5)

**Issued date** : May 25, 2022

**CLIENT** : BANGKOK AIRWAYS PUBLIC COMPANY LIMITED (SUKHOTHAI AIRPORT)

**CONTACT** :

**ADDRESS** :

## Analysis Report

**SAMPLE DESIGNATED AS** : Ambient Air Quality

**MEASUREMENT DATE** : May 3-5, 2022

**MEASUREMENT LOCATION** : โรงเรียนวัดไทรย้อย

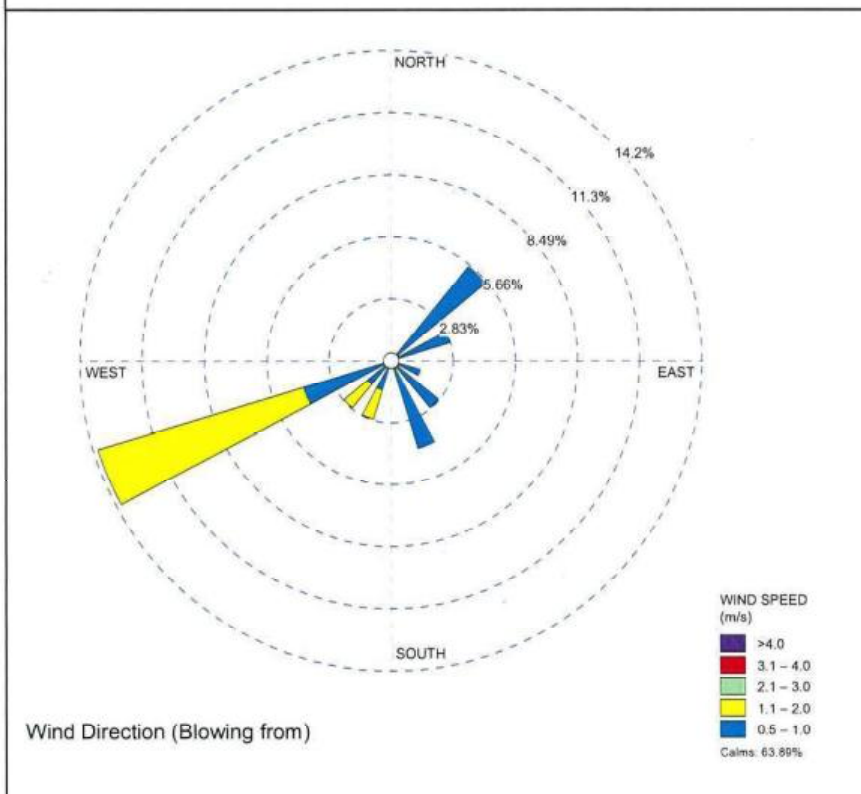
**MEASURED BY** :

Sukhothai Airport, Sukhothai Province

### WIND ROSE PLOT

**Measurement Location** : โรงเรียนวัดไทรย้อย

**Measurement Date** : วันที่ 3-5 พฤษภาคม 2565



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ระดับเสียงทั่วไป (Leq-24 hr)

**Report No. : 2022-5005041-1 / 002-1 (Page 1 of 1)**

**Issued date : May 25, 2022**

**CLIENT : BANGKOK AIRWAYS PUBLIC COMPANY LIMITED (SUKHOTHAI AIRPORT)**  
**CONTACT :**  
**ADDRESS :**

## Analysis Report

**SAMPLE DESIGNATED AS :** Noise Level  
**MEASUREMENT DATE :** May 3-5, 2022  
**MEASUREMENT LOCATION :** วัดหนองชุมแสง  
**MEASURED BY :**  
**CALIBRATION DATA :** Calibrator Model CR:515, Cirrus, Serial No. 88346, Calibration Value  
Reference : 94.1 dB(A), Pre Cal : 93.8 dB(A) Post Cal : 93.7 dB(A)  
**SOUND LEVEL METER NO. :** Model CR:161B, Cirrus, Serial No. G080140

| Time        | Noise Level [dB(A)] |      |           |             |      |           |             |      |           | Standard          |
|-------------|---------------------|------|-----------|-------------|------|-----------|-------------|------|-----------|-------------------|
|             | May 3, 2022         |      |           | May 4, 2022 |      |           | May 5, 2022 |      |           |                   |
|             | Leq                 | Lmax | L90       | Leq         | Lmax | L90       | Leq         | Lmax | L90       |                   |
| 00:00-01:00 | 49.8                | 51.3 | 48.8      | 48.3        | 52.5 | 43.1      | 46.7        | 58.8 | 45.0      |                   |
| 01:00-02:00 | 50.8                | 54.0 | 47.9      | 48.8        | 53.3 | 43.7      | 54.2        | 65.1 | 44.9      |                   |
| 02:00-03:00 | 50.6                | 54.5 | 48.4      | 50.8        | 59.5 | 49.4      | 54.0        | 65.0 | 46.1      |                   |
| 03:00-04:00 | 50.2                | 60.8 | 45.0      | 45.5        | 54.1 | 43.0      | 49.6        | 55.0 | 44.9      |                   |
| 04:00-05:00 | 49.3                | 61.0 | 42.4      | 48.7        | 58.6 | 43.0      | 48.4        | 59.4 | 44.5      |                   |
| 05:00-06:00 | 62.3                | 76.3 | 42.1      | 59.7        | 69.6 | 44.0      | 60.1        | 70.8 | 44.5      |                   |
| 06:00-07:00 | 52.8                | 70.6 | 45.5      | 51.6        | 77.2 | 44.9      | 51.6        | 66.7 | 45.6      |                   |
| 07:00-08:00 | 51.8                | 62.5 | 44.4      | 50.7        | 74.8 | 43.9      | 52.3        | 64.0 | 46.8      |                   |
| 08:00-09:00 | 52.9                | 66.8 | 45.7      | 55.1        | 67.5 | 48.2      | 56.3        | 69.7 | 50.8      |                   |
| 09:00-10:00 | 55.2                | 69.6 | 49.1      | 53.9        | 67.3 | 49.4      | 54.5        | 68.4 | 49.4      |                   |
| 10:00-11:00 | 59.3                | 81.7 | 46.0      | 52.4        | 69.6 | 46.7      | 53.6        | 67.0 | 47.7      |                   |
| 11:00-12:00 | 50.9                | 69.3 | 43.0      | 51.9        | 62.1 | 43.7      | 52.7        | 64.3 | 46.3      |                   |
| 12:00-13:00 | 50.9                | 67.6 | 42.9      | 49.5        | 65.0 | 42.5      | 51.9        | 64.9 | 42.2      |                   |
| 13:00-14:00 | 49.8                | 63.6 | 41.6      | 53.9        | 62.6 | 43.3      | 55.4        | 65.1 | 45.6      |                   |
| 14:00-15:00 | 49.7                | 61.5 | 42.0      | 54.6        | 67.0 | 47.0      | 55.2        | 73.1 | 47.3      |                   |
| 15:00-16:00 | 50.4                | 69.4 | 42.4      | 51.6        | 65.9 | 42.2      | 49.9        | 63.8 | 44.2      |                   |
| 16:00-17:00 | 51.3                | 72.3 | 42.8      | 49.2        | 66.2 | 41.7      | 48.0        | 64.7 | 42.1      |                   |
| 17:00-18:00 | 50.7                | 72.7 | 43.2      | 49.8        | 63.7 | 43.6      | 50.4        | 69.2 | 44.4      |                   |
| 18:00-19:00 | 61.0                | 67.4 | 43.4      | 68.2        | 84.6 | 44.2      | 56.5        | 68.4 | 44.2      |                   |
| 19:00-20:00 | 50.7                | 63.5 | 41.8      | 55.0        | 66.0 | 44.1      | 58.7        | 69.7 | 43.7      |                   |
| 20:00-21:00 | 45.9                | 56.5 | 43.6      | 49.3        | 58.0 | 44.6      | 46.5        | 63.7 | 44.1      |                   |
| 21:00-22:00 | 47.2                | 60.6 | 44.4      | 49.1        | 55.2 | 45.7      | 47.4        | 66.5 | 44.5      |                   |
| 22:00-23:00 | 49.1                | 61.7 | 44.2      | 49.1        | 60.7 | 47.5      | 46.7        | 55.5 | 44.7      |                   |
| 23:00-00:00 | 49.4                | 55.2 | 43.6      | 48.2        | 55.5 | 45.7      | 45.4        | 60.4 | 44.4      |                   |
| Leq 24 hrs  | 54.3                | -    | -         | 56.5        | -    | -         | 53.7        | -    | -         | 70 <sup>1/</sup>  |
| Ldn         | 60.9                | -    | -         | 60.2        | -    | -         | 59.9        | -    | -         | -                 |
| Lmax        | -                   | 81.7 | -         | -           | 84.6 | -         | -           | 73.1 | -         | 115 <sup>1/</sup> |
| L90         | -                   | -    | 41.6-49.1 | -           | -    | 41.7-49.4 | -           | -    | 42.1-50.8 | -                 |

**Source:** <sup>1/</sup> Notification of National Environmental Board, Vol. 15, B.E. 2540, dated September 12, B.E. 2540 (1997).



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**Report No. : 2022-5005041-1 / 002-2 (Page 1 of 1)**

**Issued date : May 25, 2022**

**CLIENT : BANGKOK AIRWAYS PUBLIC COMPANY LIMITED (SUKHOTHAI AIRPORT)**

**CONTACT :**

**ADDRESS :**

## Analysis Report

**SAMPLE DESIGNATED AS : Noise Level**

**MEASUREMENT DATE : May 3-5, 2022**

**MEASUREMENT LOCATION : โรงเรียนวัดไทรย้อย**

**MEASURED BY :**

**CALIBRATION DATA : Calibrator Model CR:515, Cirrus, Serial No. 81745, Calibration Value  
Reference : 94.1 dB(A), Pre Cal : 93.7 dB(A) Post Cal : 93.7 dB(A)**

**SOUND LEVEL METER NO. : Model CR:161B, Cirrus, Serial No. G078771**

| Time        | Noise Level [dB(A)] |      |           |             |      |           |             |      |           | Standard          |
|-------------|---------------------|------|-----------|-------------|------|-----------|-------------|------|-----------|-------------------|
|             | May 3, 2022         |      |           | May 4, 2022 |      |           | May 5, 2022 |      |           |                   |
|             | Leq                 | Lmax | L90       | Leq         | Lmax | L90       | Leq         | Lmax | L90       |                   |
| 00:00-01:00 | 58.3                | 65.5 | 57.0      | 53.6        | 58.2 | 47.9      | 41.7        | 55.5 | 39.8      |                   |
| 01:00-02:00 | 55.7                | 60.6 | 53.3      | 53.1        | 55.5 | 51.4      | 52.8        | 60.2 | 50.1      |                   |
| 02:00-03:00 | 54.5                | 57.0 | 49.3      | 51.7        | 56.8 | 49.9      | 46.4        | 52.1 | 39.4      |                   |
| 03:00-04:00 | 51.1                | 56.1 | 48.3      | 53.8        | 59.3 | 50.4      | 51.7        | 67.6 | 48.5      |                   |
| 04:00-05:00 | 51.5                | 68.2 | 49.0      | 58.0        | 60.4 | 56.2      | 50.6        | 58.8 | 43.1      |                   |
| 05:00-06:00 | 64.0                | 82.3 | 53.8      | 66.1        | 76.1 | 57.1      | 69.3        | 81.7 | 43.5      |                   |
| 06:00-07:00 | 61.0                | 74.6 | 49.2      | 56.5        | 69.8 | 48.4      | 67.3        | 76.7 | 54.1      |                   |
| 07:00-08:00 | 53.3                | 69.6 | 46.2      | 54.3        | 82.2 | 46.0      | 59.9        | 73.6 | 46.8      |                   |
| 08:00-09:00 | 55.0                | 83.7 | 46.5      | 52.5        | 68.4 | 45.1      | 54.3        | 81.1 | 45.9      |                   |
| 09:00-10:00 | 52.2                | 70.8 | 45.7      | 53.7        | 65.6 | 46.4      | 52.1        | 64.2 | 45.6      |                   |
| 10:00-11:00 | 60.1                | 74.9 | 45.7      | 51.5        | 65.9 | 44.3      | 51.4        | 66.2 | 44.6      |                   |
| 11:00-12:00 | 58.5                | 72.3 | 45.6      | 51.1        | 69.5 | 43.6      | 52.5        | 65.6 | 44.8      |                   |
| 12:00-13:00 | 63.4                | 72.9 | 45.2      | 52.9        | 69.9 | 45.6      | 50.9        | 63.4 | 44.6      |                   |
| 13:00-14:00 | 56.1                | 69.5 | 47.7      | 52.4        | 68.8 | 44.5      | 52.0        | 70.7 | 44.1      |                   |
| 14:00-15:00 | 53.3                | 73.6 | 45.8      | 55.7        | 76.2 | 47.5      | 51.4        | 64.1 | 44.8      |                   |
| 15:00-16:00 | 54.5                | 69.1 | 47.2      | 78.8        | 91.0 | 56.6      | 53.2        | 66.9 | 45.8      |                   |
| 16:00-17:00 | 52.6                | 67.1 | 44.8      | 80.9        | 93.5 | 64.3      | 51.6        | 65.9 | 46.0      |                   |
| 17:00-18:00 | 51.8                | 64.4 | 45.2      | 61.6        | 74.6 | 56.2      | 52.5        | 65.6 | 46.5      |                   |
| 18:00-19:00 | 62.5                | 74.1 | 52.3      | 62.8        | 76.7 | 52.2      | 66.6        | 81.9 | 45.8      |                   |
| 19:00-20:00 | 58.0                | 75.1 | 48.0      | 60.8        | 72.2 | 49.4      | 69.4        | 77.7 | 58.4      |                   |
| 20:00-21:00 | 54.6                | 67.2 | 44.3      | 54.4        | 68.9 | 48.4      | 60.4        | 73.3 | 43.7      |                   |
| 21:00-22:00 | 46.2                | 57.8 | 42.4      | 46.2        | 65.8 | 42.5      | 51.5        | 74.1 | 42.8      |                   |
| 22:00-23:00 | 53.3                | 80.7 | 46.6      | 48.7        | 60.0 | 41.7      | 44.4        | 61.9 | 42.2      |                   |
| 23:00-00:00 | 48.2                | 62.5 | 43.6      | 47.4        | 67.1 | 41.2      | 49.0        | 60.5 | 42.8      |                   |
| Leq 24 hrs  | 57.7                | -    | -         | 69.4        | -    | -         | 61.2        | -    | -         | 70 <sup>1/</sup>  |
| Ldn         | 64.3                | -    | -         | 70.4        | -    | -         | 68.3        | -    | -         | -                 |
| Lmax        | -                   | 83.7 | -         | -           | 93.5 | -         | -           | 81.9 | -         | 115 <sup>1/</sup> |
| L90         | -                   | -    | 42.4-57.0 | -           | -    | 41.2-64.3 | -           | -    | 39.4-58.4 | -                 |

**Source:** <sup>1/</sup> Notification of National Environmental Board, Vol. 15, B.E. 2540, dated September 12, B.E. 2540 (1997).

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**Report No.** : 2022-5004051-1 / 005-1 (Page 1 of 1)

**Issued date** : May 31, 2022

**CLIENT** : BANGKOK AIRWAYS PUBLIC COMPANY LIMITED (SUKHOTHAI AIRPORT)  
**CONTACT** :  
**ADDRESS** :

## Analysis Report

**SAMPLE DESIGNATED AS** : Groundwater Quality

**SAMPLING DATE** : May 4, 2022

**SAMPLING LOCATION** : บ่อบาดาลที่ทางเข้าของโครงการชุดเจาะไว้  
เป็นบ่อสังเกตการณ์

**SAMPLING TIME** : 09.15 hr.

**SAMPLING BY** :

| Parameter                           | Unit       | Method                     | Analytical Value | Standard <sup>1/</sup> |                   |
|-------------------------------------|------------|----------------------------|------------------|------------------------|-------------------|
|                                     |            |                            |                  | Optimal Value          | Maximum Allowable |
| pH                                  | -          | APHA, 4500-H+ B            | 7.21             | 7.0-8.5                | 6.5-9.2           |
| Odor                                | -          | TIS 257, 2-2521            | None             | -                      | -                 |
| Color                               | Pt.Co      | APHA, 2120 C               | <1               | 5                      | 15                |
| Turbidity                           | NTU        | APHA, 2130 B               | 2.9              | 5                      | 20                |
| Suspended Solids                    | mg/l       | APHA, 2540 D               | <2.5             | -                      | -                 |
| Total Solid                         | mg/l       | APHA, 2540 B               | 269              | -                      | -                 |
| Conductivity                        | us/cm      | APHA, 2510 B               | 411              | -                      | -                 |
| Total Hardness as CaCO <sub>3</sub> | mg/l       | APHA, 2340 C               | 125              | ≥300                   | 500               |
| Chloride (Cl)                       | mg/l       | APHA, 4500-Cl D            | 62               | ≥250                   | 600               |
| Sulphate (SO <sub>4</sub> )         | mg/l       | APHA, 4500-SO <sub>4</sub> | 2                | ≥200                   | 250               |
| Nitrate (NO <sub>3</sub> )          | mg/l       | APHA, 4110B                | 0.278            | ≥45                    | 45                |
| Iron (Fe)                           | mg/l       | APHA, 3125 B               | 0.437            | ≥0.5                   | 1.0               |
| Manganese (Mn)                      | mg/l       | APHA, 3125 B               | 0.996            | ≥0.3                   | 0.5               |
| Total Coliform Bacteria             | MPN/100 ml | APHA, 9221 B               | >23              | ≥2.2                   | -                 |
| Fecal Coilform Bacteria             | MPN/100 ml | APHA, 9221 C               | >23              | -                      | -                 |

**Remark:** - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA-AWWA-WEF.

**Source:** <sup>1/</sup> Notification of the Ministry of Natural Resources and Environment, B.E. 2551 (2008), published in the Royal Government Gazette, Vol. 125, Special Part 85D, dated May 21, B.E. 2551 (2008).

Technical Manager

SGS (THAILAND) LIMITED

TY/WP/MTM/MTM

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E 245899

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# คุณภาพน้ำผิวดิน

**Report No. : 2022-5004051-1 / 004-1 (Page 1 of 1)**

**Issued date : May 25, 2022**

**CLIENT : BANGKOK AIRWAYS PUBLIC COMPANY LIMITED (SUKHOTHAI AIRPORT)**  
**CONTACT : [REDACTED]**  
**ADDRESS : [REDACTED]**

## Analysis Report

**SAMPLE DESIGNATED AS :** Surface Water Quality **SAMPLING [REDACTED]**  
**SAMPLING LOCATION :** 1. แม่น้ำยมบริเวณวัดไพรน้อย บ้านคลองกระเจง (สถานีด้านเหนือพื้นที่โครงการ)  
 2. แม่น้ำยมบริเวณวัดเกาะ บ้านเกาะ (สถานีต้นน้ำ)  
 3. แม่น้ำยมบริเวณสะพานพัฒนาเหนือ (สถานีท้ายน้ำ)

| Parameter                       | Unit      | Method                       | Analytical Value |       |       | Standard <sup>1/</sup> |
|---------------------------------|-----------|------------------------------|------------------|-------|-------|------------------------|
|                                 |           |                              | 1                | 2     | 3     |                        |
| Sampling Time                   | hr.       | -                            | 11.10            | 11.50 | 12.10 | -                      |
| pH                              | -         | APHA, 4500-H+ B              | 8.00             | 8.05  | 7.89  | 5.0-9.0                |
| Dissolved Oxygen (DO)           | mg/l      | APHA, 4500-O C               | 7.5              | 7.7   | 7.4   | ≥4.0                   |
| Biochemical Oxygen Demand (BOD) | mg/l      | APHA, 5210 B                 | 0.8              | 0.8   | 1.0   | ≥2.0                   |
| Nitrate (NO <sub>3</sub> ) as N | mg/l      | APHA, 4500-NO <sub>3</sub> E | 0.073            | 0.111 | 0.110 | ≥5.0                   |
| Total Coliform Bacteria         | MPN/100ml | APHA, 9221 B                 | 7,900            | 2,400 | 2,400 | ≥20,000                |

**Remark :** - Analytical Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA-AWWA-WEF.

**Standards :** <sup>1/</sup> Notification of the National Environment Board No. 8, B.E. 2537 (1994), which was issued under the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992) dated January 20, B.E. 2537 (1994)  
 Class 3 Moderately clean fresh surface water resources use for:  
 (1) Consumption, but the water should be conservational treated before use.  
 (2) Agriculture.

**Technical Manager**

TY/WP/MTM/MTM

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Member of the SGS Group

## ภาคผนวก ข

- 
- สำเนาหนังสือรับรองห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอสจีเอส (ประเทศไทย) จำกัด
  - สำเนาใบรับรองมาตรฐาน ISO 9001/2015

[illegible]

กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

પગલું ૧૭

เรื่อง ค่อยๆ หนึ่งสี่รับขึ้นทะเลเขียนห้องปฏิบัติการวิเคราะห์เอกสาร

เรียน กรรมการผู้จัดการ บริษัท เอสจีเอส (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๔ มกราคม ๒๕๖๕

สิ่งส่งมาด้วย เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท เอสซีเอส (ประเทศไทย) จำกัด จำนวน ๑ แผ่น

ตามหนังสือที่ยังมี บริษัท เอสจีเอส (ประเทศไทย) จำกัด ขอต่ออายุหนังสือขึ้นทะเบียน  
 ห้างปฏิบัติการวิสาหกิจชุมชน เลขทะเบียน ว-๑๐๐ สถานที่ตั้งเลขที่ ๔๙/๑๖-๒๐ และ ๔๙/๑๖-๒๑ ต.ระยอง อ.ระยอง  
 จ.ระยอง ขอการพิจารณาต่ออายุการขึ้นทะเบียน

การโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอสซีเอส (ประเทศไทย) จำกัด ต่ออายุหนังสือ  
 รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

(3) (2) (1) (4) (5) (6) (7) (8)

๗. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

(a) (b) (c) (d) (e) (f)

๗) นายพันธุธิ...



**Green Industry**  
SUSTAINABLE BUSINESS

"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"

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ค. ขอช่วยสำรวจสภาพพื้นที่ได้รับขึ้นทะเบียนเป็นสีเขียว ตามลิงก์ด้านล่าง  
 หนังสือฉบับนี้จะหาอยู่ในวันที่ ๓๐ มกราคม ๒๕๖๕ หากประสงค์จะขอหนังสือ  
 รับขึ้นทะเบียนเพื่อไปใช้ประกอบการวิเคราะห์เอกชน ให้นำคำขอต่อฝ่ายพร้อมเอกสารประกอบคำขอต่อ  
 กระทรวงอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือรับขึ้นทะเบียนของกฎกระทรวงวิเคราะห์เอกชน  
 ซึ่งกำหนดอยู่ดังกล่าวคือวันที่ ๓๑ กรกฎาคม ๒๕๖๕ หากพ้นกำหนดจะขอผ่านระบบอิเล็กทรอนิกส์  
 ที่ผ่านเว็บไซต์กรมส่งเสริมการค้าระหว่างประเทศ ตาม QR Code ที่หาอยู่บนเว็บไซต์

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ

การดำเนินงานพัฒนาคุณภาพชีวิตของเกษตรกรผู้เลี้ยงสัตว์ปีกในเขตภาคใต้ของประเทศไทย



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและพัฒนาทรัพยากรงาน

กลั่นมาตรฐานวิธีการวิเคราะห์ทดสอบและทะเบียนการปฏิบัติการ

โทร. ๐๒๔๓๐ ๖๘๑๒ ต่อ ๒๓๐๓-๕

โทรสาร ๐ ๒๔๙๐ ๖๓๓๒ ต่อ ๒๓๔๕

ไปรษณีย์อิเล็กทรอนิกส์ saraban@div.mail.go.th



๗ "อุตสาหกรรมก้าวหน้าไกล ประเทศโดยทั่วหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอสซีเอส (ประเทศไทย) จำกัด เลขทะเบียน ๖-๐๑๐  
ที่ อก ๐๓๑๐(๑)/ ๔๗๘ ๖ ลงวันที่ ๒๑ เมษายน ๒๕๖๕

ขอขยายสามารถพิชิตที่ได้รับการขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๐ รายการ  
น้ำเสีย จำนวน 20 รายการ

| ลำดับที่ | สารเคมีพิษ         | วิธีวิเคราะห์  |
|----------|--------------------|--|
| 1        | Aldrin             | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 2        | $\alpha$ -BHC      | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 3        | $\beta$ -BHC       | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 4        | $\delta$ -BHC      | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 5        | $\gamma$ -BHC      | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 6        | Chlordane          | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 7        | p,p'-DDD           | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 8        | p,p'-DDE           | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 9        | o,p'-DDT           | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 10       | p,p'-DDT           | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 11       | Dieldrin           | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 12       | Endosulfan I       | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 13       | Endosulfan II      | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 14       | Endosulfan Sulfate | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 15       | Endrin             | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 16       | Endrin Aldehyde    | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 17       | Heptachlor         | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 18       | Heptachlor Epoxide | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 19       | Methoxychlor       | Liquid-Liquid Extraction, Gas Chromatographic Method |
| 20       | Temperature        | Laboratory and Field Methods                         |

เอกสารอ้างอิง

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



ที่ อก ๐๓๑๐(๑)/ ๔๖๖ ๐ ๕

กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ เขตราชเทวี  
กรุงเทพมหานคร ๑๐๔๐๐

๒๕ มีนาคม ๒๕๖๓

เรื่อง ต่ออายุหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
เรียน กรรมการผู้จัดการ บริษัท เอสซีเอส (ประเทศไทย) จำกัด  
อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๑๑ กันยายน ๒๕๖๒

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอสซีเอส (ประเทศไทย) จำกัด จำนวน ๑๗ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอสซีเอส (ประเทศไทย) จำกัด ขอต่ออายุหนังสือรับ  
ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๐๑๗ สถานที่ตั้งเลขที่ ๑/๒๐๙ และ ๑/๒๑๑  
หมู่ที่ ๑ ตำบลบ้านแดง อำเภอบ้านฉาง จังหวัดระยอง ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอสซีเอส (ประเทศไทย) จำกัด ต่ออายุ  
หนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

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ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

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ค. ขอข่าสารมลพิษที่ได้รับขึ้นทะเบียนไว้ให้วิเคราะห์ในน้ำเสีย จำนวน ๒๑ รายการ  
อากาศเสีย (ปล่อยระบาย) จำนวน ๑๓ รายการ น้ำใต้ดิน จำนวน ๑๓๘ รายการ และดิน จำนวน ๑๑๗  
รายการ รวมทั้งสิ้นจำนวน ๒๖๕ รายการ ดังนี้  
หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๒ ตุลาคม ๒๕๖๕ หากประสงค์จะต่ออายุหนังสือ  
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ  
กรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
ซึ่งคำขอต่ออายุดังกล่าวหรือรับได้กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

อธิบดีกรมโรงงานอุตสาหกรรม  
ผู้อำนวยการรักษาการตาม  
ผู้ดำเนินการกึ่งและกึ่งกับกึ่งกึ่ง  
ผู้ดำเนินการกึ่งและกึ่งกับกึ่งกึ่ง

กองวิจัยและเตือนภัยมลพิษโรงงาน  
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก  
โทร. ๐ ๓๘๐๕ ๗๖๖๓-๓  
โทรสาร ๐ ๓๘๐๕ ๗๖๖๓

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอสจีเอส (ประเทศไทย) จำกัด  
ที่ อก ๐๓๐๑(๑)/ ๕๖ ๒ ๐ ๔  
ลงวันที่ ๒๔ มิถุนายน ๒๕๖๓

ขอข่าสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๖๕ รายการ  
น้ำเสีย จำนวน 21 รายการ

| ลำดับที่ | ชนิดสารมลพิษ              | วิธีวิเคราะห์   |
|----------|---------------------------|---|
| 1        | Arsenic                   | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>   |
| 2        | Barium                    | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>   |
| 3        | Biochemical Oxygen Demand | 5 Day BOD Test, Membrane Electrode Method <sup>(1)</sup>  |
| 4        | Cadmium                   | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>   |
| 5        | Chemical Oxygen Demand    | Closed Reflux, Titrimetric Method <sup>(1)</sup>  |
| 6        | Color                     | ADMI Weighted - Ordinate Spectrophotometric Method <sup>(1)</sup>   |
| 7        | Copper                    | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>   |
| 8        | Hexavalent Chromium       | Filtration, Colorimetric Method <sup>(1)</sup>  |
| 9        | Lead                      | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>   |
| 10       | Manganese                 | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>   |
| 11       | Nickel                    | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>   |
| 12       | Oil and Grease            | Liquid-Liquid, Partition-Gravimetric Method <sup>(1)</sup>  |
| 13       | pH                        | Electrometric Method <sup>(1)</sup>   |
| 14       | Phenols                   | Distillation, Direct Photometric Method <sup>(1)</sup>  |
| 15       | Selenium                  | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>   |
| 16       | Total Chromium            | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>   |
| 17       | Total Dissolved Solids    | Dried at 180 °C <sup>(1)</sup>  |
| 18       | Total Kjeldahl Nitrogen   | Digestion, Distillation, Titrimetric Method <sup>(1)</sup>  |
| 19       | Total Suspended Solids    | Dried at 103-105 °C <sup>(1)</sup>  |
| 20       | Trivalent Chromium        | Digestion, Inductively Coupled Plasma Method; Filtration, Colorimetric Method, Calculation <sup>(1)</sup> |
| 21       | Zinc                      | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>   |

อากาศเสีย (ปล่อยระบาย) จำนวน 13 รายการ

| ลำดับที่ | ชนิดสารมลพิษ | วิธีวิเคราะห์  |
|----------|--------------|--|
| 1        | Ammonia      | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(2)</sup> |
| 2        | Arsenic      | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(2)</sup> |
| 3        | Chlorine     | Isokinetic Sampling, Ion Chromatographic Method <sup>(3)</sup>                   |

4 Copper...

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ภาคเชื้อเพลิง (ต่อเนื่อง) จำนวน 13 รายการ

| ลำดับที่ | ชนิดสารเคมี                 | วิธีวิเคราะห์   |
|----------|-----------------------------|---|
| 4        | Copper                      | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[2]</sup>          |
| 5        | Dioxin/Furans               | Isokinetic Sampling, Analysis by Accredited Laboratory <sup>[2]</sup>                     |
| 6        | Hydrogen Chloride           | Isokinetic Sampling, Ion Chromatographic Method <sup>[3]</sup>                            |
| 7        | Hydrogen Sulfide            | Absorption Sampling, Iodometric Method <sup>[2]</sup>                                     |
| 8        | Lead                        | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[2]</sup>          |
| 9        | Mercury                     | Isokinetic Sampling, Digestion, Cold Vapour Atomic Absorption Spectroscopy <sup>[2]</sup> |
| 10       | Oxides of Nitrogen          | Chemical Absorption, Colorimetric Method <sup>[2]</sup>                                   |
| 11       | Total Suspended Particulate | Isokinetic Sampling, Gravimetric Method <sup>[2]</sup>                                    |
| 12       | Sulfur Dioxide              | Chemical Absorption, Barium - Thorin Titrimetric Method <sup>[2]</sup>                    |
| 13       | Sulfuric Acid               | Isokinetic Sampling, Barium - Thorin Titrimetric Method <sup>[3]</sup>                    |

น้ำดื่ม จำนวน 118 รายการ

| ลำดับที่ | ชนิดสารเคมี  | วิธีวิเคราะห์  |
|----------|--------------|--|
| 1        | Acenaphthene | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |
| 2        | Acetone      | Purge and Trap Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup>            |
| 3        | Aldrin       | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |
| 4        | Anthracene   | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |
| 5        | Antimony     | Digestion, Inductively Coupled Plasma Method <sup>[1]</sup>                              |
| 6        | Arsenic      | Digestion, Inductively Coupled Plasma Method <sup>[1]</sup>                              |
| 7        | Atrazine     | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |

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8 Barium...

น้ำดื่ม จำนวน 118 รายการ

| ลำดับที่ | ชนิดสารเคมี                | วิธีวิเคราะห์  |
|----------|----------------------------|--|
| 8        | Barium                     | Digestion, Inductively Coupled Plasma Method <sup>[1]</sup>                              |
| 9        | Benzene                    | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup>           |
| 10       | Benzofluoranthene          | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |
| 11       | Benzofluoranthene          | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |
| 12       | Benzofluoranthene          | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |
| 13       | Benzoic acid               | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |
| 14       | Benzo(a)pyrene             | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |
| 15       | Benzo(g,h,i)perylene       | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |
| 16       | Beryllium                  | Digestion, Inductively Coupled Plasma Method <sup>[1]</sup>                              |
| 17       | Bis(2-chloroethyl)ether    | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |
| 18       | Bis(2-Ethylhexyl)phthalate | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |
| 19       | Bromodichloromethane       | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup>           |
| 20       | Bromoform                  | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup>           |
| 21       | Butyl benzyl phthalate     | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |
| 22       | Cadmium                    | Digestion, Inductively Coupled Plasma Method <sup>[1]</sup>                              |
| 23       | Carbazole                  | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup> |
| 24       | Carbon disulfide           | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup>           |
| 25       | Carbon tetrachloride       | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>[1]</sup>           |

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26 Chlordane...

น้ำได้ขึ้น จำนวน 118 รายการ

| ลำดับที่ | ชนิดสารพิษ            | วิธีวิเคราะห์  |
|----------|-----------------------|--|
| 26       | Chlordane             | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                   |
| 27       | p-Chloroaniline       | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                   |
| 28       | Chlorobenzene         | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                             |
| 29       | Chlorodibromomethane  | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                             |
| 30       | Chloroform            | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                             |
| 31       | 2-Chlorophenol        | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                   |
| 32       | Chromium              | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>  |
| 33       | Chromium Hexavalent   | Filtration, Colorimetric Method <sup>(1)</sup>   |
| 34       | Chromium Trivalent    | Digestion, Inductively Coupled Plasma Method ; Filtration, Colorimetric Method, Calculation <sup>(1)</sup> |
| 35       | Chrysene              | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                   |
| 36       | 2,4-D                 | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                   |
| 37       | DDO                   | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                   |
| 38       | DDE                   | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                   |
| 39       | DDT                   | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                   |
| 40       | Dibenz(a,h)anthracene | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                   |
| 41       | Di-n-Butyl phthalate  | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                   |
| 42       | 1,2-Dichlorobenzene   | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>                             |

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43 1,3-Dichlorobenzene ...

น้ำได้ขึ้น จำนวน 118 รายการ

| ลำดับที่ | ชนิดสารพิษ                 | วิธีวิเคราะห์  |
|----------|----------------------------|--|
| 43       | 1,3-Dichlorobenzene        | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 44       | 1,4-Dichlorobenzene        | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 45       | 3,3-Dichlorobenzidine      | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 46       | 1,1-Dichloroethane         | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 47       | 1,2-Dichloroethane         | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 48       | 1,1-Dichloroethylene       | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 49       | cis-1,2-Dichloroethylene   | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 50       | trans-1,2-Dichloroethylene | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 51       | 2,4-Dichlorophenol         | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 52       | 1,2-Dichloropropane        | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 53       | 1,3-Dichloropropane        | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 54       | 1,3-Dichloropropene        | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 55       | Dieldrin                   | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 56       | Diethyl phthalate          | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 57       | 2,4-Dimethylphenol         | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 58       | 2,4-Dinitrophenol          | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |

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59 2,4-Dinitrotoluene...

น้ำใต้ดิน จำนวน 118 รายการ

| ลำดับที่ | ชนิดสารพิษ                | วิธีวิเคราะห์  |
|----------|---------------------------|--|
| 59       | 2,4-Dinitrotoluene        | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 60       | 2,6-Dinitrotoluene        | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 61       | Di-n-octyl phthalate      | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 62       | Endosulfan                | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 63       | Endrin                    | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 64       | Ethylbenzene              | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 65       | Fluoranthene              | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 66       | Fluorene                  | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 67       | Heptachlor                | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 68       | Heptachlor epoxide        | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 69       | Hexachlorobenzene         | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 70       | Hexachloro-1,3-butadiene  | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 71       | α-HCH                     | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 72       | β-HCH                     | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 73       | γ-HCH                     | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 74       | Hexachlorocyclopentadiene | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |

นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน

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75 Hexachloroethane...

น้ำใต้ดิน จำนวน 118 รายการ

| ลำดับที่ | ชนิดสารพิษ                | วิธีวิเคราะห์  |
|----------|---------------------------|--|
| 75       | Hexachloroethane          | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 76       | n-Hexane                  | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method                          |
| 77       | Indeno(1,2,3-cd)pyrene    | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 78       | Isophorone                | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 79       | Lead                      | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>                              |
| 80       | Manganese                 | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>                              |
| 81       | Methoxychlor              | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 82       | Methyl Bromide            | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 83       | Methylene Chloride        | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 84       | 2-Methylnaphthalene       | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 85       | 2-Methylphenol            | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 86       | Methyl tert-butyl ether   | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 87       | Naphthalene               | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 88       | Nickel                    | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>                              |
| 89       | Nitrobenzene              | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 90       | N-Nitrosodiphenylamine    | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 91       | N-Nitrosodi-n-propylamine | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 92       | Pentachlorophenol         | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |

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93 pH...

แนบได้ต้น จำนวน 118 รายการ

| ลำดับที่ | ชนิดสารเคมี               | วิธีวิเคราะห์  |
|----------|---------------------------|--|
| 93       | pH                        | Electrometric Method <sup>(1)</sup>  |
| 94       | Phenanthrene              | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 95       | Phenol                    | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 96       | Pyrene                    | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 97       | Selenium                  | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>                              |
| 98       | Silver                    | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>                              |
| 99       | Styrene                   | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 100      | 1,1,2,2-Tetrachloroethane | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 101      | Tetrachloroethylene       | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 102      | Toluene                   | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 103      | Toxaphene                 | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 104      | 1,2,4-Trichlorobenzene    | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 105      | 1,1,1-Trichloroethane     | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 106      | 1,1,2-Trichloroethane     | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 107      | Trichloroethylene         | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup>           |
| 108      | 2,4,5-Trichlorophenol     | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 109      | 2,4,6-Trichlorophenol     | Liquid-Liquid Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |

แนบได้ต้น จำนวน 118 รายการ

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110 1,3,5-Trimethylbenzene...

แนบได้ต้น จำนวน 118 รายการ

| ลำดับที่ | ชนิดสารเคมี            | วิธีวิเคราะห์  |
|----------|------------------------|--|
| 110      | 1,3,5-Trimethylbenzene | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 111      | Vanadium               | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>                    |
| 112      | Vinyl acetate          | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 113      | Vinyl chloride         | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 114      | m-Xylene               | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 115      | o-Xylene               | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 116      | p-Xylene               | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 117      | Xylene (Total)         | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(1)</sup> |
| 118      | Zinc                   | Digestion, Inductively Coupled Plasma Method <sup>(1)</sup>                    |

แนบได้ต้น จำนวน 117 รายการ

| ลำดับที่ | ชนิดสารเคมี  | วิธีวิเคราะห์   |
|----------|--------------|---|
| 1        | Acenaphthene | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(8,10)</sup> |
| 2        | Acetone      | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 3        | Aldrin       | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 4        | Anthracene   | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(8,10)</sup> |
| 5        | Antimony     | Digestion, Inductively Coupled Plasma Method <sup>(6,7)</sup>                           |
| 6        | Arsenic      | Digestion, Inductively Coupled Plasma Method <sup>(6,7)</sup>                           |
| 7        | Atrazine     | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(8,9)</sup>  |

แนบได้ต้น จำนวน 118 รายการ

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8 Barium...

เดิม จำนวน 117 รายการ

| ลำดับที่ | ชนิดสารเคมี                | วิธีวิเคราะห์   |
|----------|----------------------------|---|
| 8        | Barium                     | Digestion, Inductively Coupled Plasma Method <sup>(๕,7)</sup>                           |
| 9        | Benz(a)anthracene          | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup> |
| 10       | Benzene                    | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(๕,๘)</sup>        |
| 11       | Benzobifluoranthene        | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup> |
| 12       | Benzokifluoranthene        | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup> |
| 13       | Benzoic acid               | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup> |
| 14       | Benzo(a)pyrene             | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup> |
| 15       | Benzo(g,h,i)perylene       | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup> |
| 16       | Beryllium                  | Digestion, Inductively Coupled Plasma Method <sup>(๕,7)</sup>                           |
| 17       | Bis(2-Chloroethyl)ether    | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup> |
| 18       | Bis(2-Ethylhexyl)phthalate | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup> |
| 19       | Bromodichloromethane       | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(๕,๘)</sup>        |
| 20       | Bromoform                  | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(๕,๘)</sup>        |
| 21       | Butyl benzyl phthalate     | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup> |
| 22       | Cadmium                    | Digestion, Inductively Coupled Plasma Method <sup>(๕,7)</sup>                           |
| 23       | Carbazole                  | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup> |
| 24       | Carbon disulfide           | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(๕,๘)</sup>        |
| 25       | Carbon tetrachloride       | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(๕,๘)</sup>        |

นักวิทยาศาสตร์ชำนาญการ ที่หน้าที่แทน 26 Chlordane...  
ผู้อำนวยการศูนย์วิจัยและเตือนภัยแลพิษโรงงานภาคตะวันออก

เดิม จำนวน 117 รายการ

| ลำดับที่ | ชนิดสารเคมี           | วิธีวิเคราะห์  |
|----------|-----------------------|--|
| 26       | Chlordane             | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup>                      |
| 27       | p-Chloroaniline       | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup>                      |
| 28       | Chlorobenzene         | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(๕,๘)</sup>                             |
| 29       | Chlorodibromomethane  | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(๕,๘)</sup>                             |
| 30       | Chloroform            | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(๕,๘)</sup>                             |
| 31       | 2-Chlorophenol        | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup>                      |
| 32       | Chromium              | Digestion, Inductively Coupled Plasma Method <sup>(๕,7)</sup>  |
| 33       | Chromium (III)        | Digestion, Inductively Coupled Plasma Method ; Filtration, Colorimetric Method; Calculation <sup>(๕,7)</sup> |
| 34       | Chromium (VI)         | Alkaline Digestion, Colorimetric Method <sup>(๕)</sup>   |
| 35       | Chrysene              | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup>                      |
| 36       | 2,4-D                 | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup>                      |
| 37       | DDD                   | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup>                      |
| 38       | DDE                   | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup>                      |
| 39       | DDT                   | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup>                      |
| 40       | Dibenz(a,h)anthracene | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup>                      |
| 41       | Di-n-Butyl phthalate  | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(๑,1๐)</sup>                      |
| 42       | 1,2-Dichlorobenzene   | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(๕,๘)</sup>                             |
| 43       | 1,3-Dichlorobenzene   | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(๕,๘)</sup>                             |

นักวิทยาศาสตร์ชำนาญการ ที่หน้าที่แทน 44 1,4-Dichlorobenzene...  
ผู้อำนวยการศูนย์วิจัยและเตือนภัยแลพิษโรงงานภาคตะวันออก

ดิน จำนวน 117 รายการ

| ลำดับที่ | ชนิดสารพิษ                 | วิธีวิเคราะห์   |
|----------|----------------------------|---|
| 44       | 1,4-Dichlorobenzene        | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 45       | 3,3-Dichlorobenzidine      | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 46       | 1,1-Dichloroethane         | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 47       | 1,2-Dichloroethane         | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 48       | 1,1-Dichloroethylene       | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 49       | cis-1,2-Dichloroethylene   | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 50       | trans-1,2-Dichloroethylene | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 51       | 2,4-Dichlorophenol         | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 52       | 1,2-Dichloropropane        | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 53       | 1,3-Dichloropropane        | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 54       | 1,3-Dichloropropene        | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 55       | Dieldrin                   | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 56       | Diethyl phthalate          | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 57       | 2,4-Dimethylphenol         | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 58       | 2,4-Dinitrophenol          | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 59       | 2,4-Dinitrotoluene         | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |

นักวิทยาศาสตร์ชำนาญการ หัวหน้าแผน

ผู้อำนวยการศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก

60 2,6-Dinitrotoluene...

ดิน จำนวน 117 รายการ

| ลำดับที่ | ชนิดสารมลพิษ              | วิธีวิเคราะห์   |
|----------|---------------------------|---|
| 60       | 2,6-Dinitrotoluene        | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 61       | Di-n-octyl phthalate      | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 62       | Endosulfan                | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 63       | Endrin                    | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 64       | Ethylbenzene              | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 65       | Fluoranthene              | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 66       | Fluorene                  | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 67       | Heptachlor                | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 68       | Heptachlor epoxide        | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 69       | Hexachlorobenzene         | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 70       | Hexachloro-1,3-butadiene  | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 71       | $\alpha$ -HCH             | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 72       | $\beta$ -HCH              | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 73       | $\gamma$ -HCH             | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 74       | Hexachlorocyclopentadiene | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 75       | Hexachloroethane          | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |

นักวิทยาศาสตร์ชำนาญการ หัวหน้าแผน

ผู้อำนวยการศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก

76 n-Hexane...

ดิน จำนวน 117 รายการ

| ลำดับที่ | ชนิดสารเคมี               | วิธีวิเคราะห์   |
|----------|---------------------------|---|
| 76       | n-Hexane                  | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 77       | Indeno(1,2,3-cd)pyrene    | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 78       | Isophorone                | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 79       | Lead                      | Digestion, Inductively Coupled Plasma Method <sup>(4,7)</sup>                           |
| 80       | Manganese                 | Digestion, Inductively Coupled Plasma Method <sup>(4,7)</sup>                           |
| 81       | Methoxychlor              | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 82       | Methyl Bromide            | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 83       | Methylene Chloride        | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 84       | 2-Methylnaphthalene       | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 85       | 2-Methylphenol            | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 86       | Methyl tert-butyl ether   | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 87       | Naphthalene               | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 88       | Nickel                    | Digestion, Inductively Coupled Plasma Method <sup>(4,7)</sup>                           |
| 89       | Nitrobenzene              | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 90       | N-Nitrosodiphenylamine    | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 91       | N-Nitrosodi-n-propylamine | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 92       | Pentachlorophenol         | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |

มหาวิทยาลัยราชภัฏวชิรญาณ กรุงเทพมหานคร ทำหน้าที่แทน  
ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

93 Phenanthrene...

ดิน จำนวน 117 รายการ

| ลำดับที่ | ชนิดสารเคมี               | วิธีวิเคราะห์   |
|----------|---------------------------|---|
| 93       | Phenanthrene              | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 94       | Phenol                    | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 95       | Pyrene                    | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 96       | Selenium                  | Digestion, Inductively Coupled Plasma Method <sup>(4,7)</sup>                           |
| 97       | Silver                    | Digestion, Inductively Coupled Plasma Method <sup>(4,7)</sup>                           |
| 98       | Styrene                   | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 99       | 1,1,2,2-Tetrachloroethane | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 100      | Tetrachloroethylene       | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 101      | Toluene                   | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 102      | Toxaphene                 | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 103      | 1,2,4-Trichlorobenzene    | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 104      | 1,1,1-Trichloroethane     | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 105      | 1,1,2-Trichloroethane     | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 106      | Trichloroethylene         | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |
| 107      | 2,4,5-Trichlorophenol     | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 108      | 2,4,6-Trichlorophenol     | Microwave Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(9,10)</sup> |
| 109      | 1,3,5-Trimethylbenzene    | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6,8)</sup>        |

มหาวิทยาลัยราชภัฏวชิรญาณ กรุงเทพมหานคร ทำหน้าที่แทน  
ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก 110 Vanadium...

สืบ จำนวน 117 รายการ

| ลำดับที่ | ชื่อย่อสารเคมี | วิธีวิเคราะห์   |
|----------|----------------|---|
| 110      | Vanadium       | Digestion, Inductively Coupled Plasma Method <sup>(4,7)</sup>                   |
| 111      | Vinyl Acetate  | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6a)</sup> |
| 112      | Vinyl Chloride | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6a)</sup> |
| 113      | m-Xylene       | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6a)</sup> |
| 114      | o-Xylene       | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6a)</sup> |
| 115      | p-Xylene       | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6a)</sup> |
| 116      | Xylene (Total) | Purge and Trap, Gas Chromatographic / Mass Spectrometric Method <sup>(6a)</sup> |
| 117      | Zinc           | Digestion, Inductively Coupled Plasma Method <sup>(4,7)</sup>                   |

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ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

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นักวิทยาศาสตร์ชำนาญการ ทำหน้าที่แทน  
ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก



ที่ อก ๐๓๑๔(๓)/ ๑ ๑ ๒๔ ๑

กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๔ พฤศจิกายน ๒๕๖๔

เรื่อง เปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอสซีเอส (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๔ สิงหาคม ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์  
บริษัท เอสซีเอส (ประเทศไทย) จำกัด จำนวน ๘ แผ่น

ตามที่อ้างถึง บริษัท เอสซีเอส (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน  
ว-๑๔๔ สถานที่ตั้งเลขที่ ๑/๒๑๔ และ ๑/๒๑๕ หมู่ที่ ๑ ตำบลบ้านฉาง อำเภอบ้านฉาง จังหวัดระยอง  
ขอเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้  
๑. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๘ ราย

- ๑) [REDACTED]  
๒) [REDACTED]  
๓) [REDACTED]  
๔) [REDACTED]  
๕) [REDACTED]  
๖) [REDACTED]  
๗) [REDACTED]  
๘) [REDACTED]

๒. ให้เพิ่มขอบข่ายสารมลพิษที่วิเคราะห์ในหนังสือแนบท้ายจำนวน ๓ รายการ นำได้คืน จำนวน  
๒ รายการ อากาศเสีย (ปล่องระบาย) จำนวน ๑๖ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๑๕ รายการ  
และดิน จำนวน ๕ รายการ รวมทั้งสิ้นจำนวน ๖๓ รายการ ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะมีผลบังคับใช้ตั้งแต่วันที่ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์  
เอกชน ที่ อก ๐๓๑๔(๓)/๔๖๖๖ ลงวันที่ ๒๔ มีนาคม ๒๕๖๔ คือในวันที่ ๓๑ ตุลาคม ๒๕๖๕

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

[REDACTED]

กองวิจัยและเตือนภัยมลพิษโรงงาน  
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก  
โทร. ๐ ๓๔๐๔ ๗๐๖๓-๓  
ไปรษณีย์อิเล็กทรอนิกส์ einw@div.mnre.go.th

ผู้อำนวยการ  
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

8 Nickel...

เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและชนิดสารมลพิษที่วิเคราะห์  
บริษัท เอสซีเอส (ประเทศไทย) จำกัด เลขทะเบียน ว-๑๔๔  
ที่ อก ๐๓๑๔(๓)/๑๑๒๔๖ ลงวันที่ ๑๔ พฤศจิกายน ๒๕๖๔

ขอรับสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๖๓ รายการ

นำสืบ จำนวน 3 รายการ

| ลำดับที่ | สารมลพิษ    | วิธีวิเคราะห์   |
|----------|-------------|---|
| 1        | Cyanide     | Distillation, Colorimetric Method <sup>[3]</sup>                            |
| 2        | Mercury     | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[3]</sup> |
| 3        | Temperature | Field Method <sup>[3]</sup>   |

นำได้คืน จำนวน 2 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์   |
|----------|----------|---|
| 1        | Cyanide  | Distillation, Colorimetric Method <sup>[3]</sup>                            |
| 2        | Mercury  | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[3]</sup> |

อากาศเสีย (ปล่องระบาย) จำนวน 16 รายการ

| ลำดับที่ | สารมลพิษ          | วิธีวิเคราะห์  |
|----------|-------------------|--|
| 1        | Beryllium         | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> |
| 2        | Cadmium           | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> |
| 3        | Carbon Monoxide   | Instrumental Analyzer Method <sup>[4]</sup>                                      |
| 4        | Chromium          | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> |
| 5        | Cobalt            | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> |
| 6        | Hydrogen Fluoride | Isokinetic Sampling, Ion Chromatographic Method <sup>[3]</sup>                   |
| 7        | Manganese         | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[4]</sup> |

| ลำดับที่ | สารเคมี           | วิธีวิเคราะห์  |
|----------|-------------------|--|
| 8        | Nickel            | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(8)</sup> |
| 9        | Opacity           | Ringelmann's Method <sup>(1)</sup>   |
| 10       | Oxide of Nitrogen | Instrumental Analyzer Method <sup>(3)</sup>                                      |
| 11       | Selenium          | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> |
| 12       | Sulfur Dioxide    | Instrumental Analyzer Method <sup>(5)</sup>                                      |
| 13       | Tellurium         | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> |
| 14       | Tin               | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> |
| 15       | Vanadium          | Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> |
| 16       | Xylene            | Adsorption Sampling, Gas Chromatographic Method <sup>(3)</sup>                   |

สิ่งปลูกสร้างหรือวัตถุที่ไม่ใช่แล้ว จำนวน 35 รายการ

| ลำดับที่ | สารเคมี  | วิธีวิเคราะห์  |
|----------|----------|--|
| 1        | Aldrin   | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,8)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(3,16)</sup>               |
| 2        | Antimony | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup> |
| 3        | Arsenic  | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup> |
| 4        | Barium   | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup> |

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ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

5 Beryllium

| ลำดับที่ | สารเคมี                                   | วิธีวิเคราะห์  |
|----------|---|--|
| 5        | Beryllium                                 | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup> |
| 6        | Cadmium                                   | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup> |
| 7        | Chlordane                                 | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,8)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(3,16)</sup>               |
| 8        | Chromium (VI)                             | 1) Waste Extraction, Digestion, Colorimetric Method <sup>(2,13)</sup><br>2) Alkaline Digestion, Colorimetric Method <sup>(7,13)</sup>                    |
| 9        | Cobalt                                    | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup> |
| 10       | Copper                                    | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup> |
| 11       | Dieldrin                                  | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,8)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(3,16)</sup>               |
| 12       | DDD                                       | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,8)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(3,16)</sup>               |
| 13       | DDE                                       | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,8)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(3,16)</sup>               |
| 14       | DDT                                       | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,8)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(3,16)</sup>               |
| 15       | 2,4-D<br>(2,4-Dichlorophenoxyacetic acid) | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,8)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(3,16)</sup>               |

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16 Endrin

| ลำดับที่ | สารเคมี                          | วิธีวิเคราะห์  |
|----------|----------------------------------|--|
| 16       | Endrin                           | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,6)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(6,16)</sup>   |
| 17       | Heptachlor                       | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,6)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(6,16)</sup>   |
| 18       | Kepone                           | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,6)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(6,16)</sup>   |
| 19       | Lead                             | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup>                               |
| 20       | Lindane                          | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,6)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(6,16)</sup>   |
| 21       | Mercury                          | 1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(2,14)</sup><br>2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(14)</sup> |
| 22       | Methoxychlor                     | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,6)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(6,16)</sup>   |
| 23       | Mirex                            | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,6)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(6,16)</sup>   |
| 24       | Molybdenum                       | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup>                               |
| 25       | Polychlorinated Biphenyls (PCBs) | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,6)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(6,16)</sup>   |
| 26       | Pentachlorophenol                | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,6)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(6,16)</sup>   |

ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

27 Nickel...

| ลำดับที่ | สารเคมี                                      | วิธีวิเคราะห์  |
|----------|--|--|
| 27       | Nickel                                       | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup>   |
| 28       | Selenium                                     | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup>   |
| 29       | Silver                                       | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup>   |
| 30       | Silver; 2,4,5-Trichlorophenoxypropionic acid | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,6)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(6,16)</sup>   |
| 31       | Thallium                                     | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup>   |
| 32       | Toxaphene                                    | 1) Waste Extraction, Gas Chromatographic Method <sup>(2,6)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic Method <sup>(6,16)</sup>   |
| 33       | Trichloroethylene                            | 1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(2,16)</sup><br>2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,16)</sup> |
| 34       | Vanadium                                     | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup>   |
| 35       | Zinc   | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(2,11)</sup><br>2) Digestion, Inductively Coupled Plasma Method <sup>(6,11)</sup>   |

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ดิน...

ต้น จำนวน 5 รายการ

| ลำดับที่ | สารเคมี                                 | วิธีการหาห้   |
|----------|---|---|
| 1        | Mercury                                 | Digestion, Cold vapor Atomic Absorption Spectrometric Method <sup>(1,4)</sup>             |
| 2        | Polychlorinated Biphenyls (PCBs)        | Ultrasonic Extraction, Gas Chromatographic Method <sup>(3,4,17)</sup>                     |
| 3        | TPH (C <sub>15</sub> -C <sub>6</sub> )  | Purge and Trap, Gas Chromatographic Mass Spectrometric Method <sup>(10,18)</sup>          |
| 4        | TPH (C <sub>10</sub> -C <sub>14</sub> ) | Ultrasonic Extraction, Gas Chromatographic Mass Spectrometric Method <sup>(8,10,18)</sup> |
| 5        | TPH (C <sub>15</sub> -C <sub>28</sub> ) | Ultrasonic Extraction, Gas Chromatographic Mass Spectrometric Method <sup>(10,18)</sup>   |

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ผู้ชำนาญการ

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ผู้ชำนาญการ

ศูนย์วิจัยและเตือนภัยมลพิษทางอากาศ



## Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services  
 Address : 41/23 Soi Rama III (59), Rama III Road,  
 Chongnonsee, Yannawa, Bangkok 10120  
 Accreditation Number : Testing - 0017  
 Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used  |
|-------------|-------------------------|--|---|
| 1           | Water                   | - Antimony<br>0.63 µg/L to 6.25 µg/L<br>- Arsenic<br>0.63 µg/L to 6.25 µg/L<br>- Cadmium<br>0.63 µg/L to 6.25 µg/L<br>- Chromium<br>0.63 µg/L to 12.5 µg/L<br>- Cobalt<br>1.25 µg/L to 62.50 µg/L<br>- Copper<br>0.63 µg/L to 6.25 µg/L<br>- Lead<br>0.63 µg/L to 6.25 µg/L<br>- Manganese<br>0.63 µg/L to 6.25 µg/L | In - house method : LBEN-14004 based on United States Environmental Protection Agency, 2014, EPA Method 6020B, Revision 2 |

Initial Issue Date 22<sup>nd</sup> June 2007

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| Item Number  | Test Material / Product | Test item / Range of Testing  | Test Method / Technique Used   |
|--------------|-------------------------|---|--|
| 1<br>(cont.) | Water                   | - Nickel<br>0.63 µg/L to 6.25 µg/L<br>- Silver<br>2.5 µg/L to 62.5 µg/L<br>- Zinc<br>2.5 µg/L to 62.5 µg/L<br>- Mercury<br>0.5 mg/L to 8.0 mg/L<br>- Hexavalent chromium<br>1.0 µg/L to 6.25 µg/L | In - house method : LBEN-14004 based on United States Environmental Protection Agency, 2014, EPA Method 6020B, Revision 2<br>In - house method : LBEN-08105 based on United States Environmental Protection Agency, 1994, EPA Method 245.1, Revision 3.0<br>ISO 18412 : 2005 |

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| Item Number  | Test Material / Product | Test item / Range of Testing                   | Test Method / Technique Used   |
|--------------|-------------------------|--|--|
| 1<br>(cont.) | Water                   | - pH<br>6.0 to 10.0                            | In - house method : LBEN-09152 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500 - H <sup>+</sup> B |
|              |                         | - Ammonia - Nitrogen<br>0.10 mg/L to 10.0 mg/L | In-house method : LBEN-19003 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500 NH <sub>3</sub> -F   |
|              |                         | - Total phosphorus<br>0.10 mg/L to 10.0 mg/L   | In - house method : LBEN-19002 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500-P J                |

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| Item Number  | Test Material / Product | Test item / Range of Testing                       | Test Method / Technique Used  |
|--------------|-------------------------|--|---|
| 1<br>(cont.) | Water                   | - Oil and Grease<br>0.50 mg/L to 100.0 mg/L        | In - house method : LBEN-18005 based on United States Environmental Protection Agency, 2010, EPA, Method 1664, Revision B   |
|              |                         | - Color<br>5 M <sup>-1</sup> to 30 M <sup>-1</sup> | ISO 7887 : 2011, method B   |
|              |                         | - Phenol<br>0.001 mg/L to 0.10 mg/L                | In - house method : LBEN-15007 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 5530 B, C    |
|              |                         | - Cyanide<br>0.01 mg/L to 0.50 mg/L                | In - house method : LBEN-97018 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500-CN C, E |

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| Item Number  | Test Material / Product | Test Item / Range of Testing   | Test Method / Technique Used   |
|--------------|-------------------------|--|--|
| 1<br>(cont.) | Water                   | - Navy Blue<br>1.0 mg/L to 7.5 mg/L<br><br>Azo colorants<br>- Aniline<br>- m-Methylaniline<br>- p-Toluidine<br>- o-Toluidine<br>- m-Toluidine<br>- n-ethylamine<br>- 2-chloroaniline<br>- 2,4-Xyldine<br>- 2,6-Xyldine<br>0.10 µg/L to 3.00 µg/L | In - house method : LBLC-19004<br>based on United States Environmental Protection Agency, 2007, EPA Method 8321 B<br><br>In - house method : SOP LBGC-18004<br>based on ISO 14362-1 : 2017 |

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| Item Number  | Test Material / Product | Test Item / Range of Testing   | Test Method / Technique Used                                      |
|--------------|-------------------------|--|---|
| 1<br>(cont.) | Water                   | Azo colorants<br>- o-Anisidine<br>- 4-Chloroaniline<br>- n,n-diethylaniline<br>- p-Cresidine<br>- 2,4,5 - Trimethylaniline<br>- 4-Chloro-o-toluidine<br>- 2,4-Toluenediamine<br>- 2,4 - Diaminoanisole<br>- 2-Naphthylamine<br>- 5-Nitro-o-toluidine<br>- 5-Nitro-o-anisidine<br>- 4-Aminobiphenyl<br>- 4-Aminoazobenzene<br>- 4,4'-Oxydianiline<br>0.10 µg/L to 3.00 µg/L | In - house method : SOP LBGC-18004<br>based on ISO 14362-1 : 2017 |

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| Item Number  | Test Material / Product | Test item / Range of Testing  | Test Method / Technique Used                                   |
|--------------|-------------------------|---|--|
| 1<br>(cont.) | Water                   | Azo colorants<br>- Benzidine<br>- 4,4'-Thiodianiline<br>- o-Aminoazotoluene<br>- 3,3'-Dimethyl-4,4'-diaminodiphenylmethane<br>- 3,3'-Dimethylbenzidine<br>- 4,4'-Thiodianiline<br>- 3,3'-Dichlorobenzidine<br>- 4,4'-Methylene-bis- (2-chloro aniline)<br>- 3,3'-Dimethoxybenzidine<br>0.10 µg/L to 3.00 µg/L | In - house method : SOP LBGC-18004 based on ISO 14362-1 : 2017 |

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| Item Number  | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used                                 |
|--------------|-------------------------|--|--|
| 1<br>(cont.) | Water                   | Organotin Compounds<br>- Trimethyltin(TMT)<br>- Dimethyltin(DMT)<br>- Dipropyltin-dichloride(DProT)<br>- Monobutyltin(MBT)<br>- Tripropyltin(TPPT)<br>- Dibutyltin(DBT)<br>- Tributyltin(TBT)<br>- Monooctyltin(MOT)<br>- Tetraoctyltin(TeBT)<br>- Diphenyltin(DPhT)<br>- Dioctyltin(DOT)<br>- Triphenyltin(TPhT)<br>- Tri-cyclohexyltin(TCYT)<br>- Tri-n-octyltin(TOT)<br>0.05 µg/L to 2.0 µg/L | In - house method : SOP LBGC-18006 based on ISO 17353 : 2004 |

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## Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services  
 Address : 41/23 Soi Rama III (59), Rama III Road,  
 Chongnonsee, Yannawa, Bangkok 10120  
 Accreditation Number : Testing - 0017  
 Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used                                    |
|--------------|-------------------------|--|---|
| 1<br>(cont.) | Water                   | Polycyclic Aromatic Hydrocarbons (PAHs)<br>- Naphthalene<br>- 2-Methylphthalene<br>- 1-Methylphthalene<br>- Acenaphthylene<br>- Acenaphthene<br>- Fluorene<br>- Phenanthrene<br>- Anthracene<br>- Fluoranthene<br>- Pyrene<br>- Cyclopenta (c,d) pyrene<br>- Benz(a) Anthracene<br>- Chrysene<br>0.01 µg/L to 2.0 µg/L | In - house method : SOP LBGC-18008 based on DIN 38407-39 : 2011 |

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## Scope of Laboratory Accreditation

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| Item Number  | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used                                    |
|--------------|-------------------------|--|---|
| 1<br>(cont.) | Water                   | Polycyclic Aromatic Hydrocarbons (PAHs)<br>- Benzo (b) Fluoranthene<br>- Benzo (j) Fluoranthene<br>- Benzo (k) Fluoranthene<br>- Benzo (e) pyrene<br>- Benzo (a) pyrene<br>- Indenol (1,2,3-cd) pyrene<br>- Dibenzo (ah) anthracene<br>- Benzo (ghi) perylene<br>0.01 µg/L to 2.0 µg/L | In - house method : SOP LBGC-18008 based on DIN 38407-39 : 2011 |

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### Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services

Address : 41/23 Soi Rama III (59), Rama III Road.

Chongonsee, Yannawa, Bangkok 10120

: Testing - 0017

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| Item Number  | Test Material / Product | Test item / Range of Testing  | Test Method / Technique Used                                  |
|--------------|-------------------------|---|---|
| 1<br>(cont.) | Water                   | <p>Chlorophenol</p> <ul style="list-style-type: none"> <li>- 2,4,5-Trichlorophenol</li> <li>- 2,4,6-Trichlorophenol</li> <li>- 2,3,4-Trichlorophenol</li> <li>- 2,3,5-Trichlorophenol</li> <li>- 3,4,5-Trichlorophenol</li> <li>- 2,3,4,5-Tetrachlorophenol</li> <li>- 2,3,5,6-Tetrachlorophenol</li> <li>- 2,3,6-trichlorophenol</li> </ul> <p>0.5 µg/L to 20.0 µg/L</p> | In - house method : SOP LBGC-18003 based on ISO 17070 : 2015  |
|              |                         | <p>Phthalates</p> <ul style="list-style-type: none"> <li>- Dimethyl phthalate</li> <li>- Diethyl phthalate</li> <li>- Di-iso-butyl phthalate</li> <li>- Benzyl buthyl phthalate</li> </ul> <p>5 µg/L to 30 µg/L</p>   | In - house method : SOP LBGC-18007 based on ISO 18856 : 2004. |

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 Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test item / Range of Testing  | Test Method / Technique Used                                 |
|--------------|-------------------------|---|--|
| 1<br>(cont.) | Water                   | Phthalates<br>- Di-butyl phthalate<br>- Di-2-ethyl hexyl phthalate<br>- Di-isononyl phthalate<br>- Bis-methylglycol ester phthalate<br>- Di-isoheptyl phthalate<br>- Bis cyclohexyl phthalate<br>- Di-n - octyl phthalate<br>- Bis-(2-propylheptyl) phthalate<br>- Bis-nonyl phthalate<br>- Bis-propyl phthalate<br>- Bis-iso-pentyl phthalate<br>- n-pentyl-iso-pentyl phthalate<br>- Bis-n-pentyl phthalate<br>- Di - n - hexyl phthalate<br>- Bis-iso -octyl phthalate<br>- Di-isodecyl phthalate<br>5 µg/L to 30 µg/L | In - house method : SOP LBGC-18007 based on ISO 18856 : 2004 |

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| Item Number  | Test Material / Product | Test item / Range of Testing  | Test Method / Technique Used  |
|--------------|-------------------------|---|---|
| 1<br>(cont.) | Water                   | Volatile Organic Compound<br>- Methylene Chloride<br>- Benzene<br>- 1,2-Dichloroethane<br>- Trichloroethylene<br>- Tetrachloroethylene<br>- Total Xylene<br>5 µg/L to 20 µg/L<br>- p- Cresol<br>- o- Cresol<br>- m- Cresol<br>5 µg/L to 25 µg/L | In - house method : SOP LBGC-18009 based on United States Environmental Protection Agency, 1996, EPA, Method 8260B, Revision 2.0<br>In - house method : SOP LBGC-18010 based on United States Environmental Protection Agency, 1996, EPA, Method 8260 B, Revision 2.0 |

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|                 |  |
|-----------------|--|
| Laboratory Name | : SGS (Thailand) Limited, Laboratory Services                                  |
| Address         | : 41/23 Soi Rama III (59), Rama III Road,<br>Chonburi, Chonburi, Bangkok 10120 |

Testing - 0017

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| Item Number  | Test Material / Product | Test Item / Range of Testing  | Test Method / Technique Used  |
|--------------|-------------------------|---|---|
| 1<br>(cont.) | Water                   | <p>Flame retardants</p> <ul style="list-style-type: none"> <li>- Polybrominated biphenyls ethers</li> <li>- Polybrominated diphenyl ethers</li> </ul> <p>0.25 µg/L to 1.5 µg/L</p> <p>Disperse dyes</p> <ul style="list-style-type: none"> <li>- Basic violet 1</li> <li>- Basic violet 3</li> <li>- Disperse Blue 1</li> <li>- Disperse Blue 7</li> <li>- Disperse Brown 1</li> <li>- Disperse Orange 1</li> <li>- Disperse Orange 3</li> <li>- Disperse Orange 11</li> <li>- Disperse Orange 37/76</li> <li>- Disperse Red 1</li> </ul> <p>10.0 µg/L to 50.0 µg/L</p> | <p>In - house method : LBGC-18005 based on United States Environmental Protection Agency, 2005, EPA, Method 527, Revision 1.0</p> <p>In - house method : LBLC-18002 based on Journal of Chromatographic Science 2015, 53 : page 1257-1264</p> |

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| Item Number  | Test Material / Product | Test item / Range of Testing  | Test Method / Technique Used   |
|--------------|-------------------------|---|--|
| 1<br>(cont.) | Water                   | Disperse dyes<br>- Disperse Violet 1<br>- Disperse Yellow 1<br>- Disperse Yellow 9<br>- Disperse Yellow 39<br>- Disperse Yellow 54<br>- Solvent Yellow 1<br>- Solvent Yellow 2<br>- Solvent Yellow 3<br>- Solvent Yellow 14<br>10.0 µg/L to 50.0 µg/L | In - house method : LBLC-18002<br>based on Journal of Chromatographic<br>Science 2015, 53 : page 1257-1264 |

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| Item Number  | Test Material / Product | Test item / Range of Testing  | Test Method / Technique Used  |
|--------------|-------------------------|---|---|
| 1<br>(cont.) | Water                   | Flame retardant<br>- Tris (2,3-dibromopropyl) phosphate<br>- Bis (2,3-dibromopropyl) phosphate<br>1.00 µg/L to 4.00 µg/L<br><br>- Glycol<br>20 µg/L to 100 µg/L | In - house method : LBLC-18001<br>based on ISO 18857-2 : 2009<br><br><br><br><br><br><br>In - house method : LBGC-18012<br>based on United States Environmental<br>Protection Agency, 2014, EPA,<br>Method 600/R-14/008 |

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| Item Number  | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used   |
|--------------|-------------------------|--|--|
| 1<br>(cont.) | Water                   | - Conductivity<br>145 µS/cm to 12 880 µS/cm                              | In - house method : LBEN-02110<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 2510 B |
|              |                         | - Total Solids<br>at 103 °C to 105 °C<br>50 mg/L to 20 000 mg/L          | In - house method : LBEN-09150<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 2540 B |
|              |                         | - Total Suspended Solids<br>at 103 °C to 105 °C<br>5 mg/L to 10 000 mg/L | In - house method : LBEN-97042<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 2540 D |

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Accreditation Number : Testing - 0017

Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used   |
|--------------|-------------------------|--|--|
| 1<br>(cont.) | Water                   | - Total Dissolved Solids<br>at 180 °C<br>50 mg/L to 20 000 mg/L              | In - house method : LBEN-00106<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 2540 C |
|              |                         | - Total hardness<br>(calculates as CaCO <sub>3</sub> )<br>1 mg/L to 300 mg/L | In - house method : LBEN-00098<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 2340 C |
|              |                         | - BOD<br>2 mg/L to 2 100 mg/L  | In - house method : LBEN-97006<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 5210 B |

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| Item Number  | Test Material / Product | Test item / Range of Testing       | Test Method / Technique Used   |
|--------------|-------------------------|------------------------------------|--|
| 1<br>(cont.) | Water                   | - COD<br>10 mg/L to 300 mg/L       | In - house method : LBEN-97010<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 5220 C                   |
|              |                         | - COD<br>10 mg/L to 400 mg/L       | In - house method : LBEN-12161<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 5220 D                   |
|              |                         | - Nitrate<br>0.02 mg/L to 6.0 mg/L | In - house method : LBEN-97029<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500 - NO <sub>3</sub> E |

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 Address : 41/23 Soi Rama III (59), Rama III Road,  
 Chongnonsee, Yamaawa, Bangkok 10120  
 Accreditation Number : Testing - 0017  
 Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test item / Range of Testing                    | Test Method / Technique Used   |
|--------------|-------------------------|---|--|
| 1<br>(cont.) | Water                   | - Nitrite<br>0.02 mg/L to 1.0 mg/L              | In - house method : LBEN-97049<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500 - NO <sub>2</sub> B               |
|              |                         | - Sulfate<br>2.0 mg/L to 100.0 mg/L             | In - house method : LBEN-14003<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500 - SO <sub>4</sub> <sup>2-</sup> E |
|              |                         | - Total organic carbon<br>0.5 mg/L to 10.0 mg/L | In - house method : LBEN-09149<br>based on United States Environmental Protection Agency, 2004, EPA Method 9060 A, Revision 1.0  |

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| Item Number  | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used   |
|--------------|-------------------------|--|--|
| 1<br>(cont.) | Water                   | Perfluorocarbons (PFCs) :<br>- PFPeA<br>- PFBS<br>- PFHxS<br>- PFHpS<br>- PF-3,7-DMOA<br>- PFDA<br>- PFOS<br>- PFUnA<br>- PFDoA<br>- PFDS<br>- PFTriA<br>- PFTeA<br>- PFOSA<br>0.05 µg/L to 0.3 µg/L | In - house method : LBLC-17014<br>based on DIN 38407-42 : 2011-03<br>and analysis with HPLC-MS |

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| Item Number  | Test Material / Product | Test item / Range of Testing                                       | Test Method / Technique Used   |
|--------------|-------------------------|--|--|
| 1<br>(cont.) | Water                   | Alkyl phenol ethoxylate :<br>- OPEO<br>- NPEO<br>1 µg/L to 10 µg/L | In - house method : LBLC-17013<br>based on ISO 18857-2 : 2009<br>and analysis with HPLC-MS |

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| Item Number | Test Material / Product | Test item / Range of Testing                                    | Test Method / Technique Used  |
|-------------|-------------------------|---|---|
| 2           | Wastewater              | - Mercury<br>0.5 µg/L to 8.0 µg/L                               | In - house method : LBEN-08145<br>based on United States Environmental Protection Agency, 1994, EPA Method 245.1, Revision 3.0  |
|             |                         | - pH<br>4.0 to 10.0   | In - house method : LBEN-09152<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500 - H <sup>+</sup> B |
|             |                         | - Total Solids<br>at 103 °C to 105 °C<br>50 mg/L to 20 000 mg/L | In - house method : LBEN-09150<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 2540 B                  |

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| Item Number | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used   |
|-------------|-------------------------|--|--|
| 2 (cont.)   | Wastewater              | - Total Suspended Solids<br>at 103 °C to 105 °C<br>5 mg/L to 10 000 mg/L | In - house method : LBEN-97042<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 2540 D |
|             |                         | - Total Dissolved Solids<br>at 180 °C<br>50 mg/L to 20 000 mg/L          | In - house method : LBEN-00106<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 2540 C |
|             |                         | - Conductivity<br>145 µS/cm to 12 880 µS/cm                              | In - house method : LBEN-02110<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 2510 B |

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| Item Number  | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used  |
|--------------|-------------------------|--|---|
| 2<br>(cont.) | Wastewater              | - Total hardness<br>(calculates as CaCO <sub>3</sub> )<br>2 mg/L to 500 mg/L | In - house method : LBEN-00098<br>based on Standard Methods for<br>the Examination of Water and<br>Wastewater, APHA, AWWA & WEF,<br>23 <sup>rd</sup> ed., 2017, part 2340 C |
|              |                         | - BOD<br>2 mg/L to 2 100 mg/L  | In - house method : LBEN-97006<br>based on Standard Methods for<br>the Examination of Water and<br>Wastewater, APHA, AWWA & WEF,<br>23 <sup>rd</sup> ed., 2017, part 5210 B |
|              |                         | - COD<br>10 mg/L to 3 000 mg/L   | In - house method : LBEN-97010<br>based on Standard Methods for<br>the Examination of Water and<br>Wastewater, APHA, AWWA & WEF,<br>23 <sup>rd</sup> ed., 2017, part 5220 C |

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| Item Number  | Test Material / Product | Test item / Range of Testing        | Test Method / Technique Used  |
|--------------|-------------------------|-------------------------------------|---|
| 2<br>(cont.) | Wastewater              | - COD<br>10 mg/L to 500 mg/L        | In - house method : LBEN-12161<br>based on Standard Methods for<br>the Examination of Water and<br>Wastewater, APHA, AWWA & WEF,<br>23 <sup>rd</sup> ed., 2017, part 5220 D                     |
|              |                         | - Nitrate<br>0.02 mg/L to 15.0 mg/L | In - house method : LBEN-97029<br>based on Standard Methods for<br>the Examination of Water and<br>Wastewater, APHA, AWWA & WEF,<br>23 <sup>rd</sup> ed., 2017, part 4500 - NO <sub>3</sub> - E |
|              |                         | - Nitrite<br>0.02 mg/L to 1.0 mg/L  | In - house method : LBEN-97049<br>based on Standard Methods for<br>the Examination of Water and<br>Wastewater, APHA, AWWA & WEF,<br>23 <sup>rd</sup> ed., 2017, part 4500 - NO <sub>2</sub> - E |

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| Item Number  | Test Material / Product | Test item / Range of Testing                    | Test Method / Technique Used   |
|--------------|-------------------------|---|--|
| 2<br>(cont.) | Wastewater              | - Sulfate<br>2.0 mg/L to 100.0 mg/L             | In - house method : LBEN-14003<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500 - SO <sub>4</sub> <sup>2-</sup> E |
|              |                         | - Total organic carbon<br>0.5 mg/L to 10.0 mg/L | In - house method : LBEN-09149<br>based on United States Environmental Protection Agency, 2004, EPA Method 9060 A, Revision 1.0  |
|              |                         | - Ammonia-Nitrogen<br>0.02 mg/L to 20 mg/L      | In - house method : LBEN-11158<br>based on ASTM D1426-08   |

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| Item Number  | Test Material / Product | Test item / Range of Testing                    | Test Method / Technique Used   |
|--------------|-------------------------|---|--|
| 2<br>(cont.) | Wastewater              | - Total phosphorus<br>0.01 mg/L to 40 mg/L      | In - house method : LBEN-97037<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500 - P B4, E |
|              |                         | - Dissolved phosphorus<br>0.005 mg/L to 20 mg/L | In - house method : LBEN-97037<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500 - P B1, E |
|              |                         | - Glycol<br>20 µg/L to 200 µg/L                 | In - house method : LBGC-18012<br>based on United States Environmental Protection Agency, 2014, EPA, Method 600/R-14/008   |

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| Item Number | Test Material / Product | Test item / Range of Testing                 | Test Method / Technique Used  |
|-------------|-------------------------|--|---|
| 2 (cont.)   | Wastewater              | - Ammonia-Nitrogen<br>0.10 mg/L to 10.0 mg/L | In - house method : LBEN-19003<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500 NH <sub>3</sub> -F |
|             |                         | - Total phosphorus<br>0.10 mg/L to 10.0 mg/L | In - house method : LBEN -19002<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500-P J               |
|             |                         | - Chloride<br>1 mg/L to 20 000 mg/L          | In - house method : LBEN-11157<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500-Cl D               |

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## Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services  
 Address : 41/23 Soi Rama III (59), Rama III Road,  
 Chongnonsee, Yannawa, Bangkok 10120  
 Accreditation Number : Testing - 0017  
 Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used  |
|-------------|-------------------------|--|---|
| 2 (cont.)   | Wastewater              | - Navy Blue<br>1.0 mg/L to 7.5 mg/L  | In - house method : LBLC-19004<br>based on United States Environmental Protection Agency, 2007, EPA, Method 8321B |
|             |                         | Perfluorocarbons (PFCs) :<br>- PFPeA<br>- PFBS<br>- PFHxS<br>- PFHpS<br>- PF-3,7-DMOA<br>- PFDA<br>- PFOS<br>- PFUnA<br>- PFDoA<br>0.05 µg/L to 0.3 µg/L | In - house method : LBLC-17014<br>based on DIN 38407-42 : 2011-03<br>and analysis with HPLC-MS                    |

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### Scope of Laboratory Accreditation

Laboratory Name

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Chongnonsee, Yannawa, Bangkok 10120

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## Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services  
 Address : 41/23 Soi Rama III (59), Rama III Road,  
 Chongnonsee, Yannawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number | Test Material / Product | Test item / Range of Testing                            | Test Method / Technique Used   |
|-------------|-------------------------|---|--|
| 2 (cont.)   | Wastewater              | - Sulfide<br>0.01 mg/L to 1.0 mg/L                      | In - house method : LBEN-97045<br>based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23 <sup>rd</sup> ed., 2017, part 4500-S <sup>2</sup> -D |
|             |                         | - Sulfite<br>0.75 mg/L to 3.0 mg/L                      | In - house method : LBEN-18006<br>based on United States Environmental Protection Agency, 1978, EPA, Method 377.1  |
|             |                         | - Total nitrogen<br>2 mg/L to 200 mg/L                  | In - house method : LBAG-18002<br>based on ISO 5663 : 1984   |
|             |                         | - True color<br>5 M <sup>-1</sup> to 30 M <sup>-1</sup> | ISO 7887 : 2011, Method B  |

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 Chongnonsee, Yannawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number | Test Material / Product | Test item / Range of Testing  | Test Method / Technique Used  |
|-------------|-------------------------|---|---|
| 2 (cont.)   | Wastewater              | - Arsenic<br>0.63 µg/L to 6.25 µg/L<br>- Lead<br>0.63 µg/L to 6.25 µg/L<br>- Cadmium<br>0.63 µg/L to 6.25 µg/L<br>- Copper<br>0.63 µg/L to 6.25 µg/L<br>- Manganese<br>0.63 µg/L to 6.25 µg/L<br>- Nickel<br>0.63 µg/L to 6.25 µg/L<br>- Zinc<br>2.5 µg/L to 62.5 µg/L<br>- Silver<br>2.5 µg/L to 62.5 µg/L | In - house method : LBEN-14004<br>based on United States Environmental Protection Agency, 2014, EPA, Method 6020B, Revision 2 |

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 Accreditation Number : Testing - 0017  
 Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used   |
|--------------|-------------------------|--|--|
| 2<br>(cont.) | Wastewater              | - Chromium<br>0.63 µg/L to 12.5 µg/L<br>- Antimony<br>0.63 µg/L to 12.5 µg/L<br>- Cobalt<br>1.25 µg/L to 62.5 µg/L<br>- Hexavalent chromium<br>1.0 µg/L to 5.0 µg/L<br>Flame retardant:<br>- Tris (2,3-dibromopropyl) phosphate<br>- Bis (2,3-dibromopropyl) phosphate<br>1.00 µg/L to 4.00 µg/L | In - house method : LBEN-14004<br>based on United States Environmental Protection Agency, 2014, EPA, Method 6020B, Revision 2<br>ISO 18412 : 2005<br>In - house method : LBLC-18001<br>based on ISO 18857-2 : 2009 |

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 Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used   |
|--------------|-------------------------|--|--|
| 2<br>(cont.) | Wastewater              | Disperse dyes<br>- Disperse Blue 1<br>- Disperse Blue 7<br>- Disperse Brown 1<br>- Disperse Orange 1<br>- Disperse Orange 3<br>- Disperse Orange 11<br>- Disperse Orange 37/76<br>- Disperse Red 1<br>- Disperse Yellow 1<br>- Disperse Yellow 9<br>- Disperse Yellow 39<br>- Basic violet 3<br>- Solvent Yellow 1<br>- Solvent Yellow 2<br>- Solvent Yellow 3<br>10.0 µg/L to 50.0 µg/L | In - house method : LBLC-18002<br>based on Journal of Chromatographic Science 2015,53 : page 1257-1264 |

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 Chongnonsee, Yannawa, Bangkok 10120

Accreditation Number : Testing - 0017

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| Item Number | Test Material / Product | Test item / Range of Testing  | Test Method / Technique Used  |
|-------------|-------------------------|---|---|
| 2 (cont.)   | Wastewater              | Disperse dyes<br>- Basic violet 1<br>- Solvent Yellow 14<br>- Disperse Yellow 54<br>- Disperse Violet 1<br>10.0 µg/L to 50.0 µg/L   | In - house method : LBLC-18002 based on Journal of Chromatographic Science 2015,53 : page 1257-1264 |
|             |                         | Azo colorants<br>- Aniline<br>- m-Methylaniline<br>- p-Toluidine<br>- o-Toluidine<br>- m-Toluidine<br>- n-ethylamine<br>- 2-chloroaniline<br>- 2,4-Xyldine<br>2,6-Xyldine<br>0.5 µg/L to 3.0 µg/L | In - house method : SOP LBGC-18004 based on ISO 14362-1 : 2017                                      |

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 Address : 41/23 Soi Rama III (59), Rama III Road,  
 Chongnonsee, Yannawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number | Test Material / Product | Test item / Range of Testing  | Test Method / Technique Used                                   |
|-------------|-------------------------|---|--|
| 2 (cont.)   | Wastewater              | Azo colorants<br>- o-Anisidine<br>- 4-Chloroaniline<br>- n,n-diethylaniline<br>- p-Cresidine<br>- 2,4,5 - Trimethylaniline<br>- 4-Chloro-o-toluidine<br>- 2,4-Toluenediamine<br>- 2,4 - Diaminoanisole<br>- 2-Naphthylamine<br>- 5-Nitro-o-toluidine<br>- 5-Nitro-o-anisidine<br>- 4-Aminobiphenyl<br>- 4-Aminoazobenzene<br>- 4,4'-Oxydianiline<br>- Benzidine<br>0.5 µg/L to 3.0 µg/L | In - house method : SOP LBGC-18004 based on ISO 14362-1 : 2017 |

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Accreditation Number : Testing - 0017

Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test item / Range of Testing  | Test Method / Technique Used                                   |
|--------------|-------------------------|---|--|
| 2<br>(cont.) | Wastewater              | Azo colorants<br>- 4,4'-Thiodianiline<br>- o-Aminoazotoluene<br>- 3,3'-Dimethyl-4,4'-diaminodiphenylmethane<br>- 3,3'-Dimethylbenzidine<br>- 4,4'-Thiodianiline<br>- 3,3'-Dichlorobenzidine<br>- 4,4'-Methylenebis (2-chloroaniline)<br>- 3,3'-Dimethoxybenzidine<br>0.5 µg/L to 3.0 µg/L | In - house method : SOP LBGC-18004 based on ISO 14362-1 : 2017 |

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 Chongnonsee, Yannawa, Bangkok 10120

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Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used   |
|--------------|-------------------------|--|--|
| 2<br>(cont.) | Wastewater              | Flame retardants<br>- 2,2-bis(bromomethyl)-1,3-propane-diol<br>- Tris (2-chloroethyl) phosphate<br>- Tris (1,3-dichloro-isopropyl) phosphate<br>- Hexabromocyclododecane<br>5 µg/L to 25 µg/L<br><br>- Polybrominated biphenyls ether<br>- polybrominated diphenyl ethers<br>0.25 µg/L to 1.5 µg/L | In - house method : LBGC-18005 based on United States Environmental Protection Agency, 2005, EPA, Method 527, Revision 1.0 |

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| Item Number  | Test Material / Product | Test Item / Range of Testing   | Test Method / Technique Used                                 |
|--------------|-------------------------|--|--|
| 2<br>(cont.) | Wastewater              | Organotin compounds<br>- Trimethyltin(TMT)<br>- Dimethyltin(DMT)<br>- Dipropyltin-dichloride(DPrOT)<br>- Monobutyltin(MBT)<br>- Tripropyltin(TPrT)<br>- Dibutyltin(DBT)<br>- Tributyltin(TBT)<br>- Monooctyltin(MOT)<br>- Tetraethyltin(TeBT)<br>- Diphenyltin(DPhT)<br>- Dioctyltin(DOT)<br>- Triphenyltin(TPhT)<br>- Tri-cyclohexyltin(TCyT)<br>- Tri-n-octyltin(TOT)<br>0.05 µg/L to 2.0 µg/L | In - house method : SOP LBGC-18006 based on ISO 17353 : 2004 |

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 Accreditation Number : Testing - 0017  
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| Item Number  | Test Material / Product | Test Item / Range of Testing  | Test Method / Technique Used                                |
|--------------|-------------------------|---|---|
| 2<br>(cont.) | Wastewater              | Polycyclic Aromatic Hydrocarbons (PAH)<br>- Naphthalene<br>- 2-Methylphthalene<br>- 1-Methylphthalene<br>- Acenaphthylene<br>- Acenaphthene<br>- Fluorene<br>- Phenanthrene<br>- Anthracene<br>- Fluoranthene<br>- Pyrene<br>- Cyclopenta (c,d) pyrene<br>- Benzof(a) Anthracene<br>- Chrysene<br>1.0 µg/L to 20.0 µg/L | In - house method : LBGC-18008 based on DIN 38407-39 : 2011 |

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Laboratory Name : SGS (Thailand) Limited, Laboratory Services  
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 Chongnonsee, Yannawa, Bangkok 10120  
 Accreditation Number : Testing - 0017  
 Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used                                |
|--------------|-------------------------|--|---|
| 2<br>(cont.) | Wastewater              | Polycyclic Aromatic Hydrocarbons (PAH)<br>- Benzo(a) Fluoranthene<br>- Benzo(b) Fluoranthene<br>- Benzo(k) Fluoranthene<br>- Benzo(e) Pyrene<br>- Benzo(a) Pyrene<br>- Indeno(1,2,3-cd) Pyrene<br>- Dibenzo (ah) Anthracene<br>- Benzo (ghi) perylene<br>1.0 µg/L to 20.0 µg/L | In - house method : LBGC-18008 based on DIN 38407-39 : 2011 |

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 Chongnonsee, Yannawa, Bangkok 10120  
 Accreditation Number : Testing - 0017  
 Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test item / Range of Testing  | Test Method / Technique Used                                 |
|--------------|-------------------------|---|--|
| 2<br>(cont.) | Wastewater              | Chlorophenol<br>- 4-Chloro-3-methylphenol<br>- 2-Chlorophenol<br>- 3-Chlorophenol<br>- 4-Chlorophenol<br>- 2,4-Dichlorophenol<br>- 2,5-Dichlorophenol<br>- 2,6-Dichlorophenol<br>- 3,5-Dichlorophenol<br>- 2,3-Dichlorophenol<br>- 3,4-Dichlorophenol<br>- Pentachlorophenol<br>- 2,3,4,6-Tetrachlorophenol<br>- 2,4,5-Trichlorophenol<br>- 2,4,6-Trichlorophenol<br>- 2,3,4-Trichlorophenol<br>0.5 µg/L to 20.0 µg/L | In - house method : SOP LBGC-18003 based on ISO 17070 : 2015 |

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### Scope of Laboratory Accreditation

|                 |  |
|-----------------|--|
| Laboratory Name | : SGS (Thailand) Limited, Laboratory Services                                    |
| Address         | : 41/23 Soi Rama III (59), Rama III Road,<br>Chonnonisee, Yarnawa, Bangkok 10120 |

Testing - 0017

☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test Item / Range of Testing  | Test Method / Technique Used                                |
|--------------|-------------------------|---|---|
| 2<br>(cont.) | Wastewater              | Phthalates<br>- Di-isooheptyl phthalate<br>- Bis cyclohexyl phthalate<br>- Di-n - octyl phthalate<br>- Bis-(2-propylheptyl) phthalate<br>- Bis-nonyl phthalate<br>- Bis -propyl phthalate<br>- Bis -iso-pentyl phthalate<br>- n-pentyl-iso-pentyl phthalate<br>- Bis-n-pentyl phthalate<br>- Di - n - hexyl phthalate<br>- Bis -iso -octhyl phthalate<br>- Di-isodecyl phthalate<br>5 µg/L to 30 µg/L | In - house method : LBGC-18007<br>based on ISO 18856 : 2004 |

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 Accreditation Number : Testing - 0017  
 Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test Item / Range of Testing   | Test Method / Technique Used   |
|--------------|-------------------------|--|--|
| 2<br>(cont.) | Wastewater              | Volatile organic compounds<br>- Methylene Chloride<br>- Benzene<br>- 1,2-Dichloroethane<br>- Trichloroethylene<br>- Tetrachloroethylene<br>- Total Xylene<br>5 µg/L to 20 µg/L<br><br>- p- Cresol<br>- o- Cresol<br>- m- Cresol<br>5 µg/L to 25 µg/L | In - house method : SOP LBGC-18009<br>based on United States Environmental<br>Protection Agency, 1996, EPA,<br>Method 8260B, Revision 2.0<br><br><br><br>In - house method : LBGC-18010<br>based on United States Environmental<br>Protection Agency, 1996, EPA,<br>Method 8260B, Revision 2.0 |

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 Accreditation Number : Testing - 0017  
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| Item Number  | Test Material / Product | Test Item / Range of Testing  | Test Method / Technique Used   |
|--------------|-------------------------|---|--|
| 2<br>(cont.) | Wastewater              | Perfluorocarbons (PFCs) :<br>- 6.2 FTOH<br>- 8.2 FTOH<br>- 10.2 FTOH<br>- 6.2 FTA<br>- 8.2 FTA<br>- 10.2 FTA<br>5 µg/L to 25 µg/L<br><br>- Coliforms<br>MPN/100 ml<br>Detected or not detected<br><br>- Coliforms<br>cfu/100 ml | In - house method : LBGC-18011<br>based on DIN 38407-42 : 2011<br><br><br><br>Standard Methods for the Examination<br>of Water and Wastewater, APHA,<br>AWWA & WEF, 23 <sup>rd</sup> ed, 2017,<br>part 9221 B<br><br>ISO 9308 -1: 2014 / Amd 1: 2016 |

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 Chongnonsee, Yannawa, Bangkok 10120  
 Accreditation Number : Testing - 0017  
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| Item Number | Test Material / Product | Test item / Range of Testing               | Test Method / Technique Used  |
|-------------|-------------------------|--|---|
| 3           | Surface water           | - Ammonia-Nitrogen<br>0.02 mg/L to 20 mg/L | In - house method : LBEN-11158<br>based on ASTM D1426-08  |
|             |                         | - Chloride<br>1 mg/L to 20 000 mg/L        | In - house method : LBEN-11157<br>based on Standard Methods for<br>the Examination of Water and<br>Wastewater, APHA, AWWA & WEF,<br>23 <sup>rd</sup> ed., 2017, part 4500 - Cl <sup>-</sup> D |
|             |                         | - Total phosphorus<br>0.01 mg/L to 40 mg/L | In - house method : LBEN-97037<br>based on Standard Methods for<br>the Examination of Water and<br>Wastewater, APHA, AWWA & WEF,<br>23 <sup>rd</sup> ed., 2017, part 4500 - P B4, E           |

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| Item Number  | Test Material / Product | Test item / Range of Testing                           | Test Method / Technique Used  |
|--------------|-------------------------|--|---|
| 3<br>(cont.) | Surface water           | - Dissolved phosphorus<br>0.005 mg/L to 20 mg/L        | In - house method : LBEN-97037<br>based on Standard Methods for<br>the Examination of Water and<br>Wastewater, APHA, AWWA & WEF,<br>23 <sup>rd</sup> ed., 2017, part 4500 - P B1, E |
|              |                         | - Total petroleum hydrocarbon<br>0.03 µg/L to 2.5 µg/L | In - house method : LBAG-08251<br>based on Methods of Seawater Analysis,<br>3 <sup>rd</sup> Completely Revised and Extended<br>Edition, 1999, chapter 21                            |
| 4            | Sea water               |  |   |
| 5            | Sludge                  | - Mercury<br>0.1 mg/kg to 4.0 mg/kg                    | In - house method : LBEN-18008<br>based on United States Environmental<br>Protection Agency, 2007, EPA,<br>Method 7473, Revision 0  |

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| Item Number  | Test Material / Product | Test item / Range of Testing                     | Test Method / Technique Used  |
|--------------|-------------------------|--|---|
| 5<br>(cont.) | Sludge                  | - Hexavalent chromium<br>1.0 mg/kg to 40.0 mg/kg | In - house method : LBEN 18003<br>based on United States Environmental Protection Agency, 1992, EPA, Method 7196A, Revision 1 |
|              |                         | - Arsenic<br>0.50 mg/kg to 5.00 mg/kg            | In - house method : LBEN 18007<br>based on United States Environmental Protection Agency, 2014, EPA, Method 6020B, Revision 2 |
|              |                         | - Cadmium<br>0.50 mg/kg to 5.00 mg/kg            |   |
|              |                         | - Lead<br>0.50 mg/kg to 5.00 mg/kg               |   |

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| Item Number  | Test Material / Product | Test item / Range of Testing   | Test Method / Technique Used   |
|--------------|-------------------------|--|--|
| 5<br>(cont.) | Sludge                  | - Cadmium<br>10 mg/kg to 1 000 mg/kg   | In - house method : LBEN 18007<br>based on United States Environmental Protection Agency, 2007, EPA Method 6010C, Revision 3   |
|              |                         | - Lead<br>10 mg/kg to 1 000 mg/kg  |  |
|              |                         | - Cyanide<br>0.5 mg/kg to 10.0 mg/kg   | In - house method : SOP LBEN-19001<br>based on ISO 11262 : 2011  |
| 6            | Chemical fertilizer     | - Water soluble potassium<br>(Calculated as K <sub>2</sub> O)<br>1.0 g/100 g to 60.4 g/100 g | In - house method : SOP LBCH-99246<br>based on Notification of Ministry of Agriculture and Cooperatives Re: Prescribing the methods of analysis of chemical fertilizers, B.E. 2559, method 1.12.02 |
|              |                         | - Total Nitrogen<br>1.0 g/100 g to 46.5 g/100 g  | In - house method : SOP LBAG-12276<br>based on Notification of Ministry of Agriculture and Cooperatives Re: Prescribing the methods of analysis of chemical fertilizers, B.E. 2559, method 1.05.01 |

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Address : 41/23 Soi Rama III (59), Rama III Road,

Chongnonsee, Yamnawa, Bangkok 10120

Accreditation Number : Testing - 0017

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| Item Number  | Test Material / Product | Test item / Range of Testing  | Test Method / Technique Used  |
|--------------|-------------------------|---|---|
| 6<br>(cont.) | Chemical fertilizer     | - Total phosphorus<br>(Calculated $P_2O_5$ )<br>2.00 g/100 g to 61.68 g/100 g           | In - house method : SOP LBAG-00106<br>based on Notification of Ministry of<br>Agriculture and Cooperatives Re: Prescribing<br>the methods of analysis of chemical<br>fertilizers, B.E. 2559, method 1.09.01 |
|              |                         | - Calcium oxide<br>(Calculated from total calcium)<br>0.02 g/100 g to 51.8 g/100 g      | In - house method : SOP LBCH-16010<br>based on Notification of Ministry of<br>Agriculture and Cooperatives Re: Prescribing<br>the methods of analysis of chemical<br>fertilizers, B.E. 2559, method 1.13.01 |
|              |                         | - Magnesium oxide<br>(Calculated from total magnesium)<br>0.02 g/100 g to 81.04 g/100 g | In - house method : SOP LBCH-16010<br>based on Notification of Ministry of<br>Agriculture and Cooperatives Re: Prescribing<br>the methods of analysis of chemical<br>fertilizers, B.E. 2559, method 1.14.01 |

Initial Issue Date 22<sup>nd</sup> June 2007

Issue Number 10

Bureau of Laboratory Accreditation, Department of Science Service, Ministry of Higher Education, Science, Research and Innovation

## Scope of Laboratory Accreditation

Laboratory Name : SGS (Thailand) Limited, Laboratory Services

Address : 41/23 Soi Rama III (59), Rama III Road,

Chongnonsee, Yamnawa, Bangkok 10120

Accreditation Number : Testing - 0017

Laboratory Status : ☒ Permanent ☐ Site ☐ Temporary ☐ Mobile

| Item Number  | Test Material / Product | Test item / Range of Testing                    | Test Method / Technique Used  |
|--------------|-------------------------|---|---|
| 6<br>(cont.) | Chemical fertilizer     | - Total sulfur<br>0.02 g/100 g to 32.76 g/100 g | In - house method : SOP LBCH-16010<br>based on Notification of Ministry of<br>Agriculture and Cooperatives Re: Prescribing<br>the methods of analysis of chemical<br>fertilizers, B.E. 2559, method 1.15.01 |

Issue Date : 21<sup>st</sup> April 2020

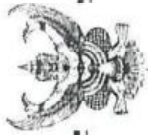
Signature :

Director of Bureau of Laboratory Accreditation

Initial Issue Date 22<sup>nd</sup> June 2007

Issue Number 10

Bureau of Laboratory Accreditation, Department of Science Service, Ministry of Higher Education, Science, Research and Innovation



ฉ.ร. ๒๒๖/ร.๒๒๖

ใบรับรองเลขที่ 19T184/0960

## ใบรับรองห้องปฏิบัติการ

อาศัยอำนาจตามความในพระราชบัญญัติการมาตรฐานแห่งชาติ พ.ศ. ๒๕๕๑

เลขานุการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

ออกใบรับรองฉบับนี้ให้

บริษัท เอสจีเอส (ประเทศไทย) จำกัด

ห้องปฏิบัติการทดสอบสิ่งแวดล้อม (สาขากระเบื้อง)

มีห้องปฏิบัติการตั้งอยู่เลขที่

๑/๒๐๙, ๑/๒๑๑ หมู่ที่ ๑ ซอยสุขุมวิท ๒ ถนนสุขุมวิท

ตำบลบางนา เขต อำเภอบางนา จังหวัดระยอง

ได้รับการรับรองความสามารถห้องปฏิบัติการทดสอบ

ตามมาตรฐานเลขที่ มอก. 17025-2561 (ISO/IEC 17025 : 2017)

ข้อกำหนดทั่วไปด้วยความสามารถห้องปฏิบัติการทดสอบและสอบเทียบ

หมายเลขการรับรองที่ ทดสอบ ๐๔๗๐

โดยมีสาขาการรับรองตามรายละเอียดแนบท้ายใบรับรอง

ตั้งแต่วันที่ ๑๑ พฤศจิกายน พ.ศ. ๒๕๖๒

ถึงวันที่ ๑๐ พฤศจิกายน พ.ศ. ๒๕๖๕

ออกให้ ณ วันที่ ๒๙ พฤศจิกายน พ.ศ. ๒๕๖๒

ลงชื่อ

รองเลขาธิการ ปฏิบัติราชการแทน

เลขานุการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม



กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองห้องปฏิบัติการทดสอบ  
ใบรับรองเลขที่ 19T184/0960

ชื่อห้องปฏิบัติการ

ห้องปฏิบัติการทดสอบสิ่งแวดล้อม (สาขากระเบื้อง)

ที่อยู่

บริษัท เอสจีเอส (ประเทศไทย) จำกัด  
เลขที่ 1/209, 1/211 หมู่ที่ 1 ซอยสุขุมวิท 2 ถนนสุขุมวิท ตำบลบางนา  
อำเภอบางนา จังหวัดระยอง

หมายเลขการรับรองที่

ทดสอบ 0470

สถานภาพห้องปฏิบัติการ

☒ถาวร ☐นอกสถานที่ ☐ชั่วคราว ☐เคลื่อนที่

| สาขาการทดสอบ   | รายการทดสอบ  | วิธีทดสอบ   |
|--|--|---|
| สาขาสิ่งแวดล้อม<br>น้ำและน้ำเสีย<br>(water and wastewater) | - Arsenic<br>0.01 mg/l to 0.50 mg/l<br>- Barium<br>0.01 mg/l to 10 mg/l<br>- Cadmium<br>0.002 mg/l to 10 mg/l<br>- Chromium<br>0.01 mg/l to 10 mg/l<br>- Copper<br>0.01 mg/l to 10 mg/l<br>- Iron<br>0.02 mg/l to 10 mg/l<br>- Lead<br>0.01 mg/l to 10 mg/l<br>- Manganese<br>0.01 mg/l to 5 mg/l<br>- Nickel<br>0.004 mg/l to 10 mg/l<br>- Selenium<br>0.01 mg/l to 0.50 mg/l<br>- Silver<br>0.01 mg/l to 10 mg/l<br>- Zinc<br>0.02 mg/l to 10 mg/l | - Standard Methods for the<br>Examination of Water and<br>Wastewater, APHA, AWWA, WEF,<br>23 <sup>rd</sup> edition, 2017, part 3120 B,<br>part 3030 F and part 3030 K |

รายละเอียดแนบท้ายใบรับรองห้องปฏิบัติการทดสอบ

ใบรับรองเลขที่ 19T184/0960

หมายเลขการรับรองที่

ทดสอบ 0470

สถานภาพห้องปฏิบัติการ

☒ ถาวร

☐ นอกสถานที่

☐ชั่วคราว

☐เคลื่อนที่

| สาขาการทดสอบ   | รายการทดสอบ  | วิธีทดสอบ  |
|--|--|--|
| สาขาสังเกตดม<br>น้ำและน้ำเสีย<br>(water and wastewater) (ตอ) | <ul style="list-style-type: none"> <li>Biochemical oxygen demand (BOD) 2 mg/l to 5 000 mg/l</li> <li>Chemical oxygen demand (COD) 40 mg/l to 10 000 mg/l</li> <li>Chloride 1 mg/l to 10 000 mg/l</li> <li>Chromium hexavalent 0.01 mg/l to 2.00 mg/l</li> <li>Oil and grease 2 mg/l to 100 mg/l</li> <li>pH 2.0 to 11.0</li> </ul> | <ul style="list-style-type: none"> <li>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> edition, 2017, part 5210 B and part 4500-O G</li> <li>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> edition, 2017, part 5220 C</li> <li>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> edition, 2017, part 4500-Cl D</li> <li>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> edition, 2017, part 3500-Cr B</li> <li>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> edition, 2017, part 5520 B</li> <li>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> edition, 2017, part 4500-H<sup>+</sup> B</li> </ul> |

ฉบับที่ 1 ตั้งแต่วันที่ 11 พฤศจิกายน พ.ศ. 2562 หน้า 2/4

กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแนบท้ายใบรับรองห้องปฏิบัติการทดสอบ

ใบรับรองเลขที่ 19T184/0960

หมายเลขการรับรองที่

ทดสอบ 0470

สถานภาพห้องปฏิบัติการ

☒ ถาวร

☐ นอกสถานที่

☐ชั่วคราว

☐เคลื่อนที่

| สาขาการทดสอบ   | รายการทดสอบ  | วิธีทดสอบ  |
|--|--|--|
| สาขาสังเกตดม<br>น้ำและน้ำเสีย<br>(water and wastewater) (ตอ) | <ul style="list-style-type: none"> <li>Phenol 0.01 mg/l to 1.00 mg/l</li> <li>Sulfate 1 mg/l to 40 mg/l</li> <li>Total hardness 1 mg/l to 1 000 mg/l (expressed as CaCO<sub>3</sub>)</li> <li>Total solids (TS) 2.5 mg/l to 10 000 mg/l</li> <li>Total dissolved solids (TDS) 2.5 mg/l to 20 000 mg/l</li> </ul> | <ul style="list-style-type: none"> <li>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> edition, 2017, part 5530 D</li> <li>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> edition, 2017, part 4500-SO<sub>4</sub> E</li> <li>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> edition, 2017, part 2340 C</li> <li>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> edition, 2017, part 2540 B</li> <li>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23<sup>rd</sup> edition, 2017, part 2540 C (dried at 180 °C and at 103 - 105 °C)</li> </ul> |

ฉบับที่ 1 ตั้งแต่วันที่ 11 พฤศจิกายน พ.ศ. 2562 หน้า 3/4

กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

รายละเอียดแบบฟอร์มใบรับรองห้องปฏิบัติการทดสอบ

ใบรับรองเลขที่ 19T184/0960

หมายเลขการรับรองที่

ทดสอบ 0470

สถานภาพห้องปฏิบัติการ

☒ ถาวร ☐ นอกสถานที่

☐ จักรวรร ☐ เคลื่อนที่

| สาขาการทดสอบ   | รายการทดสอบ   | วิธีทดสอบ   |
|--|---|---|
| สาขาสิ่งแวดล้อม<br>น้ำและน้ำเสีย<br>(water and wastewater) (ต่อ) | Total suspended solids (TSS)<br>2.5 mg/l to 10 000 mg/l | Standard Methods for the<br>Examination of Water and<br>Wastewater, APHA, AWWA, WEF,<br>23 <sup>rd</sup> edition, 2017, part 2540 D |

ออกให้ ณ วันที่ ๑๙ พฤศจิกายน พ.ศ. 2562

ลงชื่อ

รองเลขาธิการ ปฏิบัติราชการแทน

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

# ABS Quality Evaluations

## Certificate of Conformance

This is to certify that the Quality Management System of:

SGS (Thailand) Ltd.

100 Nanglinchee Road, Chongnonsee, Yannawa,  
Bangkok 10120  
Thailand

(WITH ADDITIONAL FACILITIES LISTED ON ATTACHED ANNEX)

has been assessed by ABS Quality Evaluations, Inc. and found to be in conformance with the requirements set forth by:

ISO 9001:2015

The Quality Management System is applicable to:

PROVISION OF PHYSICAL INSPECTION, FUMIGATION, PEST CONTROL AND LABORATORY TESTING AND  
CALIBRATION

This certificate may be found on the ABS OE Website (www.abs-oe.com). For certificates issued in the People's Republic of China information may also be verified on the CNCA website (www.cnca.gov.cn).

Certificate No: 52229

Certification Date: 30 July 2015

Effective Date: 23 July 2020

Expiration Date: 24 July 2023

Revision Date: 23 July 2020

President



Validity of this certificate is based on the successful completion of the periodic surveillance audits of the management system defined by the above scope and is contingent upon prompt notification to ABS Quality Evaluations, Inc. of significant changes to the management system or components thereof.

ABS Quality Evaluations, Inc. 1701 City Plaza Drive, Spring, TX 77389, U.S.A.

Validity of this certificate may be confirmed at www.abs-oe.com/cert\_validation

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ฉบับที่ 1 ตั้งแต่ วันที่ 11 ตุลาคม พ.ศ. 2562 หน้า 4/4

กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

# ABS Quality Evaluations

## ISO 9001:2015 Certificate Of Conformance

### ANNEX

Certificate No: 52229

#### SGS (Thailand) Ltd.

##### At Below Facilities:

|           |   |           |  |
|-----------|---|-----------|--|
| Facility: | Facility 1 - Rayong Branch<br>1209 and 1211 Moo 1 T. Ban Chang<br>A. Ban Chang,<br>Rayong 21130<br>Thailand                                       | Facility: | Facility 2 - Sracha Office<br>144, 146 Sracha Nilom 1 Road,<br>T. Srachak A. Sracha,<br>Chonburi 20110<br>Thailand                           |
| Activity: | Inspection & Testing  | Activity: | Inspection, Fumigation & Pest Control  |
| Facility: | Facility 3 - Nakornratchasima Office<br>134/46 Sorasani Road, T. Na-Muang<br>A. Muang Nakornratchasima,<br>30000<br>Thailand                      | Facility: | Facility 4 - Hat Yai Branch<br>57, 59 and 61 So. 10 Phadung Road,<br>T. Hat Yai, A. Hat Yai,<br>Songkhla 91110<br>Thailand                   |
| Activity: | Inspection & Fumigation   | Activity: | Inspection, Fumigation, Pest Control & Testing   |
| Facility: | Facility 5 - Rama III Branch Laboratory Services<br>41/16 - 20, 41/23 Rama III Road So. 29,<br>Chongnonsee, Yannawa,<br>Bangkok 10120<br>Thailand | Facility: | Facility 6 - SGS (Cambodia) Limited<br>No 1076 A-D Street 371 Phum Tea II Sangkat Steing Manochay,<br>Khan Monivong, Phnom Penh,<br>Cambodia |
| Activity: | Testing   | Activity: | Inspection   |



Validity of this certificate may be confirmed at [www.abs-qe.com/vert](http://www.abs-qe.com/vert) validation.

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# ABS Quality Evaluations

## Certificate Of Conformance

This is to certify that the Health and Safety Management System of:

SGS (Thailand) Ltd.  
100 Nanglinchee Road, Chongnonsee, Yannawa,  
Bangkok 10120  
Thailand

(WITH ADDITIONAL FACILITIES LISTED ON ATTACHED ANNEX)

has been assessed by ABS Quality Evaluations, Inc. and found to be in conformance with the requirements set forth by:

ISO 45001:2018

The Health and Safety Management System is applicable to:

### PROVISION OF PHYSICAL INSPECTION, FUMIGATION, PEST CONTROL AND LABORATORY TESTING AND CALIBRATION

This certificate may be found on the ABS OE Website ([www.abs-qe.com](http://www.abs-qe.com)). For certificates issued in the People's Republic of China information may also be verified on the CNCA website ([www.CNCA.gov.cn](http://www.CNCA.gov.cn)).

Certificate No: 61139  
Effective Date: 07 September 2020  
Expiration Date: 06 September 2023  
Revision Date: 07 September 2020

President



Validity of this certificate is based on the successful completion of the periodic surveillance audits of the management system defined by the above scope and is contingent upon prompt written notification to ABS Quality Evaluations, Inc. of significant changes to the management system or components thereof.  
ABS Quality Evaluations, Inc. 1701 Croy Plaza Drive, Spring, TX 77380 U.S.A.  
Validity of this certificate may be confirmed at [www.abs-qe.com/vert](http://www.abs-qe.com/vert) validation.

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# ABS Quality Evaluations

ISO 45001:2018

## Certificate Of Conformance

### ANNEX

Certificate No: 61139

**SGS (Thailand) Ltd.**  
At Below Facilities:

|          |  |          |   |
|----------|--|----------|---|
| Facility | Facility 1 - Rayong Branch<br>1009 and 1011 Moo 1 T. Ban Chang,<br>A. Ban Chang,<br>Rayong 21130<br>Thailand                                     | Facility | Facility 2 - Sracha Office<br>144, 145 Srinakharin Road,<br>T. Sracha, A. Sracha,<br>Dochburi 20110<br>Thailand   |
| Activity | Inspection & Testing   | Activity | Inspection, Fumigation & Pest Control   |
| Facility | Facility 3 - Nakornchaisri Office<br>13/048 Srinakharin Road, T. Nak-Nang,<br>A. Muang Nakornchaisri,<br>30000<br>Thailand                       | Facility | Facility 4 - Hai Yai Branch<br>57, 58 and 61 Soi 10 Prachin Road,<br>T. Hai Yai, A. Hai Yai,<br>Songkhro 90110<br>Thailand  |
| Activity | Inspection & Fumigation  | Activity | Inspection, Fumigation, Pest Control & Testing  |
| Facility | Facility 5 - Rama III Branch, Laboratory Services<br>47116 - 20, 4123 Rama III Road So 59,<br>Chongpratek, Yankawa,<br>Bangkok 10120<br>Thailand | Facility | Facility 7 - Eastern Seaboard Office, Automotive Laboratory Service<br>Eastern Seaboard Industrial Estate 300/109 Moo 1,<br>Ta Sri, Phakdaeng<br>Rayong 21140<br>Thailand |
| Activity | Testing  | Activity | Testing   |



Validity of this certificate may be confirmed at [www.abs-qe.com](http://www.abs-qe.com) connect validation

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Certificate Number: 1953081/536

certification

**ISO14001**  
ENVIRONMENTAL MANAGEMENT SYSTEM

Certificate of Approval  
This is to certify that

**SGS (Thailand) Limited**

Address of premises :

Premises 1 : Eastern Seaboard Industrial Estate,  
300/109 Moo 1,  
Ta Sri, Phakdaeng District,  
Rayong 21140, Thailand

Premises 2 :

1/209, 1/211 Moo 1, Soi Sukhumvit 2, Sukhumvit Road,  
Ban Chang, Ban Chang District,  
Rayong 21130, Thailand

has been assessed and found to be conforming to the requirements of  
TIS 14001-2559 (ISO 14001:2015)

for the scope :

Premises 1 : Automotive Laboratory  
Premises 2 : Environmental Laboratory

by  
Management System Certification Institute (Thailand),  
Foundation for Industrial Development

Date of Issue 24<sup>th</sup> January 2020

Valid Until 23<sup>rd</sup> January 2023

First issued 10th



President  
Management System Certification Institute (Thailand)



ใบรับรองระบบการจัดการสิ่งแวดล้อม  
ใบรับรองนี้มีใช้ตั้งแต่วันที่

## บริษัท เอสซีเอส (ประเทศไทย) จำกัด

สภาพประกอบการตั้งอยู่เลขที่ :  
สภาพประกอบการ 1 : นิคมอุตสาหกรรมอีสเทิร์นซีบอร์ด  
300/109 หมู่ 1  
ตำบลสาทร อำเภอลำลูกกา  
จังหวัดระยอง 21140  
สภาพประกอบการ 2 : 1/209, 1/211 หมู่ 1 ซอยสุขุมวิท 2 ถนนสุขุมวิท  
ตำบลบ้านแดง อำเภอบ้านแดง  
จังหวัดระยอง 21130

ได้รับการรับรองระบบการจัดการสิ่งแวดล้อมตามมาตรฐานเลขที่  
มอก. 14001-2559 (ISO 14001:2015)

สำหรับขอเช่า :

สภาพประกอบการ 1 : ห้องปฏิบัติการทดสอบชิ้นส่วนยานยนต์  
สภาพประกอบการ 2 : ห้องปฏิบัติการทดสอบสิ่งแวดล้อม

โดย  
สถาบันรับรองมาตรฐานอิสโ  
อสังหาริมทรัพย์อิสโ  
ออกให้ ณ วันที่ 24 มกราคม 2553  
มีผลใช้ ณ วันที่ 23 มกราคม 2556

ออกให้ด้วยนาม พ. วนันท์

ผู้อำนวยการสถาบันรับรองมาตรฐานอิสโ



สสอ.

ภาคผนวก ค

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สำเนาใบรับรองการสอบเทียบเครื่องมือ



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน SGS (Thailand) Co., Ltd.  
วันที่ 27 สิงหาคม 2564  
รายชื่ออุปกรณ์ / เครื่องมือ CO Analyzer  
รุ่นอุปกรณ์ / เครื่องมือ T300  
หมายเลขอุปกรณ์ / เครื่องมือ 1885

| API MODEL T300 |                      | TEST VALUES        |                               |
|----------------|----------------------|--------------------|-------------------------------|
|                |                      | BEFORE             | AFTER                         |
| 1              | RANGE                | 1 - 1000 PPM       | 50.0                          |
| 2              | STABILITY            | ≤ 1 PPM            | 0.027                         |
| 3              | CO MEASURE           | 2500 - 4800 mV     | 3350.8                        |
| 4              | CO REFERENCE         | 2000 - 4800 mV     | 2673.6                        |
| 5              | MIRRATION            | 1.1 ± 1.3          | 1.233                         |
| 6              | PRESEURE             | 25 - 35 in - Hg A  | 29.0                          |
| 7              | SAMPLE FLOW          | 100 ± 10% cc/min   | 73.4                          |
| 8              | SAMPLE TEMP          | -48 ± 2 °C         | -46.3                         |
| 9              | BENCH TEMP           | -29 ± 2 °C         | -48.0                         |
| 10             | WHEEL TEMP           | 68 ± 2 °C          | 68.0                          |
| 11             | BOX TEMP             | 31.9               | 33.6                          |
| 12             | PHT DRIVE            | 250 - 4750 mV      | 3405.7                        |
| 13             | SLOPE                | 1.0 ± 0.3          | 0.964                         |
| 14             | OFFSET               | 0.0 ± 0.3          | 0.024                         |
| 15             | CO READING (AMBIENT) | PPM                | 0.165                         |
| 16             | ELECTRICAL TEST      | 40 ± 2 PPM         | 31.776                        |
| 17             | VOLTAGE TEST         | +5V +12V +15V -15V | 5.12 / 12.26 / 16.65 / -15.40 |
| 18             | ZERO GAS             | 0.09 PPM           | 0.071                         |
| 19             | SPAN GAS             | 40.0 PPM           | 39.031                        |

หมายเหตุ

- เปลี่ยน Flow Sensor Board 1 ชิ้น ได้จากเครื่อง CO Analyzer T300 SN 1481

- เปลี่ยน O-ring 2 ชิ้น, Spring 1 ชิ้น, Solenoid Filter 1 ชิ้น



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

ลงนามเจ้าหน้าที่ (Signature)

สามารถร้องเรียนถึงทีมงานด้านเทคนิค คุณภาพสินค้า ลูกค้ารายอื่น  
เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระนอก เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

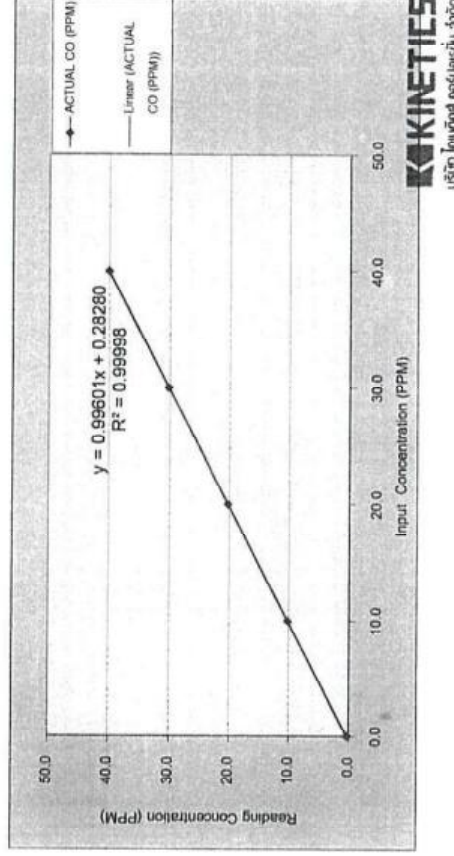
MULTI POINT CALIBRATION REPORT

|                                  |                         |
|----------------------------------|-------------------------|
| CUSTOMER NAME                    | SGS (Thailand) Co., Ltd |
| EQUIPMENT NAME                   | CO Analyzer             |
| MANUFACTURER                     | Teledyne - API          |
| MODEL                            | T300                    |
| SERIAL NO                        | 1885                    |
| STANDARD GAS CONCENTRATION (PPM) | 4443                    |
| CYLINDER NO                      | CC715528                |
| CERTIFIED DATE                   | Feb 13, 2019            |
| EXPIRED DATE                     | Feb 13, 2022            |

CERTIFIED BY AIRGAS SPECIALTY GASES

CALIBRATION RESULTS

| POINT NO    | CALIBRATION RESULTS |                 |            |
|-------------|---------------------|-----------------|------------|
|             | IDEAL (PPM)         | ACTUAL CO (PPM) | % ERROR CO |
| ZERO        | 0.00                | 0.300           | 0.30       |
| 1           | 10.00               | 10.162          | 0.16       |
| 2           | 20.00               | 20.256          | 0.26       |
| 3           | 30.00               | 30.231          | 0.23       |
| 4           | 40.00               | 40.066          | 0.07       |
| AVERAGE (%) |                     |                 | 0.96       |



DATE : 27 สิงหาคม 2564

เลขที่ 388 ถนนรัชดาภิเษก แขวงจันทระนอก เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

CERTIFICATE OF ANALYSIS  
Grade of Product: EPA Protocol

Pen Number: E03N03E154417  
Cylinder Number: 00715532  
Laboratory: 124 - Reference (EAP) - NJ  
PUMP Number: 553016  
Gas Code: CO NO CX BALN  
Reference Number: 92.401405850-1  
Cylinder Volume: 144.4 CF  
Cylinder Pressure: 2015 PSIG  
Valve Outlet: 553  
Certification Date: Feb 13, 2019  
Expiration Date: Feb 13, 2022

| ANALYTICAL RESULTS |                         |                      |                 | Assay Data                 |                       |
|--------------------|-------------------------|----------------------|-----------------|----------------------------|-----------------------|
| Component          | Requested Concentration | Actual Concentration | Protocol Method | Total Relative Uncertainty | Assay Date            |
| CO                 | 45.00 PPM               | 44.66 PPM            | G1              | +0.11% NIST Traceable      | 02/02/2019 02/13/2019 |
| NO                 | 45.00 PPM               | 44.53 PPM            | G1              | +0.11% NIST Traceable      | 02/02/2019 02/13/2019 |
| CARBON MONOXIDE    | 4500 PPM                | 4448 PPM             | G1              | +0.09% NIST Traceable      | 02/02/2019            |
| NITROGEN           |                         |                      |                 |                            |                       |

| CALIBRATION STANDARDS |         |             |                                   | Uncertainty |  | Expiration Date |  |
|-----------------------|---------|-------------|-----------------------------------|-------------|--|-----------------|--|
| Type                  | Lot ID  | Cylinder No | Concentration                     |             |  |                 |  |
| N2O                   | 1201017 | 44104407    | 52.03 PPM NITRIC OXIDE/NITROGEN   | +0.18%      |  | Mar 12, 2024    |  |
| CO                    | 1201017 | 44104407    | 9.51 PPM NITROGEN DIOXIDE/AIR     | +0.32%      |  | Jun 12, 2019    |  |
| NO                    | 1201017 | 44104407    | 4.91 PPM NITROGEN DIOXIDE/AIR     | +0.32%      |  | Nov 14, 2019    |  |
| CO                    | 1201017 | 44104407    | 25.48 PPM NITROGEN DIOXIDE/AIR    | +0.32%      |  | Jun 12, 2019    |  |
| NO                    | 1201017 | 44104407    | 5.10 PPM NITROGEN DIOXIDE/AIR     | +0.32%      |  | Jun 12, 2019    |  |
| CO                    | 1201017 | 44104407    | 4550 PPM CARBON MONOXIDE/NITROGEN | +0.34%      |  | Feb 15, 2019    |  |

| ANALYTICAL EQUIPMENT           |                      |  |  | Last Multipoint Calibration |  |
|--------------------------------|----------------------|--|--|-----------------------------|--|
| Instrument Make/Model          | Analytical Principle |  |  |                             |  |
| GasLab UltraMini 13.585 CEM/CO | NIR                  |  |  | Jan 11, 2019                |  |
| Model 8700 GasLab 13.585 NO    | FTIR                 |  |  | Feb 08, 2019                |  |
| Model 8700 GasLab 13.585 NO2   | FTIR                 |  |  | Feb 08, 2019                |  |

Triad Data Available Upon Request  
NOTES: Gross Weight: 50.6 lbs.  
Net 25.91 10.4 lbs.

Pen Number: E03N03E154417  
Cylinder Number: 00715532  
Laboratory: 124 - Reference (EAP) - NJ  
PUMP Number: 553016  
Gas Code: CO NO CX BALN  
Reference Number: 92.401405850-1  
Cylinder Volume: 144.4 CF  
Cylinder Pressure: 2015 PSIG  
Valve Outlet: 553  
Certification Date: Feb 13, 2019  
Expiration Date: Feb 13, 2022

| TEST VALUES             |                   |        |        |
|-------------------------|-------------------|--------|--------|
| API MODEL T300          | BEFORE            | AFTER  |        |
| 1 RANGE                 | 1 - 1000 PPM      | 50     | 50     |
| 2 STABILITY             | ≤ 1 PPM           | 0.15   | 0.21   |
| 3 CO MEASURE            | 2500 - 4800 mV    | 4489.4 | 4501.1 |
| 4 CO REFERENCE          | 2000 - 4800 mV    | 3873.5 | 3865.3 |
| 5 PRE-EURE              | 25 - 35 in - Hg A | 29.0   | 28.9   |
| 6 SAMPLE FLOW           | 800 ± 10% c/min   | 837    | 835    |
| 7 SAMPLE TEMP           | 48 ± 4 °C         | 45.6   | 46.5   |
| 8 BENCH TEMP            | 48 ± 2 °C         | 48     | 48     |
| 9 WHEEL TEMP            | 68 ± 2 °C         | 69.3   | 67.9   |
| 10 BOX TEMP             | AMBIENT ± 5 °C    | 38.8   | 37.3   |
| 11 SLOPE                | 1.0 ± 0.3         | 1.065  | 1.069  |
| 12 OFFSET               | 0.0 ± 0.3         | -0.045 | 0.436  |
| 13 CO READING (AMBIENT) | PPM               | 1.339  | 0.115  |
| 14 VOLTAGE TEST         | +5 V +12 V +15 V  | -      | -      |
| 15 ZERO GAS             | 0.00 PPM          | 0.750  | 0.001  |
| 16 SPAN GAS             | 40.0 PPM          | 41.574 | 40.020 |

หน้างาน



ลงนามเจ้าหน้าที่ (Signature)



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

KINETICS CORPORATION LTD.

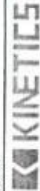
รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน : SGS (Thailand) Co., Ltd.  
วันที่ : 7 มีนาคม 2565  
รายชื่ออุปกรณ์ / เครื่องมือ : NO<sub>x</sub> Analyzer  
รุ่นของอุปกรณ์ / เครื่องมือ : T200

| TEST VALUES           |                        |                               |
|-----------------------|------------------------|-------------------------------|
| API MODEL T200        | BEFORE                 | AFTER                         |
| 1 RANGE               | 50 - 20,000 PPB        | 500                           |
| 2 STABILITY           | ≤ 1 PPB                | 0.1                           |
| 3 SAMPLE FLOW         | 500 ± 10% cc/min       | 502                           |
| 4 OZONE FLOW          | 80 ± 10% cc/min        | 80                            |
| 5 PMT                 | mV                     | 52.1                          |
| 6 NORM PMT            | mV                     | 0.5                           |
| 7 A ZERO              | -20 To 150 mV          | 48.3                          |
| 8 HPVS                | 400 - 500 V            | 668                           |
| 9 RX CELL TEMP        | 50 ± 1 °C              | 50.0                          |
| 10 BOX TEMP           | AMBIENT ± 5 °C         | 30.6                          |
| 11 PMT TEMP           | 7 ± 2 °C               | 6.9                           |
| 12 WOLY TEMP          | 315 ± 5 °C             | 315.8                         |
| 13 RX CELL PRESSURE   | -10 in. Hg-A           | 10.2                          |
| 14 SAMPLE PRESSURE    | 25 - 35 in. Hg-A       | 28.7                          |
| 15 NOX SLOPE          | 1.0 ± 0.3              | 1.985                         |
| 16 NOX OFFSET         | -50 To 150             | 1792.3                        |
| 17 NO SLOPE           | 1.0 ± 0.3              | 1.545                         |
| 18 NO OFFSET          | -50 To 150             | 1692.0                        |
| 19 NO SAMPLE READING  | PPB                    | -808.1                        |
| 20 NO2 SAMPLE READING | PPB                    | -227.2                        |
| 21 NOX SAMPLE READING | PPB                    | -835.1                        |
| 22 OPTIC TEST         | 2000 ± 1000 mV         | 2724.4                        |
| 23 ELECTRICAL TEST    | 2000 ± 1000 mV         | 2563.0                        |
| 24 VOLTAGE TEST       | +5 V +12 V +15 V -15 V | 5.23 / 12.24 / 15.72 / -15.07 |
| 25 ZERO GAS NONOX     | 0.000/00 PPB           | -888.47 / -1223.9             |
| 26 SPAN GAS NONOX     | 400.00/400.00 PPB      | -0.31 / -0.8                  |

หมายเหตุ

- ทำการปรับเทียบ Sintered Filter 1 ชิ้น, O-ring 2 ชิ้น, Spring 1 ชิ้น
- ทำการเปลี่ยนหลอด CD PMT 1 ชิ้น
- หน้าจอแสดงค่าตามภาพ Touch Screen ได้ แสดงค่าที่ Mouse ควบคุมได้
- ตรวจสอบค่า SAMPLE READING ไม่ผิดพลาด และพบว่า NOX SLOPE, NO SLOPE, NOX OFFSET, NO OFFSET มีค่าถูกต้อง
- ไม่สามารถทำการ Calibrate ZERO / SPAN ได้ / แก้ไขเรียบร้อยแล้ว



ลงนามเจ้าหน้าที่ (Signature)

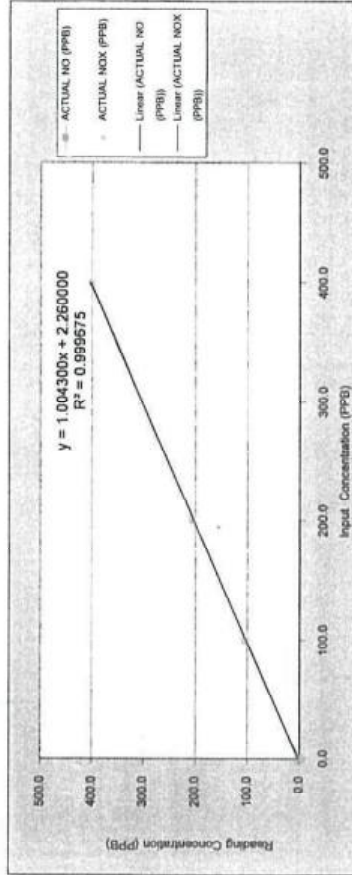
เลขที่ 388 ถนนมิตรภาพ แขวงจันทรมงคล เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th

MULTI POINT CALIBRATION REPORT

|                                  |                          |
|----------------------------------|--------------------------|
| CUSTOMER NAME                    | SGS (Thailand) Co., Ltd  |
| EQUIPMENT NAME                   | NO <sub>x</sub> Analyzer |
| MANUFACTURER                     | Teledyne - API           |
| MODEL                            | T200                     |
| SERIAL NO                        | 2199                     |
| CYLINDER NO                      | CC745169                 |
| CERTIFIED DATE                   | Mar 10, 2021             |
| EXPIRED DATE                     | Mar 10, 2029             |
| STANDARD GAS CONCENTRATION (PPM) | 53.40                    |
| CYLINDER PRESSURE (psig)         | 2000                     |
| CERTIFIED BY                     | AIRGAS SPECIALTY GASES   |

CALIBRATION RESULTS

| POINT NO    | CALIBRATION RESULTS |                 |                |            |
|-------------|---------------------|-----------------|----------------|------------|
|             | SIGNAL (PPB)        | ACTUAL NO (PPB) | ERROR NO (PPB) | % ERROR NO |
| ZERO        | 0.0                 | 0.0             | 0.0            | 0.0        |
| 1           | 100.0               | 103.4           | 3.4            | 3.3        |
| 2           | 200.0               | 205.0           | 5.0            | 2.5        |
| 3           | 300.0               | 304.7           | 4.7            | 1.6        |
| 4           | 400.0               | 399.8           | -0.2           | -0.1       |
| AVERAGE (%) |                     |                 |                | 1.9        |



DATE 7 มีนาคม 2565

เลขที่ 388 ถนนมิตรภาพ แขวงจันทรมงคล เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail : info@kinetics.co.th



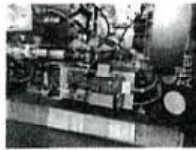

388 Ratchadapisek Rd. 32  
Chadrasakem, Chatuchak  
Bangkok 10900 | Thailand  
+66 (0) 2-515-8999

Env. Service@kinetics.co.th

| Customer Name : SCS (Thailand) Co., Ltd. |                                    |
|--|------------------------------------|
| Contact :                                |                                    |
| Description                              |                                    |
| Manufacturer : Teledyne API              | Model : T200                       |
| Equipment : NOx Analyzer                 | Serial No : 21999                  |
| Working Date : 07/03/2022                | Quotation : 042-2021-058-07 Rev.02 |

Environmental Science Business Unit

### Service Report

|                    |   |
|--------------------|---|
| Physical Checking  | <div>ตรวจเช็คเบื้องต้น</div> <div>• ไม่สามารถทำการ Calibrate ZERO / Span ได้</div> <div></div> <div>รูป หลอด CD PMT</div> |
| Correction Working | <div>• ทำการเปลี่ยน หลอด CD PMT 1 ชิ้น</div> <div>• ทำการเปลี่ยน Sintered Filter 1 ชิ้น</div> <div>• ทำการเปลี่ยน O-ring 2 ชิ้น</div> <div>• ทำการเปลี่ยน Spring 1 ชิ้น</div>   |
| Recommendation     |   |

Action By : Mr.Pornchai Date : 07/03/2022



an Air Liquide company

## CERTIFICATE OF ANALYSIS

### Grade of Product: EPA Protocol

Part Number: E04N199E15A0822  
Cylinder Number: C0745169  
Laboratory: 124 - Plumsteadville - PA  
PGVP Number: A12021  
Gas Code: CO,NO,NOX,SO2,BALN  
Reference Number: 160-402045691-1  
Cylinder Volume: 144.4 CF  
Cylinder Pressure: 2015 PSIG  
Valve Outlet: 660  
Certification Date: Mar 10, 2021  
Expiration Date: Mar 10, 2029

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards" (May 2012), document EPA-600/R-13/331, and industry procedures based. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. The analysis is subject to significant impurities which affect the use of this calibration mixture. All concentrations are on a molar basis.

Do Not Use This Cylinder below 152 psig, i.e. 0.7 megapascals

De Net Use This Cylinder Below 100 psig. i.e. 0.7 megapascals.

| ANALYTICAL RESULTS   |                         |                      |                                     |                            |                        |
|--|-------------------------|----------------------|-------------------------------------|----------------------------|------------------------|
| Component  | Requested Concentration | Actual Concentration | Protocol Method                     | Total Relative Uncertainty | Assay Dates            |
| NOX  | 53.00 PPM               | 53.40 PPM            | G1                                  | +/- 1.1% NIST Traceable    | 03/03/2021, 03/10/2021 |
| NITRIC OXIDE   | 53.00 PPM               | 53.40 PPM            | G1                                  | +/- 1.1% NIST Traceable    | 03/03/2021, 03/10/2021 |
| SULFUR DIOXIDE   | 53.00 PPM               | 53.79 PPM            | G1                                  | +/- 0.9% NIST Traceable    | 03/03/2021, 03/10/2021 |
| CARBON MONOXIDE  | 4500 PPM                | 4512 PPM             | G1                                  | +/- 0.6% NIST Traceable    | 03/04/2021             |
| NITROGEN   | Balance                 |                      |                                     |                            |                        |
| CALIBRATION STANDARDS  |                         |                      |                                     |                            |                        |
| Type   | Lot ID                  | Cylinder No          | Concentration                       | Uncertainty                | Expiration Date        |
| NTRM   | 07060227                | EE0079116            | 100.3 PPM NITRIC OXIDE/NITROGEN     | +/- 1.0%                   | Jul 23, 2023           |
| PRM  | 12386                   | D065025              | 9.91 PPM AIR/NITROGEN DIOXIDE       | 2.0%                       | Feb 20, 2020           |
| GMS  | 124206869               | CC323707             | 4.028 PPM NITROGEN DIOXIDE/NITROGEN | 2.1%                       | Aug 16, 2021           |
| NTRM   | 16010003                | KAL003087            | 97.59 PPM SULFUR DIOXIDE/NITROGEN   | +/-0.8%                    | Dec 23, 2021           |
| NTRM   | 06012341                | KAL004716            | 4857 PPM CARBON MONOXIDE/NITROGEN   | +/- 0.6%                   | Jun 07, 2024           |
| The SPIL PRM or NTRM noted above is only in reference to the GMS used in the assay and not part of the analysis. |                         |                      |                                     |                            |                        |
| ANALYTICAL EQUIPMENT   |                         |                      |                                     |                            |                        |
| Instrument/Make/Model  | Analytical Principle    |                      |                                     |                            |                        |
| SIEMENS ULTRAMAT 6 N1H0279   | NDIR                    |                      |                                     |                            |                        |
| Nicolet ISS50 FTIR AUP2010245 NO   | FTIR                    |                      |                                     |                            |                        |
| Nicolet ISS50 FTIR AUP2010245 NO2  | FTIR                    |                      |                                     |                            |                        |
| Nicolet ISS50 FTIR AUP2010245 SO2  | FTIR                    |                      |                                     |                            |                        |
| Last Multipoint Calibration  |                         |                      |                                     |                            |                        |
| Feb 26, 2021   |                         |                      |                                     |                            |                        |
| Feb 11, 2021   |                         |                      |                                     |                            |                        |
| Feb 22, 2021   |                         |                      |                                     |                            |                        |
| Feb 18, 2021   |                         |                      |                                     |                            |                        |

#### Triad Data Available Upon Request

NOTES:  
Gross Weight: 28.1 Kg  
Net Weight: 4.6 Kg



Approved for Release



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด  
KINETICS CORPORATION LTD.

รายงานผลการซ่อมและปรับเทียบอุปกรณ์ตรวจวัดคุณภาพอากาศ

ลูกค้า / หน่วยงาน SGS (Thailand) Co., Ltd.  
วันที่ 9 กุมภาพันธ์ 2565  
รายชื่ออุปกรณ์ / เครื่องมือ NOx Analyzer  
รุ่นอุปกรณ์ / เครื่องมือ T200  
บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด  
หมายเลขอุปกรณ์ / เครื่องมือ 2975

| TEST VALUES           |                        |                           |
|-----------------------|------------------------|---------------------------|
| API MODEL T200        | BEFORE                 | AFTER                     |
| 1 RANGE               | 50 - 20,000 PPB        | 500                       |
| 2 STABILITY           | ≤ 1 PPB                | 0.1                       |
| 3 SAMPLE FLOW         | 500 ± 10% cc/min       | 488                       |
| 4 OZONE FLOW          | 80 ± 10% cc/min        | 78                        |
| 5 PMT                 | mV                     | 190.1                     |
| 6 NORM PMT            | mV                     | 32.2                      |
| 7 A ZERO              | -20 To 150 mV          | 65.4                      |
| 8 HPVS                | 400 - 900 V            | 751                       |
| 9 RX CELL TEMP        | 50 ± 1 °C              | 50.0                      |
| 10 BOX TEMP           | AMBIENT ± 5 °C         | 29.4                      |
| 11 PMT TEMP           | 7 ± 2 °C               | 7.4                       |
| 12 MOLY TEMP          | 315 ± 5 °C             | 316.2                     |
| 13 RX CELL PRESSURE   | <10 in. -Hg-A          | 6.3                       |
| 14 SAMPLE PRESSURE    | 25 - 35 in. -Hg-A      | 26.3                      |
| 15 NOX SLOPE          | 1.0 ± 0.3              | 1.009                     |
| 16 NOX OFFSET         | -50 To 150             | 4.3                       |
| 17 NO SLOPE           | 1.0 ± 0.3              | 0.991                     |
| 18 NO OFFSET          | -50 To 150             | -1.7                      |
| 19 NO SAMPLE READING  | PPB                    | 90.1                      |
| 20 NO2 SAMPLE READING | PPB                    | 4.4                       |
| 21 NOX SAMPLE READING | PPB                    | 16.3                      |
| 22 OPTIC TEST         | 2000 ± 1000 mV         | 2119.3                    |
| 23 ELECTRICAL TEST    | 2000 ± 1000 mV         | 2124.9                    |
| 24 VOLTAGE TEST       | +5 V +12 V +15 V -15 V | 5.2 / 12.2 / 15.9 / -15.2 |
| 25 ZERO GAS NONOX     | 0.000/00 PPB           | 2.31 / 5.83               |
| 26 SPAN GAS NONOX     | 400.00/400.00 PPB      | 329.7 / 332.2             |
|                       |                        | 400.5 / 400.5             |

หมายเหตุ

• ขั้วการเปลี่ยน PRESSURE SENSOR 1 ชิ้น

ALARM CELL PRESS Warning



บริษัท ไคเนติกส์ คอร์ปอเรชั่น จำกัด

ลงนามเจ้าหน้าที่ (Signature)

โทรศัพท์ : 0-2515-8987

เลขที่ 368 ถนนวิภาวดีเอก แขวงจันทน์เกษม เขตจตุจักร กรุงเทพฯ 10900 โทรศัพท์ : 0-2515-8999 โทรสาร : 0-2515-8988 E-Mail info@kinetics.co.th



NSC-TS-175 1025  
CALIBRATION 0017

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-04/0851

MTC No. EEL-BP-59/09/64

CALIBRATION CERTIFICATE

Submitted by : SGS (Thailand) Limited.

Address : 100 Nanglinchee Rd., Chongnonsee, Yannawa, Bangkok 10120.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.

: Sol 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Acoustic Calibrator

Manufacturer : Cirrus

Model : CR-515

Serial No. : 81745(ID No.-ENSL17154)

Standards used : 1. Digital Function Synthesizer NF Electronic DE-193A S/N 122037.

2. Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.

3. Programmable Attenuator Tamagawa TPA-303A S/N OF 2214.

4. Digital Multimeter Agilent 34401A S/N MY44005560.

5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.

6. Audio Analyzer Panasonic VP-7722A S/N 041477D122.

7. Condenser Microphone Bruel&Kjaer 4180 S/N 2889871.

Calibration Procedure: CP-102-04 based on IEC 60942-2003. The sound pressure level of instrument was measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 17 Sep. 2021

Date of Calibration : 27 Sep. 2021

VERIFIED

DATE 17 SEP 2021

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FMBL-MTC-002 Rev.4

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0851

MTC No. EEL. BP. 59/0964

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

Nominal Output of Unit Under Test = 94 dB re 20  $\mu$ Pa at 1000 Hz

Acoustic Output in dB re 20  $\mu$ Pa, Corrected to Reference Conditions: 101.325 kPa, 23.0 °C and 50 %RH.

#### 1. Sound Pressure Level

| Standard Microphone Type | Measured Sound Pressure Level (dB) | Deviated value (dB) | Uncertainty (dB) | Tolerance limit IEC60942:2003 Class 1 |
|--------------------------|------------------------------------|---------------------|------------------|---------------------------------------|
| 1/2 inch Brüel&Kjær 4180 | 94.08                              | 0.08                | $\pm 0.10$       | $\pm 0.40$ dB                         |

#### 2. Frequency

| Standard Microphone Type | Measured Frequency (Hz) | Deviated value (Hz) | Uncertainty (Hz) | Tolerance limit IEC60942:2003 Class 1 |
|--------------------------|-------------------------|---------------------|------------------|---------------------------------------|
| 1/2 inch Brüel&Kjær 4180 | 1000.3                  | 0.3                 | $\pm 1.5$        | $\pm 1.0\%$                           |

#### 3. Total Distortion

| Standard Microphone Type | Measured Total Distortion (%) | Uncertainty (%) | Tolerance limit IEC60942:2003 Class 1 |
|--------------------------|-------------------------------|-----------------|---------------------------------------|
| 1/2 inch Brüel&Kjær 4180 | 0.86                          | $\pm 0.50$      | $\pm 3.0\%$                           |

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by :



Approved by :



Acting Director

Electrical and Electronic Standards Laboratory  
Industrial Metrology and Testing Service Centre

Date of Calibration : 27 Sep. 2021

Date of Issue : 28 Sep. 2021

Ref : 2011264091703872002

End of Certificate

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NSC-TISTR-TS 17025  
CALIBRATION 0037

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-65/0173

MTC No. EEL. BP. 51/1264

### CALIBRATION CERTIFICATE

Submitted by : SGS (Thailand), Ltd.

Address : 100 Nanglinchee Rd., Chongnonsee, Yamawa, Bangkok 10120.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre,

Sri 1C, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

#### Instrument Calibrated :

Description : Sound Level Meter

Manufacturer : Cirrus

Model : CR:161B

Serial No. : G079771 (ENSL 18158)

Microphone : Cirrus MK224 No.209923D

Preamplifier : No.6089F

#### Standards used :

1. Band Pass Filter Stanford Research Systems SR 650 S/N 28712.
2. Condenser Microphone Brüel&Kjær 4180 S/N 2889871.
3. Decade Attenuator Ando AL-205 S/N 00464602.
4. Function/Arbitrary Waveform Generator Agilent 33220A S/N MY44042668.
5. Digital Function Synthesizer NF Electronic Instruments DF-193A S/N 122037.
6. Digital Multimeter Fluke 8520A S/N 4985007.
7. Multifunction Acoustic Calibrator Brüel&Kjær 4226 S/N 2810358.
8. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

VERIFIED

Date of Receipt : 14 Dec. 2021

Date of Calibration : 10-18 Jan. 2022

1 / 8

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Request No. 21-65/0173

MTC No. EEL, BP. 51/1264

9. Power Amplifier Briel&Kjer 2706 S/N 1517650.
10. Speaker Tannoy Limited, Great Britain British Patent No. 215300.
11. Digital Multimeter Agilent 34401A S/N MY44005560.
12. Programmable Attenuator Tamaagawa TPA-303A S/N 2212.

#### Calibration Procedure :

This instrument was calibrated by using calibration procedures no CP-102-02 and CP-102-03, which were based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2006). These calibration procedures were related to the electrical and acoustic signal tests. The electrical signal test was carried out with the direct measurement method. The acoustic signal test was performed in an anechoic room with the comparison measurement method.

This instrument has been calibrated against standards maintained at the Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

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

Date of Calibration : 10-18 Jan. 2022

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FM.BI.MTC.002 Rev.4

Request No. 21-65/0173

MTC No. EEL, BP. 51/1264

#### 1. Absolute Sensitivity

| Reference<br>Acoustic Signal<br>(dB) | Unit Under Test        |                   |                      | Tolerance<br>limit Class 1<br>(±dB) |
|--------------------------------------|------------------------|-------------------|----------------------|-------------------------------------|
|                                      | Measured Value<br>(dB) | Deviation<br>(dB) | Uncertainty<br>(±dB) |                                     |
| 94.03                                | 93.8                   | -0.2              | 0.50                 | 1.1                                 |

Note: No adjustment.

#### 2. Self-generated noise

##### 2.1 Normal test

| Measured value<br>(dB) | Uncertainty<br>(±dB) |
|------------------------|----------------------|
| 18.4                   | 0.10                 |

#### 2.2 The microphone of the sound level meter was replaced by electrical signal input device

| Frequency<br>Weighting | Measured Value<br>(dB) | Uncertainty<br>(±dB) |
|------------------------|------------------------|----------------------|
| A-Weighting            | under-range            | -                    |
| C-Weighting            | 19.6                   | 0.10                 |
| Flat                   | 31.3                   | 0.10                 |

Note: The under-range means the indicator cannot display the value because it is under the setting range 20-140 dB.

Date of Calibration : 10-18 Jan. 2022

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Request No. 21-65/0173

MTC No. EEL BP. 51/1264

Request No. 21-65/0173

MTC No. EEL BP. 51/1264

### 3. Acoustical signal test of frequency weightings

| Frequency<br>(Hz) | Deviation from response curve |                     |              | Uncertainty<br>(±dB) | Tolerance Limits<br>Class 1 (±dB) |
|-------------------|-------------------------------|---------------------|--------------|----------------------|-----------------------------------|
|                   | A-weighting<br>(dB)           | C-weighting<br>(dB) | Flat<br>(dB) |                      |                                   |
| 125               | 0.4                           | 0.2                 | 0.2          | 0.40                 | 1.5                               |
| 1 000             | -0.7                          | -0.7                | -0.7         | 0.40                 | 1.1                               |
| 4 000             | 0.1                           | 0.3                 | 0.4          | 0.40                 | 1.6                               |

### 4. Electrical signal test of frequency weightings

| Frequency<br>(Hz) | Deviation from response curve |                     |              | Uncertainty<br>(±dB) | Tolerance Limits<br>Class 1 (±dB) |
|-------------------|-------------------------------|---------------------|--------------|----------------------|-----------------------------------|
|                   | A-weighting<br>(dB)           | C-weighting<br>(dB) | Flat<br>(dB) |                      |                                   |
| 63                | 0.4                           | 0.1                 | 0.1          | 0.20                 | 1.5                               |
| 125               | 0.2                           | 0.1                 | 0.0          | 0.20                 | 1.5                               |
| 250               | 0.2                           | 0.0                 | 0.0          | 0.20                 | 1.4                               |
| 500               | 0.1                           | 0.0                 | 0.0          | 0.20                 | 1.4                               |
| 1 000             | 0.0                           | 0.0                 | 0.0          | 0.20                 | 1.1                               |
| 2 000             | -0.1                          | -0.1                | -0.1         | 0.20                 | 1.6                               |
| 4 000             | -0.4                          | -0.2                | -0.1         | 0.20                 | 1.6                               |
| 8 000             | -0.5                          | -0.4                | -0.1         | 0.20                 | +2.1; -3.1                        |
| 16 000            | 0.2                           | 0.3                 | -0.2         | 0.20                 | +3.5; -17.0                       |

Date of Calibration : 10-18 Jan. 2022

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### 5. Frequency and time weightings at 1 kHz

#### 5.1 Frequency weightings at 1 kHz

| Frequency<br>Weighting | Measured<br>Value (dB) | Deviated Value<br>(dB) | Uncertainty<br>(±dB) | Tolerance Limits<br>Class 1 (±dB) |
|------------------------|------------------------|------------------------|----------------------|-----------------------------------|
| A-weighting            | 114.0                  | 0.0                    | 0.20                 | 0.4                               |
| C-weighting            | 114.0                  | 0.0                    | 0.20                 | 0.4                               |
| Flat                   | 114.0                  | 0.0                    | 0.20                 | 0.4                               |

#### 5.2 Time weightings at 1 kHz

| Frequency<br>Weighting | Measured<br>Value (dB) | Deviated Value<br>(dB) | Uncertainty<br>(±dB) | Tolerance Limits<br>Class 1 (±dB) |
|------------------------|------------------------|------------------------|----------------------|-----------------------------------|
| Fast                   | 114.0                  | 0.0                    | 0.20                 | 0.3                               |
| Slow                   | 114.0                  | 0.0                    | 0.20                 | 0.3                               |
| Leq                    | 114.0                  | 0.0                    | 0.20                 | 0.3                               |

#### 6. Level linearity on the reference level range

| Anticipated<br>Value (dB) | Measured<br>Value (dB) | Deviated Value<br>(dB) | Uncertainty<br>(±dB) | Tolerance Limits<br>Class 1 (±dB) |
|---------------------------|------------------------|------------------------|----------------------|-----------------------------------|
| 139                       | 139.1                  | 0.1                    | 0.30                 | 1.1                               |
| 134                       | 134.1                  | 0.1                    | 0.30                 | 1.1                               |
| 129                       | 129.1                  | 0.1                    | 0.30                 | 1.1                               |
| 124                       | 124.0                  | 0.0                    | 0.30                 | 1.1                               |

Date of Calibration : 10-18 Jan. 2022

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6. Level linearity on the reference level range (cont.)

| Anticipated Value (dB) | Measured Value (dB) | Deviated Value (dB) | Uncertainty (±dB) | Tolerance Limits Class I (±dB) |
|------------------------|---------------------|---------------------|-------------------|--------------------------------|
| 119                    | 119.0               | 0.0                 | 0.30              | 1.1                            |
| 114                    | 114.0               | 0.0                 | 0.30              | 1.1                            |
| 109                    | 109.0               | 0.0                 | 0.30              | 1.1                            |
| 104                    | 104.0               | 0.0                 | 0.30              | 1.1                            |
| 99                     | 99.0                | 0.0                 | 0.30              | 1.1                            |
| 94                     | 94.0                | 0.0                 | 0.30              | 1.1                            |
| 89                     | 89.1                | 0.1                 | 0.30              | 1.1                            |
| 84                     | 84.0                | 0.0                 | 0.30              | 1.1                            |
| 79                     | 79.1                | 0.1                 | 0.30              | 1.1                            |
| 74                     | 74.1                | 0.1                 | 0.30              | 1.1                            |
| 69                     | 69.0                | 0.0                 | 0.30              | 1.1                            |
| 64                     | 64.0                | 0.0                 | 0.30              | 1.1                            |
| 59                     | 59.0                | 0.0                 | 0.30              | 1.1                            |
| 54                     | 54.0                | 0.0                 | 0.30              | 1.1                            |
| 49                     | 49.0                | 0.0                 | 0.30              | 1.1                            |
| 44                     | 44.0                | 0.0                 | 0.30              | 1.1                            |
| 39                     | 39.0                | 0.0                 | 0.30              | 1.1                            |
| 34                     | 34.0                | 0.0                 | 0.30              | 1.1                            |
| 29                     | 29.0                | 0.0                 | 0.30              | 1.1                            |
| 24                     | 23.9                | -0.1                | 0.30              | 1.1                            |

7. Level linearity including the level range control

| Range  | Anticipated Value (dB) | Measured Value (dB) | Deviated Value (dB) | Uncertainty (±dB) | Tolerance Limits Class I (±dB) |
|--------|------------------------|---------------------|---------------------|-------------------|--------------------------------|
| 20-140 | 135                    | 135.0               | 0.0                 | 0.30              | 1.1                            |

8. Tone burst response

| Time Weighting | Toneburst Duration, Tb (ms) | Measured Value (dB) | Deviated Value (dB) | Uncertainty (±dB) | Tolerance Limits Class I (dB) |
|----------------|-----------------------------|---------------------|---------------------|-------------------|-------------------------------|
| Fast           | 200                         | 136.0               | 0.0                 | 0.20              | ±0.8                          |
|                | 2                           | 118.9               | -0.1                | 0.20              | +1.3; -1.8                    |
|                | 0.25                        | 109.8               | -0.2                | 0.20              | +1.3; -3.3                    |
| Slow           | 200                         | 129.6               | 0.0                 | 0.20              | ±0.8                          |
|                | 2                           | 110.0               | 0.0                 | 0.20              | +1.3; -3.3                    |
|                | 0.25                        | 130.0               | 0.0                 | 0.20              | ±0.8                          |
| SEL            | 2                           | 110.0               | 0.0                 | 0.20              | +1.3; -1.8                    |
|                | 0.25                        | 101.0               | 0.0                 | 0.20              | +1.3; -3.3                    |



NSC-TISTR-TS 17025  
CALIBRATION 0037

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-65/0173

MTC No. EEL.BP. 51/1264

9. Peak C sound level

| Number of cycles in test signal | Anticipated value (dB) | Measured value (dB) | Deviated value (dB) | Uncertainty (+dB) | Tolerance limits Class 1 (+dB) |
|---------------------------------|------------------------|---------------------|---------------------|-------------------|--------------------------------|
| Complete cycle                  | 135.4                  | 135.6               | 0.2                 | 0.20              | 2.4                            |
| Positive half cycle             | 134.4                  | 134.1               | -0.3                | 0.20              | 1.4                            |
| Negative half cycle             | 134.4                  | 134.1               | -0.3                | 0.20              | 1.4                            |

10. Overload indication

| Measured value (dB)     |                         | Deviated value (dB) | Uncertainty (+dB) | Tolerance Limits Class 1 (+dB) |
|-------------------------|-------------------------|---------------------|-------------------|--------------------------------|
| Positive one-half cycle | Negative one-half cycle |                     |                   |                                |
| 140.3                   | 140.2                   | 0.1                 | 0.30              | 1.8                            |

Calibrated by :

Approved by :



Date of Calibration : 10-18 Jan. 2022

Date of Issue : 19 Jan. 2022

Ref : 2011264121405144001

End of Certificate

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-65/0173

MTC No. EEL.BP. 52/1264

CALIBRATION CERTIFICATE

Submitted by : SGS (Thailand), Ltd.

Address : 100 Nanglinchee Rd., Chongnonssee, Yama, Bangkok 10120.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.

Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Level Meter  
Manufacturer : Cirrus  
Model : CR-161B  
Serial No. : G080140 (ENSL 18162)  
Microphone : Cirrus MK224 No.206464A  
Preamplifier : No.5472F

Ambient Environment

Temperature : (23 ± 3) °C  
Relative Humidity : (50 ± 15) %  
Ambient Pressure : (101.325 ± 1.5) kPa

Standards used :

1. Band Pass Filter Stanford Research Systems SR 650 S/N 28712.
2. Condenser Microphone Brüel&Kjær 4180 S/N 2889871.
3. Decade Attenuator Ando AI-205 S/N 00464602.
4. Function/Arbitrary Waveform Generator Agilent 33220A S/N MY44042668.
5. Digital Function Synthesizer NF Electronic Instruments DF-193A S/N 122037.
6. Digital Multimeter Fluke 8520A S/N 4985007.
7. Multifunction Acoustic Calibrator Brüel&Kjær 4226 S/N 2810358.
8. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

Date of Receipt : 14 Dec. 2021

Date of Calibration : 10-18 Jan. 2022

VERIFIED

DATE 14 Dec 2021 / 8

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-65/0173

MTC No. EEL, BP. 52/1264

9. Power Amplifier Brüel&Kjær 2706 SN 1517650.
10. Speaker Tannoy Limited, Great Britain British Patent No. 215300.
11. Digital Multimeter Agilent 34401A SN MY44005560.
12. Programmable Attenuator Tanagawa TPA-303A SN 2212.

#### Calibration Procedure :

This instrument was calibrated by using calibration procedures no CP-102-02 and CP-102-03, which were based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2006). These calibration procedures were related to the electrical and acoustic signal tests. The electrical signal test was carried out with the direct measurement method. The acoustic signal test was performed in an anechoic room with the comparison measurement method.

This instrument has been calibrated against standards maintained at the Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

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

Date of Calibration : 10-18 Jan. 2022

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-65/0173

MTC No. EEL, BP. 52/1264

#### 1. Absolute Sensitivity

| Reference<br>Acoustic Signal<br>(dB) | Unit Under Test        |                   | Tolerance<br>limit Class 1<br>(+dB) |
|--------------------------------------|------------------------|-------------------|-------------------------------------|
|                                      | Measured Value<br>(dB) | Deviation<br>(dB) | Uncertainty<br>(+dB)                |
| 94.03                                | 93.8                   | -0.2              | 0.50                                |
|                                      |                        |                   | 1.1                                 |

Note: No adjustment.

#### 2. Self-generated noise

##### 2.1 Normal test

| Measured value<br>(dB) | Uncertainty<br>(+dB) |
|------------------------|----------------------|
| 18.4                   | 0.10                 |

#### 2.2 The microphone of the sound level meter was replaced by electrical signal input device

| Frequency<br>Weighting | Measured Value<br>(dB) | Uncertainty<br>(+dB) |
|------------------------|------------------------|----------------------|
| A-Weighting            | under-range            | -                    |
| C-Weighting            | 16.5                   | 0.10                 |
| Flat                   | 28.3                   | 0.10                 |

Note: The under-range means the indicator cannot display the value because it is under the setting range 20-140 dB.

Date of Calibration : 10-18 Jan. 2022

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Request No. 21-65/0173

MTC No. EEL. BP. 52/1264

### 3. Acoustical signal test of frequency weightings

| Frequency<br>(Hz) | Deviation from response curve |                     |              | Uncertainty<br>(±dB) | Tolerance Limits<br>Class 1 (±dB) |
|-------------------|-------------------------------|---------------------|--------------|----------------------|-----------------------------------|
|                   | A-weighting<br>(dB)           | C-weighting<br>(dB) | Flat<br>(dB) |                      |                                   |
| 125               | 0.4                           | 0.3                 | 0.2          | 0.40                 | 1.5                               |
| 1 000             | -0.3                          | -0.3                | -0.3         | 0.40                 | 1.1                               |
| 4 000             | -1.1                          | -0.9                | -0.8         | 0.40                 | 1.6                               |

### 4. Electrical signal test of frequency weightings

| Frequency<br>(Hz) | Deviation from response curve |                     |              | Uncertainty<br>(±dB) | Tolerance Limits<br>Class 1 (±dB) |
|-------------------|-------------------------------|---------------------|--------------|----------------------|-----------------------------------|
|                   | A-weighting<br>(dB)           | C-weighting<br>(dB) | Flat<br>(dB) |                      |                                   |
| 63                | 0.3                           | 0.1                 | 0.1          | 0.20                 | 1.5                               |
| 125               | 0.2                           | 0.0                 | 0.1          | 0.20                 | 1.5                               |
| 250               | 0.2                           | 0.0                 | 0.0          | 0.20                 | 1.4                               |
| 500               | 0.1                           | 0.0                 | 0.0          | 0.20                 | 1.4                               |
| 1 000             | 0.0                           | 0.0                 | 0.0          | 0.20                 | 1.1                               |
| 2 000             | -0.1                          | 0.0                 | 0.1          | 0.20                 | 1.6                               |
| 4 000             | -0.4                          | -0.2                | 0.0          | 0.20                 | 1.6                               |
| 8 000             | -0.5                          | -0.3                | -0.1         | 0.20                 | +2.1; -3.1                        |
| 16 000            | 0.2                           | 0.4                 | -0.2         | 0.20                 | +3.5; -17.0                       |

Date of Calibration : 10-18 Jan. 2022

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Request No. 21-65/0173

MTC No. EEL. BP. 52/1264

### 5. Frequency and time weightings at 1 kHz

#### 5.1 Frequency weightings at 1 kHz

| Frequency<br>Weighting | Measured<br>Value (dB) | Deviated Value<br>(dB) | Uncertainty<br>(±dB) | Tolerance Limits<br>Class 1 (±dB) |
|------------------------|------------------------|------------------------|----------------------|-----------------------------------|
| A-weighting            | 114.0                  | 0.0                    | 0.20                 | 0.4                               |
| C-weighting            | 114.0                  | 0.0                    | 0.20                 | 0.4                               |
| Flat                   | 114.0                  | 0.0                    | 0.20                 | 0.4                               |

#### 5.2 Time weightings at 1 kHz

| Frequency<br>Weighting | Measured<br>Value (dB) | Deviated Value<br>(dB) | Uncertainty<br>(±dB) | Tolerance Limits<br>Class 1 (±dB) |
|------------------------|------------------------|------------------------|----------------------|-----------------------------------|
| Fast                   | 114.0                  | 0.0                    | 0.20                 | 0.3                               |
| Slow                   | 114.0                  | 0.0                    | 0.20                 | 0.3                               |
| Leq                    | 114.0                  | 0.0                    | 0.20                 | 0.3                               |

#### 6. Level linearity on the reference level range

| Anticipated<br>Value (dB) | Measured<br>Value (dB) | Deviated Value<br>(dB) | Uncertainty<br>(±dB) | Tolerance Limits<br>Class 1 (±dB) |
|---------------------------|------------------------|------------------------|----------------------|-----------------------------------|
| 139                       | 139.1                  | 0.1                    | 0.30                 | 1.1                               |
| 134                       | 134.0                  | 0.0                    | 0.30                 | 1.1                               |
| 129                       | 129.0                  | 0.0                    | 0.30                 | 1.1                               |
| 124                       | 124.0                  | 0.0                    | 0.30                 | 1.1                               |

Date of Calibration : 10-18 Jan. 2022

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6. Level linearity on the reference level range (cont.)

| Anticipated Value (dB) | Measured Value (dB) | Deviated Value (dB) | Uncertainty (±dB) | Tolerance Limits Class 1 (±dB) |
|------------------------|---------------------|---------------------|-------------------|--------------------------------|
| 119                    | 119.0               | 0.0                 | 0.30              | 1.1                            |
| 114                    | 114.0               | 0.0                 | 0.30              | 1.1                            |
| 109                    | 109.0               | 0.0                 | 0.30              | 1.1                            |
| 104                    | 104.0               | 0.0                 | 0.30              | 1.1                            |
| 99                     | 99.0                | 0.0                 | 0.30              | 1.1                            |
| 94                     | 94.0                | 0.0                 | 0.30              | 1.1                            |
| 89                     | 89.0                | 0.0                 | 0.30              | 1.1                            |
| 84                     | 84.0                | 0.0                 | 0.30              | 1.1                            |
| 79                     | 79.0                | 0.0                 | 0.30              | 1.1                            |
| 74                     | 74.0                | 0.0                 | 0.30              | 1.1                            |
| 69                     | 69.0                | 0.0                 | 0.30              | 1.1                            |
| 64                     | 63.9                | -0.1                | 0.30              | 1.1                            |
| 59                     | 58.9                | -0.1                | 0.30              | 1.1                            |
| 54                     | 53.9                | -0.1                | 0.30              | 1.1                            |
| 49                     | 48.9                | -0.1                | 0.30              | 1.1                            |
| 44                     | 43.9                | -0.1                | 0.30              | 1.1                            |
| 39                     | 39.0                | 0.0                 | 0.30              | 1.1                            |
| 34                     | 33.9                | -0.1                | 0.30              | 1.1                            |
| 29                     | 29.0                | 0.0                 | 0.30              | 1.1                            |
| 24                     | 24.0                | 0.0                 | 0.30              | 1.1                            |

Date of Calibration : 10-18 Jan. 2022

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7. Level linearity including the level range control

| Range  | Anticipated Value (dB) | Measured Value (dB) | Deviated Value (dB) | Uncertainty (±dB) | Tolerance Limits Class 1 (±dB) |
|--------|------------------------|---------------------|---------------------|-------------------|--------------------------------|
| 20-140 | 135                    | 135.0               | 0.0                 | 0.30              | 1.1                            |

8. Tone burst response

| Time Weighting | Toneburst Duration, Tb (ms) | Measured Value (dB) | Deviated Value (dB) | Uncertainty (±dB) | Tolerance Limits Class 1 (dB) |
|----------------|-----------------------------|---------------------|---------------------|-------------------|-------------------------------|
| Fast           | 200                         | 136.0               | 0.0                 | 0.20              | ±0.8                          |
|                | 2                           | 118.9               | -0.1                | 0.20              | +1.3; -1.8                    |
|                | 0.25                        | 109.8               | -0.2                | 0.20              | +1.3; -3.3                    |
| Slow           | 200                         | 129.6               | 0.0                 | 0.20              | ±0.8                          |
|                | 2                           | 110.0               | 0.0                 | 0.20              | +1.3; -3.3                    |
|                | 200                         | 130.0               | 0.0                 | 0.20              | ±0.8                          |
| SEL            | 2                           | 110.0               | 0.0                 | 0.20              | +1.3; -1.8                    |
|                | 0.25                        | 101.0               | 0.0                 | 0.20              | +1.3; -3.3                    |

Date of Calibration : 10-18 Jan. 2022

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-65/0173

MTC No. EEL. BP. 52/1264

#### 9. Peak C sound level

| Number of cycles in test signal | Anticipated value (dB) | Measured value (dB) | Deviated value (dB) | Uncertainty (±dB) | Tolerance limits Class 1 (±dB) |
|---------------------------------|------------------------|---------------------|---------------------|-------------------|--------------------------------|
| Complete cycle                  | 135.4                  | 135.6               | 0.2                 | 0.20              | 2.4                            |
| Positive half cycle             | 134.4                  | 134.1               | -0.3                | 0.20              | 1.4                            |
| Negative half cycle             | 134.4                  | 134.1               | -0.3                | 0.20              | 1.4                            |

#### 10. Overload indication

| Measured value (dB)     |       | Deviated value (dB) | Uncertainty (±dB) | Tolerance Limits Class 1 (±dB) |
|-------------------------|-------|---------------------|-------------------|--------------------------------|
| Positive one-half cycle | 140.2 | 0.1                 | 0.30              | 1.8                            |

Calibrated by :

Approved by :



Acting Director

Electrical and Electronic Standards Laboratory  
Industrial Metrology and Testing Service Centre

Date of Calibration : 10-18 Jan. 2022

Date of Issue : 19 Jan. 2022

Ref : 2011264121405144002

End of Certificate

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0637

MTC No. EEL. BP. 65/0664

### CALIBRATION CERTIFICATE

Submitted by : SGS (Thailand) Ltd.

Address : 100 Nanglinchee Rd., Chongnonsae, Yarnawa, Bangkok 10120.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.

: Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Acoustic Calibrator

Manufacturer : Cirrus

Model : CR:515

Serial No. : 88346(ID No.:ENSL19174)

Ambient Environment

Temperature : (23 ± 3) °C

Relative Humidity : (50 ± 15) %

Ambient Pressure : (101.325 ± 1.500) kPa

Standards used : 1. Digital Function Synthesizer NF Electronic DE-193A S/N 122037.

2. Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.

3. Programmable Attenuator Tanagawa TPA-303A S/N OF 2214.

4. Digital Multimeter Agilent 34401A S/N MY44005560.

5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.

6. Audio Analyzer Panasonic VP-7722A S/N 041477D122.

7. Condenser Microphone Bruel&Kjaer 4180 S/N 2633526.

Calibration Procedure: CP-102-04 based on IEC 60942-2003. The sound pressure level of instrument was measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 14 Jun. 2021

Date of Calibration : 17 Jun. 2021

VERIFIED

DATE 13 Jun 2021

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0637

MTC No. EEL BP. 65/0664

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

Nominal Output of Unit Under Test = 94 dB re 20μPa at 1000 Hz

Acoustic Output in dB re 20μPa, Corrected to Reference Conditions: 101.325 kPa, 23.0 °C and 50 %RH.

## 1. Sound Pressure Level

| Standard Microphone Type | Measured Sound Pressure Level (dB) | Deviated value (dB) | Uncertainty (dB) | Tolerance limit IEC60942:2003 Class 1 |
|--------------------------|------------------------------------|---------------------|------------------|---------------------------------------|
| 1/2 inch Brüel&Kjær 4180 | 94.08                              | 0.08                | ± 0.10           | ±0.40 dB                              |

## 2. Frequency

| Standard Microphone Type | Measured Frequency (Hz) | Deviated value (Hz) | Uncertainty (Hz) | Tolerance limit IEC60942:2003 Class 1 |
|--------------------------|-------------------------|---------------------|------------------|---------------------------------------|
| 1/2 inch Brüel&Kjær 4180 | 1000.2                  | 0.2                 | ± 1.5            | ± 1.0%                                |

## 3. Total Distortion

| Standard Microphone Type | Measured Total Distortion (%) | Uncertainty (%) | Tolerance limit IEC60942:2003 Class 1 |
|--------------------------|-------------------------------|-----------------|---------------------------------------|
| 1/2 inch Brüel&Kjær 4180 | 0.77                          | ± 0.50          | ±3.0%                                 |

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by :



Approved by :



Acting Director

Electrical and Electronic Standards Laboratory  
Industrial Metrology and Testing Service Centre

Date of Calibration : 17 Jun. 2021

Date of Issue : 18 Jun. 2021

Ref : 2011264061402560002 2 / 2

End of Certificate

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REV.02 02/24/21



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## CERTIFICATE OF CALIBRATION

Certificate No.: CO-3107002/21

Page 1 of total 2 pages

Customer  
SGS (THAILAND) LIMITED  
100 Nanglinchee Road, Chongnonsee,  
Yanawa, Bangkok 10120 Thailand

Equipment pH Meter  
Manufacturer HANNA  
Serial No. 04260059101  
Description Range : 0 - 14 pH, Resolution : 0.01 pH

Model IH98195  
ID No. ENWA19104

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

Calibration Location Jayhawks Laboratory (CL&GL)  
Received Date 31 July 2021  
Calibration Date 2 August 2021

Date of Issue 2 August 2021

Checked by :

Approved by :

Act as Technical Manager

Representative of Managing Director

VERIFIED

DATE 19 July 2021

Certificate No.: CO-3107002/21

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Reference Method:

- The calibration method used was CP-178 based on an in-house method.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard:

| Type                 | pH Value | Lot No. | Due Date      | Traceability |
|----------------------|----------|---------|---------------|--------------|
| pH Standard Solution | 4.01     | 081020  | Dec. 13, 2021 | NIMT         |
|                      | 7.01     | 020221  | Dec. 25, 2021 |              |
|                      | 10.00    | 091020  | Jan. 19, 2022 |              |

| Type                            | Model       | Serial No.            | Certificate No. | Due Date      | Traceability |
|---------------------------------|-------------|-----------------------|-----------------|---------------|--------------|
| Digital Thermometer with Sensor | 1523 / 5622 | 1709138 / 4605984-005 | 10-1006001/21   | Jun. 10, 2022 | THC          |

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

- NIMT, National Institute of Metrology (Thailand).
- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

Calibration of pH Electrode (Serial No.: N74281)

| pH Standard Solution (pH) | Measured Value |        | Uncertainty (± pH) |
|---------------------------|----------------|--------|--------------------|
|                           | (pH)           | (mV)   |                    |
| 4.01                      | 4.06           | 158.8  | 0.013              |
| 7.01                      | 7.09           | -15.6  | 0.013              |
| 10.00                     | 10.16          | -179.8 | 0.013              |

Note : Adjust Curve to Buffer Solution pH (4.7,10)  
Temperature stability of micro bath : 25 ± 0.2°C

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

VERIFIED

BY Wijaya P DATE Aug 17, 2021

- End of Certificate -

Calibrated by Onnapa

REV.02 02/24/21

FE-169

CERTIFICATE OF CALIBRATION

Certificate No.: TO-3107005/21

Page 1 of total 2 pages

Customer  
SGS (THAILAND) LIMITED  
100 Nanglinchee Road, Chongnonsee,  
Yannawa, Bangkok 10120 Thailand

Equipment  
Digital Thermometer with Probe  
Manufacturer  
HANNA  
Serial No.  
04260059101  
Model  
HI98195  
ID No.  
ENWA19104  
Description  
Temperature range : 20 °C to 40 °C, Resolution of UUC : 0.01 °C

Environmental Conditions  
Ambient Temperature: (23 ± 3) °C  
Relative Humidity: (50 ± 15) %

Calibration Location  
Blue Devils Laboratory (TL)  
Received Date  
31 July 2021  
Calibration Date  
2 August 2021  
Date of Issue  
2 August 2021

Checked by

Approved by

Act as Technical Manager

Representative of Managing Director

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

VERIFIED

BY Wijaya P DATE Aug 16, 2021

This calibration certificate shall not be reproduced other than in full except with the prior written approval of the Thai Heart Calibration Co., Ltd.

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REV.02 02/24/21



**THAI HEART CALIBRATION CO., LTD.**  
112/1 Moo 5, Phatet Sae, Muang, Samut Prakan 10280  
Tel: 0-2394-2162, 0-2393-8495, 0-2393-8496 Fax: 0-2393-74507



Certificate No.: TO-3107005/21

Page 2 of total 2 pages

Reference Method:

- The calibration method used was CP-096 based on an in-house method.
- The temperature scale used was an ITS-90.
- This certificate can be traceable to the national standards, which is realized the shown measurement units according to the International System of Units (SI Units).

Reference Standard Instruments:

| Type                            | Model     | Serial No. | Cert. No.     | Due Date      | Traceability |
|---------------------------------|-----------|------------|---------------|---------------|--------------|
| Thermometer Readout             | 1529-R    | B7C853     | 20E3985       | Nov. 9, 2021  | TPA          |
| Platinum Resistance Thermometer | 5626      | 4853       | C0A30046      | Oct. 28, 2023 | FLUKE        |
| Liquid Bath                     | XORTS-40A | XO111019   | 10-0306002/21 | Jun. 3, 2023  | THC          |

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

- TPA, Technology Promotion Association (Thailand-Japan).
- FLUKE, Fluke Corporation, U.S.A.
- THC, Thai Heart Calibration Co., Ltd.

Measurement Results:

(X) Without Adjustment

Dimension of probe : Diameter 3 mm. Sensor Type : RTD (PT100)

| Immersion Depth (mm) | Standard Reading (°C) | UUC Reading (°C) | Correction (°C) | Uncertainty (± °C) |
|----------------------|-----------------------|------------------|-----------------|--------------------|
| 120                  | 20.003                | 20.02            | -0.017          | 0.0070             |
| 120                  | 30.003                | 30.02            | -0.017          | 0.0070             |
| 120                  | 40.003                | 40.01            | -0.007          | 0.0070             |

UUC : Unit Under Calibration

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

- End of Certificate -

|                   |                         |
|-------------------|-------------------------|
| VERIFIED          |                         |
| BY <i>Wanyouf</i> | DATE <i>Aug 6, 2021</i> |

Calibrated by *Apisit*

FF-169

REV 02/02/21



Smart Cap™ Quality Certificate

|            |                  |                    |                             |
|------------|------------------|--------------------|-----------------------------|
| Cap:       | H1764113-1       | Factory Cal. date: | 2021-04-01                  |
| Parameter: | Dissolved Oxygen | Compatibility:     | H1764113/H17694494-S probes |
| Serial No: | 033779850010460  |                    |                             |

Description: Smart Cap™ for Optical Dissolved Oxygen probe

Hanna Instruments certifies that this probe has been produced, calibrated and tested to meet all applicable Hanna Procedures using standards and reference instruments whose accuracy is traceable to the National Institute of Standards (NIST) in the USA or to internationally acceptable national physical standards. The standards and reference instruments used in calibration and testing are supported by a calibration system which meets requirements of ISO9001.

| Test  | Specification | Measured | Pass |
|---|---------------|----------|------|
| Measurement at 100% saturated *               | 100% ±3%      | 99.8     | ✓    |
| Measurement in N <sub>2</sub> (0% Saturated)* | 0 ±2%         | 1        | ✓    |

Mechanical Inspection

Digital Communication

\*tested with "Master factory" H1764113

Quality control and testing has been met.

|            |               |           |                    |
|------------|---------------|-----------|--------------------|
| Inspector: | <i>Ngilue</i> | Approval: | <i>[Signature]</i> |
| Date:      | <i>4/8/21</i> |           | Production Manager |

Hanna Instruments Inc. 204 Park East Drive, Bloomer, WI 54923  
www.hannainst.com



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