

## ภาคผนวก ค

ใบรับรองผลการตรวจวิเคราะห์คุณภาพสิ่งแวดล้อม

# ภาคผนวก ค-1

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คุณภาพอากาศในบรรยากาศ

คุณภาพอากาศในบรรยากาศโดยทั่วไป

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612105**

Date Received : Mar 12, 2026

Date Reported : Mar 18, 2026

Report Number: 3503320-1

Page 1 of 1

**Sample Description** Air Quality  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Parameter** Nitrogen dioxide (ppb)  
**Measurement Date** Mar 06, 2026 - Mar 11, 2026  
**Measurement by** Siriwit Ruangsom

|                        | 2612105-1    | 2612105-2    | 2612105-3    | 2612105-4    | 2612105-5    | - | - |
|------------------------|--------------|--------------|--------------|--------------|--------------|---|---|
| Time                   | Mar 06, 2026 | Mar 07, 2026 | Mar 08, 2026 | Mar 09, 2026 | Mar 10, 2026 | - | - |
| 09:00 AM - 10:00 AM    | 2.0          | 1.5          | 1.0          | 1.3          | 0.7          | - | - |
| 10:00 AM - 11:00 AM    | 0.5          | 1.2          | 0.1          | 0.2          | 1.1          | - | - |
| 11:00 AM - 12:00 PM    | 4.6          | 1.2          | 1.3          | 0.5          | 0.3          | - | - |
| 12:00 PM - 01:00 PM    | 0.6          | 1.2          | 0.3          | 1.8          | 2.1          | - | - |
| 01:00 PM - 02:00 PM    | 0.2          | 0.2          | 2.1          | 0.3          | 1.5          | - | - |
| 02:00 PM - 03:00 PM    | 1.4          | 1.5          | 3.1          | 0.2          | 1.1          | - | - |
| 03:00 PM - 04:00 PM    | 0.4          | 0.9          | 1.2          | 4.6          | 2.6          | - | - |
| 04:00 PM - 05:00 PM    | 1.6          | 1.6          | 1.8          | 1.1          | 0.8          | - | - |
| 05:00 PM - 06:00 PM    | 10.7         | 0.4          | 1.6          | 0.6          | 0.7          | - | - |
| 06:00 PM - 07:00 PM    | 6.4          | 5.4          | 0.9          | 1.3          | 2.2          | - | - |
| 07:00 PM - 08:00 PM    | 1.0          | 1.0          | 0.5          | 1.0          | 2.2          | - | - |
| 08:00 PM - 09:00 PM    | 26.1         | 5.0          | 1.0          | 0.8          | 0.7          | - | - |
| 09:00 PM - 10:00 PM    | 5.1          | 0.4          | 1.2          | 0.7          | 1.0          | - | - |
| 10:00 PM - 11:00 PM    | 4.5          | 1.1          | 0.7          | 0.9          | 1.2          | - | - |
| 11:00 PM - 12:00 AM    | 1.9          | 1.0          | 0.2          | 1.4          | 0.2          | - | - |
| 12:00 AM - 01:00 AM    | 1.9          | 2.8          | 0.7          | 1.7          | 0.8          | - | - |
| 01:00 AM - 02:00 AM    | 0.2          | 1.3          | <0.1         | 0.6          | 0.5          | - | - |
| 02:00 AM - 03:00 AM    | 1.8          | 0.8          | 1.5          | 0.6          | 0.3          | - | - |
| 03:00 AM - 04:00 AM    | 2.0          | 1.2          | 1.2          | 0.6          | 0.4          | - | - |
| 04:00 AM - 05:00 AM    | 2.0          | 1.2          | 1.0          | 0.8          | <0.1         | - | - |
| 05:00 AM - 06:00 AM    | 1.0          | 0.6          | 0.5          | 0.4          | 1.9          | - | - |
| 06:00 AM - 07:00 AM    | 1.4          | 1.0          | 1.0          | 1.1          | 0.3          | - | - |
| 07:00 AM - 08:00 AM    | 0.4          | 0.7          | 2.7          | 0.5          | 0.7          | - | - |
| 08:00 AM - 09:00 AM    | 1.2          | 1.6          | 1.6          | 0.2          | 0.1          | - | - |
| Average                | 3.3          | 1.5          | 1.2          | 1.0          | 1.0          | - | - |
| 1hr - Maximum          | 26.1         | 5.4          | 3.1          | 4.6          | 2.6          | - | - |
| Standard 1hr - Average | 120          | 120          | 120          | 120          | 120          | - | - |

Standard : Notification of the National Environment Board B.E. 2569.

Reference Method : U.S. Environmental Protection Agency Method Part 50 App. F (Chemiluminescence)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

Approved by

*Orawan R.*

Orawan Rakyong

Scientist (3)

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612105**

Date Received : Mar 12, 2026

Date Reported : Mar 18, 2026

Report Number: 3530192-1

Page 1 of 1

**Sample Description** Air Quality  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Parameter** Nitrogen dioxide (ppb)  
**Measurement Date** Mar 06, 2026 - Mar 11, 2026  
**Measurement by** Siriwit Ruangsom

|                        | 2612105-6    | 2612105-7    | 2612105-8    | 2612105-9    | 2612105-10   | - | - |
|------------------------|--------------|--------------|--------------|--------------|--------------|---|---|
| Time                   | Mar 06, 2026 | Mar 07, 2026 | Mar 08, 2026 | Mar 09, 2026 | Mar 10, 2026 | - | - |
| 10:00 AM - 11:00 AM    | 0.1          | 0.1          | 0.1          | <0.1         | 0.1          | - | - |
| 11:00 AM - 12:00 PM    | 0.5          | <0.1         | 0.1          | <0.1         | 0.2          | - | - |
| 12:00 PM - 01:00 PM    | 0.4          | 0.2          | 0.3          | <0.1         | <0.1         | - | - |
| 01:00 PM - 02:00 PM    | 0.3          | <0.1         | 1.4          | <0.1         | <0.1         | - | - |
| 02:00 PM - 03:00 PM    | 0.2          | 0.1          | 0.3          | 0.2          | 0.1          | - | - |
| 03:00 PM - 04:00 PM    | 0.2          | 0.2          | 0.9          | 0.3          | <0.1         | - | - |
| 04:00 PM - 05:00 PM    | 0.2          | 0.3          | <0.1         | 0.1          | <0.1         | - | - |
| 05:00 PM - 06:00 PM    | 0.1          | 0.1          | 0.2          | 0.1          | <0.1         | - | - |
| 06:00 PM - 07:00 PM    | 0.2          | <0.1         | 0.1          | <0.1         | <0.1         | - | - |
| 07:00 PM - 08:00 PM    | 0.2          | 0.1          | 0.1          | <0.1         | 0.1          | - | - |
| 08:00 PM - 09:00 PM    | 0.1          | 0.1          | <0.1         | <0.1         | 0.2          | - | - |
| 09:00 PM - 10:00 PM    | <0.1         | 0.2          | <0.1         | 0.2          | 0.2          | - | - |
| 10:00 PM - 11:00 PM    | 0.2          | 0.1          | <0.1         | 0.3          | 0.2          | - | - |
| 11:00 PM - 12:00 AM    | 0.1          | 0.2          | <0.1         | 0.1          | 0.3          | - | - |
| 12:00 AM - 01:00 AM    | 0.1          | 0.2          | <0.1         | 0.4          | 0.4          | - | - |
| 01:00 AM - 02:00 AM    | 0.1          | 0.1          | 0.1          | 0.2          | 0.2          | - | - |
| 02:00 AM - 03:00 AM    | 0.2          | 0.2          | <0.1         | 0.2          | 0.2          | - | - |
| 03:00 AM - 04:00 AM    | 0.1          | <0.1         | 0.1          | 0.4          | 0.2          | - | - |
| 04:00 AM - 05:00 AM    | 0.2          | <0.1         | 0.2          | 0.3          | 0.2          | - | - |
| 05:00 AM - 06:00 AM    | 0.4          | 0.2          | 0.3          | 0.2          | 0.2          | - | - |
| 06:00 AM - 07:00 AM    | 0.4          | 0.4          | 0.6          | 0.1          | 0.3          | - | - |
| 07:00 AM - 08:00 AM    | 0.5          | 0.5          | 1.4          | 0.1          | 0.4          | - | - |
| 08:00 AM - 09:00 AM    | 0.5          | 0.3          | 0.6          | 0.2          | 0.2          | - | - |
| 09:00 AM - 10:00 AM    | 0.1          | 0.3          | 0.2          | 0.2          | <0.1         | - | - |
| Average                | 0.2          | 0.2          | 0.4          | 0.2          | 0.2          | - | - |
| 1hr - Maximum          | 0.5          | 0.5          | 1.4          | 0.4          | 0.4          | - | - |
| Standard 1hr - Average | 120          | 120          | 120          | 120          | 120          | - | - |

Standard : Notification of the National Environment Board B.E. 2569.

Reference Method : U.S. Environmental Protection Agency Method Part 50 App. F (Chemiluminescence)

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Approved by

*Orawan R.*

Orawan Rakyong

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612107**

Date Received : Mar 12, 2026

Date Reported : Mar 18, 2026

Report Number: 3503316-1

Page 1 of 1

**Sample Description** Air Quality  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Parameter** Sulfur Dioxide (ppb)  
**Measurement Date** Mar 06, 2026 - Mar 11, 2026  
**Measurement by** Siriwit Ruangsom

|                           | 2612107-1    | 2612107-2    | 2612107-3    | 2612107-4    | 2612107-5    | - | - |
|---------------------------|--------------|--------------|--------------|--------------|--------------|---|---|
| Time                      | Mar 06, 2026 | Mar 07, 2026 | Mar 08, 2026 | Mar 09, 2026 | Mar 10, 2026 | - | - |
| 09:00 AM - 10:00 AM       | 9.4          | 0.7          | 0.7          | 1.9          | 1.5          | - | - |
| 10:00 AM - 11:00 AM       | 8.6          | 0.5          | 0.7          | 2.1          | 1.5          | - | - |
| 11:00 AM - 12:00 PM       | 7.4          | 0.3          | 0.9          | 2.2          | 1.5          | - | - |
| 12:00 PM - 01:00 PM       | 6.7          | 0.3          | 1.0          | 2.2          | 1.7          | - | - |
| 01:00 PM - 02:00 PM       | 6.1          | 0.3          | 1.0          | 2.4          | 1.6          | - | - |
| 02:00 PM - 03:00 PM       | 5.4          | 0.3          | 1.0          | 2.4          | 1.6          | - | - |
| 03:00 PM - 04:00 PM       | 4.9          | 0.4          | 1.1          | 2.3          | 1.6          | - | - |
| 04:00 PM - 05:00 PM       | 4.6          | 0.3          | 1.1          | 2.3          | 1.6          | - | - |
| 05:00 PM - 06:00 PM       | 4.1          | 0.2          | 1.2          | 2.4          | 1.5          | - | - |
| 06:00 PM - 07:00 PM       | 3.7          | 0.2          | 1.0          | 2.3          | 1.6          | - | - |
| 07:00 PM - 08:00 PM       | 3.0          | 0.1          | 1.1          | 2.5          | 1.6          | - | - |
| 08:00 PM - 09:00 PM       | 2.6          | <0.1         | 1.2          | 2.7          | 1.7          | - | - |
| 09:00 PM - 10:00 PM       | 2.4          | 0.1          | 1.4          | 1.2          | 1.6          | - | - |
| 10:00 PM - 11:00 PM       | 2.0          | 0.1          | 1.4          | 1.3          | 1.7          | - | - |
| 11:00 PM - 12:00 AM       | 1.9          | 0.2          | 1.4          | 1.4          | 1.7          | - | - |
| 12:00 AM - 01:00 AM       | 1.7          | 0.2          | 1.4          | 1.4          | 1.7          | - | - |
| 01:00 AM - 02:00 AM       | 1.5          | 0.3          | 1.4          | 1.5          | 1.8          | - | - |
| 02:00 AM - 03:00 AM       | 1.4          | 0.3          | 1.5          | 1.4          | 1.8          | - | - |
| 03:00 AM - 04:00 AM       | 1.2          | 0.4          | 1.4          | 1.3          | 1.8          | - | - |
| 04:00 AM - 05:00 AM       | 1.1          | 0.5          | 1.6          | 1.4          | 1.8          | - | - |
| 05:00 AM - 06:00 AM       | 0.9          | 0.6          | 1.8          | 1.4          | 1.8          | - | - |
| 06:00 AM - 07:00 AM       | 1.0          | 0.7          | 1.9          | 1.4          | 1.8          | - | - |
| 07:00 AM - 08:00 AM       | 0.9          | 0.7          | 2.0          | 1.5          | 1.9          | - | - |
| 08:00 AM - 09:00 AM       | 0.9          | 0.7          | 2.0          | 1.5          | 1.9          | - | - |
| Average                   | 3.5          | 0.4          | 1.3          | 1.9          | 1.7          | - | - |
| 1hr - Maximum             | 9.4          | 0.7          | 2.0          | 2.7          | 1.9          | - | - |
| Standard 1hr - Average    | 100          | 100          | 100          | 100          | 100          | - | - |
| Standard 24 hrs - Average | 50           | 50           | 50           | 50           | 50           | - | - |

Standard : Notification of the National Environment Board B.E. 2569.

Reference Method : U.S. Environmental Protection Agency, EPA Method Part 53 and 58

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

Approved by

*Orawan R.*

Orawan Rakyong

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612107**

Date Received : Mar 12, 2026

Date Reported : Mar 18, 2026

Report Number: 3530193-1

Page 1 of 1

**Sample Description** Air Quality  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Parameter** Sulfur Dioxide (ppb)  
**Measurement Date** Mar 06, 2026 - Mar 11, 2026  
**Measurement by** Siriwit Ruangsom

|                           | 2612107-6    | 2612107-7    | 2612107-8    | 2612107-9    | 2612107-10   | - | - |
|---------------------------|--------------|--------------|--------------|--------------|--------------|---|---|
| Time                      | Mar 06, 2026 | Mar 07, 2026 | Mar 08, 2026 | Mar 09, 2026 | Mar 10, 2026 | - | - |
| 10:00 AM - 11:00 AM       | 1.1          | 1.1          | 1.1          | 1.2          | 0.9          | - | - |
| 11:00 AM - 12:00 PM       | 1.1          | 1.0          | 1.1          | 1.1          | 1.0          | - | - |
| 12:00 PM - 01:00 PM       | 1.1          | 1.1          | 1.1          | 1.1          | 1.0          | - | - |
| 01:00 PM - 02:00 PM       | 1.1          | 1.1          | 1.2          | 1.1          | 1.1          | - | - |
| 02:00 PM - 03:00 PM       | 1.1          | 1.1          | 1.2          | 1.2          | 0.9          | - | - |
| 03:00 PM - 04:00 PM       | 1.1          | 1.1          | 1.1          | 1.2          | 0.6          | - | - |
| 04:00 PM - 05:00 PM       | 1.1          | 1.1          | 1.2          | 1.1          | 1.0          | - | - |
| 05:00 PM - 06:00 PM       | 1.1          | 1.1          | 1.2          | 1.1          | 1.1          | - | - |
| 06:00 PM - 07:00 PM       | 1.2          | 1.1          | 1.1          | 1.1          | 1.1          | - | - |
| 07:00 PM - 08:00 PM       | 1.1          | 1.1          | 1.1          | 1.1          | 1.2          | - | - |
| 08:00 PM - 09:00 PM       | 1.1          | 1.0          | 1.0          | 1.1          | 1.0          | - | - |
| 09:00 PM - 10:00 PM       | 1.1          | 1.0          | 1.1          | 1.1          | 1.1          | - | - |
| 10:00 PM - 11:00 PM       | 1.1          | 1.1          | 1.2          | 1.1          | 1.0          | - | - |
| 11:00 PM - 12:00 AM       | 1.1          | 1.1          | 1.3          | 1.1          | 1.1          | - | - |
| 12:00 AM - 01:00 AM       | 1.0          | 1.1          | 1.2          | 1.1          | 1.1          | - | - |
| 01:00 AM - 02:00 AM       | 1.0          | 1.2          | 1.2          | 1.1          | 1.0          | - | - |
| 02:00 AM - 03:00 AM       | 1.1          | 1.0          | 1.2          | 1.1          | 1.0          | - | - |
| 03:00 AM - 04:00 AM       | 1.0          | 1.0          | 1.2          | 1.1          | 1.0          | - | - |
| 04:00 AM - 05:00 AM       | 1.0          | 1.1          | 1.2          | 1.2          | 1.1          | - | - |
| 05:00 AM - 06:00 AM       | 1.1          | 1.0          | 1.2          | 1.2          | 1.0          | - | - |
| 06:00 AM - 07:00 AM       | 1.1          | 1.1          | 1.3          | 1.1          | 1.0          | - | - |
| 07:00 AM - 08:00 AM       | 1.1          | 1.1          | 1.3          | 1.1          | 0.9          | - | - |
| 08:00 AM - 09:00 AM       | 1.0          | 1.1          | 1.2          | 1.2          | 1.0          | - | - |
| 09:00 AM - 10:00 AM       | 1.1          | 1.1          | 1.2          | 1.0          | 1.0          | - | - |
| Average                   | 1.1          | 1.1          | 1.2          | 1.1          | 1.0          | - | - |
| 1hr - Maximum             | 1.2          | 1.2          | 1.3          | 1.2          | 1.2          | - | - |
| Standard 1hr - Average    | 100          | 100          | 100          | 100          | 100          | - | - |
| Standard 24 hrs - Average | 50           | 50           | 50           | 50           | 50           | - | - |

Standard : Notification of the National Environment Board B.E. 2569.

Reference Method : U.S. Environmental Protection Agency, EPA Method Part 53 and 58

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

Approved by

*Orawan R.*

Orawan Rakyong

Scientist (3)

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612108**

Date Received : Mar 11, 2026

Date Reported : Mar 19, 2026

Report Number : 3503312-1

Page 1 of 10

**Sample Number** 2612108-1  
**Sampled Date** Mar 06, 2026  
**Sample Description** Air Quality  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Date Analysis Commenced** Mar 12, 2026  
**Condition of Sample** Drawn into one 10-L air sampling bag

| Analyte                 | Sampled Date/time   | Unit | LOD | LOQ (LOR) | Result | Method                     | Testing Location |
|-------------------------|---------------------|------|-----|-----------|--------|----------------------------|------------------|
| <b>Air Testing</b>      |                     |      |     |           |        |                            |                  |
| Non-Methane Hydrocarbon | 06/03/26 - 07/03/26 | ppm  | -   | 1.0       | <1.0   | Total Hydrocarbon Analyzer | Rayong           |

**Sampled By :** Siriwit Ruangsom

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

*Thanita K.*

Thanita Kulsuriwong  
Scientist (4)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

**Lot ID: 2612108**

Date Received : Mar 11, 2026

Date Reported : Mar 19, 2026

Report Number : 3503312-1

Page 2 of 10

**Sample Number** 2612108-2  
**Sampled Date** Mar 07, 2026  
**Sample Description** Air Quality  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Date Analysis Commenced** Mar 12, 2026  
**Condition of Sample** Drawn into one 10-L air sampling bag

| Analyte                 | Sampled Date/time   | Unit | LOD | LOQ (LOR) | Result | Method                     | Testing Location |
|-------------------------|---------------------|------|-----|-----------|--------|----------------------------|------------------|
| <b>Air Testing</b>      |                     |      |     |           |        |                            |                  |
| Non-Methane Hydrocarbon | 07/03/26 - 08/03/26 | ppm  | -   | 1.0       | <1.0   | Total Hydrocarbon Analyzer | Rayong           |

**Sampled By** : Siriwit Ruangsom

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

*Thanita K.*

Thanita Kulsuriwong  
Scientist (4)

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612108**

Date Received : Mar 11, 2026

Date Reported : Mar 19, 2026

Report Number : 3503312-1

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**Sample Number** 2612108-3  
**Sampled Date** Mar 08, 2026  
**Sample Description** Air Quality  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Date Analysis Commenced** Mar 12, 2026  
**Condition of Sample** Drawn into one 10-L air sampling bag

| Analyte                 | Sampled Date/time   | Unit | LOD | LOQ (LOR) | Result | Method                     | Testing Location |
|-------------------------|---------------------|------|-----|-----------|--------|----------------------------|------------------|
| <b>Air Testing</b>      |                     |      |     |           |        |                            |                  |
| Non-Methane Hydrocarbon | 08/03/26 - 09/03/26 | ppm  | -   | 1.0       | <1.0   | Total Hydrocarbon Analyzer | Rayong           |

**Sampled By :** Siriwit Ruangsom

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

*Thanita K.*

Thanita Kulsuriwong  
Scientist (4)

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## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

**Lot ID: 2612108**

Date Received : Mar 11, 2026

Date Reported : Mar 19, 2026

Report Number : 3503312-1

Page 4 of 10

**Sample Number** 2612108-4  
**Sampled Date** Mar 09, 2026  
**Sample Description** Air Quality  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Date Analysis Commenced** Mar 12, 2026  
**Condition of Sample** Drawn into one 10-L air sampling bag

| Analyte                 | Sampled Date/time   | Unit | LOD | LOQ (LOR) | Result | Method                     | Testing Location |
|-------------------------|---------------------|------|-----|-----------|--------|----------------------------|------------------|
| <b>Air Testing</b>      |                     |      |     |           |        |                            |                  |
| Non-Methane Hydrocarbon | 09/03/26 - 10/03/26 | ppm  | -   | 1.0       | <1.0   | Total Hydrocarbon Analyzer | Rayong           |

**Sampled By** : Siriwit Ruangsom

Remark :

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Approved by

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**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612108**

Date Received : Mar 11, 2026

Date Reported : Mar 19, 2026

Report Number : 3503312-1

Page 5 of 10

**Sample Number** 2612108-5  
**Sampled Date** Mar 10, 2026  
**Sample Description** Air Quality  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Date Analysis Commenced** Mar 12, 2026  
**Condition of Sample** Drawn into one 10-L air sampling bag

| Analyte                 | Sampled Date/time   | Unit | LOD | LOQ (LOR) | Result | Method                     | Testing Location |
|-------------------------|---------------------|------|-----|-----------|--------|----------------------------|------------------|
| <b>Air Testing</b>      |                     |      |     |           |        |                            |                  |
| Non-Methane Hydrocarbon | 10/03/26 - 11/03/26 | ppm  | -   | 1.0       | <1.0   | Total Hydrocarbon Analyzer | Rayong           |

**Sampled By :** Siriwit Ruangsom

Remark :

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Approved by

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18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612108**

Date Received : Mar 11, 2026

Date Reported : Mar 19, 2026

Report Number : 3503312-1

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**Sample Number** 2612108-6  
**Sampled Date** Mar 06, 2026  
**Sample Description** Air Quality  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Date Analysis Commenced** Mar 12, 2026  
**Condition of Sample** Drawn into one 10-L air sampling bag

| Analyte                 | Sampled Date/time   | Unit | LOD | LOQ (LOR) | Result | Method                     | Testing Location |
|-------------------------|---------------------|------|-----|-----------|--------|----------------------------|------------------|
| <b>Air Testing</b>      |                     |      |     |           |        |                            |                  |
| Non-Methane Hydrocarbon | 06/03/26 - 07/03/26 | ppm  | -   | 1.0       | <1.0   | Total Hydrocarbon Analyzer | Rayong           |

**Sampled By :** Siriwit Ruangsom

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

*Thanita K.*

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
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**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612108**

Date Received : Mar 11, 2026

Date Reported : Mar 19, 2026

Report Number : 3503312-1

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**Sample Number** 2612108-7  
**Sampled Date** Mar 07, 2026  
**Sample Description** Air Quality  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Date Analysis Commenced** Mar 12, 2026  
**Condition of Sample** Drawn into one 10-L air sampling bag

| Analyte                 | Sampled Date/time   | Unit | LOD | LOQ (LOR) | Result | Method                     | Testing Location |
|-------------------------|---------------------|------|-----|-----------|--------|----------------------------|------------------|
| <b>Air Testing</b>      |                     |      |     |           |        |                            |                  |
| Non-Methane Hydrocarbon | 07/03/26 - 08/03/26 | ppm  | -   | 1.0       | 1.2    | Total Hydrocarbon Analyzer | Rayong           |

**Sampled By :** Siriwit Ruangsom

Remark :

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Approved by

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**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612108**

Date Received : Mar 11, 2026

Date Reported : Mar 19, 2026

Report Number : 3503312-1

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**Sample Number** 2612108-8  
**Sampled Date** Mar 08, 2026  
**Sample Description** Air Quality  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Date Analysis Commenced** Mar 12, 2026  
**Condition of Sample** Drawn into one 10-L air sampling bag

| Analyte                 | Sampled Date/time   | Unit | LOD | LOQ (LOR) | Result | Method                     | Testing Location |
|-------------------------|---------------------|------|-----|-----------|--------|----------------------------|------------------|
| <b>Air Testing</b>      |                     |      |     |           |        |                            |                  |
| Non-Methane Hydrocarbon | 08/03/26 - 09/03/26 | ppm  | -   | 1.0       | <1.0   | Total Hydrocarbon Analyzer | Rayong           |

**Sampled By :** Siriwit Ruangsom

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**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612108**

Date Received : Mar 11, 2026

Date Reported : Mar 19, 2026

Report Number : 3503312-1

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**Sample Number** 2612108-9  
**Sampled Date** Mar 09, 2026  
**Sample Description** Air Quality  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Date Analysis Commenced** Mar 12, 2026  
**Condition of Sample** Drawn into one 10-L air sampling bag

| Analyte                 | Sampled Date/time   | Unit | LOD | LOQ (LOR) | Result | Method                     | Testing Location |
|-------------------------|---------------------|------|-----|-----------|--------|----------------------------|------------------|
| <b>Air Testing</b>      |                     |      |     |           |        |                            |                  |
| Non-Methane Hydrocarbon | 09/03/26 - 10/03/26 | ppm  | -   | 1.0       | <1.0   | Total Hydrocarbon Analyzer | Rayong           |

**Sampled By :** Siriwit Ruangsom

Remark :

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**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612108**

Date Received : Mar 11, 2026

Date Reported : Mar 19, 2026

Report Number : 3503312-1

Page 10 of 10

**Sample Number** 2612108-10  
**Sampled Date** Mar 10, 2026  
**Sample Description** Air Quality  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Date Analysis Commenced** Mar 12, 2026  
**Condition of Sample** Drawn into one 10-L air sampling bag

| Analyte                 | Sampled Date/time   | Unit | LOD | LOQ (LOR) | Result | Method                     | Testing Location |
|-------------------------|---------------------|------|-----|-----------|--------|----------------------------|------------------|
| <b>Air Testing</b>      |                     |      |     |           |        |                            |                  |
| Non-Methane Hydrocarbon | 10/03/26 - 11/03/26 | ppm  | -   | 1.0       | <1.0   | Total Hydrocarbon Analyzer | Rayong           |

**Sampled By :** Siriwit Ruangsom

Remark :

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## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID: 2612109**  
Date Received :Mar 11, 2026  
Date Reported :Mar 18, 2026  
Report Number :3503302-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** 2612109-1 to 5  
**Parameter** Wind Speed / Wind Direction  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Sampling Date** Mar 06 - Mar 11, 2026  
**Sampling by** Siriwit Ruangsom

| Time                | Mar 06 - Mar 07, 2026 |             |     | Mar 07 - Mar 08, 2026 |             |     | Mar 08 - Mar 09, 2026 |             |     | Mar 09 - Mar 10, 2026 |             |     | Mar 10 - Mar 11, 2026 |             |     | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|-----------------------|-------------|-----|-----------------------|-------------|-----|-----------------------|-------------|-----|-----------------------|-------------|-----|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | WS<br>(m/s)           | WD<br>(deg) |     | WS<br>(m/s)           | WD<br>(deg) |     | WS<br>(m/s)           | WD<br>(deg) |     | WS<br>(m/s)           | WD<br>(deg) |     | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 1.5                   | 277.0       | W   | 0.8                   | 179.0       | S   | 0.7                   | 140.0       | SE  | 2.1                   | 58.0        | ENE | 1.4                   | 136.0       | SE  | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 0.5                   | 164.0       | SSE | 1.3                   | 151.0       | SSE | 0.3                   | 259.0       | W   | 3.7                   | 76.0        | ENE | 1.8                   | 99.0        | E   | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 1.3                   | 258.0       | WSW | 0.5                   | 119.0       | ESE | 0.4                   | 190.0       | S   | 0.4                   | 196.0       | SSW | 1.1                   | 142.0       | SE  | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 0.9                   | 195.0       | SSW | 1.6                   | 127.0       | SE  | 0.6                   | 209.0       | SSW | 0.6                   | 129.0       | SE  | 1.4                   | 323.0       | NW  | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 0.9                   | 204.0       | SSW | 0.6                   | 194.0       | SSW | 1.0                   | 307.0       | NW  | 0.9                   | 272.0       | W   | 1.0                   | 111.0       | ESE | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 0.5                   | 183.0       | S   | 0.7                   | 279.0       | W   | 0.6                   | 159.0       | SSE | 0.6                   | 330.0       | NNW | 0.9                   | 136.0       | SE  | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 1.5                   | 337.0       | NNW | 0.7                   | 146.0       | SE  | 0.7                   | 235.0       | SW  | 1.1                   | 269.0       | W   | 0.6                   | 138.0       | SE  | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 0.7                   | 230.0       | SW  | 0.4                   | 247.0       | WSW | 0.7                   | 119.0       | ESE | 1.0                   | 235.0       | SW  | 0.8                   | 189.0       | S   | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 0.9                   | 159.0       | SSE | 0.8                   | 246.0       | WSW | 0.7                   | 261.0       | W   | 0.3                   | 238.0       | WSW | 0.9                   | 305.0       | NW  | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 0.4                   | 86.0        | E   | 1.2                   | 271.0       | W   | 0.3                   | 318.0       | NW  | 0.5                   | 169.0       | S   | 0.8                   | 221.0       | SW  | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 0.0                   | -           | -   | 0.8                   | 291.0       | WNW | 0.1                   | -           | -   | 0.6                   | 241.0       | WSW | 2.0                   | 278.0       | W   | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 1.9                   | 72.0        | ENE | 0.4                   | 233.0       | SW  | 0.4                   | 241.0       | WSW | 0.0                   | -           | -   | 0.2                   | -           | -   | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 0.9                   | 110.0       | ESE | 0.3                   | 266.0       | W   | 0.3                   | 300.0       | WNW | 0.0                   | -           | -   | 0.0                   | -           | -   | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 1.4                   | 45.0        | NE  | 0.3                   | 196.0       | SSW | 0.2                   | -           | -   | 0.0                   | -           | -   | 0.1                   | -           | -   | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 0.0                   | -           | -   | 0.2                   | -           | -   | 0.5                   | 109.0       | ESE | 0.2                   | -           | -   | 0.6                   | 304.0       | NW  | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.1                   | -           | -   | 0.4                   | 256.0       | WSW | 0.0                   | -           | -   | 0.0                   | -           | -   | 0.8                   | 303.0       | WNW | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 1.0                   | 90.0        | E   | 0.2                   | -           | -   | 0.4                   | 162.0       | SSE | 1.4                   | 49.0        | NE  | 1.4                   | 297.0       | WNW | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 1.3                   | 90.0        | E   | 0.2                   | -           | -   | 0.0                   | -           | -   | 0.7                   | 86.0        | E   | 1.7                   | 291.0       | WNW | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 1.3                   | 93.0        | E   | 0.3                   | 250.0       | WSW | 0.0                   | -           | -   | 1.8                   | 53.0        | NE  | 0.8                   | 78.0        | ENE | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.1                   | -           | -   | 0.5                   | 308.0       | NW  | 0.8                   | 66.0        | ENE | 1.2                   | 18.0        | NNE | 2.7                   | 64.0        | ENE | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 0.2                   | -           | -   | 0.8                   | 65.0        | ENE | 1.8                   | 46.0        | NE  | 0.9                   | 56.0        | NE  | 0.9                   | 99.0        | E   | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 0.7                   | 63.0        | ENE | 0.9                   | 96.0        | E   | 0.8                   | 62.0        | ENE | 1.0                   | 303.0       | WNW | 1.1                   | 129.0       | SE  | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 1.1                   | 125.0       | SE  | 0.8                   | 302.0       | WNW | 0.8                   | 57.0        | ENE | 1.5                   | 79.0        | E   | 1.4                   | 80.0        | E   | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 1.0                   | 91.0        | E   | 0.3                   | 288.0       | WNW | 1.1                   | 115.0       | ESE | 0.8                   | 75.0        | ENE | 2.3                   | 71.0        | ENE | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2612109

Date Received : Mar 11, 2026

Date Reported : Mar 18, 2026

Report Number : 3503302-1

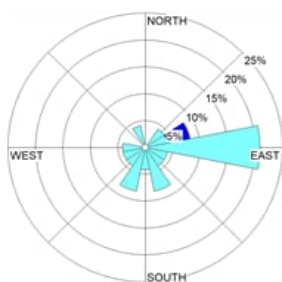
**P/O** : PMM-2025-336

**Project Name** :

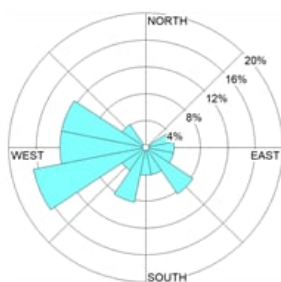
**Project Location** :

Page 2 of 2

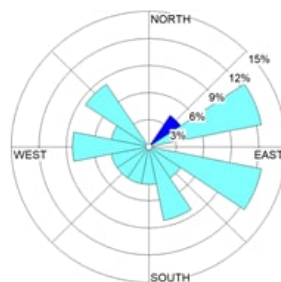
### Wind Rose



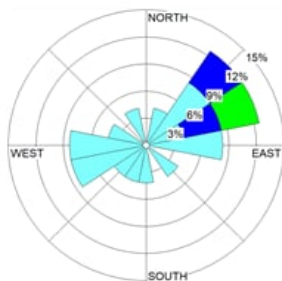
Date : Mar 06-07, 2026



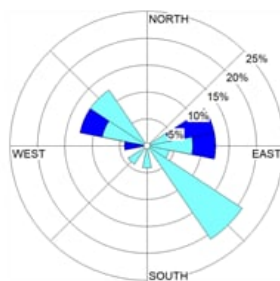
Date : Mar 07-08, 2026



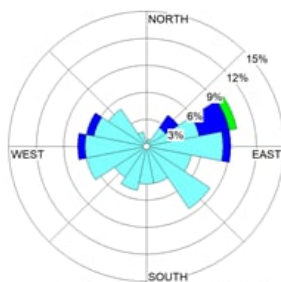
Date : Mar 08-09, 2026



Date : Mar 09-10, 2026



Date : Mar 10-11, 2026



Date : Mar 06-11, 2026

| WS (m/s) | %     |
|----------|-------|
| ≥ 10.0   | 0.00  |
| 8.0-10.0 | 0.00  |
| 5.5-8.0  | 0.00  |
| 3.3-5.5  | 0.83  |
| 1.7-3.3  | 7.50  |
| 0.3-1.7  | 74.17 |
| Calms    | 17.50 |

**Location** : ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)

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Approved by

Sarayuth Jitranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2612109

Date Received : Mar 11, 2026

Date Reported : Mar 18, 2026

Report Number : 3503302-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** : 2612109-6 to 10  
**Parameter** : Wind Speed / Wind Direction  
**Location** : บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Sampling Date** : Mar 06 - Mar 11, 2026  
**Sampling by** : Siriwit Ruangsom

| Time                | Mar 06 - Mar 07, 2026 |             |     | Mar 07 - Mar 08, 2026 |             |     | Mar 08 - Mar 09, 2026 |             |     | Mar 09 - Mar 10, 2026 |             |     | Mar 10 - Mar 11, 2026 |             |     | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|-----------------------|-------------|-----|-----------------------|-------------|-----|-----------------------|-------------|-----|-----------------------|-------------|-----|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | WS<br>(m/s)           | WD<br>(deg) |     | WS<br>(m/s)           | WD<br>(deg) |     | WS<br>(m/s)           | WD<br>(deg) |     | WS<br>(m/s)           | WD<br>(deg) |     | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 2.7                   | 243.0       | WSW | 0.3                   | 56.0        | NE  | 1.8                   | 103.0       | ESE | 0.7                   | 307.0       | NW  | 1.4                   | 142.0       | SE  | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 3.2                   | 252.0       | WSW | 3.2                   | 257.0       | WSW | 1.5                   | 170.0       | S   | 1.3                   | 272.0       | W   | 0.8                   | 199.0       | SSW | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 2.0                   | 272.0       | W   | 3.3                   | 239.0       | WSW | 1.1                   | 225.0       | SW  | 2.0                   | 264.0       | W   | 0.4                   | 338.0       | NNW | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 0.7                   | 253.0       | WSW | 1.3                   | 278.0       | W   | 3.3                   | 313.0       | NW  | 0.6                   | 267.0       | W   | 1.9                   | 150.0       | SSE | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 1.8                   | 246.0       | WSW | 0.7                   | 331.0       | NNW | 1.7                   | 340.0       | NNW | 0.9                   | 267.0       | W   | 1.4                   | 268.0       | W   | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 1.3                   | 278.0       | W   | 2.3                   | 260.0       | W   | 2.4                   | 317.0       | NW  | 1.9                   | 278.0       | W   | 0.9                   | 316.0       | NW  | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 0.7                   | 255.0       | WSW | 0.5                   | 274.0       | W   | 1.9                   | 307.0       | NW  | 1.4                   | 225.0       | SW  | 0.6                   | 295.0       | WNW | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 0.0                   | -           | -   | 0.9                   | 296.0       | WNW | 0.5                   | 315.0       | NW  | 0.4                   | 304.0       | NW  | 0.7                   | 281.0       | W   | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 0.9                   | 69.0        | ENE | 0.7                   | 286.0       | WNW | 1.3                   | 242.0       | WSW | 1.2                   | 334.0       | NNW | 0.0                   | -           | -   | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 0.8                   | 111.0       | ESE | 0.4                   | 352.0       | N   | 0.0                   | -           | -   | 0.0                   | -           | -   | 0.0                   | -           | -   | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 0.6                   | 64.0        | ENE | 1.7                   | 296.0       | WNW | 0.0                   | -           | -   | 0.0                   | -           | -   | 0.0                   | -           | -   | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 1.1                   | 149.0       | SSE | 0.0                   | -           | -   | 0.0                   | -           | -   | 0.0                   | -           | -   | 0.0                   | -           | -   | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 1.2                   | 65.0        | ENE | 0.8                   | 258.0       | WSW | 0.0                   | -           | -   | 0.0                   | -           | -   | 0.0                   | -           | -   | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 0.0                   | -           | -   | 1.2                   | 227.0       | SW  | 0.0                   | -           | -   | 0.0                   | -           | -   | 0.3                   | 81.0        | E   | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.3                   | 97.0        | E   | 0.0                   | -           | -   | 0.2                   | -           | -   | 0.0                   | -           | -   | 0.0                   | -           | -   | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 0.4                   | 86.0        | E   | 0.0                   | -           | -   | 0.2                   | -           | -   | 0.0                   | -           | -   | 0.0                   | -           | -   | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 0.0                   | -           | -   | 0.0                   | -           | -   | 0.0                   | -           | -   | 0.0                   | -           | -   | 0.5                   | 74.0        | ENE | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 0.2                   | -           | -   | 0.0                   | -           | -   | 0.2                   | -           | -   | 0.1                   | -           | -   | 0.6                   | 104.0       | ESE | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 1.2                   | 93.0        | E   | 0.1                   | -           | -   | 0.0                   | -           | -   | 0.2                   | -           | -   | 0.0                   | -           | -   | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 0.0                   | -           | -   | 0.0                   | -           | -   | 0.0                   | -           | -   | 0.2                   | -           | -   | 0.3                   | 84.0        | E   | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 0.2                   | -           | -   | 1.0                   | 59.0        | ENE | 1.1                   | 63.0        | ENE | 2.3                   | 90.0        | E   | 0.3                   | 87.0        | E   | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.9                   | 98.0        | E   | 0.5                   | 77.0        | ENE | 0.3                   | 105.0       | ESE | 2.6                   | 95.0        | E   | 1.7                   | 58.0        | ENE | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 2.2                   | 90.0        | E   | 1.0                   | 320.0       | NW  | 1.3                   | 147.0       | SSE | 1.7                   | 91.0        | E   | 0.2                   | -           | -   | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 2.1                   | 166.0       | SSE | 0.3                   | 67.0        | ENE | 1.2                   | 103.0       | ESE | 3.0                   | 126.0       | SE  | 2.2                   | 166.0       | SSE | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2612109

Date Received :Mar 11, 2026

Date Reported :Mar 18, 2026

Report Number :3503302-1

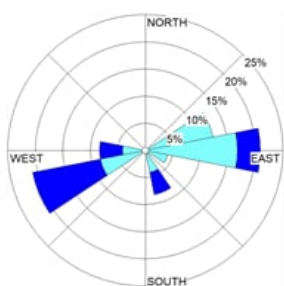
**P/O :** PMM-2025-336

**Project Name :**

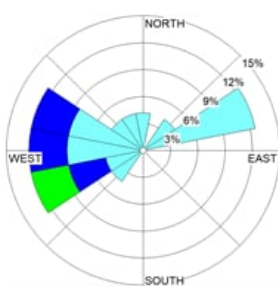
**Project Location :**

Page 2 of 2

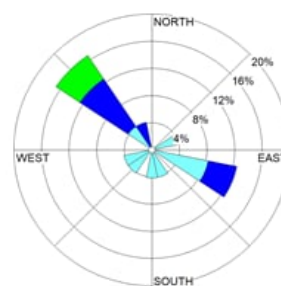
### Wind Rose



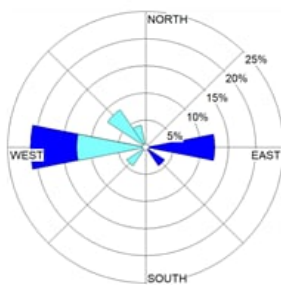
Date : Mar 06-07, 2026



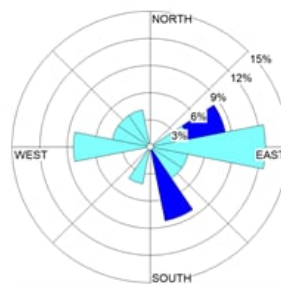
Date : Mar 07-08, 2026



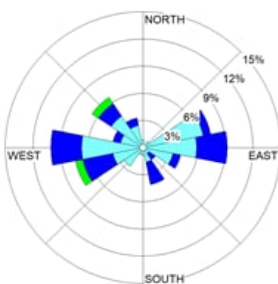
Date : Mar 08-09, 2026



Date : Mar 09-10, 2026



Date : Mar 10-11, 2026



Date : Mar 06-11, 2026

|  | WS (m/s) | %     |
|--|----------|-------|
|  | ≥ 10.0   | 0.00  |
|  | 8.0-10.0 | 0.00  |
|  | 5.5-8.0  | 0.00  |
|  | 3.3-5.5  | 1.67  |
|  | 1.7-3.3  | 18.33 |
|  | 0.3-1.7  | 43.33 |
|  | Calms    | 36.67 |

**Location :** บริเวณหมู่บ้านหนองแดง (GPS 47P 0738026, 1402909)

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Approved by

Sarayuth Jitranont  
Assistant General Manager

สารประกอบอินทรีย์ระเหยง่าย

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location :**

**Lot ID: 265490**

Date Received : Jan 22, 2026

Date Reported : Jan 28, 2026

Report Number : 3496967-2

Page 1 of 1

**Sample Number** 265490-1  
**Sampled Date** Jan 21, 2026  
**Sample Description** Air Quality  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Date Analysis Commenced** Jan 23, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 21/01/26 - 22/01/26 | ug/m3 | 0.04 | 0.11      | 0.13   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 21/01/26 - 22/01/26 | ug/m3 | 0.05 | 0.16      | 1.15   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

**Guideline :**

NEB : Notification of National Environment Board, B.E. 2560 (2017)

PCD : Notification of the Pollution Control Department, which was published in the Royal Government Gazette Vol. 126 Special Part 13 D dated January 27, B.E. 2552 (2009).

**Sampled By :** Sawai Tonpho

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Chontichak

Chonticha Subongkoch  
Scientist (3)

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location :**

**Lot ID: 265490**

Date Received : Jan 22, 2026

Date Reported : Jan 28, 2026

Report Number : 3496968-2

Page 1 of 1

**Sample Number** 265490-2  
**Sampled Date** Jan 21, 2026  
**Sample Description** Air Quality  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Date Analysis Commenced** Jan 23, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 21/01/26 - 22/01/26 | ug/m3 | 0.04 | 0.11      | <0.11  | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 21/01/26 - 22/01/26 | ug/m3 | 0.05 | 0.16      | 1.21   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

**Guideline :**

NEB : Notification of National Environment Board, B.E. 2560 (2017)

PCD : Notification of the Pollution Control Department, which was published in the Royal Government Gazette Vol. 126 Special Part 13 D dated January 27, B.E. 2552 (2009).

**Sampled By :** Sawai Tonpho

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Chontichak

Chonticha Subongkoch  
Scientist (3)

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location :**

**Lot ID: 265490**

Date Received : Jan 22, 2026

Date Reported : Jan 28, 2026

Report Number : 3496969-2

Page 1 of 1

**Sample Number** 265490-3  
**Sampled Date** Jan 21, 2026  
**Sample Description** Air Quality  
**Location** บริเวณชุมชนบ้านตากวน ((GPS 47P 0735896, 1402032)  
**Date Analysis Commenced** Jan 23, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 21/01/26 - 22/01/26 | ug/m3 | 0.04 | 0.11      | 0.18   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 21/01/26 - 22/01/26 | ug/m3 | 0.05 | 0.16      | 1.28   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

**Guideline :**

NEB : Notification of National Environment Board, B.E. 2560 (2017)

PCD : Notification of the Pollution Control Department, which was published in the Royal Government Gazette Vol. 126 Special Part 13 D dated January 27, B.E. 2552 (2009).

**Sampled By :** Sawai Tonpho

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Chontichak

Chonticha Subongkoch  
Scientist (3)

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 266707**

Date Received : Feb 13, 2026

Date Reported : Feb 18, 2026

Report Number : 3510685-2

Page 1 of 1

**Sample Number** 266707-1  
**Sampled Date** Feb 12, 2026  
**Sample Description** Air Quality  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Date Analysis Commenced** Feb 16, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 12/02/26 - 13/02/26 | ug/m3 | 0.04 | 0.11      | 0.58   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 12/02/26 - 13/02/26 | ug/m3 | 0.05 | 0.16      | 0.77   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

**Guideline :**

NEB : Notification of National Environment Board, B.E. 2560 (2017)

PCD : Notification of the Pollution Control Department, which was published in the Royal Government Gazette Vol. 126 Special Part 13 D dated January 27, B.E. 2552 (2009).

**Sampled By :** Siriwit Ruangsom

**Remark :**

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Chontichak

Chonticha Subongkoch  
Scientist (3)

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 266707**

Date Received : Feb 13, 2026

Date Reported : Feb 18, 2026

Report Number : 3510686-2

Page 1 of 1

**Sample Number** 266707-2  
**Sampled Date** Feb 12, 2026  
**Sample Description** Air Quality  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Date Analysis Commenced** Feb 16, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 12/02/26 - 13/02/26 | ug/m3 | 0.04 | 0.11      | 0.13   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 12/02/26 - 13/02/26 | ug/m3 | 0.05 | 0.16      | 0.89   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

**Guideline :**

NEB : Notification of National Environment Board, B.E. 2560 (2017)

PCD : Notification of the Pollution Control Department, which was published in the Royal Government Gazette Vol. 126 Special Part 13 D dated January 27, B.E. 2552 (2009).

**Sampled By :** Siriwit Ruangsom

**Remark :**

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Chontichak

Chonticha Subongkoch  
Scientist (3)

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 266707**

Date Received : Feb 13, 2026

Date Reported : Feb 18, 2026

Report Number : 3510687-2

Page 1 of 1

**Sample Number** 266707-3  
**Sampled Date** Feb 12, 2026  
**Sample Description** Air Quality  
**Location** บริเวณชุมชนบ้านตากวน ((GPS 47P 0735896, 1402032)  
**Date Analysis Commenced** Feb 16, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 12/02/26 - 13/02/26 | ug/m3 | 0.04 | 0.11      | 0.18   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 12/02/26 - 13/02/26 | ug/m3 | 0.05 | 0.16      | 0.96   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

**Guideline :**

NEB : Notification of National Environment Board, B.E. 2560 (2017)

PCD : Notification of the Pollution Control Department, which was published in the Royal Government Gazette Vol. 126 Special Part 13 D dated January 27, B.E. 2552 (2009).

**Sampled By :** Siriwit Ruangsom

**Remark :**

- LOD : Limit of Detection
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Approved by

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Scientist (3)

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612100**

Date Received : Mar 11, 2026

Date Reported : Mar 18, 2026

Report Number : 3530398-2

Page 1 of 1

**Sample Number** 2612100-1  
**Sampled Date** Mar 10, 2026  
**Sample Description** Air Quality  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Date Analysis Commenced** Mar 12, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 10/03/26 - 11/03/26 | ug/m3 | 0.04 | 0.11      | 3.85   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 10/03/26 - 11/03/26 | ug/m3 | 0.05 | 0.16      | 2.36   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

**Guideline :**

NEB : Notification of National Environment Board, B.E. 2560 (2017)

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**Sampled By :** Siriwit Ruangsom

**Remark :**

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Chontichak

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## Analysis / Test Report

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18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612100**

Date Received : Mar 11, 2026

Date Reported : Mar 18, 2026

Report Number : 3530399-2

Page 1 of 1

**Sample Number** 2612100-2  
**Sampled Date** Mar 10, 2026  
**Sample Description** Air Quality  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Date Analysis Commenced** Mar 12, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 10/03/26 - 11/03/26 | ug/m3 | 0.04 | 0.11      | 0.27   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 10/03/26 - 11/03/26 | ug/m3 | 0.05 | 0.16      | 1.66   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

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**Sampled By :** Siriwit Ruangsom

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**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612100**

Date Received : Mar 11, 2026

Date Reported : Mar 18, 2026

Report Number : 3530400-2

Page 1 of 1

**Sample Number** 2612100-3  
**Sampled Date** Mar 10, 2026  
**Sample Description** Air Quality  
**Location** บริเวณชุมชนบ้านตากวน ((GPS 47P 0735896, 1402032)  
**Date Analysis Commenced** Mar 12, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 10/03/26 - 11/03/26 | ug/m3 | 0.04 | 0.11      | 0.53   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 10/03/26 - 11/03/26 | ug/m3 | 0.05 | 0.16      | 2.94   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

**Guideline :**

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**Sampled By :** Siriwit Ruangsom

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## Analysis / Test Report

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18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2624608**

Date Received : Apr 08, 2026

Date Reported : Apr 20, 2026

Report Number : 3552243-2

Page 1 of 1

**Sample Number** 2624608-1  
**Sampled Date** Apr 07, 2026  
**Sample Description** Air Quality  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Date Analysis Commenced** Apr 10, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 07/04/26 - 08/04/26 | ug/m3 | 0.04 | 0.11      | <0.11  | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 07/04/26 - 08/04/26 | ug/m3 | 0.05 | 0.16      | 1.41   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

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**Sampled By :** Siriwit Ruangsom

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**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2624608**

Date Received : Apr 08, 2026

Date Reported : Apr 20, 2026

Report Number : 3552244-2

Page 1 of 1

**Sample Number** 2624608-2  
**Sampled Date** Apr 07, 2026  
**Sample Description** Air Quality  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Date Analysis Commenced** Apr 10, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 07/04/26 - 08/04/26 | ug/m3 | 0.04 | 0.11      | 0.22   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 07/04/26 - 08/04/26 | ug/m3 | 0.05 | 0.16      | 1.21   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

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**Sampled By :** Siriwit Ruangsom

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**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2624608**

Date Received : Apr 08, 2026

Date Reported : Apr 20, 2026

Report Number : 3552245-2

Page 1 of 1

**Sample Number** 2624608-3  
**Sampled Date** Apr 07, 2026  
**Sample Description** Air Quality  
**Location** บริเวณชุมชนบ้านตากวน ((GPS 47P 0735896, 1402032)  
**Date Analysis Commenced** Apr 10, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 07/04/26 - 08/04/26 | ug/m3 | 0.04 | 0.11      | <0.11  | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 07/04/26 - 08/04/26 | ug/m3 | 0.05 | 0.16      | 1.85   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

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**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2633835**

Date Received : May 13, 2026

Date Reported : May 21, 2026

Report Number : 3576510-2

Page 1 of 1

**Sample Number** 2633835-1  
**Sampled Date** May 12, 2026  
**Sample Description** Air Quality  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Date Analysis Commenced** May 14, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 12/05/26 - 13/05/26 | ug/m3 | 0.04 | 0.11      | 0.40   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 12/05/26 - 13/05/26 | ug/m3 | 0.05 | 0.16      | 2.43   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

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**Sampled By :** Siriwit Ruangsom

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**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2633835**

Date Received : May 13, 2026

Date Reported : May 21, 2026

Report Number : 3576511-2

Page 1 of 1

**Sample Number** 2633835-2  
**Sampled Date** May 12, 2026  
**Sample Description** Air Quality  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Date Analysis Commenced** May 14, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 12/05/26 - 13/05/26 | ug/m3 | 0.04 | 0.11      | 0.35   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 12/05/26 - 13/05/26 | ug/m3 | 0.05 | 0.16      | 1.41   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

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**Sampled By :** Siriwit Ruangsom

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**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2633835**

Date Received : May 13, 2026

Date Reported : May 21, 2026

Report Number : 3576512-2

Page 1 of 1

**Sample Number** 2633835-3  
**Sampled Date** May 12, 2026  
**Sample Description** Air Quality  
**Location** บริเวณชุมชนบ้านตากวน ((GPS 47P 0735896, 1402032)  
**Date Analysis Commenced** May 14, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 12/05/26 - 13/05/26 | ug/m3 | 0.04 | 0.11      | 0.44   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 12/05/26 - 13/05/26 | ug/m3 | 0.05 | 0.16      | 1.21   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

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**Sampled By :** Siriwit Ruangsom

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18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2643695**

Date Received : Jun 10, 2026

Date Reported : Jun 17, 2026

Report Number : 3598873-2

Page 1 of 1

**Sample Number** 2643695-1  
**Sampled Date** Jun 09, 2026  
**Sample Description** Air Quality  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Date Analysis Commenced** Jun 11, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result       | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |              |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 09/06/26 - 10/06/26 | ug/m3 | 0.04 | 0.11      | Not Detected | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 09/06/26 - 10/06/26 | ug/m3 | 0.05 | 0.16      | 0.77         | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

**Guideline :**

NEB 2017 : Notification of National Environmental Board, B.E. 2560 (2017)

PCD : Notification of the Pollution Control Department, which was published in the Royal Government Gazette Vol. 126 Special Part 13 D dated January 27, B.E. 2552 (2009).

**Sampled By :** Jaradrawee Sriruksa

**Remark :**

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Approved by

Chontichak

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## Analysis / Test Report

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18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2643695**

Date Received : Jun 10, 2026

Date Reported : Jun 17, 2026

Report Number : 3598874-2

Page 1 of 1

**Sample Number** 2643695-2  
**Sampled Date** Jun 09, 2026  
**Sample Description** Air Quality  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Date Analysis Commenced** Jun 11, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 09/06/26 - 10/06/26 | ug/m3 | 0.04 | 0.11      | 0.13   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 09/06/26 - 10/06/26 | ug/m3 | 0.05 | 0.16      | 0.26   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

**Guideline :**

NEB 2017 : Notification of National Environmental Board, B.E. 2560 (2017)

PCD : Notification of the Pollution Control Department, which was published in the Royal Government Gazette Vol. 126 Special Part 13 D dated January 27, B.E. 2552 (2009).

**Sampled By :** Jaradrawee Sriruksa

**Remark :**

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Chontichak

Chonticha Subongkoch  
Scientist (3)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2643695**

Date Received : Jun 10, 2026

Date Reported : Jun 17, 2026

Report Number : 3598875-2

Page 1 of 1

**Sample Number** 2643695-3  
**Sampled Date** Jun 09, 2026  
**Sample Description** Air Quality  
**Location** บริเวณชุมชนบ้านตากวน ((GPS 47P 0735896, 1402032)  
**Date Analysis Commenced** Jun 11, 2026  
**Condition of Sample** Drawn into one 6-L Canister

| Analyte            | Sampled Date/time   | Unit  | LOD  | LOQ (LOR) | Result | Guideline Limit | Method                                                                  | Guideline | Testing Location |
|--------------------|---------------------|-------|------|-----------|--------|-----------------|-------------------------------------------------------------------------|-----------|------------------|
| <b>Air Testing</b> |                     |       |      |           |        |                 |                                                                         |           |                  |
| 1,3-Butadiene      | 09/06/26 - 10/06/26 | ug/m3 | 0.04 | 0.11      | 0.40   | 5.3             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |
| Benzene            | 09/06/26 - 10/06/26 | ug/m3 | 0.05 | 0.16      | 0.70   | 7.6             | Based on U.S. Environmental Protection Agency, Compendium Method, TO-15 | PCD       | Rayong           |

**Guideline :**

NEB 2017 : Notification of National Environmental Board, B.E. 2560 (2017)

PCD : Notification of the Pollution Control Department, which was published in the Royal Government Gazette Vol. 126 Special Part 13 D dated January 27, B.E. 2552 (2009).

**Sampled By :** Jaradrawee Sriruksa

**Remark :**

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Chontichak

Chonticha Subongkoch  
Scientist (3)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID: 265488**  
Date Received :Jan 22, 2026  
Date Reported :Jan 28, 2026  
Report Number :3490985-1

**P/O :**  
**Project Name :**  
**Project Location :**

Page 1 of 2

**Sample Number** 265488-1  
**Parameter** Wind Speed / Wind Direction  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Sampling Date** Jan 21 - Jan 22, 2026  
**Sampling by** Sawai Tonpho

| Time                | Jan 21 - Jan 22, 2026 |             |     | - |   | - |   | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   | - | - |
| 03:00 PM - 04:00 PM | 2.7                   | 214.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 2.5                   | 210.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 1.6                   | 272.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 1.1                   | 224.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 0.1                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 0.3                   | 167.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 2.2                   | 119.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 2.1                   | 158.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 2.1                   | 117.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 2.5                   | 119.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 2.3                   | 120.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by

Sarayuth Jittrantont  
Assistant General Manager



## Analysis / Test Report

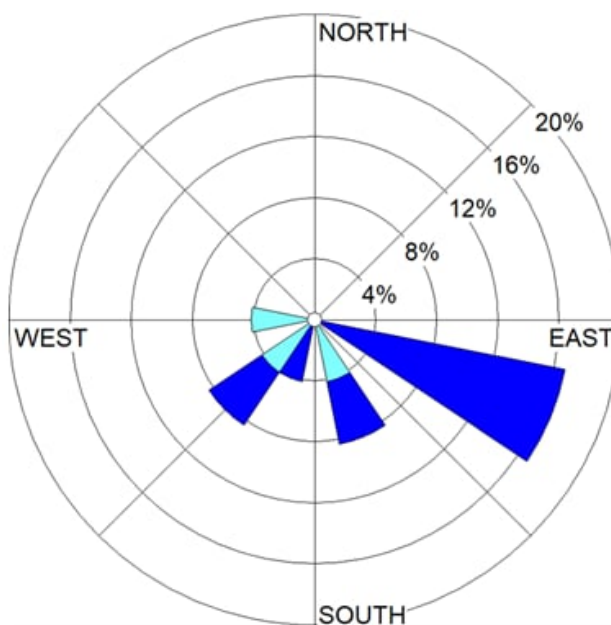
**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID: 265488**  
Date Received :Jan 22, 2026  
Date Reported :Jan 28, 2026  
Report Number :3490985-1

**P/O :**  
**Project Name :**  
**Project Location :**

Page 2 of 2

### Wind Rose



Date : Jan 21-22, 2026

| WS (m/s) | %     |
|----------|-------|
| ≥ 10.0   | 0.00  |
| 8.0-10.0 | 0.00  |
| 5.5-8.0  | 0.00  |
| 3.3-5.5  | 0.00  |
| 1.7-3.3  | 29.17 |
| 0.3-1.7  | 12.50 |
| Calms    | 58.33 |

**Location :** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)

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Approved by

Sarayuth Jitranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID: 265488**  
Date Received :Jan 22, 2026  
Date Reported :Jan 28, 2026  
Report Number :3490985-1

**P/O :**  
**Project Name :**  
**Project Location :**

Page 1 of 2

**Sample Number** 265488-2  
**Parameter** Wind Speed / Wind Direction  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Sampling Date** Jan 21 - Jan 22, 2026  
**Sampling by** Sawai Tonpho

| Time                | Jan 21 - Jan 22, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 1.7                   | 206.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 2.4                   | 210.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 1.3                   | 220.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 1.8                   | 176.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 0.5                   | 249.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 0.1                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 0.9                   | 96.0        | E   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 0.7                   | 57.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.3                   | 13.0        | NNE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 1.0                   | 57.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 1.7                   | 33.0        | NNE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 2.8                   | 99.0        | E   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 2.2                   | 102.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 2.1                   | 113.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittrantont  
Assistant General Manager



## Analysis / Test Report

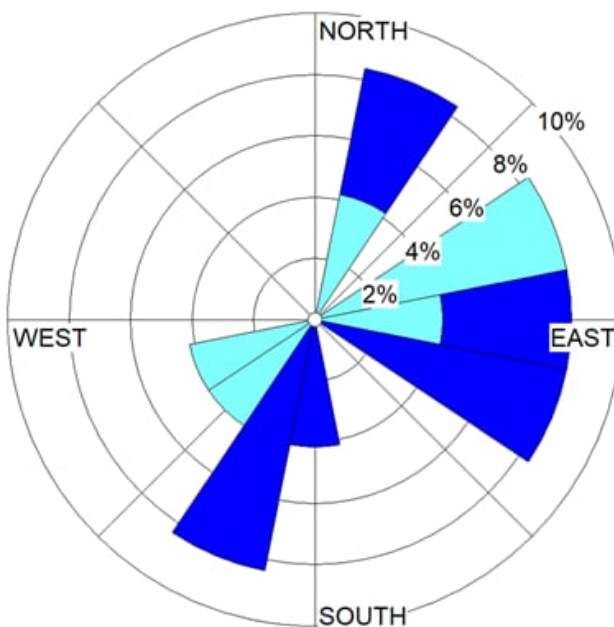
**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID: 265488**  
Date Received :Jan 22, 2026  
Date Reported :Jan 28, 2026  
Report Number :3490985-1

**P/O :**  
**Project Name :**  
**Project Location :**

Page 2 of 2

### Wind Rose



Date : Jan 21-22, 2026

|  | WS (m/s) | %     |
|--|----------|-------|
|  | ≥ 10.0   | 0.00  |
|  | 8.0-10.0 | 0.00  |
|  | 5.5-8.0  | 0.00  |
|  | 3.3-5.5  | 0.00  |
|  | 1.7-3.3  | 29.17 |
|  | 0.3-1.7  | 25.00 |
|  | Calms    | 45.83 |

**Location :** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)

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Approved by

Sarayuth Jittrantont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID: 265488**  
Date Received :Jan 22, 2026  
Date Reported :Jan 28, 2026  
Report Number :3490985-1

**P/O :**  
**Project Name :**  
**Project Location :**

Page 1 of 2

**Sample Number** 265488-3  
**Parameter** Wind Speed / Wind Direction  
**Location** บริเวณชุมชนบ้านตากวน (GPS 47P 0735896, 1402032)  
**Sampling Date** Jan 21 - Jan 22, 2026  
**Sampling by** Sawai Tonpho

| Time                | Jan 21 - Jan 22, 2026 |             | -   |   | - |   | - |   | - |   | - |   | - |   | - |   | - |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 1.3                   | 182.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 0.7                   | 196.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 0.3                   | 359.0       | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 0.7                   | 203.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 0.1                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 0.1                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 0.4                   | 93.0        | E   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 0.5                   | 90.0        | E   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.1                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.3                   | 359.0       | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 1.1                   | 339.0       | NNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 1.1                   | 88.0        | E   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 1.4                   | 124.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 2.3                   | 116.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 2.5                   | 114.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittrantont  
Assistant General Manager



## Analysis / Test Report

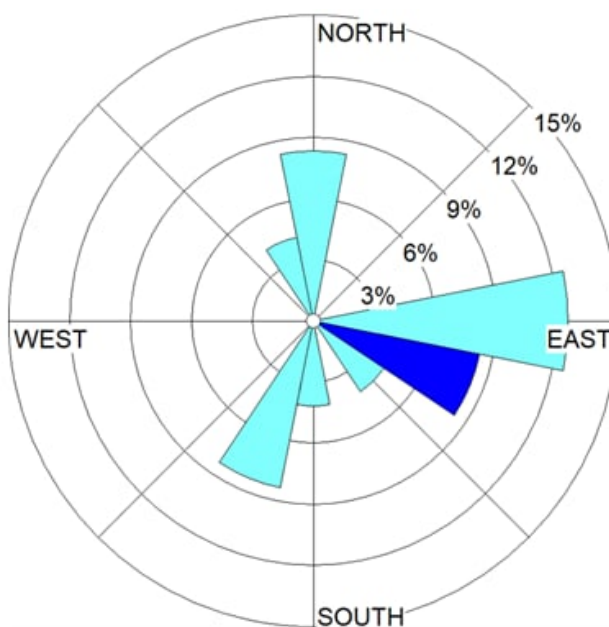
**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID: 265488**  
Date Received :Jan 22, 2026  
Date Reported :Jan 28, 2026  
Report Number :3490985-1

**P/O :**  
**Project Name :**  
**Project Location :**

Page 2 of 2

### Wind Rose



**Date : Jan 21-22, 2026**

|  | WS (m/s) | %     |
|--|----------|-------|
|  | ≥ 10.0   | 0.00  |
|  | 8.0-10.0 | 0.00  |
|  | 5.5-8.0  | 0.00  |
|  | 3.3-5.5  | 0.00  |
|  | 1.7-3.3  | 8.33  |
|  | 0.3-1.7  | 41.67 |
|  | Calms    | 50.00 |

**Location :** บริเวณชุมชนบ้านตากวน (GPS 47P 0735896, 1402032)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID: 266705**  
Date Received :Feb 13, 2026  
Date Reported :Feb 18, 2026  
Report Number :3492934-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** 266705-1  
**Parameter** Wind Speed / Wind Direction  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Sampling Date** Feb 12 - Feb 13, 2026  
**Sampling by** Siriwit Ruangsom

| Time                | Feb 12 - Feb 13, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   |
| 10:00 AM - 11:00 AM | 2.2                   | 198.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 2.2                   | 188.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 1.9                   | 193.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 2.0                   | 165.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 3.2                   | 188.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 3.7                   | 195.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 3.7                   | 226.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 3.6                   | 220.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 3.2                   | 215.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 3.3                   | 200.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 3.3                   | 202.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 2.5                   | 184.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 0.7                   | 140.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 2.8                   | 187.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.9                   | 162.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.4                   | 178.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 0.4                   | 48.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 0.5                   | 36.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.8                   | 50.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 0.9                   | 24.0        | NNE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 1.2                   | 17.0        | NNE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 266705

Date Received :Feb 13, 2026

Date Reported :Feb 18, 2026

Report Number :3492934-1

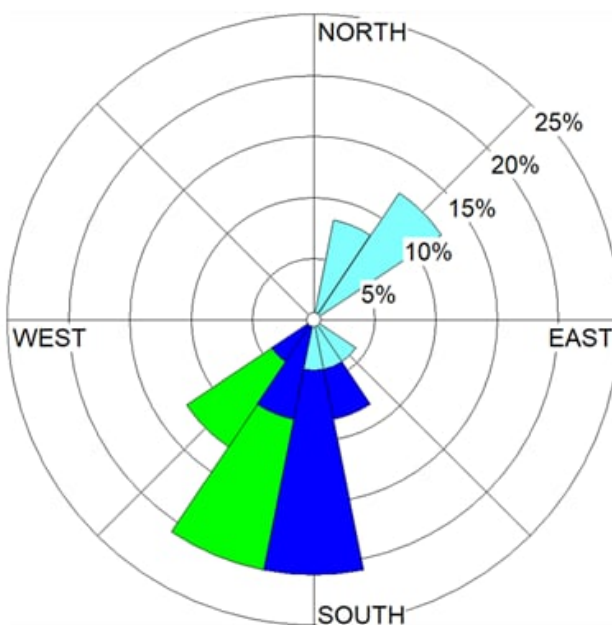
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

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### Wind Rose



Date : Feb 12-13, 2026

| WS (m/s) | %     |
|----------|-------|
| ≥ 10.0   | 0.00  |
| 8.0-10.0 | 0.00  |
| 5.5-8.0  | 0.00  |
| 3.3-5.5  | 20.83 |
| 1.7-3.3  | 33.33 |
| 0.3-1.7  | 33.33 |
| Calms    | 12.50 |

**Location** : ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID: 266705**  
Date Received :Feb 13, 2026  
Date Reported :Feb 18, 2026  
Report Number :3492934-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** 266705-2  
**Parameter** Wind Speed / Wind Direction  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Sampling Date** Feb 12 - Feb 13, 2026  
**Sampling by** Siriwit Ruangsom

| Time                | Feb 12 - Feb 13, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 1.0                   | 181.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 1.0                   | 151.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 0.9                   | 174.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 0.6                   | 202.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 1.5                   | 180.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 0.3                   | 201.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 1.1                   | 167.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 0.1                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 0.9                   | 178.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 1.0                   | 10.0        | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 0.8                   | 15.0        | NNE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 0.5                   | 9.0         | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 266705

Date Received :Feb 13, 2026

Date Reported :Feb 18, 2026

Report Number :3492934-1

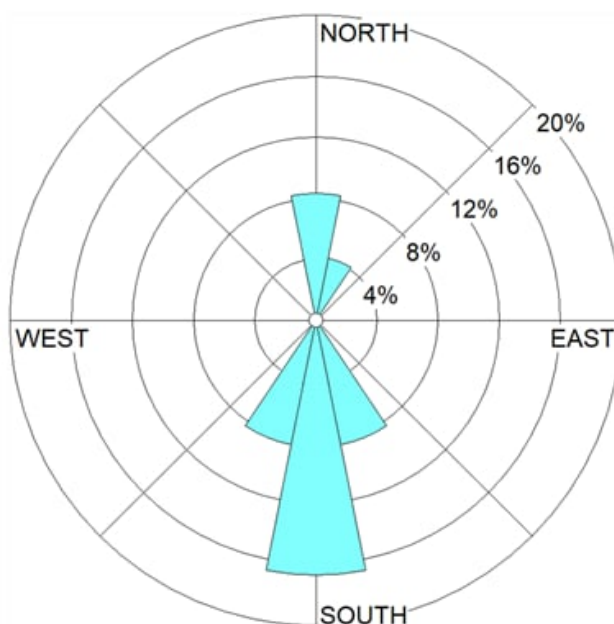
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

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### Wind Rose



Date : Feb 12-13, 2026

| WS (m/s) | %     |
|----------|-------|
| ≥ 10.0   | 0.00  |
| 8.0-10.0 | 0.00  |
| 5.5-8.0  | 0.00  |
| 3.3-5.5  | 0.00  |
| 1.7-3.3  | 0.00  |
| 0.3-1.7  | 45.83 |
| Calms    | 54.17 |

**Location** : บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)

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Sarayuth Jittrantont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID: 266705**  
Date Received :Feb 13, 2026  
Date Reported :Feb 18, 2026  
Report Number :3492934-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** 266705-3  
**Parameter** Wind Speed / Wind Direction  
**Location** บริเวณชุมชนบ้านตากวน (GPS 47P 0735896, 1402032)  
**Sampling Date** Feb 12 - Feb 13, 2026  
**Sampling by** Siriwit Ruangsom

| Time                | Feb 12 - Feb 13, 2026 |             | -   |   | - |   | - |   | - |   | - |   | - |   | - |   | - |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 0.5                   | 112.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 1.6                   | 87.0        | E   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 1.7                   | 249.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 2.0                   | 255.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 0.4                   | 214.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 1.0                   | 252.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 0.6                   | 191.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 0.3                   | 26.0        | NNE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.4                   | 348.0       | NNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 0.4                   | 4.0         | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 0.5                   | 334.0       | NNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 0.5                   | 40.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 0.3                   | 50.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 0.6                   | 55.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 266705

Date Received :Feb 13, 2026

Date Reported :Feb 18, 2026

Report Number :3492934-1

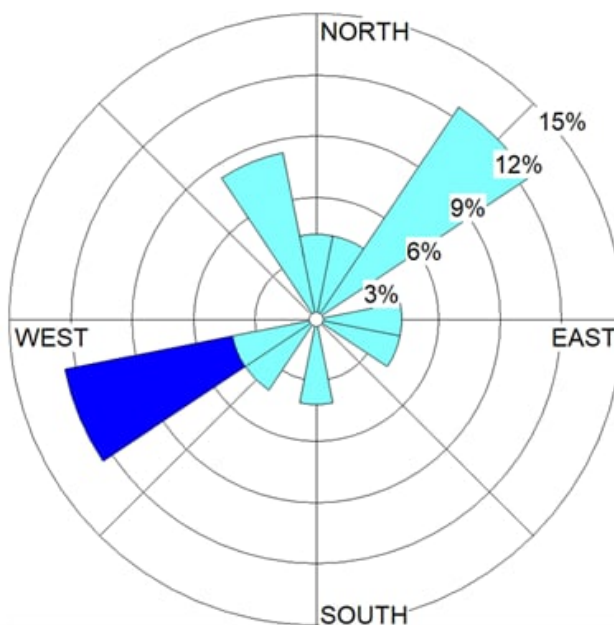
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

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### Wind Rose



Date : Feb 12-13, 2026

| WS (m/s) | %     |
|----------|-------|
| ≥ 10.0   | 0.00  |
| 8.0-10.0 | 0.00  |
| 5.5-8.0  | 0.00  |
| 3.3-5.5  | 0.00  |
| 1.7-3.3  | 8.33  |
| 0.3-1.7  | 50.00 |
| Calms    | 41.67 |

**Location** : บริเวณชุมชนบ้านตากวน (GPS 47P 0735896, 1402032)

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2612098

Date Received : Mar 11, 2026

Date Reported : Mar 18, 2026

Report Number : 3503293-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** : 2612098-1  
**Parameter** : Wind Speed / Wind Direction  
**Location** : ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Sampling Date** : Mar 10 - Mar 11, 2026  
**Sampling by** : Siriwit Ruangsom

| Time                | Mar 10 - Mar 11, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 2.2                   | 55.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 4.1                   | 61.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 2.7                   | 66.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 2.3                   | 124.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 1.9                   | 112.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 1.3                   | 105.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 3.2                   | 149.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 3.0                   | 198.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 2.9                   | 211.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 1.7                   | 250.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 1.6                   | 288.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 1.3                   | 278.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 1.8                   | 253.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 1.0                   | 276.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 1.3                   | 243.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.6                   | 279.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 2.1                   | 283.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 1.4                   | 278.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 2.3                   | 282.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.1                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 2.5                   | 34.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 0.3                   | 3.0         | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.9                   | 34.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 1.7                   | 7.0         | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2612098

Date Received :Mar 11, 2026

Date Reported :Mar 18, 2026

Report Number :3503293-1

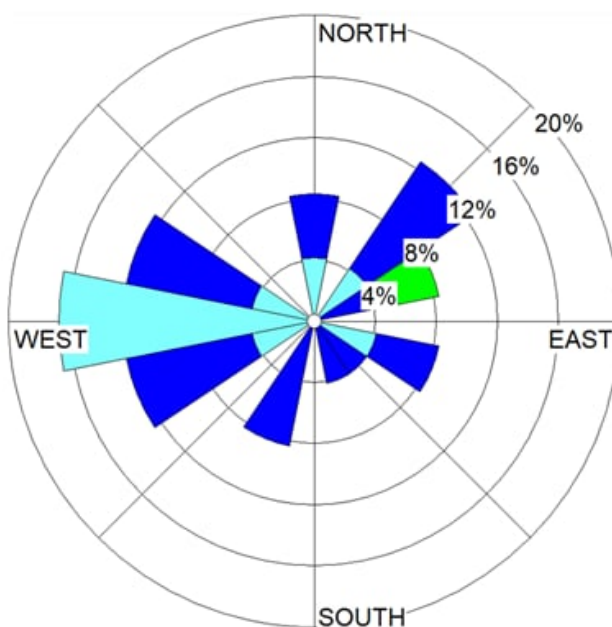
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 2 of 2

### Wind Rose



Date : Mar 10-11, 2026

|  | WS (m/s) | %     |
|--|----------|-------|
|  | ≥ 10.0   | 0.00  |
|  | 8.0-10.0 | 0.00  |
|  | 5.5-8.0  | 0.00  |
|  | 3.3-5.5  | 4.17  |
|  | 1.7-3.3  | 54.17 |
|  | 0.3-1.7  | 37.50 |
|  | Calms    | 4.17  |

**Location** : ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)

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Approved by

Sarayuth Jitranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID: 2612098**

Date Received : Mar 11, 2026

Date Reported : Mar 18, 2026

Report Number : 3503293-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** : 2612098-2  
**Parameter** : Wind Speed / Wind Direction  
**Location** : บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Sampling Date** : Mar 10 - Mar 11, 2026  
**Sampling by** : Siriwit Ruangsom

| Time                | Mar 10 - Mar 11, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   |
| 11:00 AM - 12:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 0.6                   | 69.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 0.1                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 2.3                   | 90.0        | E   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 2.6                   | 95.0        | E   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 1.7                   | 91.0        | E   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 3.0                   | 126.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 1.4                   | 142.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 0.8                   | 199.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.4                   | 338.0       | NNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 1.9                   | 150.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 1.4                   | 268.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 0.9                   | 316.0       | NW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.6                   | 295.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 0.7                   | 281.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 1.1                   | 86.0        | E   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2612098

Date Received : Mar 11, 2026

Date Reported : Mar 18, 2026

Report Number : 3503293-1

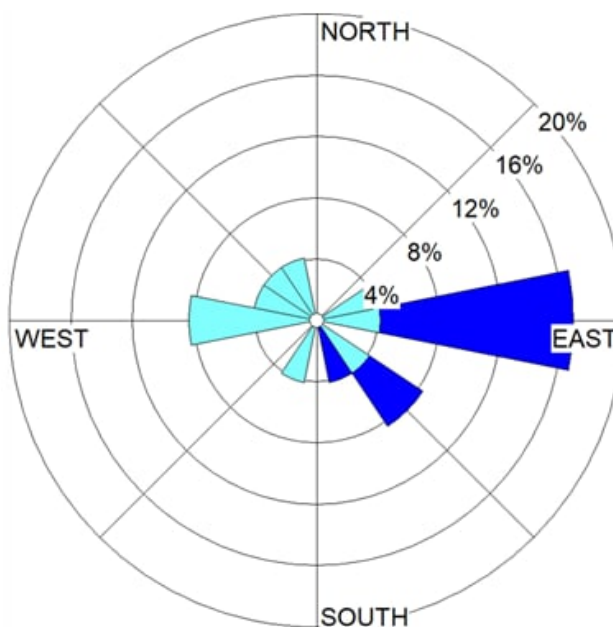
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

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### Wind Rose



Date : Mar 10-11, 2026

|  | WS (m/s) | %     |
|--|----------|-------|
|  | ≥ 10.0   | 0.00  |
|  | 8.0-10.0 | 0.00  |
|  | 5.5-8.0  | 0.00  |
|  | 3.3-5.5  | 0.00  |
|  | 1.7-3.3  | 20.83 |
|  | 0.3-1.7  | 37.50 |
|  | Calms    | 41.67 |

**Location** : บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)

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Sarayuth Jittrantont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2612098

Date Received : Mar 11, 2026

Date Reported : Mar 18, 2026

Report Number : 3503293-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** 2612098-3  
**Parameter** Wind Speed / Wind Direction  
**Location** บริเวณชุมชนบ้านตากวน (GPS 47P 0735896, 1402032)  
**Sampling Date** Mar 10 - Mar 11, 2026  
**Sampling by** Siriwit Ruangsom

| Time                | Mar 10 - Mar 11, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   |
| 11:00 AM - 12:00 PM | 1.0                   | 110.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 1.3                   | 62.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 1.0                   | 178.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 1.3                   | 225.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 1.3                   | 208.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 0.6                   | 154.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 1.4                   | 278.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 1.0                   | 283.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 0.4                   | 36.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 1.1                   | 10.0        | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.6                   | 45.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 2.2                   | 50.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 1.5                   | 5.0         | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 0.3                   | 5.0         | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2612098

Date Received :Mar 11, 2026

Date Reported :Mar 18, 2026

Report Number :3503293-1

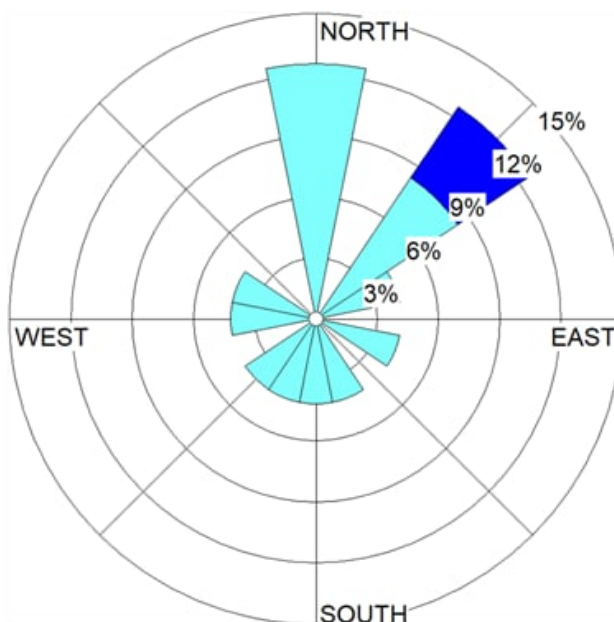
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 2 of 2

### Wind Rose



Date : Mar 10-11, 2026

|  | WS (m/s) | %     |
|--|----------|-------|
|  | ≥ 10.0   | 0.00  |
|  | 8.0-10.0 | 0.00  |
|  | 5.5-8.0  | 0.00  |
|  | 3.3-5.5  | 0.00  |
|  | 1.7-3.3  | 4.17  |
|  | 0.3-1.7  | 54.17 |
|  | Calms    | 41.67 |

**Location** : บริเวณชุมชนบ้านตากวน (GPS 47P 0735896, 1402032)

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Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID: 2624606**  
Date Received : Apr 08, 2026  
Date Reported : Apr 10, 2026  
Report Number : 3531680-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** : 264606-1  
**Parameter** : Wind Speed / Wind Direction  
**Location** : ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Sampling Date** : Apr 07 - Apr 08, 2026  
**Sampling by** : Siriwit Ruangsom

| Time                | Apr 07 - Apr 08, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 3.6                   | 127.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 3.6                   | 135.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 2.8                   | 147.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 4.4                   | 145.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 4.2                   | 136.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 2.3                   | 144.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 1.4                   | 149.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 0.1                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 0.4                   | 209.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 0.6                   | 210.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 0.6                   | 132.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 2.2                   | 181.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 1.7                   | 150.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 2.3                   | 149.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 3.5                   | 136.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 5.0                   | 135.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 3.0                   | 153.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 1.0                   | 142.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 3.7                   | 149.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 2.0                   | 149.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 0.9                   | 155.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2624606

Date Received : Apr 08, 2026

Date Reported : Apr 10, 2026

Report Number : 3531680-1

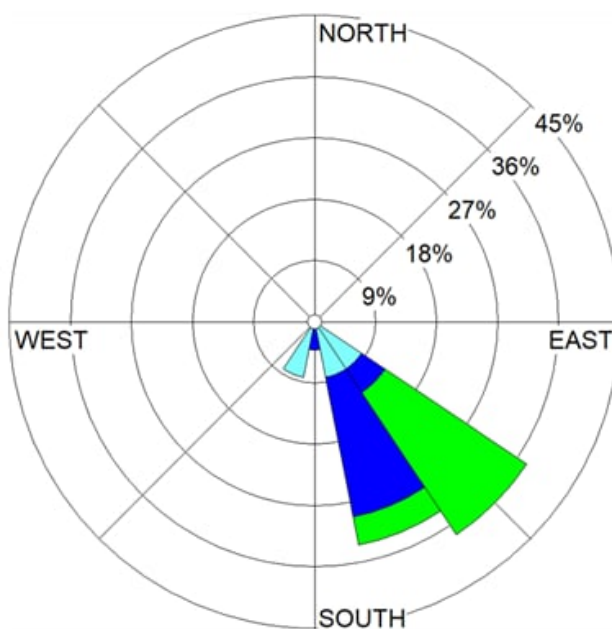
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 2 of 2

### Wind Rose



Date : Apr 07-08, 2026

|  | WS (m/s) | %     |
|--|----------|-------|
|  | ≥ 10.0   | 0.00  |
|  | 8.0-10.0 | 0.00  |
|  | 5.5-8.0  | 0.00  |
|  | 3.3-5.5  | 29.17 |
|  | 1.7-3.3  | 29.17 |
|  | 0.3-1.7  | 25.00 |
|  | Calms    | 16.67 |

**Location** : ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2624606

Date Received : Apr 08, 2026

Date Reported : Apr 10, 2026

Report Number : 3531680-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** : 264606-2  
**Parameter** : Wind Speed / Wind Direction  
**Location** : บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Sampling Date** : Apr 07 - Apr 08, 2026  
**Sampling by** : Siriwit Ruangsom

| Time                | Apr 07 - Apr 08, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   |
| 10:00 AM - 11:00 AM | 1.8                   | 262.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 3.5                   | 143.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 1.9                   | 201.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 1.8                   | 158.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 3.3                   | 166.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 2.0                   | 177.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 1.6                   | 148.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 1.1                   | 12.0        | NNE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 0.7                   | 182.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 0.7                   | 56.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 0.6                   | 174.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 2.3                   | 199.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 2.6                   | 171.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 0.8                   | 194.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 1.1                   | 143.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 1.1                   | 148.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 0.4                   | 172.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 0.6                   | 200.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 2.4                   | 186.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 1.4                   | 200.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 2.5                   | 152.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.9                   | 177.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 1.0                   | 171.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 0.8                   | 155.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2624606

Date Received : Apr 08, 2026

Date Reported : Apr 10, 2026

Report Number : 3531680-1

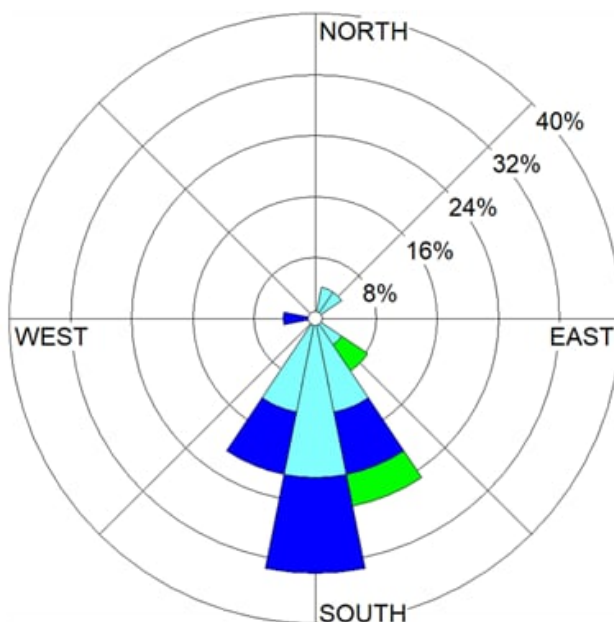
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 2 of 2

### Wind Rose



Date : Apr 07-08, 2026

| WS (m/s) | %     |
|----------|-------|
| ≥ 10.0   | 0.00  |
| 8.0-10.0 | 0.00  |
| 5.5-8.0  | 0.00  |
| 3.3-5.5  | 8.33  |
| 1.7-3.3  | 33.33 |
| 0.3-1.7  | 58.33 |
| Calms    | 0.00  |

**Location** : บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)

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Sarayuth Jittrantont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID: 2624606**  
Date Received : Apr 08, 2026  
Date Reported : Apr 10, 2026  
Report Number : 3531680-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** : 264606-3  
**Parameter** : Wind Speed / Wind Direction  
**Location** : บริเวณชุมชนบ้านตากวน (GPS 47P 0735896, 1402032)  
**Sampling Date** : Apr 07 - Apr 08, 2026  
**Sampling by** : Siriwit Ruangsom

| Time                | Apr 07 - Apr 08, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   |
| 10:00 AM - 11:00 AM | 0.4                   | 274.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 0.6                   | 73.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 2.3                   | 133.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 1.0                   | 132.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 0.3                   | 124.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 0.4                   | 146.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 0.5                   | 91.0        | E   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 0.6                   | 44.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 0.3                   | 103.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 0.1                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.9                   | 198.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 1.0                   | 16.0        | NNE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 1.1                   | 113.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2624606

Date Received : Apr 08, 2026

Date Reported : Apr 10, 2026

Report Number : 3531680-1

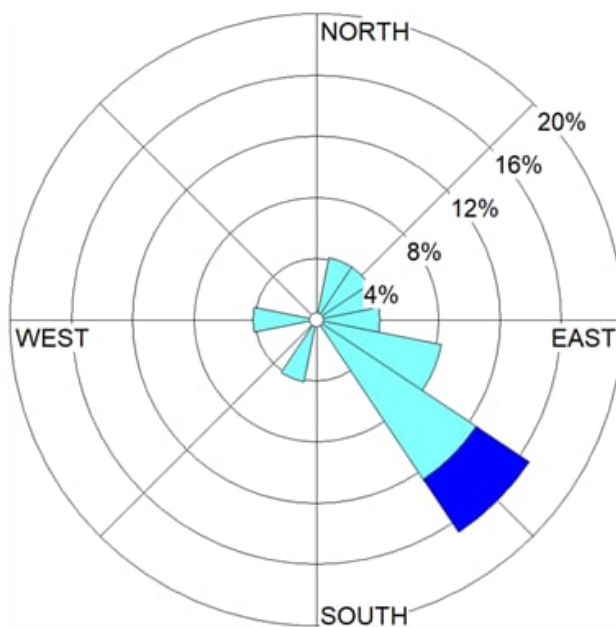
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 2 of 2

### Wind Rose



Date : Apr 07-08, 2026

|  | WS (m/s) | %     |
|--|----------|-------|
|  | ≥ 10.0   | 0.00  |
|  | 8.0-10.0 | 0.00  |
|  | 5.5-8.0  | 0.00  |
|  | 3.3-5.5  | 0.00  |
|  | 1.7-3.3  | 4.17  |
|  | 0.3-1.7  | 45.83 |
|  | Calms    | 50.00 |

**Location** : บริเวณชุมชนบ้านตากวน (GPS 47P 0735896, 1402032)

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2633834

Date Received : May 13, 2026

Date Reported : May 18, 2026

Report Number : 3555255-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** : 2633834-1  
**Parameter** : Wind Speed / Wind Direction  
**Location** : ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Sampling Date** : May 12 - May 13, 2026  
**Sampling by** : Siriwit Ruangsom

| Time                | May 12 - May 13, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   |
| 03:00 PM - 04:00 PM | 1.9                   | 217.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 1.5                   | 226.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 2.5                   | 247.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 1.2                   | 273.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 0.6                   | 238.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 0.7                   | 183.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 0.5                   | 187.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 1.3                   | 227.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.7                   | 211.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 0.8                   | 205.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 1.0                   | 210.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 2.5                   | 226.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 1.2                   | 53.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 1.0                   | 55.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 1.3                   | 69.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.4                   | 88.0        | E   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 0.4                   | 70.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 0.8                   | 225.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 2.5                   | 200.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 1.3                   | 155.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 1.5                   | 226.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 2.5                   | 247.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 0.2                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2633834

Date Received : May 13, 2026

Date Reported : May 18, 2026

Report Number : 3555255-1

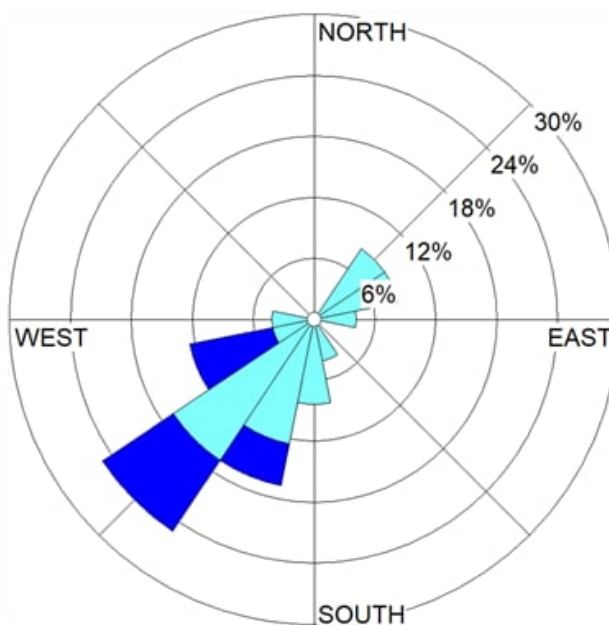
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 2 of 2

### Wind Rose



Date : May 12-13, 2026

| WS (m/s) | %     |
|----------|-------|
| ≥ 10.0   | 0.00  |
| 8.0-10.0 | 0.00  |
| 5.5-8.0  | 0.00  |
| 3.3-5.5  | 0.00  |
| 1.7-3.3  | 20.83 |
| 0.3-1.7  | 70.83 |
| Calms    | 8.33  |

**Location** : ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2633834

Date Received : May 13, 2026

Date Reported : May 18, 2026

Report Number : 3555255-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** : 2633834-2  
**Parameter** : Wind Speed / Wind Direction  
**Location** : บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Sampling Date** : May 12 - May 13, 2026  
**Sampling by** : Siriwit Ruangsom

| Time                | May 12 - May 13, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 1.0                   | 310.0       | NW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 1.2                   | 297.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 1.3                   | 264.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 0.9                   | 273.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 0.8                   | 251.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 1.0                   | 311.0       | NW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 0.7                   | 349.0       | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 0.9                   | 313.0       | NW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 1.2                   | 345.0       | NNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 1.1                   | 345.0       | NNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 0.8                   | 345.0       | NNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 1.4                   | 345.0       | NNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 0.9                   | 247.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 1.2                   | 247.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.6                   | 177.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 1.5                   | 177.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 1.7                   | 133.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 1.4                   | 104.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.9                   | 120.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 1.2                   | 119.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 1.1                   | 117.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 1.6                   | 297.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 1.9                   | 264.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 0.9                   | 273.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2633834

Date Received : May 13, 2026

Date Reported : May 18, 2026

Report Number : 3555255-1

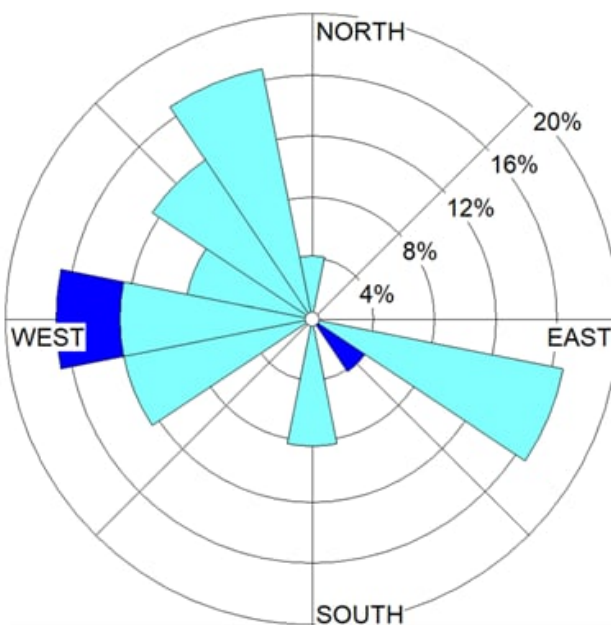
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 2 of 2

### Wind Rose



**Date** : May 12-13, 2026

|  | WS (m/s) | %     |
|--|----------|-------|
|  | ≥ 10.0   | 0.00  |
|  | 8.0-10.0 | 0.00  |
|  | 5.5-8.0  | 0.00  |
|  | 3.3-5.5  | 0.00  |
|  | 1.7-3.3  | 8.33  |
|  | 0.3-1.7  | 91.67 |
|  | Calms    | 0.00  |

**Location** : บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)

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Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2633834

Date Received : May 13, 2026

Date Reported : May 18, 2026

Report Number : 3555255-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** : 2633834-3  
**Parameter** : Wind Speed / Wind Direction  
**Location** : บริเวณชุมชนบ้านตากวน (GPS 47P 0735896, 1402032)  
**Sampling Date** : May 12 - May 13, 2026  
**Sampling by** : Siriwit Ruangsom

| Time                | May 12 - May 13, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   |
| 10:00 AM - 11:00 AM | 1.5                   | 233.0       | SW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 1.6                   | 185.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 2.0                   | 273.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 0.7                   | 270.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 1.1                   | 357.0       | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 0.8                   | 251.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 0.9                   | 278.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 0.8                   | 209.0       | SSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 1.2                   | 37.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 0.9                   | 113.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 0.4                   | 113.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 1.3                   | 60.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 2.1                   | 303.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 1.6                   | 303.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 1.1                   | 65.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 1.7                   | 13.0        | NNE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 0.5                   | 104.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 0.8                   | 58.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.9                   | 69.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 2.6                   | 358.0       | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 1.7                   | 113.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 1.9                   | 185.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 1.8                   | 273.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 0.6                   | 270.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2633834

Date Received : May 13, 2026

Date Reported : May 18, 2026

Report Number : 3555255-1

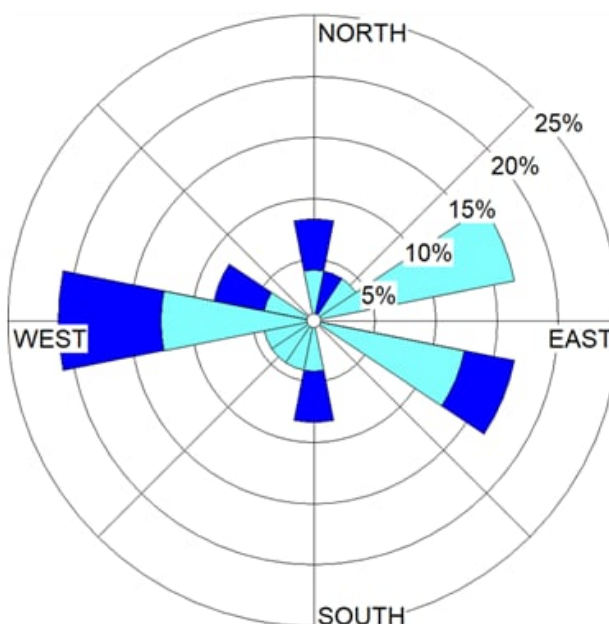
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

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### Wind Rose



Date : May 12-13, 2026

|  | WS (m/s)    | %     |
|--|-------------|-------|
|  | $\geq 10.0$ | 0.00  |
|  | 8.0-10.0    | 0.00  |
|  | 5.5-8.0     | 0.00  |
|  | 3.3-5.5     | 0.00  |
|  | 1.7-3.3     | 29.17 |
|  | 0.3-1.7     | 70.83 |
|  | Calms       | 0.00  |

**Location** : บริเวณชุมชนบ้านตากวน (GPS 47P 0735896, 1402032)

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Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2643694

Date Received :Jun 10, 2026

Date Reported :Jun 17, 2026

Report Number :3575172-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** 2643694-1  
**Parameter** Wind Speed / Wind Direction  
**Location** ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)  
**Sampling Date** Jun 09 - Jun 10, 2026  
**Sampling by** Jaradrawee Sriruksa

| Time                | Jun 09 - Jun 10, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   |
| 10:00 AM - 11:00 AM | 7.3                   | 291.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 3.8                   | 289.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 5.4                   | 280.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 3.9                   | 275.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 2.9                   | 324.0       | NW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 3.9                   | 287.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 4.3                   | 259.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 5.4                   | 281.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 4.2                   | 260.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 3.0                   | 293.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 3.2                   | 291.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 6.3                   | 293.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 2.2                   | 265.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 3.6                   | 290.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 2.6                   | 316.0       | NW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 2.7                   | 284.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 3.2                   | 291.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 5.4                   | 291.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 4.0                   | 269.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 5.7                   | 294.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 3.4                   | 256.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 2.4                   | 264.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 4.6                   | 256.0       | WSW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 4.2                   | 277.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2643694

Date Received :Jun 10, 2026

Date Reported :Jun 17, 2026

Report Number :3575172-1

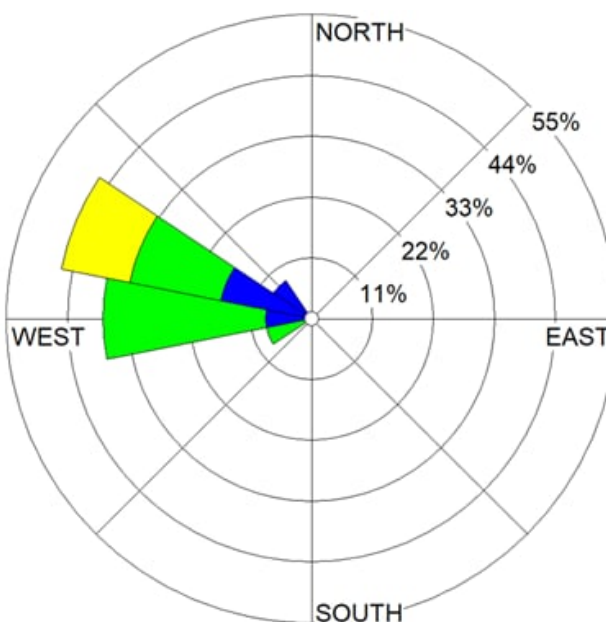
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 2 of 2

### Wind Rose



Date : Jun 09-10, 2026

|  | WS (m/s)    | %     |
|--|-------------|-------|
|  | $\geq 10.0$ | 0.00  |
|  | 8.0-10.0    | 0.00  |
|  | 5.5-8.0     | 12.50 |
|  | 3.3-5.5     | 54.17 |
|  | 1.7-3.3     | 33.33 |
|  | 0.3-1.7     | 0.00  |
|  | Calms       | 0.00  |

**Location** : ภายในพื้นที่โครงการ (GPS 47P 0733872, 1400595)

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Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2643694

Date Received :Jun 10, 2026

Date Reported :Jun 17, 2026

Report Number :3575172-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** 2643694-2  
**Parameter** Wind Speed / Wind Direction  
**Location** บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)  
**Sampling Date** Jun 09 - Jun 10, 2026  
**Sampling by** Jaradrawee Sriruksa

| Time                | Jun 09 - Jun 10, 2026 |             |     | - |   | - |   | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   | - | - |
| 12:00 PM - 01:00 PM | 0.3                   | 313.0       | NW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 0.9                   | 0.0         | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 1.1                   | 18.0        | NNE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 2.6                   | 346.0       | NNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 0.4                   | 296.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 3.4                   | 306.0       | NW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 1.5                   | 3.0         | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 0.7                   | 325.0       | NW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 1.4                   | 303.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 0.3                   | 305.0       | NW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 0.4                   | 3.0         | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 1.6                   | 359.0       | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 0.7                   | 29.0        | NNE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 1.3                   | 0.0         | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 0.8                   | 352.0       | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 2.9                   | 17.0        | NNE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.3                   | 8.0         | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 1.7                   | 312.0       | NW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 0.7                   | 338.0       | NNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.8                   | 299.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 0.9                   | 300.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 1.3                   | 311.0       | NW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 1.8                   | 298.0       | WNW | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 AM - 12:00 PM | 2.0                   | 308.0       | NW  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2643694

Date Received :Jun 10, 2026

Date Reported :Jun 17, 2026

Report Number :3575172-1

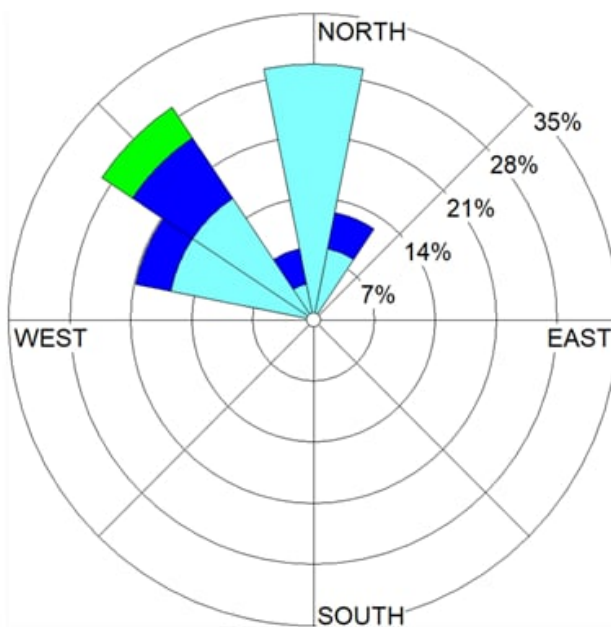
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 2 of 2

### Wind Rose



Date : Jun 09-10, 2026

|  | WS (m/s) | %     |
|--|----------|-------|
|  | ≥ 10.0   | 0.00  |
|  | 8.0-10.0 | 0.00  |
|  | 5.5-8.0  | 0.00  |
|  | 3.3-5.5  | 4.17  |
|  | 1.7-3.3  | 20.83 |
|  | 0.3-1.7  | 75.00 |
|  | Calms    | 0.00  |

**Location** : บริเวณหมู่บ้านหนองแดงเม (GPS 47P 0738026, 1402909)

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2643694

Date Received :Jun 10, 2026

Date Reported :Jun 17, 2026

Report Number :3575172-1

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 1 of 2

**Sample Number** 2643694-3  
**Parameter** Wind Speed / Wind Direction  
**Location** บริเวณชุมชนบ้านตากวน (GPS 47P 0735896, 1402032)  
**Sampling Date** Jun 09 - Jun 10, 2026  
**Sampling by** Jaradrawee Sriruksa

| Time                | Jun 09 - Jun 10, 2026 |             |     | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   | - |   |   |
|---------------------|-----------------------|-------------|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                     | WS<br>(m/s)           | WD<br>(deg) |     | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   | - | - |   |
| 11:00 AM - 12:00 PM | 0.4                   | 135.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 PM - 01:00 PM | 0.6                   | 121.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 PM - 02:00 PM | 0.9                   | 152.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 PM - 03:00 PM | 2.7                   | 117.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 PM - 04:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 PM - 05:00 PM | 0.4                   | 76.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 PM - 06:00 PM | 0.4                   | 70.0        | ENE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 PM - 07:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 PM - 08:00 PM | 0.3                   | 266.0       | W   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 PM - 09:00 PM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 PM - 10:00 PM | 0.6                   | 135.0       | SE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 PM - 11:00 PM | 0.3                   | 181.0       | S   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 11:00 PM - 12:00 AM | 2.7                   | 159.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 12:00 AM - 01:00 AM | 1.8                   | 107.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 01:00 AM - 02:00 AM | 0.4                   | 119.0       | ESE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 02:00 AM - 03:00 AM | 1.5                   | 148.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 03:00 AM - 04:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 04:00 AM - 05:00 AM | 0.9                   | 56.0        | NE  | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 05:00 AM - 06:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 06:00 AM - 07:00 AM | 0.4                   | 150.0       | SSE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 07:00 AM - 08:00 AM | 0.0                   | -           | -   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 08:00 AM - 09:00 AM | 0.5                   | 11.0        | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 09:00 AM - 10:00 AM | 1.6                   | 20.0        | NNE | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10:00 AM - 11:00 AM | 2.0                   | 6.0         | N   | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont  
Assistant General Manager



## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**Lot ID:** 2643694

Date Received :Jun 10, 2026

Date Reported :Jun 17, 2026

Report Number :3575172-1

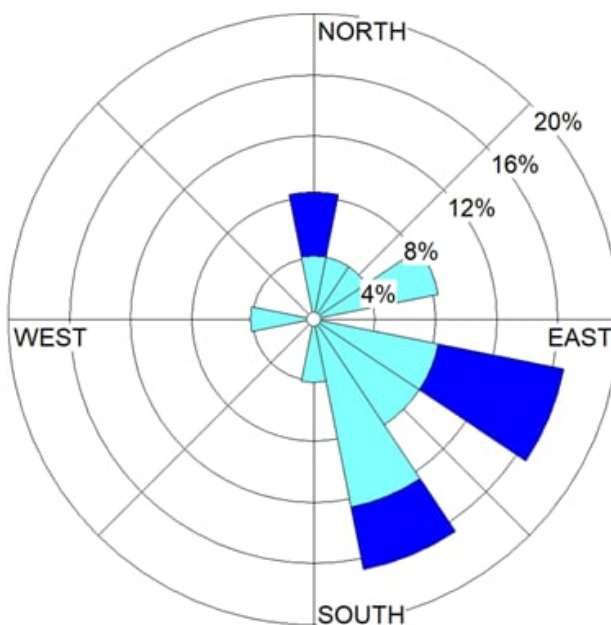
**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

Page 2 of 2

### Wind Rose



Date : Jun 09-10, 2026

|  | WS (m/s) | %     |
|--|----------|-------|
|  | ≥ 10.0   | 0.00  |
|  | 8.0-10.0 | 0.00  |
|  | 5.5-8.0  | 0.00  |
|  | 3.3-5.5  | 0.00  |
|  | 1.7-3.3  | 16.67 |
|  | 0.3-1.7  | 58.33 |
|  | Calms    | 25.00 |

**Location** : บริเวณชุมชนบ้านตากวน (GPS 47P 0735896, 1402032)

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Approved by

Sarayuth Jittranont  
Assistant General Manager

สารอินทรีย์ระเหยง่ายทั้งหมด (TVOCs) จากปล่องระบาย VRU

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-23-18

**Project Name :**

**Project Location :**

**Lot ID: 2575922**

Date Received : Sep 18, 2025

Date Reported : Sep 26, 2025

Report Number: 3381220-1

Page 1 of 1

**Sample Number** 2575922-1  
**Sampled Date** Sep 18, 2025  
**Sample Description** Emission from Stationary Source  
**Location** ปล่องระบายของหน่วย VRU  
**Date Analysis Commenced** Sep 19, 2025  
**Condition of Sample** Extracted into one 10-L air sampling bag

### Stack Description

|                     |         |      |                   |        |    |                       |      |        |
|---------------------|---------|------|-------------------|--------|----|-----------------------|------|--------|
| Ambient Pressure    | 754     | mmHg | Diameter          | 0.10   | m  | Oxygen                | 20.9 | %      |
| Ambient Temperature | 30.6    | °C   | Shape             | Circle |    | Carbon Dioxide        | 0.0  | %      |
| Type of Process     | Process |      | Stack Temperature | -      | °C | Gas Velocity          | -    | m/s    |
| Type of Fuel        | -       |      | Moisture          | -      | %  | Flow Rate (Actual O2) | -    | Nm3/hr |

| Analyte            | Sampled Time        | Unit | LOD | LOQ (LOR) | Result | Method                                               | Testing Location |
|--------------------|---------------------|------|-----|-----------|--------|------------------------------------------------------|------------------|
| <b>Air Testing</b> |                     |      |     |           |        |                                                      |                  |
| Total VOC          | 02:30 PM - 02:40 PM | mg/L | -   | 0.0015    | 0.003  | U.S. Environmental Protection Agency, EPA Method 25A | Bangkok          |
| Total VOCs         | 02:30 PM - 02:40 PM | ppm  | -   | 1.0       | 5.4    | U.S. Environmental Protection Agency, EPA Method 25A | Bangkok          |

**Sampling By :** Kitsanapon Panyawong

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

*Orawan R.*

Orawan Rakyong  
Scientist (3)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

# ภาคผนวก ค-2

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คุณภาพน้ำทะเลชายฝั่ง



## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2612120**

Date Received : Mar 10, 2026

Date Reported : Mar 30, 2026

Report Number : 3503329-1

Page 1 of 12

|                                |                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612120-1                                                                                                                                                         |
| <b>Sampled Date</b>            | Mar 10, 2026 9:30 AM                                                                                                                                              |
| <b>Sample Description</b>      | Sea Water                                                                                                                                                         |
| <b>Location</b>                | สถานีที่ 2 จุดปล่อยน้ำออก                                                                                                                                         |
| <b>Date Analysis Commenced</b> | Mar 10, 2026                                                                                                                                                      |
| <b>Condition of Sample</b>     | Contained in six glass vials, three amber glass bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                            | Unit      | LOD      | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                             | Testing Location |
|------------------------------------|-----------|----------|-----------|--------------|---------------------------|--------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Metals Testing</b>              |           |          |           |              |                           |                                                                                                                    |                  |
| Cadmium *                          | mg/L      | 0.0009   | 0.003     | Not Detected | ≤0.005                    | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Lead *                             | mg/L      | 0.001    | 0.003     | Not Detected | ≤0.0085                   | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Mercury                            | mg/L      | 0.000003 | 0.00005   | <0.00005     | ≤0.0001                   | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112          | Bangkok          |
| <b>Microbiological Testing</b>     |           |          |           |              |                           |                                                                                                                    |                  |
| Fecal Coliform                     | CFU/100mL | -        | -         | <1           | ≤100                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9222 D        | Bangkok          |
| Total Coliform                     | MPN/100mL | -        | -         | <1.8         | ≤1000                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B        | Bangkok          |
| <b>Volatile Organics Compounds</b> |           |          |           |              |                           |                                                                                                                    |                  |
| 1,2-Dichloroethane *               | ug/L      | 0.07     | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B        | Bangkok          |
| 1,3-Butadiene *                    | ug/L      | 0.3      | 1.0       | <1.0         | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B        | Bangkok          |
| Benzene *                          | ug/L      | 0.03     | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B        | Bangkok          |

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2612120**

Date Received : Mar 10, 2026

Date Reported : Mar 30, 2026

Report Number : 3503329-1

Page 2 of 12

| <b>Sample Number</b>               | 2612120-1                                                                                                                                                         |      |           |              |                           |                                                                                                                              |                  |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Sampled Date</b>                | Mar 10, 2026 9:30 AM                                                                                                                                              |      |           |              |                           |                                                                                                                              |                  |
| <b>Sample Description</b>          | Sea Water                                                                                                                                                         |      |           |              |                           |                                                                                                                              |                  |
| <b>Location</b>                    | สถานีที่ 2 จุดปล่อยน้ำออก                                                                                                                                         |      |           |              |                           |                                                                                                                              |                  |
| <b>Date Analysis Commenced</b>     | Mar 10, 2026                                                                                                                                                      |      |           |              |                           |                                                                                                                              |                  |
| <b>Condition of Sample</b>         | Contained in six glass vials, three amber glass bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |      |           |              |                           |                                                                                                                              |                  |
| Analyte                            | Unit                                                                                                                                                              | LOD  | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                                       | Testing Location |
| <b>Volatile Organics Compounds</b> |                                                                                                                                                                   |      |           |              |                           |                                                                                                                              |                  |
| Ethylbenzene *                     | ug/L                                                                                                                                                              | 0.03 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| m,p-Xylene *                       | ug/L                                                                                                                                                              | 0.03 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| Styrene *                          | ug/L                                                                                                                                                              | 0.02 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| Toluene *                          | ug/L                                                                                                                                                              | 0.04 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| Total Xylene *                     | ug/L                                                                                                                                                              | 0.04 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| <b>Water Testing</b>               |                                                                                                                                                                   |      |           |              |                           |                                                                                                                              |                  |
| BOD (5 days at 20 Degree C) *      | mg/L                                                                                                                                                              | -    | 2.0       | <2.0         | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G | Rayong           |
| Conductivity at 25 Degree C *      | micromhos/cm                                                                                                                                                      | -    | 0.5       | 50220        | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2510 B                  | Rayong           |
| Depth *                            | m                                                                                                                                                                 | -    | -         | 14.10        | No Standard               | Water Level Meter                                                                                                            | Bangkok          |
| Dissolved Oxygen *                 | mg/L                                                                                                                                                              | -    | 0.1       | 7.1          | ≥4                        | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)              | Rayong           |

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2612120**

Date Received : Mar 10, 2026

Date Reported : Mar 30, 2026

Report Number : 3503329-1

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|                                |                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612120-1                                                                                                                                                         |
| <b>Sampled Date</b>            | Mar 10, 2026 9:30 AM                                                                                                                                              |
| <b>Sample Description</b>      | Sea Water                                                                                                                                                         |
| <b>Location</b>                | สถานีที่ 2 จุดปล่อยน้ำออก                                                                                                                                         |
| <b>Date Analysis Commenced</b> | Mar 10, 2026                                                                                                                                                      |
| <b>Condition of Sample</b>     | Contained in six glass vials, three amber glass bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                                              | Unit     | LOD  | LOQ (LOR) | Result | Guideline / Specification                                                  | Method                                                                                                            | Testing Location |
|------------------------------------------------------|----------|------|-----------|--------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b>                                 |          |      |           |        |                                                                            |                                                                                                                   |                  |
| Methanol *                                           | mg/L     | -    | 0.01      | <0.01  | No Standard                                                                | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B       | Bangkok          |
| Oil & Grease *                                       | mg/L     | -    | 3         | <3     | No Standard                                                                | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B       | Rayong           |
| Petroleum Hydrocarbon *                              | ug/L     | 0.02 | 0.05      | 0.28   | ≤5                                                                         |                                                                                                                   | Bangkok          |
| pH at 25 degree C                                    |          | -    | -         | 8.1    | 7.0-8.5                                                                    | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B) | Rayong           |
| Salinity *                                           | ppt      | -    | 0.1       | 32.7   | Change from lower salinity not more than 10%                               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2510 B       | Rayong           |
| Temperature *                                        | Degree C | -    | -         | 32.3   | Change from natural condition not more than 2 degree C                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B       | Rayong           |
| Total Dissolved Solids Dried at 180 degree C *       | mg/L     | -    | 5         | 34150  | No Standard                                                                | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C       | Rayong           |
| Total Suspended Solids Dried from 103-105 degree C * | mg/L     | -    | 2         | 2      | No Standard                                                                | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D       | Rayong           |
| Transparency *                                       | m        | -    | -         | 3.0    | Change from Natural condition not more than 10% of the lowest transparency | Visual Method                                                                                                     | Rayong           |

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2612120**

Date Received : Mar 10, 2026

Date Reported : Mar 30, 2026

Report Number : 3503329-1

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|                                |                                                                                                                                                                   |  |  |  |  |  |  |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|
| <b>Sample Number</b>           | 2612120-1                                                                                                                                                         |  |  |  |  |  |  |
| <b>Sampled Date</b>            | Mar 10, 2026 9:30 AM                                                                                                                                              |  |  |  |  |  |  |
| <b>Sample Description</b>      | Sea Water                                                                                                                                                         |  |  |  |  |  |  |
| <b>Location</b>                | สถานีที่ 2 จุดปล่อยน้ำออก                                                                                                                                         |  |  |  |  |  |  |
| <b>Date Analysis Commenced</b> | Mar 10, 2026                                                                                                                                                      |  |  |  |  |  |  |
| <b>Condition of Sample</b>     | Contained in six glass vials, three amber glass bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |  |  |  |  |  |  |

| Analyte              | Unit | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                      | Testing Location |
|----------------------|------|-----|-----------|--------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b> |      |     |           |        |                           |                                                                                                             |                  |
| Turbidity *          | NTU  | -   | 0.1       | 0.8    | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2130 B | Rayong           |

**Guideline :** Notification of the National Environmental Board, B.E.2564 : Coastal Water Quality Standard (Class 5)

**Sampling By :** Wasan Kinunti

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2612120**

Date Received : Mar 10, 2026

Date Reported : Mar 30, 2026

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|                                |                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612120-2                                                                                                                                                         |
| <b>Sampled Date</b>            | Mar 10, 2026 9:45 AM                                                                                                                                              |
| <b>Sample Description</b>      | Sea Water                                                                                                                                                         |
| <b>Location</b>                | สถานีที่ 3 ระหว่างทางระบายน้ำโครงการกับทะเลชายฝั่ง(หน้าท่าเทียบเรือที่ 2)                                                                                         |
| <b>Date Analysis Commenced</b> | Mar 10, 2026                                                                                                                                                      |
| <b>Condition of Sample</b>     | Contained in six glass vials, three amber glass bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                            | Unit      | LOD      | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                             | Testing Location |
|------------------------------------|-----------|----------|-----------|--------------|---------------------------|--------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Metals Testing</b>              |           |          |           |              |                           |                                                                                                                    |                  |
| Cadmium *                          | mg/L      | 0.0009   | 0.003     | Not Detected | ≤0.005                    | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Lead *                             | mg/L      | 0.001    | 0.003     | Not Detected | ≤0.0085                   | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Mercury                            | mg/L      | 0.000003 | 0.00005   | <0.00005     | ≤0.0001                   | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112          | Bangkok          |
| <b>Microbiological Testing</b>     |           |          |           |              |                           |                                                                                                                    |                  |
| Fecal Coliform                     | CFU/100mL | -        | -         | <1           | ≤100                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9222 D        | Bangkok          |
| Total Coliform                     | MPN/100mL | -        | -         | <1.8         | ≤1000                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B        | Bangkok          |
| <b>Volatile Organics Compounds</b> |           |          |           |              |                           |                                                                                                                    |                  |
| 1,2-Dichloroethane *               | ug/L      | 0.07     | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B        | Bangkok          |
| 1,3-Butadiene *                    | ug/L      | 0.3      | 1.0       | <1.0         | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B        | Bangkok          |
| Benzene *                          | ug/L      | 0.03     | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B        | Bangkok          |

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2612120**

Date Received : Mar 10, 2026

Date Reported : Mar 30, 2026

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|                                |                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612120-2                                                                                                                                                         |
| <b>Sampled Date</b>            | Mar 10, 2026 9:45 AM                                                                                                                                              |
| <b>Sample Description</b>      | Sea Water                                                                                                                                                         |
| <b>Location</b>                | สถานีที่ 3 ระหว่างทางระบายน้ำโครงการกั้นทะเลชายฝั่ง(หน้าท่าเทียบเรือที่ 2)                                                                                        |
| <b>Date Analysis Commenced</b> | Mar 10, 2026                                                                                                                                                      |
| <b>Condition of Sample</b>     | Contained in six glass vials, three amber glass bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                            | Unit         | LOD  | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                                       | Testing Location |
|------------------------------------|--------------|------|-----------|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Volatile Organics Compounds</b> |              |      |           |              |                           |                                                                                                                              |                  |
| Ethylbenzene *                     | ug/L         | 0.03 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| m,p-Xylene *                       | ug/L         | 0.03 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| Styrene *                          | ug/L         | 0.02 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| Toluene *                          | ug/L         | 0.04 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| Total Xylene *                     | ug/L         | 0.04 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| <b>Water Testing</b>               |              |      |           |              |                           |                                                                                                                              |                  |
| BOD (5 days at 20 Degree C) *      | mg/L         | -    | 2.0       | <2.0         | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G | Rayong           |
| Conductivity at 25 Degree C *      | micromhos/cm | -    | 0.5       | 50080        | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2510 B                  | Rayong           |
| Depth *                            | m            | -    | -         | 13.50        | No Standard               | Water Level Meter                                                                                                            | Bangkok          |
| Dissolved Oxygen *                 | mg/L         | -    | 0.1       | 7.0          | ≥4                        | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)              | Rayong           |

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2612120**

Date Received : Mar 10, 2026

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|                                |                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612120-2                                                                                                                                                         |
| <b>Sampled Date</b>            | Mar 10, 2026 9:45 AM                                                                                                                                              |
| <b>Sample Description</b>      | Sea Water                                                                                                                                                         |
| <b>Location</b>                | สถานีที่ 3 ระหว่างทางระบายน้ำโครงการกับทะเลชายฝั่ง(หน้าท่าเทียบเรือที่ 2)                                                                                         |
| <b>Date Analysis Commenced</b> | Mar 10, 2026                                                                                                                                                      |
| <b>Condition of Sample</b>     | Contained in six glass vials, three amber glass bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                                              | Unit     | LOD  | LOQ (LOR) | Result | Guideline / Specification                                                  | Method                                                                                                            | Testing Location |
|------------------------------------------------------|----------|------|-----------|--------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b>                                 |          |      |           |        |                                                                            |                                                                                                                   |                  |
| Methanol *                                           | mg/L     | -    | 0.01      | <0.01  | No Standard                                                                | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B       | Bangkok          |
| Oil & Grease *                                       | mg/L     | -    | 3         | <3     | No Standard                                                                | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B       | Rayong           |
| Petroleum Hydrocarbon *                              | ug/L     | 0.02 | 0.05      | 0.21   | ≤5                                                                         |                                                                                                                   | Bangkok          |
| pH at 25 degree C *                                  |          | -    | -         | 8.2    | 7.0-8.5                                                                    | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B) | Rayong           |
| Salinity *                                           | ppt      | -    | 0.1       | 32.7   | Change from lower salinity not more than 10%                               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2510 B       | Rayong           |
| Temperature *                                        | Degree C | -    | -         | 31.3   | Change from natural condition not more than 2 degree C                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B       | Rayong           |
| Total Dissolved Solids Dried at 180 degree C *       | mg/L     | -    | 5         | 35050  | No Standard                                                                | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C       | Rayong           |
| Total Suspended Solids Dried from 103-105 degree C * | mg/L     | -    | 2         | <2     | No Standard                                                                | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D       | Rayong           |
| Transparency *                                       | m        | -    | -         | 2.7    | Change from Natural condition not more than 10% of the lowest transparency | Visual Method                                                                                                     | Rayong           |

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

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## Analysis / Test Report

TESTING  
No.0009

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

**Lot ID: 2612120**

Date Received : Mar 10, 2026

Date Reported : Mar 30, 2026

Report Number : 3503329-1

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|                                |                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612120-2                                                                                                                                                         |
| <b>Sampled Date</b>            | Mar 10, 2026 9:45 AM                                                                                                                                              |
| <b>Sample Description</b>      | Sea Water                                                                                                                                                         |
| <b>Location</b>                | สถานีที่ 3 ระหว่างทางระบายน้ำโครงการกั้นทะเลชายฝั่ง(หน้าท่าเทียบเรือที่ 2)                                                                                        |
| <b>Date Analysis Commenced</b> | Mar 10, 2026                                                                                                                                                      |
| <b>Condition of Sample</b>     | Contained in six glass vials, three amber glass bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte              | Unit | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                      | Testing Location |
|----------------------|------|-----|-----------|--------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b> |      |     |           |        |                           |                                                                                                             |                  |
| Turbidity *          | NTU  | -   | 0.1       | 1.0    | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2130 B | Rayong           |

**Guideline** : Notification of the National Environmental Board, B.E.2564 : Coastal Water Quality Standard (Class 5)

**Sampling By** : Wasan Kinunti

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2612120**

Date Received : Mar 10, 2026

Date Reported : Mar 30, 2026

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|                                |                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612120-3                                                                                                                                                         |
| <b>Sampled Date</b>            | Mar 10, 2026 9:50 AM                                                                                                                                              |
| <b>Sample Description</b>      | Sea Water                                                                                                                                                         |
| <b>Location</b>                | สถานที่ 4 ระยะ 500 เมตร ด้านทิศใต้จากท่าเทียบเรือ                                                                                                                 |
| <b>Date Analysis Commenced</b> | Mar 10, 2026                                                                                                                                                      |
| <b>Condition of Sample</b>     | Contained in six glass vials, three amber glass bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                            | Unit      | LOD      | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                             | Testing Location |
|------------------------------------|-----------|----------|-----------|--------------|---------------------------|--------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Metals Testing</b>              |           |          |           |              |                           |                                                                                                                    |                  |
| Cadmium *                          | mg/L      | 0.0009   | 0.003     | Not Detected | ≤0.005                    | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Lead *                             | mg/L      | 0.001    | 0.003     | Not Detected | ≤0.0085                   | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Mercury                            | mg/L      | 0.000003 | 0.00005   | <0.00005     | ≤0.0001                   | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112          | Bangkok          |
| <b>Microbiological Testing</b>     |           |          |           |              |                           |                                                                                                                    |                  |
| Fecal Coliform                     | CFU/100mL | -        | -         | <1           | ≤100                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9222 D        | Bangkok          |
| Total Coliform                     | MPN/100mL | -        | -         | <1.8         | ≤1000                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B        | Bangkok          |
| <b>Volatile Organics Compounds</b> |           |          |           |              |                           |                                                                                                                    |                  |
| 1,2-Dichloroethane *               | ug/L      | 0.07     | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B        | Bangkok          |
| 1,3-Butadiene *                    | ug/L      | 0.3      | 1.0       | <1.0         | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B        | Bangkok          |
| Benzene *                          | ug/L      | 0.03     | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B        | Bangkok          |

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2612120**

Date Received : Mar 10, 2026

Date Reported : Mar 30, 2026

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|                                |                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612120-3                                                                                                                                                         |
| <b>Sampled Date</b>            | Mar 10, 2026 9:50 AM                                                                                                                                              |
| <b>Sample Description</b>      | Sea Water                                                                                                                                                         |
| <b>Location</b>                | สถานที่ 4 ระยะ 500 เมตร ด้านทิศใต้จากท่าเทียบเรือ                                                                                                                 |
| <b>Date Analysis Commenced</b> | Mar 10, 2026                                                                                                                                                      |
| <b>Condition of Sample</b>     | Contained in six glass vials, three amber glass bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                            | Unit         | LOD  | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                                       | Testing Location |
|------------------------------------|--------------|------|-----------|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Volatile Organics Compounds</b> |              |      |           |              |                           |                                                                                                                              |                  |
| Ethylbenzene *                     | ug/L         | 0.03 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| m,p-Xylene *                       | ug/L         | 0.03 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| Styrene *                          | ug/L         | 0.02 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| Toluene *                          | ug/L         | 0.04 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| Total Xylene *                     | ug/L         | 0.04 | 0.5       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                  | Bangkok          |
| <b>Water Testing</b>               |              |      |           |              |                           |                                                                                                                              |                  |
| BOD (5 days at 20 Degree C) *      | mg/L         | -    | 2.0       | <2.0         | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G | Rayong           |
| Conductivity at 25 Degree C *      | micromhos/cm | -    | 0.5       | 49930        | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2510 B                  | Rayong           |
| Depth *                            | m            | -    | -         | 16.10        | No Standard               | Water Level Meter                                                                                                            | Bangkok          |
| Dissolved Oxygen *                 | mg/L         | -    | 0.1       | 7.0          | ≥4                        | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-O (G)              | Rayong           |

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2612120**

Date Received : Mar 10, 2026

Date Reported : Mar 30, 2026

Report Number : 3503329-1

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|                                |                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612120-3                                                                                                                                                         |
| <b>Sampled Date</b>            | Mar 10, 2026 9:50 AM                                                                                                                                              |
| <b>Sample Description</b>      | Sea Water                                                                                                                                                         |
| <b>Location</b>                | สถานที่ 4 ระยะ 500 เมตร ด้านทิศใต้จากท่าเทียบเรือ                                                                                                                 |
| <b>Date Analysis Commenced</b> | Mar 10, 2026                                                                                                                                                      |
| <b>Condition of Sample</b>     | Contained in six glass vials, three amber glass bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                                              | Unit     | LOD  | LOQ (LOR) | Result | Guideline / Specification                                                  | Method                                                                                                            | Testing Location |
|------------------------------------------------------|----------|------|-----------|--------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b>                                 |          |      |           |        |                                                                            |                                                                                                                   |                  |
| Methanol *                                           | mg/L     | -    | 0.01      | <0.01  | No Standard                                                                | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B       | Bangkok          |
| Oil & Grease *                                       | mg/L     | -    | 3         | <3     | No Standard                                                                | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B       | Rayong           |
| Petroleum Hydrocarbon *                              | ug/L     | 0.02 | 0.05      | 0.18   | ≤5                                                                         |                                                                                                                   | Bangkok          |
| pH at 25 degree C *                                  |          | -    | -         | 8.2    | 7.0-8.5                                                                    | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B) | Rayong           |
| Salinity *                                           | ppt      | -    | 0.1       | 32.6   | Change from lower salinity not more than 10%                               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2510 B       | Rayong           |
| Temperature *                                        | Degree C | -    | -         | 32.7   | Change from natural condition not more than 2 degree C                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B       | Rayong           |
| Total Dissolved Solids Dried at 180 degree C *       | mg/L     | -    | 5         | 35350  | No Standard                                                                | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C       | Rayong           |
| Total Suspended Solids Dried from 103-105 degree C * | mg/L     | -    | 2         | <2     | No Standard                                                                | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D       | Rayong           |
| Transparency *                                       | m        | -    | -         | 3.5    | Change from Natural condition not more than 10% of the lowest transparency | Visual Method                                                                                                     | Rayong           |

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2612120**

Date Received : Mar 10, 2026

Date Reported : Mar 30, 2026

Report Number : 3503329-1

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|                                |                                                                                                                                                                   |  |  |  |  |  |  |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|
| <b>Sample Number</b>           | 2612120-3                                                                                                                                                         |  |  |  |  |  |  |
| <b>Sampled Date</b>            | Mar 10, 2026 9:50 AM                                                                                                                                              |  |  |  |  |  |  |
| <b>Sample Description</b>      | Sea Water                                                                                                                                                         |  |  |  |  |  |  |
| <b>Location</b>                | สถานที่ 4 ระยะ 500 เมตร ด้านทิศใต้จากท่าเทียบเรือ                                                                                                                 |  |  |  |  |  |  |
| <b>Date Analysis Commenced</b> | Mar 10, 2026                                                                                                                                                      |  |  |  |  |  |  |
| <b>Condition of Sample</b>     | Contained in six glass vials, three amber glass bottles and four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |  |  |  |  |  |  |

| Analyte              | Unit | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                      | Testing Location |
|----------------------|------|-----|-----------|--------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b> |      |     |           |        |                           |                                                                                                             |                  |
| Turbidity *          | NTU  | -   | 0.1       | 0.8    | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2130 B | Rayong           |

**Guideline :** Notification of the National Environmental Board, B.E.2564 : Coastal Water Quality Standard (Class 5)

**Sampling By :** Wasan Kinunti

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

# ภาคผนวก ค-3

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คุณภาพน้ำทิ้ง



## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location:**

**TESTING**  
**No.0042**

**Lot ID: 261089**

Date Received : Jan 06, 2026

Date Reported : Jan 20, 2026

Report Number : 3482569-1 Rev. No.1

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|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 261089-1                                                                                                                                                      |
| <b>Sampled Date</b>            | Jan 06, 2026 2:12 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater (EIA)                                                                                                                                              |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Jan 06, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                                      | Unit     | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                                           | Testing Location |
|----------------------------------------------|----------|-----|-----------|--------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b>                         |          |     |           |        |                           |                                                                                                                                  |                  |
| BOD (5 days at 20 Degree C)                  | mg/L     | -   | 2.0       | <2.0   | ≤20                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G     | Rayong           |
| COD                                          | mg/L     | 1.5 | 25        | <25    | ≤120                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D                      | Rayong           |
| Oil & Grease                                 | mg/L     | -   | 3         | <3     | ≤5                        | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B                      | Rayong           |
| pH at 25 degree C                            |          | -   | -         | 8.1    | 5.5-9.0                   | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)                | Rayong           |
| Sulfide *                                    | mg/L     | -   | 0.5       | <0.5   | ≤1.0                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)              | Rayong           |
| Temperature *                                | Degree C | -   | -         | 27.7   | ≤40                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B                      | Rayong           |
| Total Dissolved Solids Dried at 180 degree C | mg/L     | -   | 5         | 268    | ≤3000                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C                      | Rayong           |
| Total Kjeldahl Nitrogen as N                 | mg/L     | -   | 1.0       | <1.0   | ≤100                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D) | Rayong           |

**Technical Management**

*Jitsupa P.*

Jitsupa Pratuangsuk  
Scientist (2)

ทะเบียนเลขที่ ว-323-จ-0004

**Approved by**

*D. Changchon.*

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ว-323-ค-0001

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location:**

**Lot ID: 261089**

Date Received : Jan 06, 2026

Date Reported : Jan 20, 2026

Report Number : 3482569-1 Rev. No.1

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|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 261089-1                                                                                                                                                      |
| <b>Sampled Date</b>            | Jan 06, 2026 2:12 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater (EIA)                                                                                                                                              |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Jan 06, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                                          | Unit | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                      | Testing Location |
|--------------------------------------------------|------|-----|-----------|--------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b>                             |      |     |           |        |                           |                                                                                                             |                  |
| Total Suspended Solids Dried at 103-105 degree C | mg/L | -   | 5         | <5     | ≤50                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D | Rayong           |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Note :** This Analysis test Report is reissued to supersede Report No. 261089-1, Date Reported : Jan 15, 2026 due to the revision of guideline from Notification of Marine Department No.164/2560

**Sampling By :** Suphanat Sakulkittimasak ทะเบียนเลขที่ ว-323-จ-0021 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Jitsupa P.

Jitsupa Pratuangsuk  
Scientist (2)

ทะเบียนเลขที่ ว-323-จ-0004

Approved by

D. Johnson.

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ว-323-ค-0001

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location :**

**Lot ID: 261089**

Date Received : Jan 06, 2026

Date Reported : Jan 20, 2026

Report Number : 3482569-2 Rev. No.1

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|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 261089-1                                                                                                                                                      |
| <b>Sampled Date</b>            | Jan 06, 2026 2:12 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater (EIA)                                                                                                                                              |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Jan 07, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte               | Unit | LOD    | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                             | Testing Location |
|-----------------------|------|--------|-----------|--------------|---------------------------|--------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Metals Testing</b> |      |        |           |              |                           |                                                                                                                    |                  |
| Arsenic               | mg/L | 0.0003 | 0.0005    | 0.005        | ≤0.25                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Lead                  | mg/L | 0.0003 | 0.0005    | Not Detected | ≤0.2                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Mercury *             | mg/L | 0.0001 | 0.0005    | Not Detected | ≤0.005                    | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112          | Bangkok          |
| Zinc                  | mg/L | 0.003  | 0.005     | 0.16         | ≤5.0                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Note :** This Analysis test Report is reissued to supersede Report No. 261089-2, Date Reported : Jan 14, 2026 due to the revision of guideline from Notification of Marine Department No.164/2560

**Sampling By :** Suphanat Sakulkittimasak ทะเบียนเลขที่ ว-323-จ-0021 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

**Remark :**

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

**Technical Management**

*Savitree N.*

Savitree Noisangiam  
Manager

ทะเบียนเลขที่ ว-204-จ-0007

**Approved by**

*Kanokkorn Anek*

Kanokkorn Anek  
Assistant General Manager  
ทะเบียนเลขที่ ว-204-ค-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 261089**

Date Received : Jan 06, 2026

Date Reported : Jan 20, 2026

Report Number : 3482569-3 Rev. No.1

Page 1 of 2

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 261089-1                                                                                                                                                      |
| <b>Sampled Date</b>            | Jan 06, 2026 2:12 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater (EIA)                                                                                                                                              |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Jan 07, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                            | Unit      | LOD | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                      | Testing Location |
|------------------------------------|-----------|-----|-----------|--------------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Microbiological Testing</b>     |           |     |           |              |                           |                                                                                                             |                  |
| Total Coliform                     | MPN/100mL | -   | -         | <1.8         | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B | Bangkok          |
| <b>Volatile Organics Compounds</b> |           |     |           |              |                           |                                                                                                             |                  |
| 1,2-Dichloroethane                 | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| 1,3-Butadiene *                    | ug/L      | 0.3 | 1.0       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Benzene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Ethylbenzene                       | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| m,p-Xylene                         | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Styrene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Toluene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Total Xylene                       | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |

### Water Testing

Approved by

Suwannee Chuamkeaw  
Section Head

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.



## Analysis / Test Report

TESTING  
No.0009

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location:**

**Lot ID: 261089**

Date Received : Jan 06, 2026

Date Reported : Jan 20, 2026

Report Number : 3482569-3 Rev. No.1

Page 2 of 2

| <b>Sample Number</b>           | 261089-1                                                                                                                                                      |     |           |        |                           |                                                                                                                                      |                  |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------|--------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Sampled Date</b>            | Jan 06, 2026 2:12 PM                                                                                                                                          |     |           |        |                           |                                                                                                                                      |                  |
| <b>Sample Description</b>      | Wastewater (EIA)                                                                                                                                              |     |           |        |                           |                                                                                                                                      |                  |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |     |           |        |                           |                                                                                                                                      |                  |
| <b>Date Analysis Commenced</b> | Jan 07, 2026                                                                                                                                                  |     |           |        |                           |                                                                                                                                      |                  |
| <b>Condition of Sample</b>     | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |     |           |        |                           |                                                                                                                                      |                  |
| Analyte                        | Unit                                                                                                                                                          | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                                               | Testing Location |
| <b>Water Testing</b>           |                                                                                                                                                               |     |           |        |                           |                                                                                                                                      |                  |
| Hydrocarbons *                 | mg/L                                                                                                                                                          | -   | 3         | <3     | No Standard               | In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 F | Rayong           |
| Methanol *                     | ug/L                                                                                                                                                          | -   | 10        | <10    | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                          | Bangkok          |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Note :** This Analysis test Report is reissued to supersede Report No. 261089-3, Date Reported : Jan 15, 2026 due to the revision of guideline from Notification of Marine Department No.164/2560

**Sampling By :** Suphanat Sakulkittimasak , Thanasoun Namakunna

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Suwannee Chumkeaw  
Section Head

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.



## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location :**

**TESTING**  
**No.0042**

**Lot ID: 267040**

Date Received : Feb 03, 2026

Date Reported : Feb 11, 2026

Report Number : 3493342-1

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| <b>Sample Number</b>                         | 267040-1                                                                                                                                                      |     |           |        |                           |                                                                                                                                  |                  |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------|--------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Sampled Date</b>                          | Feb 03, 2026 2:08 PM                                                                                                                                          |     |           |        |                           |                                                                                                                                  |                  |
| <b>Sample Description</b>                    | Wastewater                                                                                                                                                    |     |           |        |                           |                                                                                                                                  |                  |
| <b>Location</b>                              | Sea Water Return Pit                                                                                                                                          |     |           |        |                           |                                                                                                                                  |                  |
| <b>Date Analysis Commenced</b>               | Feb 03, 2026                                                                                                                                                  |     |           |        |                           |                                                                                                                                  |                  |
| <b>Condition of Sample</b>                   | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |     |           |        |                           |                                                                                                                                  |                  |
| Analyte                                      | Unit                                                                                                                                                          | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                                           | Testing Location |
| <b>Water Testing</b>                         |                                                                                                                                                               |     |           |        |                           |                                                                                                                                  |                  |
| BOD (5 days at 20 Degree C)                  | mg/L                                                                                                                                                          | -   | 2.0       | <2.0   | ≤20                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G     | Rayong           |
| COD                                          | mg/L                                                                                                                                                          | 1.5 | 25        | <25    | ≤120                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D                      | Rayong           |
| Oil & Grease                                 | mg/L                                                                                                                                                          | -   | 3         | <3     | ≤5                        | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B                      | Rayong           |
| pH at 25 degree C                            |                                                                                                                                                               | -   | -         | 7.8    | 5.5-9.0                   | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)                | Rayong           |
| Sulfide *                                    | mg/L                                                                                                                                                          | -   | 0.5       | <0.5   | ≤1.0                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)              | Rayong           |
| Temperature *                                | Degree C                                                                                                                                                      | -   | -         | 31.0   | ≤40                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B                      | Rayong           |
| Total Dissolved Solids Dried at 180 degree C | mg/L                                                                                                                                                          | -   | 5         | 732    | ≤3000                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C                      | Rayong           |
| Total Kjeldahl Nitrogen as N                 | mg/L                                                                                                                                                          | -   | 1.0       | 2.4    | ≤100                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D) | Rayong           |

**Technical Management**

*Photchana S*

Photchana Seeda  
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-0028

**Approved by**

*D. Changchon*

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ว-323-ค-0001

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location :**

**Lot ID: 267040**

Date Received : Feb 03, 2026

Date Reported : Feb 11, 2026

Report Number : 3493342-1

Page 2 of 2

| <b>Sample Number</b>                             | 267040-1                                                                                                                                                      |     |           |        |                           |                                                                                                             |                  |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------|--------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Sampled Date</b>                              | Feb 03, 2026 2:08 PM                                                                                                                                          |     |           |        |                           |                                                                                                             |                  |
| <b>Sample Description</b>                        | Wastewater                                                                                                                                                    |     |           |        |                           |                                                                                                             |                  |
| <b>Location</b>                                  | Sea Water Return Pit                                                                                                                                          |     |           |        |                           |                                                                                                             |                  |
| <b>Date Analysis Commenced</b>                   | Feb 03, 2026                                                                                                                                                  |     |           |        |                           |                                                                                                             |                  |
| <b>Condition of Sample</b>                       | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |     |           |        |                           |                                                                                                             |                  |
| Analyte                                          | Unit                                                                                                                                                          | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                      | Testing Location |
| <b>Water Testing</b>                             |                                                                                                                                                               |     |           |        |                           |                                                                                                             |                  |
| Total Suspended Solids Dried at 103-105 degree C | mg/L                                                                                                                                                          | -   | 5         | <5     | ≤50                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D | Rayong           |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Suphanat Sakulkittimasak ทะเบียนเลขที่ ว-323-จ-0021 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

**Remark :**

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

**Technical Management**

Photchana S

Photchana Seeda  
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-0028

**Approved by**

D. Chumma

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ว-323-ค-0001

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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## Analysis / Test Report

TESTING  
No.0009

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location :**

**Lot ID: 267040**

Date Received : Feb 03, 2026

Date Reported : Feb 11, 2026

Report Number : 3493342-2

Page 1 of 1

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 267040-1                                                                                                                                                      |
| <b>Sampled Date</b>            | Feb 03, 2026 2:08 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater                                                                                                                                                    |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Feb 04, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte               | Unit | LOD    | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                             | Testing Location |
|-----------------------|------|--------|-----------|--------------|---------------------------|--------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Metals Testing</b> |      |        |           |              |                           |                                                                                                                    |                  |
| Arsenic               | mg/L | 0.0003 | 0.0005    | 0.002        | ≤0.25                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Lead                  | mg/L | 0.0003 | 0.0005    | 0.004        | ≤0.2                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Mercury *             | mg/L | 0.0001 | 0.0005    | Not Detected | ≤0.005                    | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112          | Bangkok          |
| Zinc                  | mg/L | 0.003  | 0.005     | 0.11         | ≤5.0                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Suphanat Sakulkittimasak ทะเบียนเลขที่ ว-323-จ-0021 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

Remark :

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- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

*Chamatt L.*

Chanattagarn Imchom

Section Head

ทะเบียนเลขที่ ว-204-จ-0008

Approved by

*Kanokkorn Anek*

Kanokkorn Anek

Assistant General Manager

ทะเบียนเลขที่ ว-204-ค-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.



## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 267040**

Date Received : Feb 03, 2026

Date Reported : Feb 11, 2026

Report Number : 3493342-3

Page 1 of 2

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 267040-1                                                                                                                                                      |
| <b>Sampled Date</b>            | Feb 03, 2026 2:08 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater                                                                                                                                                    |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Feb 04, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                            | Unit      | LOD | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                      | Testing Location |
|------------------------------------|-----------|-----|-----------|--------------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Microbiological Testing</b>     |           |     |           |              |                           |                                                                                                             |                  |
| Total Coliform                     | MPN/100mL | -   | -         | 7.8          | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B | Bangkok          |
| <b>Volatile Organics Compounds</b> |           |     |           |              |                           |                                                                                                             |                  |
| 1,2-Dichloroethane                 | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| 1,3-Butadiene *                    | ug/L      | 0.3 | 1.0       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Benzene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Ethylbenzene                       | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| m,p-Xylene                         | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Styrene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Toluene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Total Xylene                       | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |

### Water Testing

Approved by

Suwannee Chumkeaw  
Section Head

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.



## Analysis / Test Report

TESTING  
No.0009

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location :**

**Lot ID: 267040**

Date Received : Feb 03, 2026

Date Reported : Feb 11, 2026

Report Number : 3493342-3

Page 2 of 2

| <b>Sample Number</b>           | 267040-1                                                                                                                                                      |     |           |        |                           |                                                                                                                                      |                  |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------|--------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Sampled Date</b>            | Feb 03, 2026 2:08 PM                                                                                                                                          |     |           |        |                           |                                                                                                                                      |                  |
| <b>Sample Description</b>      | Wastewater                                                                                                                                                    |     |           |        |                           |                                                                                                                                      |                  |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |     |           |        |                           |                                                                                                                                      |                  |
| <b>Date Analysis Commenced</b> | Feb 04, 2026                                                                                                                                                  |     |           |        |                           |                                                                                                                                      |                  |
| <b>Condition of Sample</b>     | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |     |           |        |                           |                                                                                                                                      |                  |
| Analyte                        | Unit                                                                                                                                                          | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                                               | Testing Location |
| <b>Water Testing</b>           |                                                                                                                                                               |     |           |        |                           |                                                                                                                                      |                  |
| Hydrocarbons *                 | mg/L                                                                                                                                                          | -   | 3         | <3     | No Standard               | In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 F | Rayong           |
| Methanol *                     | mg/L                                                                                                                                                          | -   | 0.01      | <0.01  | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                          | Bangkok          |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Suphanat Sakulkittimasak , Thanasoun Namakunna

Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Suwannee Chumkeaw  
Section Head

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0042**

**Lot ID: 2612184**

Date Received : Mar 02, 2026

Date Reported : Mar 11, 2026

Report Number : 3503653-1

Page 1 of 2

|                                |                                                                                                                                                         |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612184-1                                                                                                                                               |
| <b>Sampled Date</b>            | Mar 02, 2026 2:16 PM                                                                                                                                    |
| <b>Sample Description</b>      | Wastewater                                                                                                                                              |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                    |
| <b>Date Analysis Commenced</b> | Mar 02, 2026                                                                                                                                            |
| <b>Condition of Sample</b>     | Contained in six vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                                      | Unit     | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                                           | Testing Location |
|----------------------------------------------|----------|-----|-----------|--------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b>                         |          |     |           |        |                           |                                                                                                                                  |                  |
| BOD (5 days at 20 Degree C)                  | mg/L     | -   | 2.0       | <2.0   | ≤20                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G     | Rayong           |
| COD                                          | mg/L     | 1.5 | 25        | <25    | ≤120                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D                      | Rayong           |
| Oil & Grease                                 | mg/L     | -   | 3         | <3     | ≤5                        | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B                      | Rayong           |
| pH at 25 degree C                            |          | -   | -         | 8.6    | 5.5-9.0                   | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)                | Rayong           |
| Sulfide *                                    | mg/L     | -   | 0.5       | <0.5   | ≤1.0                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)              | Rayong           |
| Temperature *                                | Degree C | -   | -         | 31.4   | ≤40                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B                      | Rayong           |
| Total Dissolved Solids Dried at 180 degree C | mg/L     | -   | 5         | 632    | ≤3000                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C                      | Rayong           |
| Total Kjeldahl Nitrogen as N                 | mg/L     | -   | 1.0       | 2.9    | ≤100                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D) | Rayong           |

**Technical Management**

*Photchana S*

Photchana Seeda  
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-0028

**Approved by**

*D. Changchon*

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ว-323-ค-0001

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0042**

**Lot ID: 2612184**

Date Received : Mar 02, 2026

Date Reported : Mar 11, 2026

Report Number : 3503653-1

Page 2 of 2

|                                |                                                                                                                                                         |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612184-1                                                                                                                                               |
| <b>Sampled Date</b>            | Mar 02, 2026 2:16 PM                                                                                                                                    |
| <b>Sample Description</b>      | Wastewater                                                                                                                                              |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                    |
| <b>Date Analysis Commenced</b> | Mar 02, 2026                                                                                                                                            |
| <b>Condition of Sample</b>     | Contained in six vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                                          | Unit | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                      | Testing Location |
|--------------------------------------------------|------|-----|-----------|--------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b>                             |      |     |           |        |                           |                                                                                                             |                  |
| Total Suspended Solids Dried at 103-105 degree C | mg/L | -   | 5         | <5     | ≤50                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D | Rayong           |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Wasan Kinunti ทะเบียนเลขที่ ว-323-จ-0019 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Photchana S

Photchana Seeda  
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-0028

Approved by

D. Changchon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ว-323-ค-0001

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## Analysis / Test Report

TESTING  
No.0009

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

**Lot ID: 2612184**

Date Received : Mar 02, 2026

Date Reported : Mar 11, 2026

Report Number : 3503653-2

Page 1 of 1

|                                |                                                                                                                                                         |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612184-1                                                                                                                                               |
| <b>Sampled Date</b>            | Mar 02, 2026 2:16 PM                                                                                                                                    |
| <b>Sample Description</b>      | Wastewater                                                                                                                                              |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                    |
| <b>Date Analysis Commenced</b> | Mar 04, 2026                                                                                                                                            |
| <b>Condition of Sample</b>     | Contained in six vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte               | Unit | LOD    | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                             | Testing Location |
|-----------------------|------|--------|-----------|--------------|---------------------------|--------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Metals Testing</b> |      |        |           |              |                           |                                                                                                                    |                  |
| Arsenic               | mg/L | 0.0003 | 0.0005    | 0.005        | ≤0.25                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Lead                  | mg/L | 0.0003 | 0.0005    | 0.002        | ≤0.2                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Mercury *             | mg/L | 0.0001 | 0.0005    | Not Detected | ≤0.005                    | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112          | Bangkok          |
| Zinc                  | mg/L | 0.003  | 0.005     | 0.53         | ≤5.0                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Wasan Kinunti ทะเบียนเลขที่ ว-323-จ-0019 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

*Chamatt L.*

Chanattagarn Imchom

Section Head

ทะเบียนเลขที่ ว-204-จ-0008

Approved by

*Kanokkorn Anek*

Kanokkorn Anek

Assistant General Manager

ทะเบียนเลขที่ ว-204-ค-0004

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2612184**

Date Received : Mar 02, 2026

Date Reported : Mar 11, 2026

Report Number : 3503653-3

Page 1 of 2

|                                |                                                                                                                                                         |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612184-1                                                                                                                                               |
| <b>Sampled Date</b>            | Mar 02, 2026 2:16 PM                                                                                                                                    |
| <b>Sample Description</b>      | Wastewater                                                                                                                                              |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                    |
| <b>Date Analysis Commenced</b> | Mar 03, 2026                                                                                                                                            |
| <b>Condition of Sample</b>     | Contained in six vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                            | Unit      | LOD | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                      | Testing Location |
|------------------------------------|-----------|-----|-----------|--------------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Microbiological Testing</b>     |           |     |           |              |                           |                                                                                                             |                  |
| Total Coliform                     | MPN/100mL | -   | -         | <1.8         | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B | Bangkok          |
| <b>Volatile Organics Compounds</b> |           |     |           |              |                           |                                                                                                             |                  |
| 1,2-Dichloroethane                 | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| 1,3-Butadiene *                    | ug/L      | 0.3 | 1.0       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Benzene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Ethylbenzene                       | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| m,p-Xylene                         | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Styrene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Toluene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Total Xylene                       | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |

### Water Testing

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.



## Analysis / Test Report

TESTING  
No.0009

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2612184**

Date Received : Mar 02, 2026

Date Reported : Mar 11, 2026

Report Number : 3503653-3

Page 2 of 2

|                                |                                                                                                                                                         |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2612184-1                                                                                                                                               |
| <b>Sampled Date</b>            | Mar 02, 2026 2:16 PM                                                                                                                                    |
| <b>Sample Description</b>      | Wastewater                                                                                                                                              |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                    |
| <b>Date Analysis Commenced</b> | Mar 03, 2026                                                                                                                                            |
| <b>Condition of Sample</b>     | Contained in six vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte              | Unit | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                                               | Testing Location |
|----------------------|------|-----|-----------|--------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b> |      |     |           |        |                           |                                                                                                                                      |                  |
| Hydrocarbons *       | mg/L | -   | 3         | <3     | No Standard               | In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 F | Rayong           |
| Methanol *           | ug/L | -   | 10        | <10    | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                          | Bangkok          |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Wasan Kinunti , Thanasoun Namakunna

Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0042**

**Lot ID: 2624613**

Date Received : Apr 07, 2026

Date Reported : Apr 18, 2026

Report Number : 3531707-1

Page 1 of 2

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2624613-1                                                                                                                                                     |
| <b>Sampled Date</b>            | Apr 07, 2026 2:15 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater                                                                                                                                                    |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Apr 07, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in one amber glass bottle, six glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                                      | Unit     | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                                           | Testing Location |
|----------------------------------------------|----------|-----|-----------|--------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b>                         |          |     |           |        |                           |                                                                                                                                  |                  |
| BOD (5 days at 20 Degree C)                  | mg/L     | -   | 2.0       | <2.0   | ≤20                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G     | Rayong           |
| COD                                          | mg/L     | 1.5 | 25        | <25    | ≤120                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D                      | Rayong           |
| Oil & Grease                                 | mg/L     | -   | 3         | <3     | ≤5                        | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B                      | Rayong           |
| pH at 25 degree C                            |          | -   | -         | 8.2    | 5.5-9.0                   | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)                | Rayong           |
| Sulfide *                                    | mg/L     | -   | 0.5       | <0.5   | ≤1.0                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)              | Rayong           |
| Temperature *                                | Degree C | -   | -         | 32.4   | ≤40                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B                      | Rayong           |
| Total Dissolved Solids Dried at 180 degree C | mg/L     | -   | 5         | 488    | ≤3000                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C                      | Rayong           |
| Total Kjeldahl Nitrogen as N                 | mg/L     | -   | 1.0       | 5.7    | ≤100                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D) | Rayong           |

**Technical Management**

*Photchana S*

Photchana Seeda  
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-0028

**Approved by**

*D. Changchon*

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ว-323-ค-0001

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0042**

**Lot ID: 2624613**

Date Received : Apr 07, 2026

Date Reported : Apr 18, 2026

Report Number : 3531707-1

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|                                |                                                                                                                                                               |  |  |  |  |  |  |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|
| <b>Sample Number</b>           | 2624613-1                                                                                                                                                     |  |  |  |  |  |  |
| <b>Sampled Date</b>            | Apr 07, 2026 2:15 PM                                                                                                                                          |  |  |  |  |  |  |
| <b>Sample Description</b>      | Wastewater                                                                                                                                                    |  |  |  |  |  |  |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |  |  |  |  |  |  |
| <b>Date Analysis Commenced</b> | Apr 07, 2026                                                                                                                                                  |  |  |  |  |  |  |
| <b>Condition of Sample</b>     | Contained in one amber glass bottle, six glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |  |  |  |  |  |  |

| Analyte                                            | Unit | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                      | Testing Location |
|----------------------------------------------------|------|-----|-----------|--------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b>                               |      |     |           |        |                           |                                                                                                             |                  |
| Total Suspended Solids Dried from 103-105 degree C | mg/L | -   | 5         | <5     | ≤50                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D | Rayong           |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Wanlop Hunchainaow ทะเบียนเลขที่ ว-323-จ-0038 , Patchanon Inprik ทะเบียนเลขที่ ว-204-จ-0197

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Photchana S

Photchana Seeda

Scientist (4)

ทะเบียนเลขที่ ว-323-จ-0028

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-0001

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## Analysis / Test Report

TESTING  
No.0009

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

**Lot ID: 2624613**

Date Received : Apr 07, 2026

Date Reported : Apr 18, 2026

Report Number : 3531707-2

Page 1 of 1

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2624613-1                                                                                                                                                     |
| <b>Sampled Date</b>            | Apr 07, 2026 2:15 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater                                                                                                                                                    |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Apr 08, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in one amber glass bottle, six glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte               | Unit | LOD    | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                             | Testing Location |
|-----------------------|------|--------|-----------|--------------|---------------------------|--------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Metals Testing</b> |      |        |           |              |                           |                                                                                                                    |                  |
| Arsenic               | mg/L | 0.0003 | 0.0005    | 0.004        | ≤0.25                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Lead                  | mg/L | 0.0003 | 0.0005    | Not Detected | ≤0.2                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Mercury *             | mg/L | 0.0001 | 0.0005    | Not Detected | ≤0.005                    | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112          | Bangkok          |
| Zinc                  | mg/L | 0.003  | 0.005     | 0.09         | ≤5.0                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Wanlop Hunchainaow ทะเบียนเลขที่ ว-323-จ-0038 , Patchanon Inprik ทะเบียนเลขที่ ว-204-จ-0197

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

*Savitree N.*

Savitree Noisangiam

Manager

ทะเบียนเลขที่ ว-204-จ-0007

Approved by

*Kanokkorn Anek*

Kanokkorn Anek

Assistant General Manager

ทะเบียนเลขที่ ว-204-ค-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.



## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2624613**

Date Received : Apr 07, 2026

Date Reported : Apr 18, 2026

Report Number : 3531707-3

Page 1 of 2

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2624613-1                                                                                                                                                     |
| <b>Sampled Date</b>            | Apr 07, 2026 2:15 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater                                                                                                                                                    |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Apr 08, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in one amber glass bottle, six glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                            | Unit      | LOD | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                      | Testing Location |
|------------------------------------|-----------|-----|-----------|--------------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Microbiological Testing</b>     |           |     |           |              |                           |                                                                                                             |                  |
| Total Coliform                     | MPN/100mL | -   | -         | <1.8         | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B | Bangkok          |
| <b>Volatile Organics Compounds</b> |           |     |           |              |                           |                                                                                                             |                  |
| 1,2-Dichloroethane                 | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| 1,3-Butadiene *                    | ug/L      | 0.3 | 1.0       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Benzene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Ethylbenzene                       | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| m,p-Xylene                         | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Styrene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Toluene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Total Xylene                       | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |

### Water Testing

Approved by

Sithichok T.

Sithichok Thongnguen  
Scientist (3)

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## Analysis / Test Report

TESTING  
No.0009

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2624613**

Date Received : Apr 07, 2026

Date Reported : Apr 18, 2026

Report Number : 3531707-3

Page 2 of 2

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2624613-1                                                                                                                                                     |
| <b>Sampled Date</b>            | Apr 07, 2026 2:15 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater                                                                                                                                                    |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Apr 08, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in one amber glass bottle, six glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte              | Unit | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                                               | Testing Location |
|----------------------|------|-----|-----------|--------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b> |      |     |           |        |                           |                                                                                                                                      |                  |
| Hydrocarbons *       | mg/L | -   | 3         | <3     | No Standard               | In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 F | Rayong           |
| Methanol *           | ug/L | -   | 10        | <10    | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                          | Bangkok          |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Wanlop Hunchainaow , Patchanon Inprik

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Sithichok T.

Sithichok Thongnguen  
Scientist (3)

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0042**

**Lot ID: 2633845**

Date Received : May 06, 2026

Date Reported : May 14, 2026

Report Number : 3555275-1

Page 1 of 2

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2633845-1                                                                                                                                                     |
| <b>Sampled Date</b>            | May 06, 2026 2:33 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater                                                                                                                                                    |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | May 06, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                                      | Unit     | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                                           | Testing Location |
|----------------------------------------------|----------|-----|-----------|--------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b>                         |          |     |           |        |                           |                                                                                                                                  |                  |
| BOD (5 days at 20 Degree C)                  | mg/L     | -   | 2.0       | <2.0   | ≤20                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G     | Rayong           |
| COD                                          | mg/L     | 1.5 | 25        | <25    | ≤120                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D                      | Rayong           |
| Oil & Grease                                 | mg/L     | -   | 3         | <3     | ≤5                        | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B                      | Rayong           |
| pH at 25 degree C                            |          | -   | -         | 8.1    | 5.5-9.0                   | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)                | Rayong           |
| Sulfide *                                    | mg/L     | -   | 0.5       | <0.5   | ≤1.0                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)              | Rayong           |
| Temperature *                                | Degree C | -   | -         | 32.0   | ≤40                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B                      | Rayong           |
| Total Dissolved Solids Dried at 180 degree C | mg/L     | -   | 5         | 376    | ≤3000                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C                      | Rayong           |
| Total Kjeldahl Nitrogen as N                 | mg/L     | -   | 1.0       | <1.0   | ≤100                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D) | Rayong           |

**Technical Management**

*Photchana S*

Photchana Seeda  
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-0028

**Approved by**

*D. Changchon*

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ว-323-ค-0001

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0042**

**Lot ID: 2633845**

Date Received : May 06, 2026

Date Reported : May 14, 2026

Report Number : 3555275-1

Page 2 of 2

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2633845-1                                                                                                                                                     |
| <b>Sampled Date</b>            | May 06, 2026 2:33 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater                                                                                                                                                    |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | May 06, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                                            | Unit | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                      | Testing Location |
|----------------------------------------------------|------|-----|-----------|--------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b>                               |      |     |           |        |                           |                                                                                                             |                  |
| Total Suspended Solids Dried from 103-105 degree C | mg/L | -   | 5         | <5     | ≤50                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D | Rayong           |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Chainusorn Lertnanthakunchai ทะเบียนเลขที่ ว-323-จ-0041 , Kardbundit Kitipavanit ทะเบียนเลขที่ ว-204-จ-0001

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Photchana S

Photchana Seeda  
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-0028

Approved by

D. Changchon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ว-323-ค-0001

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## Analysis / Test Report

TESTING  
No.0009

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

**Lot ID: 2633845**

Date Received : May 06, 2026

Date Reported : May 14, 2026

Report Number : 3555275-2

Page 1 of 1

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2633845-1                                                                                                                                                     |
| <b>Sampled Date</b>            | May 06, 2026 2:33 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater                                                                                                                                                    |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | May 07, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte               | Unit | LOD    | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                             | Testing Location |
|-----------------------|------|--------|-----------|--------------|---------------------------|--------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Metals Testing</b> |      |        |           |              |                           |                                                                                                                    |                  |
| Arsenic               | mg/L | 0.0003 | 0.0005    | 0.004        | ≤0.25                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Lead                  | mg/L | 0.0003 | 0.0005    | 0.0007       | ≤0.2                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Mercury *             | mg/L | 0.0001 | 0.0005    | Not Detected | ≤0.005                    | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112          | Bangkok          |
| Zinc                  | mg/L | 0.003  | 0.005     | 0.18         | ≤5.0                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Chainusorn Lertnanthakunchai ทะเบียนเลขที่ ว-323-จ-0041 , Kardbundit Kitisupavanit ทะเบียนเลขที่ ว-204-จ-0001

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

*Chamatt L.*

Chanattagarn Imchom

Section Head

ทะเบียนเลขที่ ว-204-จ-0008

Approved by

*Kanokkorn Anek*

Kanokkorn Anek

Assistant General Manager

ทะเบียนเลขที่ ว-204-ค-0004

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0009**

**Lot ID: 2633845**

Date Received : May 06, 2026

Date Reported : May 14, 2026

Report Number : 3555275-3

Page 1 of 2

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2633845-1                                                                                                                                                     |
| <b>Sampled Date</b>            | May 06, 2026 2:33 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater                                                                                                                                                    |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | May 07, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                            | Unit      | LOD | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                      | Testing Location |
|------------------------------------|-----------|-----|-----------|--------------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Microbiological Testing</b>     |           |     |           |              |                           |                                                                                                             |                  |
| Total Coliform                     | MPN/100mL | -   | -         | <1.8         | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B | Bangkok          |
| <b>Volatile Organics Compounds</b> |           |     |           |              |                           |                                                                                                             |                  |
| 1,2-Dichloroethane                 | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| 1,3-Butadiene *                    | ug/L      | 0.3 | 1.0       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Benzene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Ethylbenzene                       | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| m,p-Xylene                         | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Styrene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Toluene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Total Xylene                       | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |

### Water Testing

Approved by

Suwannee Chumkeaw  
Section Head

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.



## Analysis / Test Report

TESTING  
No.0009

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2633845**

Date Received : May 06, 2026

Date Reported : May 14, 2026

Report Number : 3555275-3

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|                                |                                                                                                                                                               |            |                  |               |                                  |                                                                                                                                      |                         |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------|---------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Sample Number</b>           | 2633845-1                                                                                                                                                     |            |                  |               |                                  |                                                                                                                                      |                         |
| <b>Sampled Date</b>            | May 06, 2026 2:33 PM                                                                                                                                          |            |                  |               |                                  |                                                                                                                                      |                         |
| <b>Sample Description</b>      | Wastewater                                                                                                                                                    |            |                  |               |                                  |                                                                                                                                      |                         |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |            |                  |               |                                  |                                                                                                                                      |                         |
| <b>Date Analysis Commenced</b> | May 07, 2026                                                                                                                                                  |            |                  |               |                                  |                                                                                                                                      |                         |
| <b>Condition of Sample</b>     | Contained in six glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |            |                  |               |                                  |                                                                                                                                      |                         |
| <b>Analyte</b>                 | <b>Unit</b>                                                                                                                                                   | <b>LOD</b> | <b>LOQ (LOR)</b> | <b>Result</b> | <b>Guideline / Specification</b> | <b>Method</b>                                                                                                                        | <b>Testing Location</b> |
| <b>Water Testing</b>           |                                                                                                                                                               |            |                  |               |                                  |                                                                                                                                      |                         |
| Hydrocarbons *                 | mg/L                                                                                                                                                          | -          | 3                | <3            | No Standard                      | In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 F | Rayong                  |
| Methanol *                     | ug/L                                                                                                                                                          | -          | 10               | <10           | No Standard                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                          | Bangkok                 |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Chainusorn Lertnanthakunchai , Kardbundit Kitisupavanit

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Suwannee Chumkeaw  
Section Head

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0042**

**Lot ID: 2643704**

Date Received : Jun 02, 2026

Date Reported : Jun 11, 2026

Report Number : 3575206-1

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|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2643704-1                                                                                                                                                     |
| <b>Sampled Date</b>            | Jun 02, 2026 2:35 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater (EIA)                                                                                                                                              |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Jun 02, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in one amber glass bottle, six glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                                      | Unit     | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                                           | Testing Location |
|----------------------------------------------|----------|-----|-----------|--------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b>                         |          |     |           |        |                           |                                                                                                                                  |                  |
| BOD (5 days at 20 Degree C)                  | mg/L     | -   | 2.0       | <2.0   | ≤20                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5210 B, part 4500 - O G     | Rayong           |
| COD                                          | mg/L     | 1.5 | 25        | <25    | ≤120                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5220 D                      | Rayong           |
| Oil & Grease                                 | mg/L     | -   | 3         | <3     | ≤5                        | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 B                      | Rayong           |
| pH at 25 degree C                            |          | -   | -         | 8.8    | 5.5-9.0                   | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)                | Rayong           |
| Sulfide *                                    | mg/L     | -   | 0.5       | <0.5   | ≤1.0                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-S2 (C, F)              | Rayong           |
| Temperature *                                | Degree C | -   | -         | 32.9   | ≤40                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B                      | Rayong           |
| Total Dissolved Solids Dried at 180 degree C | mg/L     | -   | 5         | 272    | ≤3000                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C                      | Rayong           |
| Total Kjeldahl Nitrogen as N                 | mg/L     | -   | 1.0       | 7.2    | ≤100                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Norg (C), part NH3 (D) | Rayong           |

**Technical Management**

*Photchana S*

Photchana Seeda  
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-0028

**Approved by**

*D. Changchon*

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ว-323-ค-0001

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**TESTING**  
**No.0042**

**Lot ID: 2643704**

Date Received : Jun 02, 2026

Date Reported : Jun 11, 2026

Report Number : 3575206-1

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|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2643704-1                                                                                                                                                     |
| <b>Sampled Date</b>            | Jun 02, 2026 2:35 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater (EIA)                                                                                                                                              |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Jun 02, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in one amber glass bottle, six glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                                            | Unit | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                      | Testing Location |
|----------------------------------------------------|------|-----|-----------|--------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Water Testing</b>                               |      |     |           |        |                           |                                                                                                             |                  |
| Total Suspended Solids Dried from 103-105 degree C | mg/L | -   | 5         | <5     | ≤50                       | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 D | Rayong           |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Narunat thammassaro ทะเบียนเลขที่ ว-323-จ-0052 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

Remark :

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- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

Photchana S

Photchana Seeda  
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-0028

Approved by

D. Changchon

Dej Changchon  
Senior Manager

ทะเบียนเลขที่ ว-323-ค-0001

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## Analysis / Test Report

TESTING  
No.0009

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O** : PMM-2025-336

**Project Name** :

**Project Location** :

**Lot ID: 2643704**

Date Received : Jun 02, 2026

Date Reported : Jun 11, 2026

Report Number : 3575206-2

Page 1 of 1

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2643704-1                                                                                                                                                     |
| <b>Sampled Date</b>            | Jun 02, 2026 2:35 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater (EIA)                                                                                                                                              |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Jun 04, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in one amber glass bottle, six glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte               | Unit | LOD    | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                             | Testing Location |
|-----------------------|------|--------|-----------|--------------|---------------------------|--------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Metals Testing</b> |      |        |           |              |                           |                                                                                                                    |                  |
| Arsenic               | mg/L | 0.0003 | 0.0005    | 0.006        | ≤0.25                     | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Lead                  | mg/L | 0.0003 | 0.0005    | 0.002        | ≤0.2                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |
| Mercury *             | mg/L | 0.0001 | 0.0005    | Not Detected | ≤0.005                    | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3112          | Bangkok          |
| Zinc                  | mg/L | 0.003  | 0.005     | 0.08         | ≤5.0                      | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F | Bangkok          |

**Guideline** : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By** : Narunat thammasaro ทะเบียนเลขที่ ว-323-จ-0052 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Technical Management

*Savitree N.*

Savitree Noisangiam

Manager

ทะเบียนเลขที่ ว-204-จ-0007

Approved by

*Kanokkorn Anek*

Kanokkorn Anek

Assistant General Manager

ทะเบียนเลขที่ ว-204-ค-0004

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.



## Analysis / Test Report

TESTING  
No.0009

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2643704**

Date Received : Jun 02, 2026

Date Reported : Jun 11, 2026

Report Number : 3575206-3

Page 1 of 2

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 2643704-1                                                                                                                                                     |
| <b>Sampled Date</b>            | Jun 02, 2026 2:35 PM                                                                                                                                          |
| <b>Sample Description</b>      | Wastewater (EIA)                                                                                                                                              |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |
| <b>Date Analysis Commenced</b> | Jun 03, 2026                                                                                                                                                  |
| <b>Condition of Sample</b>     | Contained in one amber glass bottle, six glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte                            | Unit      | LOD | LOQ (LOR) | Result       | Guideline / Specification | Method                                                                                                      | Testing Location |
|------------------------------------|-----------|-----|-----------|--------------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------|
| <b>Microbiological Testing</b>     |           |     |           |              |                           |                                                                                                             |                  |
| Total Coliform                     | MPN/100mL | -   | -         | <1.8         | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 9221 B | Bangkok          |
| <b>Volatile Organics Compounds</b> |           |     |           |              |                           |                                                                                                             |                  |
| 1,2-Dichloroethane                 | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| 1,3-Butadiene *                    | ug/L      | 0.3 | 1.0       | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Benzene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Ethylbenzene                       | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| m,p-Xylene                         | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Styrene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Toluene                            | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |
| Total Xylene                       | ug/L      | 1.5 | 5         | Not Detected | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B | Bangkok          |

### Water Testing

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.



## Analysis / Test Report

TESTING  
No.0009

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :** PMM-2025-336

**Project Name :**

**Project Location :**

**Lot ID: 2643704**

Date Received : Jun 02, 2026

Date Reported : Jun 11, 2026

Report Number : 3575206-3

Page 2 of 2

| <b>Sample Number</b>           | 2643704-1                                                                                                                                                     |     |           |        |                           |                                                                                                                                      |                  |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------|--------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Sampled Date</b>            | Jun 02, 2026 2:35 PM                                                                                                                                          |     |           |        |                           |                                                                                                                                      |                  |
| <b>Sample Description</b>      | Wastewater (EIA)                                                                                                                                              |     |           |        |                           |                                                                                                                                      |                  |
| <b>Location</b>                | Sea Water Return Pit                                                                                                                                          |     |           |        |                           |                                                                                                                                      |                  |
| <b>Date Analysis Commenced</b> | Jun 03, 2026                                                                                                                                                  |     |           |        |                           |                                                                                                                                      |                  |
| <b>Condition of Sample</b>     | Contained in one amber glass bottle, six glass vials and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |     |           |        |                           |                                                                                                                                      |                  |
| Analyte                        | Unit                                                                                                                                                          | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                                               | Testing Location |
| <b>Water Testing</b>           |                                                                                                                                                               |     |           |        |                           |                                                                                                                                      |                  |
| Hydrocarbons *                 | mg/L                                                                                                                                                          | -   | 3         | <3     | No Standard               | In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 5520 F | Rayong           |
| Methanol *                     | ug/L                                                                                                                                                          | -   | 10        | <10    | No Standard               | Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 6200 B                          | Bangkok          |

**Guideline :** Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

**Sampling By :** Narunat thammassaro , Pattarapol Sawangjaitam

Remark :

- LOD : Limit of Detection
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- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

Siriluk P.

Siriluk Bunnak  
Section Head

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

# ภาคผนวก ค-4

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นิเวศวิทยาทางทะเล

เพลงก็ตอนพีช

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สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : Map Ta Phut Tank Terminal Co., Ltd.

Address : 18, I-8 Road, Map Ta Phut, Muang Rayong, Rayong, Thailand, 21150

รายงานผลการวิเคราะห์แพลงก์ตอนพืช

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

| ชนิดแพลงก์ตอนพืช                   | ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร) |           |           |           |
|------------------------------------|-------------------------------------------|-----------|-----------|-----------|
|                                    | 2612130-1                                 | 2612130-2 | 2612130-3 | 2612130-4 |
| <b>Division Cyanophyta</b>         |                                           |           |           |           |
| <b>Class Cyanophyceae</b>          |                                           |           |           |           |
| <b>Order Nostocales</b>            |                                           |           |           |           |
| <b>Family Oscillatoriaceae</b>     |                                           |           |           |           |
| 1. <i>Oscillatoria erythraea</i>   | -                                         | 7,000     | -         | -         |
| 2. <i>Oscillatoria</i> sp.         | -                                         | -         | 17,000    | -         |
| 3. <i>Oscillatoria tenuis</i>      | 930,000                                   | 1,080,000 | 1,445,000 | 1,236,000 |
| <b>Family Nostocaceae</b>          |                                           |           |           |           |
| 4. <i>Pseudanabaena</i> sp.        | 8,000                                     | 29,000    | 25,000    | 41,000    |
| 5. <i>Richelia intracellularis</i> | 34,000                                    | 29,000    | 302,000   | 72,000    |
| <b>Division Chlorophyta</b>        |                                           |           |           |           |
| <b>Class Euglenophyceae</b>        |                                           |           |           |           |
| <b>Order Euglenales</b>            |                                           |           |           |           |
| <b>Family Euglenaceae</b>          |                                           |           |           |           |
| 6. <i>Phacus longicauda</i>        | -                                         | 7,000     | -         | -         |

**ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)**

(ต่อ)

| ชนิดแพลงก์ตอนพืช                        | ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร) |           |           |           |
|-----------------------------------------|-------------------------------------------|-----------|-----------|-----------|
|                                         | 2612130-1                                 | 2612130-2 | 2612130-3 | 2612130-4 |
| <b>Division Chromophyta</b>             |                                           |           |           |           |
| <b>Class Bacillariophyceae</b>          |                                           |           |           |           |
| <b>Order Biddulphiales</b>              |                                           |           |           |           |
| <b>Suborder Coscinodiscineae</b>        |                                           |           |           |           |
| <b>Family Thalassiosiraceae</b>         |                                           |           |           |           |
| 7. <i>Cyclotella striata</i>            | 482,000                                   | 65,000    | 67,000    | 62,000    |
| 8. <i>Lauderia annulata</i>             | 1,014,000                                 | 1,872,000 | 185,000   | 1,236,000 |
| 9. <i>Thalassiosira anguste-lineata</i> | -                                         | -         | 25,000    | 41,000    |
| 10. <i>Thalassiosira eccentrica</i>     | 8,000                                     | 22,000    | 25,000    | 10,000    |
| 11. <i>Thalassiosira hendeyi</i>        | -                                         | -         | -         | 10,000    |
| 12. <i>Thalassiosira</i> sp.            | 25,000                                    | 29,000    | 67,000    | -         |
| <b>Family Melosiraceae</b>              |                                           |           |           |           |
| 13. <i>Paralia sulcata</i>              | 59,000                                    | 65,000    | 168,000   | -         |
| <b>Family Leptocyliodraceae</b>         |                                           |           |           |           |
| 14. <i>Corethron criophilum</i>         | 8,000                                     | 14,000    | -         | 10,000    |
| <b>Family Coscinodiscaceae</b>          |                                           |           |           |           |
| 15. <i>Coscinodiscus granii</i>         | -                                         | -         | -         | 10,000    |
| 16. <i>Coscinodiscus radiatus</i>       | 8,000                                     | -         | 25,000    | 10,000    |
| 17. <i>Coscinodiscus</i> sp.            | 17,000                                    | 14,000    | -         | 31,000    |
| 18. <i>Coscinodiscus wailesii</i>       | 17,000                                    | 14,000    | 17,000    | 21,000    |
| 19. <i>Palmeria hardmaniana</i>         | -                                         | -         | 8,000     | 21,000    |
| <b>Family Hemidiscaceae</b>             |                                           |           |           |           |
| 20. <i>Actinocyclus octonarius</i>      | 17,000                                    | -         | -         | 10,000    |
| <b>Family Asterolampraceae</b>          |                                           |           |           |           |
| 21. <i>Asterolampra marylandica</i>     | -                                         | -         | 25,000    | 21,000    |
| 22. <i>Asteromphalus flabellatus</i>    | -                                         | 14,000    | -         | -         |

**ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช** (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

(ต่อ)

| ชนิดแพลงก์ตอนพืช                       | ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร) |           |           |           |
|----------------------------------------|-------------------------------------------|-----------|-----------|-----------|
|                                        | 2612130-1                                 | 2612130-2 | 2612130-3 | 2612130-4 |
| <b>Family Heliopeltaceae</b>           |                                           |           |           |           |
| 23. <i>Actinoptychus senarius</i>      | 42,000                                    | 50,000    | 42,000    | 62,000    |
| <b>Suborder Rhizosoleniineae</b>       |                                           |           |           |           |
| <b>Family Rhizosoleniaceae</b>         |                                           |           |           |           |
| 24. <i>Dactyliosolen antarcticus</i>   | 152,000                                   | 65,000    | 160,000   | 185,000   |
| 25. <i>Dactyliosolen fragilissimus</i> | 566,000                                   | 58,000    | 84,000    | 845,000   |
| 26. <i>Guinardia flaccida</i>          | 51,000                                    | 432,000   | 235,000   | 247,000   |
| 27. <i>Guinardia striata</i>           | 25,000                                    | 115,000   | 202,000   | 824,000   |
| 28. <i>Proboscia alata</i>             | 93,000                                    | 288,000   | 92,000    | 247,000   |
| 29. <i>Pseudosolenia calcar-avis</i>   | 68,000                                    | 29,000    | 50,000    | 62,000    |
| 30. <i>Rhizosolenia acuminata</i>      | 17,000                                    | 29,000    | 42,000    | 31,000    |
| 31. <i>Rhizosolenia formosa</i>        | -                                         | 7,000     | 17,000    | -         |
| 32. <i>Rhizosolenia hyalina</i>        | -                                         | 194,000   | 76,000    | 237,000   |
| 33. <i>Rhizosolenia imbricata</i>      | -                                         | 36,000    | 50,000    | 31,000    |
| 34. <i>Rhizosolenia pungens</i>        | -                                         | -         | 8,000     | 10,000    |
| 35. <i>Rhizosolenia setigera</i>       | 8,000                                     | 14,000    | 8,000     | -         |
| 36. <i>Rhizosolenia</i> sp.            | 25,000                                    | -         | -         | -         |
| 37. <i>Rhizosolenia striata</i>        | 34,000                                    | 58,000    | 34,000    | 31,000    |
| 38. <i>Rhizosolenia styliformis</i>    | 25,000                                    | 58,000    | 168,000   | 31,000    |
| <b>Suborder Biddulphiineae</b>         |                                           |           |           |           |
| <b>Family Hemiaulaceae</b>             |                                           |           |           |           |
| 39. <i>Cerataulina bicornis</i>        | 59,000                                    | 50,000    | 42,000    | -         |
| 40. <i>Cerataulina pelagica</i>        | -                                         | 29,000    | 269,000   | 628,000   |
| 41. <i>Climacodium frauenfeldianum</i> | -                                         | 22,000    | 34,000    | 103,000   |
| 42. <i>Hemiaulus hauckii</i>           | -                                         | -         | 17,000    | -         |
| 43. <i>Hemiaulus indicus</i>           | 228,000                                   | 108,000   | 302,000   | 185,000   |
| 44. <i>Hemiaulus membranaceus</i>      | -                                         | -         | -         | 41,000    |

**ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช** (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

(ต่อ)

| ชนิดแพลงก์ตอนพืช                        | ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร) |            |            |            |
|-----------------------------------------|-------------------------------------------|------------|------------|------------|
|                                         | 2612130-1                                 | 2612130-2  | 2612130-3  | 2612130-4  |
| 45. <i>Hemiaulus sinensis</i>           | 51,000                                    | 29,000     | 67,000     | -          |
| 46. <i>Hemiaulus</i> sp.                | -                                         | -          | -          | 21,000     |
| <b>Family Chaetoceraceae</b>            |                                           |            |            |            |
| 47. <i>Bacteriastrum delicatulum</i>    | 203,000                                   | 36,000     | 260,000    | 742,000    |
| 48. <i>Bacteriastrum furcatum</i>       | 3,549,000                                 | 5,616,000  | 9,072,000  | 7,210,000  |
| 49. <i>Bacteriastrum</i> sp.            | 980,000                                   | 936,000    | 1,428,000  | 927,000    |
| 50. <i>Chaetoceros affinis</i>          | -                                         | 14,000     | -          | 21,000     |
| 51. <i>Chaetoceros atlanticus</i>       | -                                         | -          | -          | 185,000    |
| 52. <i>Chaetoceros borealis</i>         | -                                         | -          | 8,000      | -          |
| 53. <i>Chaetoceros coarctatus</i>       | 25,000                                    | 22,000     | 151,000    | 93,000     |
| 54. <i>Chaetoceros compressus</i>       | -                                         | -          | -          | 21,000     |
| 55. <i>Chaetoceros costatus</i>         | 8,000                                     | -          | -          | -          |
| 56. <i>Chaetoceros curvisetus</i>       | 42,415,000                                | 41,472,000 | 29,064,000 | 27,192,000 |
| 57. <i>Chaetoceros debilis</i>          | 25,000                                    | 144,000    | 218,000    | 1,009,000  |
| 58. <i>Chaetoceros didymus</i>          | 8,000                                     | 29,000     | 25,000     | 742,000    |
| 59. <i>Chaetoceros diversus</i>         | 34,000                                    | 43,000     | 25,000     | 52,000     |
| 60. <i>Chaetoceros flexuosus</i>        | -                                         | 14,000     | -          | -          |
| 61. <i>Chaetoceros laciniosus</i>       | 51,000                                    | 43,000     | 25,000     | 31,000     |
| 62. <i>Chaetoceros lorenzianus</i>      | 76,000                                    | 202,000    | 42,000     | 175,000    |
| 63. <i>Chaetoceros mitra</i>            | -                                         | -          | -          | 41,000     |
| 64. <i>Chaetoceros peruvianus</i>       | 8,000                                     | 22,000     | 50,000     | 10,000     |
| 65. <i>Chaetoceros pseudocurvisetus</i> | 8,957,000                                 | 8,784,000  | 9,240,000  | 12,360,000 |
| 66. <i>Chaetoceros radicans</i>         | 237,000                                   | 79,000     | 118,000    | 299,000    |
| 67. <i>Chaetoceros</i> sp.              | -                                         | 14,000     | 25,000     | 237,000    |
| 68. <i>Chaetoceros teres</i>            | 558,000                                   | 14,000     | 34,000     | 82,000     |
| 69. <i>Chaetoceros tortissimus</i>      | 25,000                                    | -          | -          | 10,000     |
| <b>Family Lithodesmaceae</b>            |                                           |            |            |            |
| 70. <i>Ditylum brightwellii</i>         | 583,000                                   | 762,000    | 370,000    | 1,082,000  |

**ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช** (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

(ต่อ)

| ชนิดแพลงก์ตอนพืช                       | ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร) |           |           |           |
|----------------------------------------|-------------------------------------------|-----------|-----------|-----------|
|                                        | 2612130-1                                 | 2612130-2 | 2612130-3 | 2612130-4 |
| 71. <i>Ditylum sol</i>                 | 423,000                                   | 202,000   | 235,000   | 113,000   |
| 72. <i>Helicotheca tamesis</i>         | 1,521,000                                 | 576,000   | 202,000   | 330,000   |
| <b>Family Eupodiscaceae</b>            |                                           |           |           |           |
| 73. <i>Odontella mobiliensis</i>       | -                                         | 29,000    | 8,000     | 10,000    |
| 74. <i>Odontella sinensis</i>          | 3,127,000                                 | 4,608,000 | 2,688,000 | 3,914,000 |
| <b>Order Bacillariales</b>             |                                           |           |           |           |
| <b>Suborder Fragilariineae</b>         |                                           |           |           |           |
| <b>Family Thalassionemataceae</b>      |                                           |           |           |           |
| 75. <i>Thalassionema frauenfeldii</i>  | -                                         | 238,000   | 193,000   | 93,000    |
| 76. <i>Thalassionema nitzschioides</i> | 220,000                                   | 108,000   | 210,000   | 412,000   |
| 77. <i>Thalassionema</i> sp.           | 8,000                                     | -         | -         | -         |
| <b>Family Licmophoriaceae</b>          |                                           |           |           |           |
| 78. <i>Licmophora abbreviata</i>       | 8,000                                     | -         | -         | -         |
| <b>Suborder Bacillariineae</b>         |                                           |           |           |           |
| <b>Family Naviculaceae</b>             |                                           |           |           |           |
| 79. <i>Amphora exigua</i>              | 8,000                                     | 22,000    | 8,000     | 10,000    |
| 80. <i>Amphora robusta</i>             | 25,000                                    | 43,000    | 42,000    | 82,000    |
| 81. <i>Diploneis smithii</i>           | -                                         | -         | -         | 10,000    |
| 82. <i>Haslea trompii</i>              | 51,000                                    | 50,000    | 92,000    | 103,000   |
| 83. <i>Haslea wawrikan</i>             | -                                         | -         | 8,000     | -         |
| 84. <i>Meuniera membranacea</i>        | 25,000                                    | -         | -         | 52,000    |
| 85. <i>Navicula</i> sp.                | 68,000                                    | 302,000   | 76,000    | 196,000   |
| 86. <i>Pleurosigma aestuarii</i>       | -                                         | 14,000    | 17,000    | -         |
| 87. <i>Pleurosigma angulatum</i>       | 76,000                                    | 58,000    | 76,000    | 72,000    |
| 88. <i>Pleurosigma elongatum</i>       | 17,000                                    | 58,000    | 34,000    | 10,000    |
| 89. <i>Pleurosigma normanii</i>        | 17,000                                    | 29,000    | 160,000   | 21,000    |
| 90. <i>Pleurosigma</i> sp.             | -                                         | 14,000    | -         | 41,000    |

**ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช** (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

(ต่อ)

| ชนิดแพลงก์ตอนพืช                    | ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร) |           |           |           |
|-------------------------------------|-------------------------------------------|-----------|-----------|-----------|
|                                     | 2612130-1                                 | 2612130-2 | 2612130-3 | 2612130-4 |
| 91. <i>Trachyneis</i> sp.           | 17,000                                    | 14,000    | 17,000    | 10,000    |
| <b>Family Bacillariaceae</b>        |                                           |           |           |           |
| 92. <i>Bacillaria paxillifera</i>   | -                                         | 22,000    | -         | -         |
| 93. <i>Cylindrotheca closterium</i> | -                                         | -         | 8,000     | -         |
| 94. <i>Nitzschia lorenziana</i>     | -                                         | 22,000    | 17,000    | 10,000    |
| 95. <i>Nitzschia reversa</i>        | -                                         | -         | 8,000     | -         |
| 96. <i>Nitzschia</i> sp.            | 25,000                                    | -         | -         | -         |
| <b>Family Surirellaceae</b>         |                                           |           |           |           |
| 97. <i>Entomoneis alata</i>         | -                                         | 22,000    | 8,000     | -         |
| 98. <i>Entomoneis robusta</i>       | -                                         | 14,000    | 8,000     | -         |
| 99. <i>Surirella ovata</i>          | -                                         | 7,000     | -         | -         |
| <b>Class Dinophyceae</b>            |                                           |           |           |           |
| <b>Order Prorocentrales</b>         |                                           |           |           |           |
| <b>Family Prorocentraceae</b>       |                                           |           |           |           |
| 100. <i>Prorocentrum micans</i>     | -                                         | -         | 8,000     | -         |
| 101. <i>Prorocentrum sigmoides</i>  | -                                         | 14,000    | -         | 10,000    |
| <b>Order Gonyaulacales</b>          |                                           |           |           |           |
| <b>Family Ceratiaceae</b>           |                                           |           |           |           |
| 102. <i>Ceratium deflexum</i>       | -                                         | 14,000    | -         | -         |
| 103. <i>Ceratium furca</i>          | 25,000                                    | 22,000    | -         | 31,000    |
| 104. <i>Ceratium fusus</i>          | -                                         | -         | -         | 10,000    |
| 105. <i>Ceratium kofoidii</i>       | -                                         | 7,000     | -         | -         |
| 106. <i>Ceratium trichoceros</i>    | -                                         | -         | 8,000     | -         |
| <b>Family Gonyaulacaceae</b>        |                                           |           |           |           |
| 107. <i>Gonyaulax diegensis</i>     | 8,000                                     | -         | -         | -         |
| 108. <i>Gonyaulax</i> sp.           | -                                         | -         | 17,000    | -         |
| 109. <i>Oxytoxum diploconus</i>     | -                                         | 7,000     | -         | -         |

**ตาราง ผลการวิเคราะห์แพลงก์ตอนพืช** (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

(ต่อ)

| ชนิดแพลงก์ตอนพืช                        | ปริมาณแพลงก์ตอนพืช (หน่วยต่อลูกบาศก์เมตร) |                   |                   |                   |
|-----------------------------------------|-------------------------------------------|-------------------|-------------------|-------------------|
|                                         | 2612130-1                                 | 2612130-2         | 2612130-3         | 2612130-4         |
| <b>Order Peridinales</b>                |                                           |                   |                   |                   |
| <b>Family Protoperidiniaceae</b>        |                                           |                   |                   |                   |
| 110. <i>Protoperidinium claudicans</i>  | -                                         | -                 | 8,000             | -                 |
| 111. <i>Protoperidinium conicum</i>     | 8,000                                     | 22,000            | 25,000            | -                 |
| 112. <i>Protoperidinium curtipes</i>    | -                                         | 43,000            | -                 | 21,000            |
| 113. <i>Protoperidinium depressum</i>   | 8,000                                     | 7,000             | 8,000             | -                 |
| 114. <i>Protoperidinium latispinum</i>  | 17,000                                    | -                 | -                 | -                 |
| 115. <i>Protoperidinium punctulatum</i> | -                                         | -                 | -                 | 10,000            |
| 116. <i>Protoperidinium</i> sp.         | 25,000                                    | 22,000            | 17,000            | 52,000            |
| <b>ชนิดแพลงก์ตอนพืช</b>                 | <b>67</b>                                 | <b>81</b>         | <b>80</b>         | <b>79</b>         |
| <b>ปริมาณแพลงก์ตอนพืช</b>               | <b>67,540,000</b>                         | <b>69,788,000</b> | <b>58,761,000</b> | <b>64,807,000</b> |
| <b>ดัชนีความหลากหลายแพลงก์ตอนพืช</b>    | <b>1.5578</b>                             | <b>1.6419</b>     | <b>1.8515</b>     | <b>2.1631</b>     |
| <b>ดัชนีความสม่ำเสมอแพลงก์ตอนพืช</b>    | <b>0.3705</b>                             | <b>0.3736</b>     | <b>0.4225</b>     | <b>0.4951</b>     |
| <b>ระดับความลึกของน้ำ (เมตร)</b>        | <b>14.00</b>                              | <b>14.10</b>      | <b>13.50</b>      | <b>16.10</b>      |

**Sample Location :**

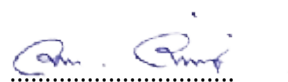
1. สถานี 2612130-1 : สถานีที่ 1 จุฬารับน้ำเข้า
2. สถานี 2612130-2 : สถานีที่ 2 จุดปล่อยน้ำออก
3. สถานี 2612130-3 : สถานีที่ 3 ระหว่างทางระบายน้ำโครงการกับทะเลชายฝั่ง  
(หน้าท่าเทียบเรือที่ 2)
4. สถานี 2612130-4 : สถานีที่ 4 ระยะ 500 เมตร ด้านทิศใต้จากท่าเทียบเรือ

**Condition of Sample :** contained in one plastic bottle, sample containers comply to pretreatment-preservation standards (APHA, USEPA)



(นางสาวกนกวรรณ ขาวดอน)

ผู้วิเคราะห์



(นายอลงกต อินทรชาติ)

หัวหน้าสถานีวิจัยประมงศรีราชา

เพลงก็ต๋อนสัตว์

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สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : Map Ta Phut Tank Terminal Co., Ltd.

Address : 18, I-8 Road, Map Ta Phut, Muang Rayong, Rayong, Thailand, 21150

รายงานผลการวิเคราะห์แพลงก์ตอนสัตว์

ตาราง ผลการวิเคราะห์แพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

| ชนิดแพลงก์ตอนสัตว์                  | ปริมาณแพลงก์ตอนสัตว์ (หน่วยต่อลูกบาศก์เมตร) |           |           |           |
|-------------------------------------|---------------------------------------------|-----------|-----------|-----------|
|                                     | 2612130-1                                   | 2612130-2 | 2612130-3 | 2612130-4 |
| <b>Phylum Protozoa</b>              |                                             |           |           |           |
| <b>Subphylum Ciliophora</b>         |                                             |           |           |           |
| <b>Class Ciliata</b>                |                                             |           |           |           |
| <b>Subclass Spirotricha</b>         |                                             |           |           |           |
| <b>Order Tintinnida</b>             |                                             |           |           |           |
| <b>Family Tintinnididae</b>         |                                             |           |           |           |
| 1. <i>Leptotintinnus nordquisti</i> | -                                           | 7,000     | -         | 10,000    |
| <b>Family Codonellidae</b>          |                                             |           |           |           |
| 2. <i>Tintinnopsis beroidea</i>     | 25,000                                      | 43,000    | -         | 21,000    |
| 3. <i>Tintinnopsis mortensii</i>    | -                                           | 7,000     | -         | -         |
| 4. <i>Tintinnopsis schotti</i>      | -                                           | 7,000     | -         | 10,000    |
| 5. <i>Tintinnopsis</i> sp.          | 8,000                                       | -         | -         | -         |
| 6. <i>Tintinnopsis tocaninensis</i> | -                                           | -         | 8,000     | -         |
| <b>Family Codonellopsidae</b>       |                                             |           |           |           |
| 7. <i>Codonellopsis ostenfeldi</i>  | 8,000                                       | -         | -         | -         |
| 8. <i>Stenosemella nivalis</i>      | 8,000                                       | 22,000    | 25,000    | -         |

ตาราง ผลการวิเคราะห์แพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

(ต่อ)

| ชนิดแพลงก์ตอนสัตว์             | ปริมาณแพลงก์ตอนสัตว์ (หน่วยต่อลูกบาศก์เมตร) |           |           |           |
|--------------------------------|---------------------------------------------|-----------|-----------|-----------|
|                                | 2612130-1                                   | 2612130-2 | 2612130-3 | 2612130-4 |
| <b>Family Petalotrichidae</b>  |                                             |           |           |           |
| 9. <i>Metacylis pithos</i>     | -                                           | -         | 8,000     | -         |
| <b>Family Tintinnidae</b>      |                                             |           |           |           |
| 10. <i>Eutintinnus fraknoi</i> | 8,000                                       | -         | -         | -         |
| <b>Subclass Peritricha</b>     |                                             |           |           |           |
| <b>Order Peritrichida</b>      |                                             |           |           |           |
| 11. <i>Vorticella</i> sp.      | 59,000                                      | 29,000    | 176,000   | 62,000    |
| <b>Phylum Arthropoda</b>       |                                             |           |           |           |
| <b>Class Crustacea</b>         |                                             |           |           |           |
| <b>Subclass Copepoda</b>       |                                             |           |           |           |
| 12. Copepod nauplius           | 144,000                                     | 310,000   | 294,000   | 258,000   |
| <b>Order Calanoida</b>         |                                             |           |           |           |
| 13. Calaniod copepod           | -                                           | 72,000    | 17,000    | 10,000    |
| <b>Order Harpacticoida</b>     |                                             |           |           |           |
| 14. Harpacticoid copepod       | 8,000                                       | 7,000     | -         | 10,000    |
| <b>Phylum Mollusca</b>         |                                             |           |           |           |
| <b>Class Gastropoda</b>        |                                             |           |           |           |
| 15. Gastropod larvae           | 8,000                                       | -         | -         | 10,000    |
| <b>Class Bivalvia</b>          |                                             |           |           |           |
| 16. Pelecypod larvae           | 17,000                                      | -         | 8,000     | -         |
| <b>Phylum Echinodermata</b>    |                                             |           |           |           |
| <b>Class Ophiuroidae</b>       |                                             |           |           |           |
| 17. Ophiopluteus larvae        | 8,000                                       | -         | -         | -         |

**ตาราง ผลการวิเคราะห์แพลงก์ตอนสัตว์** (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

(ต่อ)

| ชนิดแพลงก์ตอนสัตว์                                                                                                                                                    | ปริมาณแพลงก์ตอนสัตว์ (หน่วยต่อลูกบาศก์เมตร) |           |           |           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------|-----------|-----------|
|                                                                                                                                                                       | 2612130-1                                   | 2612130-2 | 2612130-3 | 2612130-4 |
| <b>Phylum Chordata</b><br><b>Subphylum Urochordata</b><br><b>Class Larvacea</b><br><b>Order Urochorda</b><br><b>Family Oikopleuridae</b><br>18. <i>Oikopleura</i> sp. |                                             |           |           |           |
| ชนิดแพลงก์ตอนสัตว์                                                                                                                                                    | 12                                          | 10        | 8         | 9         |
| ปริมาณแพลงก์ตอนสัตว์                                                                                                                                                  | 309,000                                     | 518,000   | 544,000   | 422,000   |
| ดัชนีความหลากหลายแพลงก์ตอนสัตว์                                                                                                                                       | 1.7918                                      | 1.4139    | 1.1957    | 1.3671    |
| ดัชนีความสม่ำเสมอแพลงก์ตอนสัตว์                                                                                                                                       | 0.7211                                      | 0.6140    | 0.5750    | 0.6222    |
| ระดับความลึกของน้ำ (เมตร)                                                                                                                                             | 14.00                                       | 14.10     | 13.50     | 16.10     |

**Sample Location :**

- สถานี 2612130-1 : สถานีที่ 1 จุฬารับน้ำเข้า
- สถานี 2612130-2 : สถานีที่ 2 จุดปล่อยน้ำออก
- สถานี 2612130-3 : สถานีที่ 3 ระหว่างทางระบายน้ำโครงการกับทะเลชายฝั่ง (หน้าท่าเทียบเรือที่ 2)
- สถานี 2612130-4 : สถานีที่ 4 ระยะ 500 เมตร ด้านทิศใต้จากท่าเทียบเรือ

**Condition of Sample :** contained in one plastic bottle, sample containers comply to pretreatment-preservation standards (APHA, USEPA)



(นางสาวกนกวรรณ ขาวด่อน)  
ผู้วิเคราะห์



(นายอลงกต อินทรชาติ)  
หัวหน้าสถานีวิจัยประมงศรีราชา

สัตว์หน้าดิน

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สถานีวิจัยประมงศรีราชา  
101/12 หมู่ 9 ต. บางพระ  
อ. ศรีราชา จ. ชลบุรี 20110  
โทร./โทรสาร. (038) 311379

Client : Map Ta Phut Tank Terminal Co., Ltd.

Address : 18, I-8 Road, Map Ta Phut, Mueang, Rayong, Thailand, 21150

รายงานผลการวิเคราะห์สัตว์หน้าดิน

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

| สกุลสัตว์หน้าดิน                       | ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร) |           |           |           |
|----------------------------------------|--------------------------------------|-----------|-----------|-----------|
|                                        | 2612129-1                            | 2612129-2 | 2612129-3 | 2612129-4 |
| <b>Phylum Annelida</b>                 |                                      |           |           |           |
| <b>Class Polychaeta</b>                |                                      |           |           |           |
| <b>Order Capitellida</b>               |                                      |           |           |           |
| <b>Family Capitellidae</b>             |                                      |           |           |           |
| <i>Heteromastus</i> sp. (ไส้เดือนทะเล) | -                                    | 45        | 30        | 30        |
| <b>Order Cirratulida</b>               |                                      |           |           |           |
| <b>Family Paraonidae</b>               |                                      |           |           |           |
| <i>Paraonis</i> sp. (ไส้เดือนทะเล)     | -                                    | -         | 30        | 15        |
| <b>Order Phyllodocida</b>              |                                      |           |           |           |
| <b>Family Glyceridae</b>               |                                      |           |           |           |
| <i>Glycera</i> sp. (ไส้เดือนทะเล)      | -                                    | -         | -         | 15        |
| <b>Family Nephtyidae</b>               |                                      |           |           |           |
| <i>Nephtys</i> sp. (ไส้เดือนทะเล)      | 30                                   | 15        | 15        | -         |
| <b>Order Terebellida</b>               |                                      |           |           |           |
| <b>Family Cirratulidae</b>             |                                      |           |           |           |
| <i>Cirratulus</i> sp. (ไส้เดือนทะเล)   | -                                    | -         | 30        | -         |

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)(ต่อ)

| สกุลสัตว์หน้าดิน                                                                                                                                 | ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร) |               |               |               |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------------|---------------|---------------|
|                                                                                                                                                  | 2612129-1                            | 2612129-2     | 2612129-3     | 2612129-4     |
| <b>Family Sternaspidae</b><br><i>Sternaspis</i> sp. (ไส้เดือนทะเล)                                                                               | -                                    | -             | 30            | -             |
| <b>Phylum Arthropoda</b><br><b>Class Malacostraca</b><br><b>Order Amphipoda</b><br><b>Family Aoridae</b><br><i>Grandidierella</i> sp. (แอมฟิพอด) | -                                    | 15            | -             | 15            |
| <b>Phylum Mollusca</b><br><b>Class Bivalvia</b><br><b>Order Cardiida</b><br><b>Family Tellinidae</b><br><i>Tellina</i> sp. (หอยสองฝาชนิดหนึ่ง)   | 15                                   | -             | -             | 30            |
| <b>Order Nuculanida</b><br><b>Family Nuculanidae</b><br><i>Nuculana</i> sp. (หอยสองฝาชนิดหนึ่ง)                                                  | 15                                   | -             | -             | 30            |
| <b>Order Venerida</b><br><b>Family Veneridae</b><br><i>Timoclea</i> sp. (หอยสองฝาชนิดหนึ่ง)                                                      | -                                    | -             | -             | 30            |
| <b>สกุลสัตว์หน้าดิน</b>                                                                                                                          | <b>3</b>                             | <b>3</b>      | <b>5</b>      | <b>7</b>      |
| <b>ปริมาณสัตว์หน้าดิน</b>                                                                                                                        | <b>60</b>                            | <b>75</b>     | <b>135</b>    | <b>165</b>    |
| <b>ค่าดัชนีความหลากหลายสัตว์หน้าดิน</b>                                                                                                          | <b>1.0397</b>                        | <b>0.9503</b> | <b>1.5811</b> | <b>1.8938</b> |
| <b>ระดับความลึกของน้ำ (เมตร)</b>                                                                                                                 | <b>14.00</b>                         | <b>14.10</b>  | <b>13.50</b>  | <b>16.10</b>  |

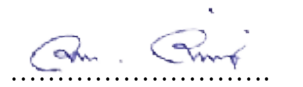
**Sample Location :** 1. สถานี 2612129-1 : สถานีที่ 1 จุฬารับน้ำเข้า  
2. สถานี 2612129-2 : สถานีที่ 2 จุดปล่อยน้ำออก  
3. สถานี 2612129-3 : สถานีที่ 3 ระหว่างทางระบายน้ำโครงการกับทะเลชายฝั่ง  
(หน้าท่าเทียบเรือที่ 2)  
4. สถานี 2612129-4 : สถานีที่ 4 ระยะ 500 เมตร ด้านทิศใต้จากท่าเทียบเรือ

**Condition of Sample :** contained in one plastic zip bag



(นายอรรถวุฒิ กันทะวงศ์)

ผู้วิเคราะห์



(นายอลงกต อินทรชาติ)

หัวหน้าสถานีวิจัยประมงศรีราชา

สัตว์น้ำวัยอ่อน

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สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : Map Ta Phut Tank Terminal Co., Ltd.

Address : 18, I-8 Road, Map Ta Phut, Mueang, Rayong, Thailand, 21150

รายงานผลการวิเคราะห์สัตว์น้ำวัยอ่อน

ตาราง ผลการวิเคราะห์สัตว์น้ำวัยอ่อน (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

| กลุ่มของสัตว์น้ำวัยอ่อน              | ปริมาณของสัตว์น้ำวัยอ่อน (ตัว/1,000 ลูกบาศก์เมตร) |           |
|--------------------------------------|---------------------------------------------------|-----------|
|                                      | 2612144-1                                         | 2612144-2 |
| <b>Phylum Arthropoda</b>             |                                                   |           |
| Lucifer larvae (ตัวอ่อนเคยสำลี)      | 4,990                                             | 2,674     |
| Young mantis shrimp (ลูกกั้งตั๊กแตน) | 157                                               | 95        |
| Young mysid shrimp (ลูกเคยดาต้า)     | 1,653                                             | -         |
| Young shrimp (ลูกกุ้ง)               | 454                                               | 595       |
| จำนวนกลุ่มของสัตว์น้ำวัยอ่อนทั้งหมด  | 4                                                 | 3         |
| ปริมาณของสัตว์น้ำวัยอ่อนทั้งหมด      | 7,254                                             | 3,364     |

Sample Location : 1. สถานี 2612144-1 : สถานีที่ 1 จุดรับน้ำเข้า  
2. สถานี 2612144-2 : สถานีที่ 2 จุดปล่อยน้ำออก

Condition of Sample : contained in one plastic bottle, add 10% formalin sample containers comply to pretreatment-preservation standards (APHA, USEPA)

(นางสาวกนกวรรณ ขาวอ่อน)

ผู้วิเคราะห์

(นายอลงกต อินทราชิต)

หัวหน้าสถานีวิจัยประมงศรีราชา

ไขปลา และลูกปลาวัยอ่อน

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สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : Map Ta Phut Tank Terminal Co., Ltd.

Address : 18, I-8 Road, Map Ta Phut, Mueang, Rayong, Thailand, 21150

รายงานผลการวิเคราะห์ไขปลาและลูกปลาวัยอ่อน

ตาราง ผลการวิเคราะห์ลูกปลาวัยอ่อน (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

| สกุลของลูกปลาวัยอ่อน                 | ปริมาณ (ตัว/ฟองต่อ 1,000 ลูกบาศก์เมตร) |           |
|--------------------------------------|----------------------------------------|-----------|
|                                      | 2612144-1                              | 2612144-2 |
| Phylum Chordata                      |                                        |           |
| Class Actinopterygii                 |                                        |           |
| Order Perciformes                    |                                        |           |
| Family Ambassidae                    |                                        |           |
| <i>Ambassis</i> sp. (ลูกปลาข้าวเม่า) | 16                                     | 9         |
| สกุลของลูกปลาวัยอ่อน                 | 1                                      | 1         |
| ปริมาณของลูกปลาวัยอ่อน               | 16                                     | 9         |
| ค่าดัชนีความหลากหลายของลูกปลาวัยอ่อน | 0.0000                                 | 0.0000    |
| ปริมาณไข่ปลา                         | 212                                    | 129       |

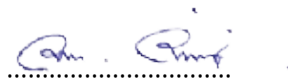
Sample Location : 1. สถานี 2612144-1 : สถานีที่ 1 จุดรับน้ำเข้า  
2. สถานี 2612144-2 : สถานีที่ 2 จุดปล่อยน้ำออก

**Condition of Sample :** contained in one plastic bottle, add 10% formalin sample containers comply to pretreatment-preservation standards (APHA, USEPA)



(นางสาวกนกวรรณ ขาวดอน)

ผู้วิเคราะห์



(นายอลงกต อินทรชาติ)

หัวหน้าสถานีวิจัยประมงศรีราชา

ปะการัง



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต.บางพระ

อ.ศรีราชา จ.ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : Map Ta Phut Tank Terminal Co., Ltd.

Address : 18, I-8 Road, Map Ta Phut, Mueang, Rayong, Thailand, 21150

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### รายงานผลการสำรวจสภาพแนวปะการังบริเวณนิคมท่าเทียบเรือมาบตาพุด

#### 1. พื้นที่สำรวจ

การสำรวจปะการังครั้งนี้ใช้พิกัดจุดอ้างอิงในการสำรวจ ซึ่งทางบริษัทที่ปรึกษาได้กำหนดพิกัดจุดสำรวจแต่ละพื้นที่สำรวจไว้ จากนั้นจึงใช้วิธีการวางทุ่นตำแหน่งในการสำรวจเพื่อตรวจสอบปะการังในแต่ละสถานี ซึ่งมีรายละเอียดดังนี้ (ภาพที่ 1-2)

**Lot 2612146-1** สถานีที่ 6 ทิศตะวันตกจากเกาะสะเก็ด 500 เมตร (สำรวจจริงด้านทิศตะวันตกเฉียงใต้จากเกาะสะเก็ด) (พิกัด N 12° 38' 38.02" และ E 101° 10' 04.23")

**Lot 2612146-2** สถานีที่ 7 ทิศตะวันออกเฉียงเหนือของเกาะสะเก็ด ห่างประมาณ 500 เมตร (พิกัด N 12° 39' 13.41" และ E 101° 10' 26.37")

#### 2. วิธีการสำรวจแนวปะการัง

การสำรวจแนวปะการังทำโดยวิธี Line Intercept Transect (English *et al.* 1997) ซึ่งใช้อุปกรณ์ในการสำรวจได้แก่ ทุ่นบอกตำแหน่ง เส้นเชือกที่มีจุดบอกระยะ และสายพลาสติกเทปวัดระยะ โดยจะวางแนวสำรวจซึ่งเป็นเส้นเชือกที่มีจุดบอกระยะในแนวตั้งฉากกับชายฝั่งของเกาะสะเก็ดตรงบริเวณจุดที่กำหนดพิกัดในการสำรวจไว้ ทั้งทุ่นบอกตำแหน่งและวางแนวเส้นเชือกออกไปเป็นระยะทางยาว 100 เมตร จากนั้นดำน้ำแบบ Scuba ลงสำรวจสภาพแนวปะการังตามแนวเส้นเชือกที่วางไว้ และใช้สายพลาสติกเทปึงในแนวตั้งฉากกับแนวเส้นเชือกเป็นระยะทางประมาณ 20 เมตร (ทางด้านซ้ายและด้านขวาของแนวเส้นเชือกด้านละ 10 เมตร) ในบริเวณที่พบปะการังกระจายตัวอยู่หนาแน่น โดยใช้เทคนิคการถ่ายภาพใต้น้ำ (Underwater photographic technique) ประกอบการศึกษาสำรวจ แล้วบันทึกชนิด สกุล หรือกลุ่มของปะการังที่พบทั้งที่มีชีวิตและไม่มีชีวิต

รวมทั้งสิ่งมีชีวิตบริเวณพื้นทะเลที่สำรวจพบ พร้อมบันทึกระยะทางที่พบเพื่อใช้ในการคำนวณหาเปอร์เซ็นต์การครอบคลุมพื้นที่ (ภาพที่ 3-10)

### 3. ผลการสำรวจแนวปะการัง

การสำรวจสภาพแนวปะการังบริเวณสถานีที่ 6 ทิศตะวันตกจากเกาะสะเก็ด 500 เมตร (สำรวจจริงด้านทิศตะวันตกเฉียงใต้จากเกาะสะเก็ด) และบริเวณสถานีที่ 7 ทิศตะวันออกเฉียงเหนือของเกาะสะเก็ด ห่างประมาณ 500 เมตร ดำเนินการเมื่อวันที่ 20 มีนาคม 2569 ซึ่งผลการศึกษาสำรวจพบว่า

#### 3.1 บริเวณสถานีที่ 6 ทิศตะวันตกจากเกาะสะเก็ด 500 เมตร

การสำรวจในบริเวณนี้พบว่าพื้นทะเลมีลักษณะเป็นทรายและมีเศษก้อนหินขนาดเล็กกระจายปะปนอยู่สลับกับแนวกองหินและโขดหินใต้น้ำ โดยช่วงที่ดำเนินการศึกษาสำรวจสภาพแนวปะการังเป็นช่วงน้ำกำลังลง ทะเลมีคลื่นและลมแรงเล็กน้อยถึงปานกลาง ระดับความลึกของน้ำทะเลอยู่ในช่วง 2.0-4.5 เมตร น้ำทะเลขุ่นบ้างเล็กน้อย ทักษะวิสัยในการมองเห็นใต้น้ำประมาณ 1.0-2.5 เมตร ซึ่งจากการสำรวจพบว่าบริเวณนี้มีกลุ่มของปะการังกระจายตัวปกคลุมอยู่บ้างในบริเวณใกล้ๆ กับแนวกองหินใต้น้ำที่อยู่ใกล้กับชายฝั่งของเกาะสะเก็ด โดยปะการังส่วนใหญ่เจริญเติบโตปกคลุมอยู่บนก้อนหินหรือตามแนวโขดหินใต้น้ำ กลุ่มปะการังที่พบมีการกระจายตัวในลักษณะเป็นหย่อมเล็กๆ ตามบริเวณแนวกองหินใต้น้ำ โดยบริเวณที่พบกลุ่มของปะการังมีการกระจายตัวอยู่มากพบอยู่ในบริเวณที่ใกล้กับแนวชายฝั่งของเกาะสะเก็ด หรือที่ระยะ 0-10 เมตร บนแนวสำรวจ ซึ่งห่างจากชายฝั่งออกมาประมาณ 300 เมตร และในบริเวณที่ใกล้แนวชายฝั่งของเกาะสะเก็ดมากกว่าที่ระยะสำรวจ โดยกลุ่มของปะการังที่พบส่วนใหญ่ในบริเวณนี้เป็นพวกปะการังที่พบในบริเวณน้ำตื้นทั่วไป ได้แก่ ปะการังดอกไม้มะเด ปะการังม้าลาย ปะการังรังผึ้ง ปะการังโขด ปะการังวงแหวน และปะการังจาน ซึ่งสภาพของปะการังที่พบส่วนใหญ่ พบว่ามีลักษณะการฟื้นตัวและบางส่วนเจริญเติบโตขึ้นใหม่อยู่ในสภาพที่ค่อนข้างดี แต่ก็พบบางส่วนถูกตะกอนปกคลุมจนเริ่มเสื่อมสภาพ นอกจากนี้ยังพบพวกฟองน้ำ และดอกไม้พรมใหญ่ แพร่กระจายครอบคลุมอยู่ในบริเวณนี้ด้วย ส่วนสัตว์ทะเลและสิ่งมีชีวิตที่พบอาศัยอยู่ตามบริเวณพื้นทะเลในบริเวณนี้ ได้แก่ เม่นทะเล ปลิงทะเล และหอยจอบ เป็นต้น สำหรับเศษซากปะการังที่ตายแล้วในบริเวณนี้พบว่ามีสภาพการทับถมของตะกอนที่ปกคลุมค่อนข้างหนาแน่นบนซากปะการัง (ภาพที่ 11-32 และตารางที่ 1-2)

### 3.2 บริเวณสถานีที่ 7 ทิศตะวันออกเฉียงเหนือของเกาะสะเก็ด ห่างประมาณ 500 เมตร

การสำรวจสภาพแนวปะการังในบริเวณนี้ พบว่าลักษณะพื้นทะเลมีลักษณะเป็นดินทราย โดยช่วงที่ดำเนินการสำรวจบริเวณนี้เป็นช่วงน้ำกำลังลง ทะเลมีคลื่นและลมแรงเล็กน้อยถึงปานกลาง มีระดับความลึกของน้ำทะเลอยู่ในช่วง 2.5-4.5 เมตร น้ำทะเลค่อนข้างขุ่นบ้างพอสมควร ทัศนวิสัยในการมองเห็นได้น้ำประมาณ 1.0-2.5 เมตร จากการสำรวจในบริเวณนี้ปรากฏว่าไม่พบกลุ่มหรือแนวของปะการังกระจายตัวอยู่ในบริเวณแนวสำรวจนี้เลย (ภาพที่ 33-44)

#### ตารางที่ 1 กลุ่มของปะการังและเปอร์เซ็นต์การครอบคลุมพื้นที่บนแนวสำรวจ

บริเวณสถานีที่ 6 ทิศตะวันตกจากเกาะสะเก็ด 500 เมตร

| กลุ่มของปะการัง                  | สกุล (Genus)           | เปอร์เซ็นต์การครอบคลุมพื้นที่ของปะการัง (% เฉลี่ย) |
|----------------------------------|------------------------|----------------------------------------------------|
| ปะการังดอกไม้ทะเล                | <i>Bernardpora</i> sp. | 8.50%                                              |
| ปะการังมัลลาย                    | <i>Oulastrea</i> sp.   | 7.00%                                              |
| ปะการังรังผึ้ง                   | <i>Goniastrea</i> sp.  | 2.50%                                              |
| ปะการังโขด                       | <i>Porites</i> sp.     | 2.50%                                              |
| ปะการังวงแหวน                    | <i>Dipsastraea</i> sp. | 1.00%                                              |
| ปะการังจาน                       | <i>Turbinaria</i> sp.  | 0.15%                                              |
| ฟองน้ำ                           | (Class) Demospongiae   | 8.00%                                              |
| ดอกไม้พรมใหญ่                    | <i>Palythoa</i> sp.    | 0.25%                                              |
| อื่นๆ (กองหิน, ทราย, ซากปะการัง) | -                      | 70.10%                                             |

#### ตารางที่ 2 เปอร์เซนต์ของปะการังตายและปะการังมีชีวิตบริเวณสถานีที่ 6 ทิศตะวันตกจากเกาะ

สะเก็ด 500 เมตร

| เปอร์เซนต์ปะการังตาย | เปอร์เซนต์ปะการังมีชีวิต | เปอร์เซนต์ปะการังรวม | อื่นๆ  |
|----------------------|--------------------------|----------------------|--------|
| 18.00%               | 21.65%                   | 39.65%               | 60.35% |

จากตารางแสดงกลุ่มของปะการังและเปอร์เซ็นต์การครอบคลุมพื้นที่บนแนวสำรวจพบว่าปะการังกลุ่มหลักหรือกลุ่มที่พบเด่นในบริเวณนี้เป็นกลุ่มของปะการังดอกไม้น้ำทะเลและปะการังมีาลาย ซึ่งพบว่าสามารถปรับตัวให้สามารถทนและเจริญเติบโตอยู่ได้ดีในสภาพแวดล้อมที่ไม่ค่อยเอื้ออำนวยต่อการเจริญเติบโตและอยู่รอดได้ของปะการังกลุ่มอื่นๆ เพราะสามารถปรับตัวและทนอยู่ในสภาพแวดล้อมที่มีการเปลี่ยนแปลงได้ดีกว่าปะการังกลุ่มอื่นๆ เช่น การทนอยู่ในสภาพแวดล้อมซึ่งอยู่ใกล้กับแนวชายฝั่งที่มีระดับน้ำตื้นและมีตะกอนค่อนข้างหนาแน่นสามารถเจริญเติบโตและแผ่ขยายครอบคลุมพื้นที่ตามแนวโขดหิน ก้อนหิน และซากปะการังได้ดี ซึ่งต่างจากปะการังบางกลุ่มที่จำเป็นต้องอยู่ในสภาพแวดล้อมที่ค่อนข้างดีกว่านี้เพื่อสร้างเป็นแนวปะการังขึ้นมา เช่น ปะการังโขด ปะการังสมอง ปะการังรังผึ้ง ปะการังวงแหวน ฯ เป็นต้น ในการสำรวจครั้งนี้ซึ่งเป็นช่วงหลังฤดูหนาว พบว่าสภาพของปะการังส่วนใหญ่มีลักษณะเหมือนพื้นตัวกลับมาจากวิกฤตการณ์การเกิดปะการังฟอกขาวที่แพร่กระจายเป็นวงกว้างทั่วโลก จากปรากฏการณ์ของสภาวะโลกที่ร้อนขึ้นส่งผลให้น้ำทะเลมีอุณหภูมิสูงขึ้นเกินปกติเป็นระยะเวลานานต่อเนื่องกันนานหลายวันในช่วงฤดูแล้ง (เมษายน-พฤษภาคม) จนทำให้ปะการังส่วนใหญ่มีลักษณะการเกิดอาการที่เรียกว่า ปะการังฟอกขาว ซึ่งในช่วงฤดูหนาวจะเป็นช่วงที่น้ำทะเลมีระดับสูงขึ้นและมีลมมรสุมพัดพาให้กระแสน้ำมีการไหลเวียนได้ต่อเนื่องและมีการเปลี่ยนแปลงของสภาพแวดล้อมกลับมาอยู่ในช่วงที่เหมาะสม ส่งผลให้ปะการังส่วนใหญ่พื้นตัวกลับมาอยู่ในสภาพที่ค่อนข้างปกติดีขึ้นได้ แต่ก็ยังคงพบปะการังบางส่วนถูกตะกอนทับถมและเสื่อมสภาพรวมอยู่ด้วย

สำหรับสภาพแนวปะการังบริเวณนี้โดยรวมถือว่าอยู่ในเกณฑ์ที่มีปะการังอยู่ในสภาพที่เริ่มเสื่อมโทรม มีปะการังเหลืออยู่ค่อนข้างน้อยมาก เมื่อเทียบกับบริเวณอื่นๆ ที่ยังมีปะการังสมบูรณ์กว่าในพื้นที่บริเวณใกล้เคียง เช่น บริเวณหมู่เกาะคราม หมู่เกาะต่างๆ บริเวณทะเลช่องแสมสาร สัตหีบ จ. ชลบุรี บริเวณเกาะทะลุ เกาะมันนอก เกาะมันใน จ. ระยอง หรือหมู่เกาะใน จ. จันทบุรี และ จ.ตราด เป็นต้น ทั้งนี้สาเหตุที่บริเวณเกาะสะเก็ดพบปะการังเหลือน้อยมาก ก็เนื่องมาจากปัจจัยหลายๆ อย่างด้วยกัน ไม่ว่าจะเป็นผลจากสภาพแวดล้อมของพื้นที่ในบริเวณนี้ที่ส่งผลต่อการเจริญเติบโตและการดำรงชีวิตอยู่รอดของปะการัง เช่น ความขุ่นของน้ำทะเล ปริมาณตะกอนที่ค่อนข้างหนาแน่น ระดับความลึก และระยะห่างจากชายฝั่ง เป็นต้น รวมทั้งผลกระทบที่อาจเกิดขึ้นจากกิจกรรมต่างๆ ในบริเวณนี้ด้วย ซึ่งแม้จะไม่ส่งผลกระทบโดยตรงให้เห็นในทันที แต่ก็อาจส่งผลกระทบได้ในระยะยาว ซึ่งยากสำหรับการอธิบายเหตุผล จำเป็นต้องอาศัยข้อมูลอ้างอิงเฉพาะด้านที่เกี่ยวข้องตั้งแต่อดีตจนถึงปัจจุบันมาสรุป เพื่อชี้ให้เห็นผลกระทบที่เกิดขึ้นได้อย่างชัดเจนมากยิ่งขึ้น แต่กระนั้นก็ตาม ยังถือว่าเป็นเรื่องที่น่ายินดีที่ยังคงมีพื้นที่ซึ่งยังสามารถพบเห็นปะการังอาศัยเจริญเติบโตอยู่รอดได้ ถึงแม้ว่าจะเป็นเพียงพื้นที่เล็กๆ ของเกาะเล็กๆ แห่งนี้ก็ตาม

ดังนั้นการกระทำหรือการดำเนินกิจกรรมใดๆ ที่อาจส่งผลกระทบต่อระบบนิเวศน์ปะการังเหล่านี้ทั้งในระยะสั้นหรือระยะยาวก็ตาม ผู้ที่มีส่วนเกี่ยวข้องจึงจำเป็นต้องตระหนักและจัดให้มีการศึกษารวบรวมข้อมูลเพื่อกำหนดแนวทางหรือมาตรการที่ดีที่สุด เพื่อช่วยป้องกันไม่ทำให้ระบบนิเวศน์ปะการังเหล่านี้ได้รับผลกระทบหรือเกิดผลกระทบน้อยที่สุด

#### 4. สรุปผลการสำรวจแนวปะการัง

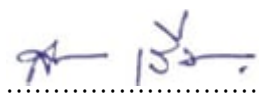
##### 4.1 บริเวณสถานที่ที่ 6 แนวสำรวจทิศตะวันตกจากเกาะสะเก็ด 500 เมตร

บริเวณนี้พบกลุ่มหรือแนวของปะการังมีการกระจายตัวอยู่ในลักษณะเป็นหย่อมเล็กๆ ที่ระยะ 0-10 เมตร มากกว่าที่ระยะอื่นๆ บนแนวสำรวจ ซึ่งปะการังส่วนใหญ่ที่พบมีการเจริญเติบโตอาศัยกรอบคลุมอยู่บนก้อนหิน หรือโขดหินใต้น้ำ โดยปะการังกลุ่มเด่นที่พบในการสำรวจครั้งนี้คือ ปะการังดอกไม้มะเลและปะการังมีลาย รองลงมาได้แก่ ปะการังโขดและปะการังรังผึ้ง นอกจากนี้ยังพบพวกฟองน้ำ และดอกไม้พรมใหญ่ อาศัยปะปนร่วมอยู่กับปะการังในบริเวณนี้ด้วย ส่วนสัตว์ทะเลและสิ่งมีชีวิตที่พบอาศัยอยู่ตามบริเวณพื้นทะเลในบริเวณนี้ ได้แก่ เม่นทะเล ปลิงทะเล และหอยจอบ

##### 4.2 บริเวณสถานที่ที่ 7 แนวสำรวจทิศตะวันออกเฉียงเหนือของเกาะสะเก็ด ห่างออกมา

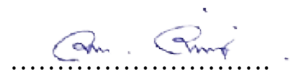
500 เมตร

บริเวณนี้ไม่พบกลุ่มหรือแนวของปะการังกระจายตัวอยู่เลย พบเพียงสาหร่ายทะเลและสัตว์ทะเลที่อาศัยอยู่ตามบริเวณพื้นทะเล ได้แก่ ปูเสฉวน หอยชักตีน และปลิงทะเล



(นายสาโรจน์ เริ่มคำริห์)

ผู้วิเคราะห์



(นายอลงกต อินทรชาติ)

หัวหน้าสถานีวิจัยประมงศรีราชา

มวลชีวภาพ (Biomass)

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สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : Map Ta Phut Tank Terminal Co., Ltd.

Address : 18, I-8 Road, Map Ta Phut, Mueang, Rayong, Thailand, 21150

รายงานผลการวิเคราะห์มลชีวภาพของแพลงก์ตอน

ตาราง ผลการวิเคราะห์มลชีวภาพของแพลงก์ตอน (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

| มลชีวภาพของแพลงก์ตอน                      | 2612147-1                         |
|-------------------------------------------|-----------------------------------|
| มลชีวภาพของแพลงก์ตอน (น้ำนักเปือก)        | 3.5625 กรัมต่อลูกบาศก์เมตร        |
| มลชีวภาพของแพลงก์ตอน (คาร์บอนกรัมสมมูลย์) | 0.0345 กรัมคาร์บอนต่อลูกบาศก์เมตร |
| สภาพตัวอย่าง                              | ตะกอนสีน้ำตาลอมเขียว              |

Sample Location : 1. สถานี 2612147-1 : สถานีที่ 1 จุดรับน้ำเข้า

Condition of Sample : contained in one plastic bottle, sample containers comply to pretreatment-  
preservation standards (APHA, USEPA)

(นางสาวกนกวรรณ ขาวดอน)

ผู้วิเคราะห์

(นายอลงกต อินทรชาติ)

หัวหน้าสถานีวิจัยประมงศรีราชา



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

Client : Map Ta Phut Tank Terminal Co., Ltd.

Address : 18, I-8 Road, Map Ta Phut, Mueang, Rayong, Thailand, 21150

รายงานผลการวิเคราะห์มวลชีวภาพของสัตว์น้ำวัยอ่อน

ตาราง ผลการวิเคราะห์มวลชีวภาพของสัตว์น้ำวัยอ่อน (เก็บตัวอย่างวันที่ 10 มีนาคม 2569)

| มวลชีวภาพของสัตว์น้ำวัยอ่อน                    | 2612173-1                                |
|------------------------------------------------|------------------------------------------|
| มวลชีวภาพของสัตว์น้ำวัยอ่อน (น้ำหนักเปียก)     | 0.7485 กรัมต่อ 1,000 ลูกบาศก์เมตร        |
| มวลชีวภาพของสัตว์น้ำวัยอ่อน (คาร์บอนกรัมสมมูล) | 0.2416 กรัมคาร์บอนต่อ 1,000 ลูกบาศก์เมตร |
| สภาพตัวอย่าง                                   | ตะกอนสีน้ำตาล                            |

Sample Location : 1. สถานี 2612173-1 : สถานีที่ 1 จุดรับน้ำเข้า

Condition of Sample : contained in one plastic bottle, sample containers comply to pretreatment-preservation standards (APHA, USEPA)

(นางสาวกนกวรรณ ขาวดอน)

ผู้วิเคราะห์

(นายอลงกต อินทรชาติ)

หัวหน้าสถานีวิจัยประมงศรีราชา

โลหะหนักในตะกอนดินและโลหะหนักในสัตรว์หน้าดิน

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## Analysis / Test Report

**Client :** Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O :**

**Project Name :**

**Project Location :**

**Lot ID: 25101419**

Date Received : Nov 28, 2025

Date Reported : Dec 08, 2025

Report Number : 3441573-1

Page 1 of 1

**Sample Number** 25101419-1  
**Sampled Date** Nov 28, 2025 10:45 AM  
**Sample Description** การปนเปื้อนโลหะหนักในตะกอนดิน  
**Location** บริเวณพื้นที่ทิ้งตะกอน  
**Date Analysis Commenced** Dec 01, 2025  
**Condition of Sample** Packed in one plastic bag, refrigerated

| Analyte                    | Unit  | LOD | LOQ (LOR) | Result | Guideline / Specification | Method                                                                                                                               | Testing Location |
|----------------------------|-------|-----|-----------|--------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Metals Testing</b>      |       |     |           |        |                           |                                                                                                                                      |                  |
| Cadmium                    | mg/kg | -   | 0.50      | <0.50  | ≤2                        | United States Environmental Protection Agency, EPA Method 3050 B and 6010 D                                                          | Bangkok          |
| Lead                       | mg/kg | -   | 1.00      | 7.68   | ≤52                       | United States Environmental Protection Agency, EPA Method 3050 B and 6010 D                                                          | Bangkok          |
| Mercury                    | mg/kg | -   | 0.10      | <0.10  | ≤0.4                      | United States Environmental Protection Agency, EPA Method 7473                                                                       | Bangkok          |
| <b>Physical Parameters</b> |       |     |           |        |                           |                                                                                                                                      |                  |
| Moisture                   | %     | -   | 0.1       | 38.2   | No Standard               | In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 G | Bangkok          |

**Guideline :** ประกาศกรมควบคุมมลพิษ เรื่องกำหนดหลักเกณฑ์คุณภาพตะกอนดินชายฝั่งทะเล

**Note :** Analysis Results expressed on dry basis.

**Sampling By :** Patchanon Inprik

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Suwimon C.

Suwimon Chairuangwut  
Scientist (3)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.



ISO/IEC 17025  
Accreditation No. 1031/47

## Analysis / Test Report

**Client** : Map Ta Phut Tank Terminal Co., Ltd.  
18, I-8 Road, Map Ta Phut, Mueang, Rayong Thailand 21150

**P/O** : PMM-23-18

**Project Name** :

**Project Location** :

**Lot ID: 25109795**

Date Received : Oct 17, 2025

Date Reported : Dec 09, 2025

Report Number : 3463325-1

Page 1 of 1

|                                |                                                                                                            |
|--------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Sample Number</b>           | 25109795-1                                                                                                 |
| <b>Sampled Date</b>            | Oct 17, 2025 12:10 PM                                                                                      |
| <b>Sample Description</b>      | การปนเปื้อนโลหะหนักในสัตว์หน้าดิน                                                                          |
| <b>Location</b>                | บริเวณพื้นที่ทิ้งตะกอน                                                                                     |
| <b>Date Analysis Commenced</b> | Oct 20, 2025                                                                                               |
| <b>Condition of Sample</b>     | Packed in one plastic bag, sample containers comply to pretreatment - preservation standards (APHA, USEPA) |

| Analyte               | Unit  | LOD   | LOQ (LOR) | Result | Method                                                                                                          | Testing Location |
|-----------------------|-------|-------|-----------|--------|-----------------------------------------------------------------------------------------------------------------|------------------|
| <b>Metals Testing</b> |       |       |           |        |                                                                                                                 |                  |
| Cadmium               | mg/kg | 0.01  | 0.03      | <0.03  | In-house method, STM No.05-040 based on AOAC (2023) 2011.19                                                     | Bangkok          |
| Lead                  | mg/kg | 0.02  | 0.10      | 1.06   | In-house method, STM No.05-040 based on AOAC (2023) 2011.19                                                     | Bangkok          |
| Mercury               | mg/kg | 0.002 | 0.005     | 0.005  | In-house method, STM No. 05-045 based on United States Environmental Protection Agency (EPA), 2007, Method 7473 | Bangkok          |

**Sampling By** : KARBUNDIT Kitisupavanit

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- Sampling is not included in scope of accreditation ISO/IEC 17025

Approved by

*Sawitree N.*

Sawitree Noisangiam  
Manager

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. The report shall not be reproduced except in full without the written approval of the laboratory.

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# ภาคผนวก ง

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ใบรับรองการสอบเทียบเครื่องมือ



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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

| Sample Name | Parameter                    | Equipment Name                  | ID No.     | Calibrated Date | Next Cal  | Freq. Calibrate (Months) |
|-------------|------------------------------|---------------------------------|------------|-----------------|-----------|--------------------------|
| Ambient     | Nitrogen Dioxide             | NO <sub>2</sub> Analyzer        | RYG_FS0272 | 5-Jan-26        | 5-Jul-26  | 6                        |
| Ambient     | Nitrogen Dioxide             | NO <sub>2</sub> Analyzer        | RYG_FS0455 | 5-Jan-26        | 5-Jul-26  | 6                        |
| Ambient     | Sulfur Dioxide               | SO <sub>2</sub> Analyzer        | RYG_FS0271 | 5-Jan-26        | 5-Jul-26  | 6                        |
| Ambient     | Sulfur Dioxide               | SO <sub>2</sub> Analyzer        | RYG_FS0454 | 5-Jan-26        | 5-Jul-26  | 6                        |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0650 | 7-Feb-25        | 7-Aug-26  | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0649 | 17-Jan-25       | 16-Jul-26 | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0647 | 15-Jan-25       | 14-Jul-26 | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0610 | 6-Jan-26        | 5-Jul-27  | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0611 | 6-Jan-26        | 5-Jul-27  | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0545 | 2-Apr-25        | 1-Oct-26  | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0647 | 15-Jan-25       | 14-Jul-26 | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0648 | 16-Jan-25       | 15-Jul-26 | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | BKK_FS0887 | 1-Aug-25        | 1-Feb-27  | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0649 | 17-Jan-25       | 16-Jul-26 | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | BKK_FS0165 | 1-Aug-25        | 1-Feb-27  | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0329 | 7-May-25        | 6-Nov-26  | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | BKK_FS1438 | 9-Mar-26        | 9-Sep-27  | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0435 | 28-May-25       | 28-May-26 | 12                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0085 | 15-Jan-25       | 15-Jul-26 | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0087 | 8-Apr-26        | 7-Oct-27  | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | NKH_FS0053 | 9-Dec-25        | 9-Jun-27  | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0436 | 16-Dec-25       | 15-Dec-26 | 12                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | RYG_FS0611 | 6-Jan-26        | 5-Jul-27  | 18                       |
| Ambient     | Wind Speed / Wind Direction  | Wind Speed / Wind Direction     | BKK_FS0910 | 27-Nov-25       | 27-May-27 | 18                       |
| Ambient     | Benzene                      | GC-MSD                          | RYG_EN0136 | 4-Jul-25        | 3-Jan-27  | 18                       |
| Ambient     | 1,3-Butadiene                | GC-MSD                          | RYG_EN0136 | 4-Jul-25        | 3-Jan-27  | 18                       |
| Ambient     | Non-Methane Hydrocarbon      | DRYCAL FLOWMETER                | BKK_FS0614 | 10-Sep-25       | 9-Sep-26  | 12                       |
| Ambient     | Non-Methane Hydrocarbon      | DRYCAL FLOWMETER                | BKK_FS0619 | 10-Sep-25       | 9-Sep-26  | 12                       |
| Ambient     | Non-Methane Hydrocarbon      | Total Hydrocarbon Analyzer      | RYG_FS0762 | 15-Jan-26       | 14-Jan-27 | 12                       |
| Stack       | Total VOC                    | Fuel Gas Analyzer               | RYG_FS0565 | 7-Nov-24        | 7-Nov-25  | 12                       |
| Stack       | Total VOC                    | DRYCAL FLOWMETER                | RYG_FS0208 | 27-Jan-25       | 26-Jan-26 | 12                       |
| Stack       | Total VOC                    | DRYCAL FLOWMETER                | BKK_FS0614 | 9-Sep-24        | 9-Sep-25  | 12                       |
| Stack       | Total VOC                    | Air Sampling Pump               | RYG_FS0515 | 3-Jul-25        | 3-Oct-25  | 3                        |
| Stack       | Total VOC                    | FID Analyzer                    | BKK_FS0758 | 1-Jul-25        | 1-Jan-26  | 6                        |
| Rayong Lab  | BOD                          | DO meter with Sensor            | RYG_EN0032 | 20-Jan-25       | 20-Jul-26 | 18                       |
| Rayong Lab  | BOD                          | Incubator                       | RYG_EN0154 | 18-Mar-26       | 18-Sep-27 | 18                       |
| Rayong Lab  | BOD                          | Burette                         | RYG_EN0216 | 18-Sep-25       | 18-Sep-26 | 12                       |
| Rayong Lab  | Temperature                  | Digital Thermometer With Sensor | RYG_FS0418 | 9-Oct-25        | 9-Oct-26  | 12                       |
| Rayong Lab  | Oil & Grease                 | Electronic Balance              | RYG_EN0003 | 3-Feb-26        | 3-Feb-27  | 12                       |
| Rayong Lab  | Oil & Grease                 | Liquid Bath (Water)             | RYG_EN0220 | 27-Nov-25       | 27-Nov-26 | 12                       |
| Rayong Lab  | pH at 25 °C                  | pH Meter                        | RYG_EN0152 | 18-Jun-25       | 18-Dec-26 | 18                       |
| Rayong Lab  | Total Suspended Solids       | Electronic Balance              | RYG_EN0163 | 3-Feb-26        | 3-Feb-27  | 12                       |
| Rayong Lab  | Total Suspended Solids       | Chamber (Oven)                  | RYG_EN0012 | 10-Sep-25       | 10-Mar-27 | 18                       |
| Rayong Lab  | Total Dissolved Solids 180°C | Electronic Balance              | RYG_EN0163 | 3-Feb-26        | 3-Feb-27  | 12                       |
| Rayong Lab  | Total Dissolved Solids 180°C | Chamber (Oven)                  | RYG_EN0012 | 10-Sep-25       | 10-Mar-27 | 18                       |
| Rayong Lab  | COD                          | Spectrophotometer               | RYG_EN0037 | 18-Mar-25       | 18-Sep-26 | 18                       |
| Rayong Lab  | Sulfide                      | Chamber (Cold Room)             | RYG_EN0184 | 27-Nov-25       | 27-May-27 | 18                       |
| Rayong Lab  | Total Kjeldahl Nitrogen      | Block Digestion Unit            | RYG_EN0188 | 10-Sep-25       | 10-Mar-27 | 18                       |
| Rayong Lab  | Total Kjeldahl Nitrogen      | pH Meter                        | RYG_EN0152 | 18-Jun-25       | 18-Dec-26 | 18                       |



right solutions.  
right partner.

รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

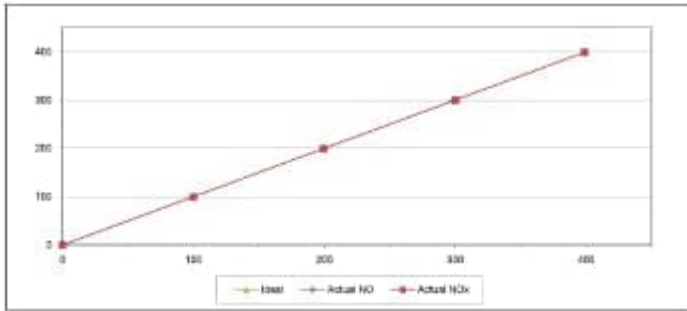
| Sample Name | Parameter                    | Equipment Name                  | ID No.     | Calibrated Date | Next Cal  | Freq. Calibrate (Months) |
|-------------|------------------------------|---------------------------------|------------|-----------------|-----------|--------------------------|
| Rayong Lab  | Hydrocarbon                  | Electronic Balance              | RYG_EN0003 | 3-Feb-26        | 3-Feb-27  | 12                       |
| Rayong Lab  | Hydrocarbon                  | Liquid Bath (Water)             | RYG_EN0220 | 27-Nov-25       | 27-Nov-26 | 12                       |
| Water Lab   | Lead                         | ICP-MS                          | BKK_EL0043 | 3-Oct-25        | 2-Oct-26  | 12                       |
| Water Lab   | Lead                         | Hot Block                       | BKK_EL0054 | 4-Mar-25        | 4-Sep-26  | 18                       |
| Water Lab   | Lead                         | Chamber (Cooling Room)          | BKK_EN0167 | 4-Jun-25        | 4-Dec-26  | 18                       |
| Water Lab   | Mercury                      | DUO-CVAFS / CVAAS               | BKK_EL0176 | 9-Apr-26        | 9-Apr-27  | 12                       |
| Water Lab   | Total Coliform               | Autoclave                       | BKK_ML0041 | 4-Mar-25        | 4-Sep-26  | 18                       |
| Water Lab   | Total Coliform               | Incubator                       | BKK_ML0231 | 21-Aug-25       | 21-Aug-26 | 12                       |
| Water Lab   | Total Coliform               | Hot Air Oven                    | BKK_ML0013 | 9-Oct-25        | 9-Apr-27  | 18                       |
| Water Lab   | Volatile Organic Compound    | Gas Chromatography (MSD)        | BKK_EN0059 | 25-Jun-25       | 25-Dec-26 | 18                       |
| Water Lab   | Arsenic                      | ICP-MS                          | BKK_EL0043 | 3-Oct-25        | 2-Oct-26  | 12                       |
| Water Lab   | Arsenic                      | Hot Block                       | BKK_EL0054 | 4-Mar-25        | 4-Sep-26  | 18                       |
| Water Lab   | Arsenic                      | Chamber (Cooling Room)          | BKK_EN0167 | 4-Jun-25        | 4-Dec-26  | 18                       |
| Water Lab   | Zinc                         | ICP-MS                          | BKK_EL0043 | 3-Oct-25        | 2-Oct-26  | 12                       |
| Water Lab   | Zinc                         | Hot Block                       | BKK_EL0054 | 4-Mar-25        | 4-Sep-26  | 18                       |
| Water Lab   | Zinc                         | Chamber (Cooling Room)          | BKK_EN0167 | 4-Jun-25        | 4-Dec-26  | 18                       |
| Water Lab   | Methanol                     | Gas Chromatography              | BKK_EN0041 | 3-Jan-25        | 3-Jul-26  | 18                       |
| Sludge      | Lead                         | ICP-OES                         | BKK_EL0037 | 23-Sep-24       | 23-Mar-26 | 18                       |
| Sludge      | Lead                         | Hot Block                       | BKK_EL0054 | 4-Mar-25        | 4-Sep-26  | 18                       |
| Sludge      | Lead                         | Chamber (Cooling Room)          | BKK_EN0167 | 4-Jun-25        | 4-Dec-26  | 18                       |
| Sludge      | Mercury                      | DUO-CVAFS / CVAAS               | BKK_EL0023 | 12-Dec-24       | 12-Jun-26 | 18                       |
| Sludge      | Cadmium                      | ICP-OES                         | BKK_EL0037 | 23-Sep-24       | 23-Mar-26 | 18                       |
| Sludge      | Cadmium                      | Hot Block                       | BKK_EL0054 | 4-Mar-25        | 4-Sep-26  | 18                       |
| Sludge      | Cadmium                      | Chamber (Cooling Room)          | BKK_EN0167 | 4-Jun-25        | 4-Dec-26  | 18                       |
| Sea Water   | Cadmium                      | ICP-MS                          | BKK_EL0043 | 3-Oct-25        | 2-Oct-26  | 12                       |
| Sea Water   | Cadmium                      | Hot Block                       | BKK_EL0054 | 4-Mar-25        | 4-Sep-26  | 18                       |
| Sea Water   | Cadmium                      | Chamber (Cooling Room)          | BKK_EN0167 | 4-Jun-25        | 4-Dec-26  | 18                       |
| Sea Water   | Lead                         | ICP-MS                          | BKK_EL0043 | 3-Oct-25        | 2-Oct-26  | 12                       |
| Sea Water   | Lead                         | Hot Block                       | BKK_EL0054 | 4-Mar-25        | 4-Sep-26  | 18                       |
| Sea Water   | Lead                         | Chamber (Cooling Room)          | BKK_EN0167 | 4-Jun-25        | 4-Dec-26  | 18                       |
| Sea Water   | Mercury                      | DUO-CVAFS / CVAAS               | BKK_EL0176 | 9-Apr-26        | 9-Apr-27  | 12                       |
| Sea Water   | Total Coliform               | Autoclave                       | BKK_ML0041 | 4-Mar-25        | 4-Sep-26  | 18                       |
| Sea Water   | Total Coliform               | Incubator                       | BKK_ML0231 | 21-Aug-25       | 21-Aug-26 | 12                       |
| Sea Water   | Total Coliform               | Hot Air Oven                    | BKK_ML0013 | 9-Oct-25        | 9-Apr-27  | 18                       |
| Sea Water   | Fecal Coliform               | Autoclave                       | BKK_ML0041 | 4-Mar-25        | 4-Sep-26  | 18                       |
| Sea Water   | Fecal Coliform               | Incubator                       | BKK_ML0231 | 21-Aug-25       | 21-Aug-26 | 12                       |
| Sea Water   | Fecal Coliform               | Hot Air Oven                    | BKK_ML0013 | 9-Oct-25        | 9-Apr-27  | 18                       |
| Sea Water   | Fecal Coliform               | Water Bath                      | BKK_ML0056 | 4-Feb-26        | 4-Feb-27  | 12                       |
| Sea Water   | Volatile Organic Compound    | Gas Chromatography (MSD)        | BKK_EN0059 | 25-Jun-25       | 25-Dec-26 | 18                       |
| Sea Water   | BOD                          | DO meter with Sensor            | RYG_EN0032 | 20-Jan-25       | 20-Jul-26 | 18                       |
| Sea Water   | BOD                          | Incubator                       | RYG_EN0154 | 18-Mar-26       | 18-Sep-27 | 18                       |
| Sea Water   | BOD                          | Burette                         | RYG_EN0216 | 18-Sep-25       | 18-Sep-26 | 12                       |
| Sea Water   | Conductivity                 | Conductivity meter              | RYG_EN0200 | 1-Dec-25        | 1-Dec-26  | 12                       |
| Sea Water   | Dissolved Oxygen (on site)   | DO Meter                        | RYG_FS0547 | 13-Aug-25       | 13-Aug-26 | 12                       |
| Sea Water   | Methanol                     | Gas Chromatography              | BKK_EN0041 | 3-Jan-25        | 3-Jul-26  | 18                       |
| Sea Water   | Oil & Grease                 | Electronic Balance              | RYG_EN0003 | 3-Feb-26        | 3-Feb-27  | 12                       |
| Sea Water   | Oil & Grease                 | Liquid Bath (Water)             | RYG_EN0220 | 27-Nov-25       | 27-Nov-26 | 12                       |
| Sea Water   | pH at 25 °C                  | pH Meter                        | RYG_EN0152 | 18-Jun-25       | 18-Dec-26 | 18                       |
| Sea Water   | Temperature                  | Digital Thermometer With Sensor | RYG_FS0418 | 9-Oct-25        | 9-Oct-26  | 12                       |
| Sea Water   | Salinity                     | Conductivity meter              | RYG_EN0200 | 1-Dec-25        | 1-Dec-26  | 12                       |
| Sea Water   | Total Dissolved Solids 180°C | Electronic Balance              | RYG_EN0163 | 3-Feb-26        | 3-Feb-27  | 12                       |
| Sea Water   | Total Dissolved Solids 180°C | Chamber (Oven)                  | RYG_EN0012 | 10-Sep-25       | 10-Mar-27 | 18                       |
| Sea Water   | Total Petroleum Hydrocarbon  | Electronic Balance              | RYG_EN0003 | 3-Feb-26        | 3-Feb-27  | 12                       |
| Sea Water   | Total Petroleum Hydrocarbon  | Liquid Bath (Water)             | RYG_EN0220 | 27-Nov-25       | 27-Nov-26 | 12                       |
| Sea Water   | Total Suspended Solids       | Electronic Balance              | RYG_EN0163 | 3-Feb-26        | 3-Feb-27  | 12                       |
| Sea Water   | Total Suspended Solids       | Chamber (Oven)                  | RYG_EN0012 | 10-Sep-25       | 10-Mar-27 | 18                       |
| Sea Water   | Turbidity                    | Chamber (Cold Room)             | RYG_EN0184 | 27-Nov-25       | 27-May-27 | 18                       |



## MULTIPOINT CALIBRATION REPORT

|                              |             |                |              |
|------------------------------|-------------|----------------|--------------|
| Calibration Date             | 5-Jan-26    | Equipment Name | NOx Analyzer |
| Manufacturer                 | HORIBA      | Model          | APNA-370     |
| Serial No.                   | 7AVB8544    | Equipment ID   | RYQ_FB0272   |
| Calibrator Manufacturer      | Twidyne API | Model          | 700          |
| Serial No.                   | 947         |                |              |
| Std. Gas Concentration (PPM) | 55.88       | Cylinder No.   | GN0027222    |
| Cylinder Pressure (psi)      | 1800        | Certified By   | Airgas Inc.  |
| Certified Date               | 9-Feb-22    | Expired Date   | 9-Feb-30     |

| Point       | CALIBRATION RESULTS |           |          |           |            |           |            |
|-------------|---------------------|-----------|----------|-----------|------------|-----------|------------|
|             | Ideal               | Actual NO | Error NO | %Error NO | Actual NOx | Error NOx | %Error NOx |
| ZERO        | 0.00                | 0.05      | 0.05     | 0.05      | 0.10       | 0.10      | 0.10       |
| 1           | 100.00              | 99.10     | -0.90    | -0.90     | 100.10     | 0.10      | 0.10       |
| 2           | 200.00              | 198.70    | -1.30    | -0.65     | 199.50     | -0.50     | -0.25      |
| 3           | 300.00              | 298.00    | -1.40    | -0.47     | 300.30     | 0.30      | 0.10       |
| 4           | 400.00              | 398.00    | -1.10    | -0.28     | 398.70     | -1.30     | -0.33      |
| AVERAGE (%) |                     |           |          | -0.48     |            |           | -0.08      |



Calibrated By

(Mr. Jirawat Sakam)  
Field Environmental Scientist (3)

Approved By

(Mr. Sansyuth Jitthamont)  
Assistant General Manager

ALS Laboratory Group

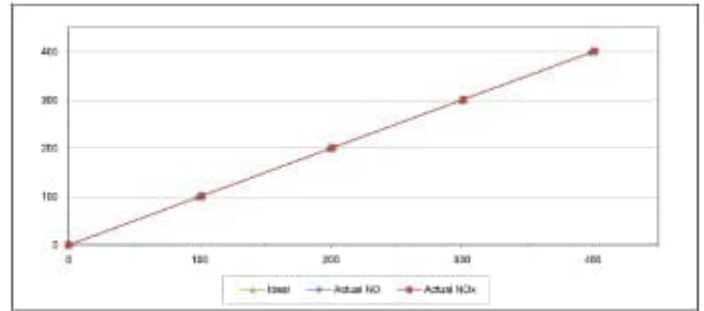
FORM NO.: F 08-055 REVISION NO.: - ISSUE DATE: 12/04/12



## MULTIPOINT CALIBRATION REPORT

|                              |             |                |              |
|------------------------------|-------------|----------------|--------------|
| Calibration Date             | 5-Jan-26    | Equipment Name | NOx Analyzer |
| Manufacturer                 | HORIBA      | Model          | APNA-370     |
| Serial No.                   | ALP0V0VWY   | Equipment ID   | RYQ_FB0455   |
| Calibrator Manufacturer      | Twidyne API | Model          | 700          |
| Serial No.                   | 947         |                |              |
| Std. Gas Concentration (PPM) | 55.88       | Cylinder No.   | GN0027222    |
| Cylinder Pressure (psi)      | 1800        | Certified By   | Airgas Inc.  |
| Certified Date               | 9-Feb-22    | Expired Date   | 9-Feb-30     |

| Point       | CALIBRATION RESULTS |           |          |           |            |           |            |
|-------------|---------------------|-----------|----------|-----------|------------|-----------|------------|
|             | Ideal               | Actual NO | Error NO | %Error NO | Actual NOx | Error NOx | %Error NOx |
| ZERO        | 0.00                | 0.10      | 0.10     | 0.10      | 0.10       | 0.10      | 0.10       |
| 1           | 100.00              | 98.60     | -1.20    | -1.20     | 101.60     | 1.60      | 1.60       |
| 2           | 200.00              | 198.60    | -1.20    | -0.60     | 201.30     | 1.30      | 0.65       |
| 3           | 300.00              | 301.30    | 1.30     | 0.43      | 301.10     | 1.10      | 0.37       |
| 4           | 400.00              | 398.50    | -1.50    | -0.38     | 401.30     | 1.30      | 0.33       |
| AVERAGE (%) |                     |           |          | -0.33     |            |           | 0.61       |



Calibrated By

(Mr. Jirawat Sakam)  
Field Environmental Scientist (3)

Approved By

(Mr. Sansyuth Jitthamont)  
Assistant General Manager

ALS Laboratory Group

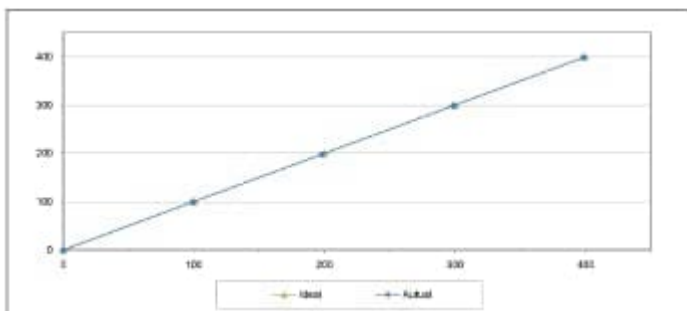
FORM NO.: F 08-055 REVISION NO.: - ISSUE DATE: 12/04/12



## MULTIPOINT CALIBRATION REPORT

|                              |             |                |              |
|------------------------------|-------------|----------------|--------------|
| Calibration Date             | 5-Jan-26    | Equipment Name | SO2 Analyzer |
| Manufacturer                 | HORIBA      | Model          | APSA-370     |
| Serial No.                   | 1092NYKM    | Equipment ID   | RYQ_FB0271   |
| Calibrator Manufacturer      | Twidyne API | Model          | 700          |
| Serial No.                   | 947         |                |              |
| Std. Gas Concentration (PPM) | 55.3        | Cylinder No.   | GN0027222    |
| Cylinder Pressure (psi)      | 1800        | Certified By   | Airgas Inc.  |
| Certified Date               | 9-Feb-22    | Expired Date   | 9-Feb-30     |

| Point       | CALIBRATION RESULTS |        |       |        |
|-------------|---------------------|--------|-------|--------|
|             | Ideal               | Actual | Error | %Error |
| ZERO        | 0.00                | 0.10   | 0.10  | 0.10   |
| 1           | 100.00              | 99.50  | -0.50 | -0.50  |
| 2           | 200.00              | 198.00 | -2.00 | -1.00  |
| 3           | 300.00              | 298.70 | -1.30 | -0.43  |
| 4           | 400.00              | 398.50 | -1.50 | -0.38  |
| AVERAGE (%) |                     |        |       | -0.44  |



Calibrated By

(Mr. Jirawat Sakam)  
Field Environmental Scientist (3)

Approved By

(Mr. Sansyuth Jitthamont)  
Assistant General Manager

ALS Laboratory Group

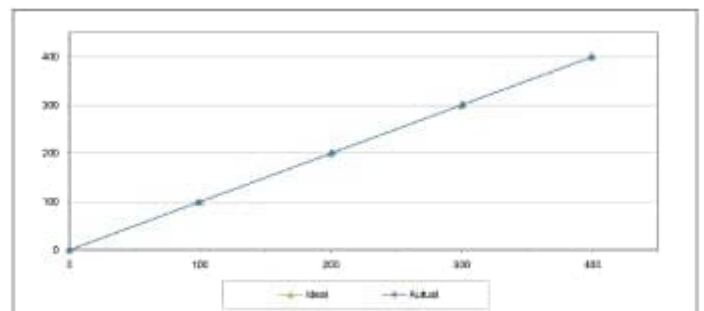
FORM NO.: F 08-055 REVISION NO.: - ISSUE DATE: 12/04/12



## MULTIPOINT CALIBRATION REPORT

|                              |             |                |              |
|------------------------------|-------------|----------------|--------------|
| Calibration Date             | 5-Jan-26    | Equipment Name | SO2 Analyzer |
| Manufacturer                 | HORIBA      | Model          | APSA-370     |
| Serial No.                   | H03309FA    | Equipment ID   | RYQ_FB0454   |
| Calibrator Manufacturer      | Twidyne API | Model          | 700          |
| Serial No.                   | 947         |                |              |
| Std. Gas Concentration (PPM) | 55.3        | Cylinder No.   | GN0027222    |
| Cylinder Pressure (psi)      | 1800        | Certified By   | Airgas Inc.  |
| Certified Date               | 9-Feb-22    | Expired Date   | 9-Feb-30     |

| Point       | CALIBRATION RESULTS |        |       |        |
|-------------|---------------------|--------|-------|--------|
|             | Ideal               | Actual | Error | %Error |
| ZERO        | 0.00                | 0.10   | 0.10  | 0.10   |
| 1           | 100.00              | 98.50  | -1.50 | -1.50  |
| 2           | 200.00              | 201.00 | 1.00  | 0.50   |
| 3           | 300.00              | 301.10 | 1.10  | 0.37   |
| 4           | 400.00              | 398.50 | -0.50 | -0.13  |
| AVERAGE (%) |                     |        |       | -0.13  |



Calibrated By

(Mr. Jirawat Sakam)  
Field Environmental Scientist (3)

Approved By

(Mr. Sansyuth Jitthamont)  
Assistant General Manager

ALS Laboratory Group

FORM NO.: F 08-055 REVISION NO.: - ISSUE DATE: 12/04/12







## CERTIFICATE OF CALIBRATION

Certificate No. : C79-025-68

Page 1 of 2 Pages

### MEASUREMENT ITEM MANUFACTURER MODEL/TYPE

Digital barometer  
Newlyn  
Series: 110-W5-2500  
Data logger: 110-W5-2500-D  
Series: NP-05000  
Data logger: 05000  
Model: NP-05000

### SERIAL NUMBER

05000

### CONDITION AS-RECEIVED

### CUSTOMER

Used item

AKS Laboratory group (Thailand) Co., Ltd.  
104 Phatthanasani Rd, Phatthanasani Rd,  
Klongkum Suburb, Bangkok 10110 Thailand

### RECEIVED DATE

17 Jan 2025

### MEASUREMENT DATE

17 Feb 2025

### ISSUE DATE

17 Feb 2025

### CONDITION OF THIS RESULT OF CALIBRATION:

1. Calibration effort for calibration sequence C
2. The UUC\* was obtained in vertical orientation above reference standard instrument and center of UUC\* was used as the reference level
3. Calibration conditions:
4. Condition:
  - ☒ Normal
  - ☐ Abnormal
5. Pressure transmitting medium: Air
6.  $p_0$  (DPC, 1 bar): 1.01325 bar
7.  $p_{ref}$ : 1.01325 bar
8.  $p_{max}$ : 1.01325 bar
9.  $p_{min}$ : 1.01325 bar
10.  $p_{avg}$ : 1.01325 bar
11.  $p_{std}$ : 1.01325 bar
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48.  $p_{std}$ : 1.01325 bar
49.  $p_{std}$ : 1.01325 bar
50.  $p_{std}$ : 1.01325 bar
51.  $p_{std}$ : 1.01325 bar
52.  $p_{std}$ : 1.01325 bar
53.  $p_{std}$ : 1.01325 bar
54.  $p_{std}$ : 1.01325 bar
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56.  $p_{std}$ : 1.01325 bar
57.  $p_{std}$ : 1.01325 bar
58.  $p_{std}$ : 1.01325 bar
59.  $p_{std}$ : 1.01325 bar
60.  $p_{std}$ : 1.01325 bar
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62.  $p_{std}$ : 1.01325 bar
63.  $p_{std}$ : 1.01325 bar
64.  $p_{std}$ : 1.01325 bar
65.  $p_{std}$ : 1.01325 bar
66.  $p_{std}$ : 1.01325 bar
67.  $p_{std}$ : 1.01325 bar
68.  $p_{std}$ : 1.01325 bar
69.  $p_{std}$ : 1.01325 bar
70.  $p_{std}$ : 1.01325 bar
71.  $p_{std}$ : 1.01325 bar
72.  $p_{std}$ : 1.01325 bar
73.  $p_{std}$ : 1.01325 bar
74.  $p_{std}$ : 1.01325 bar
75.  $p_{std}$ : 1.01325 bar
76.  $p_{std}$ : 1.01325 bar
77.  $p_{std}$ : 1.01325 bar
78.  $p_{std}$ : 1.01325 bar
79.  $p_{std}$ : 1.01325 bar
80.  $p_{std}$ : 1.01325 bar
81.  $p_{std}$ : 1.01325 bar
82.  $p_{std}$ : 1.01325 bar
83.  $p_{std}$ : 1.01325 bar
84.  $p_{std}$ : 1.01325 bar
85.  $p_{std}$ : 1.01325 bar
86.  $p_{std}$ : 1.01325 bar
87.  $p_{std}$ : 1.01325 bar
88.  $p_{std}$ : 1.01325 bar
89.  $p_{std}$ : 1.01325 bar
90.  $p_{std}$ : 1.01325 bar
91.  $p_{std}$ : 1.01325 bar
92.  $p_{std}$ : 1.01325 bar
93.  $p_{std}$ : 1.01325 bar
94.  $p_{std}$ : 1.01325 bar
95.  $p_{std}$ : 1.01325 bar
96.  $p_{std}$ : 1.01325 bar
97.  $p_{std}$ : 1.01325 bar
98.  $p_{std}$ : 1.01325 bar
99.  $p_{std}$ : 1.01325 bar
100.  $p_{std}$ : 1.01325 bar

Calibrated by:  
J NAC  
JIRANATEE ASSOCIATES CO., LTD.



Approved signature:  
Mr. Panyaporn Boonkarn  
Calibration Services Department Manager

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## CERTIFICATE OF CALIBRATION

Certificate No. : C79-025-68

Page 2 of 2 Pages

### MEASUREMENT RESULTS

☐ Without adjustment ☒ With adjustment

### CALIBRATION IN THE RANGE OF

950 mbar to 1050 mbar

The results of calibration and associated measurement uncertainties are reported in the table below.

| STD<br>(mbar) | UUC*<br>(mbar) | Error<br>(mbar) | Uncertainty (k=2)<br>(mbar) |
|---------------|----------------|-----------------|-----------------------------|
| 950.02        | 951.4          | 1.4             | 0.87                        |
| 970.23        | 971.0          | 0.8             | 0.33                        |
| 990.04        | 990.8          | 0.7             | 0.33                        |
| 1000.11       | 1012.4         | 0.2             | 0.37                        |
| 1000.08       | 1020.0         | 0.2             | 0.37                        |
| 1000.06       | 1040.0         | 0.6             | 0.83                        |



JNAC - TIS - TIS 17025  
CALIBRATION 0367

Certificate Number

CDT-038-05

## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER

Wild Direction Sensor  
Hanslope  
Sensor WS-020A  
Data logger: L20 WS-200A-D  
Sensor: WS-020A-D  
Data logger: WS-020A  
Used date  
JNAC Laboratory group (Thailand) Co., Ltd.  
12/14-15, 4th Floor, Bangkok 10110 (Thailand)

RECEIVED DATE  
MEASUREMENT DATE  
WEEK DATE

10 Jan 2025  
17 Jan 2025  
20 Jan 2025

### ENVIRONMENTAL CONDITIONS:

As stated condition in the laboratory are as follows:  
Temperature  
Relative Humidity  
Atmospheric Pressure

(23.0 ± 0.5) °C  
(55.0 ± 5.0) %RH  
(1013 ± 5.0) hPa

PLACE OF CALIBRATION  
JNAC Laboratory group (Thailand) Co., Ltd.

**CALIBRATION CONDITION**

|                                 |         |    |
|---------------------------------|---------|----|
| Wild Direction sensor (WS-020A) | WS-020A | mm |
| Wild Direction sensor (WS-020A) | WS-020A | mm |
| Wild Direction sensor (WS-020A) | WS-020A | mm |

**Preconditioning**  
Measurement Condition  
The average values during measurement are (24.4 °C, (54.4) %RH and (1013.2) hPa.

**TABULATION OF RESULTS**  
The table on next page give the required results.

Calibrated by:  
JNAC Laboratory group (Thailand) Co., Ltd.



Approved signature  
Mr. Pinyakorn Chaiyaporn  
Calibration Department Manager

**Remark:**  
1. The table on next page give the required results.  
2. The table on next page give the required results.  
3. The table on next page give the required results.  
4. The table on next page give the required results.

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JNAC - TIS - TIS 17025  
CALIBRATION 0367

## CERTIFICATE OF CALIBRATION

Certificate No. : CDT-038-05

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER

Data Logger with Temperature sensor  
Hanslope  
L20 WS-200A-D  
AS400  
R10 WS-020A-D  
Used date  
JNAC Laboratory group (Thailand) Co., Ltd.  
12/14-15, 4th Floor, Bangkok 10110 (Thailand)

RECEIVED DATE  
MEASUREMENT DATE  
WEEK DATE

10 Jan 2025  
17 Jan 2025  
20 Jan 2025

### ENVIRONMENTAL CONDITIONS:

As stated condition in the laboratory are as follows:  
Temperature  
Relative Humidity

(23.0 ± 0.5) °C  
(55.0 ± 5.0) %RH

**NOTED:** The certificate is valid only to the item calibrated as stated place of calibration.

**TABULATION OF RESULTS:**  
The table on next page give the required results.

**Calibration procedure:**  
The temperature calibration was done by using a temperature calibration system (JNAC-0017) according to comparison with a standard digital temperature measurement standard temperature probe. The temperature probe was used as a reference.

**Traceability:**  
The temperature probe is traceable to the International System of Units (SI) through National Institute of Standards and Technology (NIST) Certificate number: 71-0047-24, Certificate number: 0123-24.

**Reference Used During Calibration:**  
1. Standard Temperature Probe  
Model: STS-200-A000, Serial No.: 00000000, Due date: 31 Mar 2025  
2. Digital Temperature Indicator  
Model: DTI-3000-A, Serial No.: 00000000, Due date: 31 Dec 2025

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

Calibrated by:  
JNAC Laboratory group (Thailand) Co., Ltd.



Approved signature  
Mr. Pinyakorn Chaiyaporn  
Calibration Department Manager

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Certificate Number

CDT-038-05

Page 1 of 2 Pages

### MEASUREMENT RESULTS

The wild direction sensor was calibrated against standard using a comparison method. During calibration, the measurement was carried out at 23 °C, humidity is 55% and atmospheric pressure is 1013 hPa. The results of calibration and standard uncertainty are reported in the table below.

| Direction | Direction (°) | Direction (°) | Direction (°) | Direction (°) |
|-----------|---------------|---------------|---------------|---------------|
| 0.000     | 0             | 0             | 0             | 0.000         |
| 45.000    | 45            | 4             | 4             | 0.000         |
| 90.000    | 90            | 4             | 4             | 0.000         |
| 135.000   | 135           | 4             | 4             | 0.000         |
| 180.000   | 180           | 4             | 4             | 0.000         |
| 225.000   | 225           | 4             | 4             | 0.000         |
| 270.000   | 270           | 4             | 4             | 0.000         |
| 315.000   | 315           | 4             | 4             | 0.000         |

### Remarks:

1. Calibration results are only valid for the stated measurement conditions during which calibration was performed.

2. Direction of measurement

3. Direction of measurement

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



Continuation of Certificate of Calibration Number CDT-038-05

Page 2 of 2 Pages

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

**Calibration Range:** 20 °C to 40 °C

### Function:

Table 1: This equipment was connected with temperature sensor Model: HMT60 N/N: V19202234, Dimension: Diameter 12 mm, Length 80 mm.

| Immersion Depth (mm) | Standard Reading (°C) | UUC Reading (°C) | Error (°C) | Uncertainty (°C) |
|----------------------|-----------------------|------------------|------------|------------------|
| 80                   | 20.078                | 19.8             | -0.3       | 0.000            |
| 80                   | 25.067                | 24.8             | -0.3       | 0.000            |
| 80                   | 30.054                | 29.7             | -0.4       | 0.000            |
| 80                   | 35.045                | 34.7             | -0.3       | 0.000            |
| 80                   | 40.039                | 39.7             | -0.3       | 0.000            |

UUC's Unit Under Calibration

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





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## CERTIFICATE OF CALIBRATION

Certificate No. : COT-064-06

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER

Relation humidity with data logger  
Novolyte  
Data logger: 139 WS-25D-D  
Sensor: HMR60  
Data logger: 10000  
Sensor: V503334  
EQ: F20549  
Unit item  
A) Laboratory group (Thailand) Co., Ltd.  
224 Phrasarakon Rd, Phrasarakon Rd, Khlong San Luang,  
Bangkok 10250 Thailand

**RECEIVED DATE**  
**MEASUREMENT DATE**  
**ISSUE DATE**

17 Jan 2025  
17 Jan 2025  
17 Jan 2025

**ENVIRONMENTAL CONDITIONS:**  
Ambient condition in the laboratory are as follows:  
Temperature : 23.2 ± 1.0 °C  
Relative Humidity : 64.2 ± 1.5 %

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

**TABLE OF RESULTS:**  
The table on next page give the result and value.

**Calibration procedure:**  
The relation humidity was calibrated using the digital humidity sensor, the data logger was used as a collection device.

**Traceability:**  
The measurement results are traceable to the International System of Units (SI) through National Accredited Institute (Thailand) (NAC). Certificate number: NAC-TSI-TS 17025 and Accredited Associate Co., Ltd. Calibration number: COT-064-06.

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

Calibration by:  
☐ Measurement Department  
☐ Measurement Department  
☐ Measurement Department



Approved signature:

Mr. Pongsakorn  
Calibration Department Manager

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JIRANATEE ASSOCIATES CO., LTD.

Continuation of Certificate of Calibration Number: COT-064-06

Page 2 of 2 Pages

## Measurement Results

The results of calibration and associated measurement uncertainties are reported in the table below.

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

**Table 1:** The results of calibration of relation humidity at 25 °C are reported in table below.  
Calibration Range : 20%RH to 80%RH

| AC Compensation (°C) | Standard Reading (RH%) | UUT Reading (RH%) | Error (RH%) | Uncertainty (RH%) |
|----------------------|------------------------|-------------------|-------------|-------------------|
| 20.71                | 19.81                  | 19.9              | 0.0         | 0.7               |
| 26.71                | 54.47                  | 54.7              | 0.4         | 0.4               |
| 29.71                | 63.81                  | 63.3              | -0.4        | 0.3               |

UUT: Unit Under Calibration



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



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ISO/IEC 17025:2017  
NAC-TSI-TS 17025  
CALIBRATION 0367



## CERTIFICATE OF CALIBRATION

Certificate No. : CFB-004-06

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER

Digital barometer  
Novolyte  
Sensor: 139 WS-25D-D  
Data logger: 139 WS-25D-D  
Sensor: SP-A0580  
Data logger: A0580  
EQ: F166-41  
Unit item  
A) Laboratory group (Thailand) Co., Ltd.  
224 Phrasarakon Rd, Phrasarakon Rd,  
Khlong San Luang, Khlong San Luang,  
Bangkok 10250 Thailand

**RECEIVED DATE**  
**MEASUREMENT DATE**  
**ISSUE DATE**

17 Jan 2025  
17 Jan 2025  
17 Jan 2025

**Calibration procedure:**  
The digital barometer was calibrated using the digital pressure calibrator, the data logger was used as a collection device.

**Traceability:**  
The measurement results are traceable to the International System of Units (SI) through the BIPM (Bureau International des Poids et Mesures) (Thailand) (NAC). Certificate number: NAC-TSI-TS 17025 and Accredited Associate Co., Ltd. Calibration number: COT-064-06.

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

## CONDITION OF THIS RESULT OF CALIBRATION:

- Calibration effort for calibration sequence C.
- The UUT was installed in vertical orientation above reference standard instrument and sensor of UUT was used as the reference level.
- Calibration conditions:
- Condition:
  - Pressure transmitting medium: Air
  - Pressure: 1.01325 bar
  - Temperature: 23.2 ± 1.0 °C
  - Humidity: 64.2 ± 1.5 %
  - Location: (102.910, 13.7) °N
- The certificate is valid only for the item calibrated on date and place of calibration.

Calibration by:  
☐ Measurement Department  
☐ Measurement Department  
☐ Measurement Department



Approved signature:

Mr. Pongsakorn  
Calibration Department Manager

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## CERTIFICATE OF CALIBRATION

Certificate No. : CFB-004-06

Page 2 of 2 Pages

**MEASUREMENT RESULTS:** ☐ Without adjustment ☒ With adjustment

**CALIBRATION IN THE RANGE OF:** ☐ 0.01 bar to 1050 bar

The results of calibration and associated measurement uncertainties are reported in the table below.

| STD (bar) | UUT* (bar) | Error (bar) | Uncertainty (k=2) (bar) |
|-----------|------------|-------------|-------------------------|
| 950.09    | 951.4      | 1.3         | 0.87                    |
| 970.07    | 970.9      | 0.8         | 0.58                    |
| 990.10    | 990.6      | 0.5         | 0.38                    |
| 1010.06   | 1010.1     | 0.0         | 0.38                    |
| 1030.07   | 1029.9     | -0.3        | 0.57                    |
| 1050.09   | 1049.8     | -0.3        | 0.57                    |

**Note:** UUT\* Unit Under Calibration  
\* To convert the result in report unit to Pa should be multiply by 100



\*\*\*End of certificate\*\*\*

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JNAC-06, 10/10/2561  
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JNAC-10, 10/10/2561

Accredited calibration laboratory  
ISO/IEC 17025:2017  
JNAC-101-101.17025  
CALIBRATION 0367



Temperature measurement laboratory  
Calibration services department

## CERTIFICATE OF CALIBRATION

Certificate No.: COT-028-68

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
Data Logger with Temperature sensor  
**MANUFACTURER**  
Mettler  
**MODEL/TYPE**  
130-WS-25D(-)G  
**SERIAL NUMBER**  
A0077  
**SI NUMBER**  
F00047  
**CONDITION AS RECEIVED**  
Used item  
**CUSTOMER**  
ACS Laboratory Group (Thailand) Co., Ltd.  
104 Phrasakorn Road, Phrasakorn Rd.,  
Bangkok 10250 Thailand

**RECEIVED DATE**  
10 Jan 2025  
**MEASUREMENT DATE**  
10 Jan 2025  
**ISSUE DATE**  
10 Jan 2025

### ENVIRONMENTAL CONDITIONS:

Ambient conditions in the laboratory are as follows:  
Temperature: 23.0 ± 0.5 °C  
Relative Humidity: 55.0 ± 5.0 %RH

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

### TABULATION OF RESULTS:

The table on next page gives the measured values.

### Calibration procedure:

The temperature calibration was done by  
in-house calibration method by NIST 101  
according to comparison method with industrial  
digital temperature indicator and standard  
temperature sensor. The temperature scale was  
adjusted to ITS-90.

### Traceability:

The measurement is traceable to the  
International System of Units (SI) through  
National Institute of Metrology (NIMT)  
Certificate number: T-0002-26, Certificate  
number: T-0113-24

### Reference Used During Calibration:

1. Standard Temperature Probe  
Model: ST-101-450, Serial No.: 60700-08,  
Due date: 28 Mar 2025  
2. Digital Temperature Indicator  
Model: DT-1000-4-008, Serial No.: 671400-  
0000 Due date: 22 Oct 2025

### Uncertainty of Measurement:

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



Approved signature:

Mr. Pongthorn Jirananate  
Calibration Department Manager

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JIRANATEE ASSOCIATES CO., LTD.

Continuation of Certificate of Calibration Number COT-028-68

Page 2 of 2 Pages

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

**Calibration Range:** 20 °C to 40 °C

### Facilities:

Table 1: This equipment was connected with temperature sensor (Model: HMF65 G/No: V1000012,  
Dimension: Diameter 12 mm, Length 80 mm).

| Immersion Depth<br>(mm) | Measured Reading<br>(°C) | UUC Reading<br>(°C) | Error<br>(°C) | Uncertainty<br>(°C) |
|-------------------------|--------------------------|---------------------|---------------|---------------------|
| 80                      | 20.077                   | 19.8                | -0.3          | 0.009               |
| 80                      | 25.068                   | 24.8                | -0.3          | 0.009               |
| 80                      | 30.053                   | 29.8                | -0.3          | 0.009               |
| 80                      | 35.034                   | 34.7                | -0.5          | 0.009               |
| 80                      | 40.028                   | 39.7                | -0.5          | 0.009               |

UUC's Unit Under Calibration:



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Accredited calibration laboratory  
ISO/IEC 17025:2017  
JNAC-101-101.17025  
CALIBRATION 0367



Relative Humidity and Air Temperature measurement laboratory  
Calibration services department

## CERTIFICATE OF CALIBRATION

Certificate No.: COT-028-68

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
Relative Humidity with data logger  
**MANUFACTURER**  
Mettler  
**MODEL/TYPE**  
Data Logger: 130-WS-25D(-)G  
Sensor: RH402  
**SERIAL NUMBER**  
Data Logger: A0077  
Sensor: V00012  
**SI NUMBER**  
F00047  
**CONDITION AS RECEIVED**  
Used item  
**CUSTOMER**  
ACS Laboratory Group (Thailand) Co., Ltd.  
104 Phrasakorn Road, Phrasakorn Rd.,  
Bangkok 10250 Thailand

**RECEIVED DATE**  
10 Jan 2025  
**MEASUREMENT DATE**  
10 Jan 2025  
**ISSUE DATE**  
10 Jan 2025

### ENVIRONMENTAL CONDITIONS:

Ambient conditions in the laboratory are as follows:  
Temperature: 23.0 ± 0.5 °C  
Relative Humidity: 55.0 ± 5.0 %RH

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

### TABULATION OF RESULTS:

The table on next page gives the measured values.

### Calibration procedure:

The Relative Humidity and Air Temperature  
calibration was done by NIST 101  
according to comparison method with standard  
humidity generator and standard  
humidity generator sensor.

### Traceability:

The measurement is traceable to the  
International System of Units (SI) through  
National Institute of Metrology (NIMT)  
Certificate number: T-0002-26 and Certificate  
number: T-0113-24

### Uncertainty of Measurement:

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



Approved signature:

Mr. Pongthorn Jirananate  
Calibration Department Manager

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JIRANATEE ASSOCIATES CO., LTD.

Continuation of Certificate of Calibration Number COT-028-68

Page 2 of 2 Pages

### Measurement Results:

The results of calibration and associated measurement uncertainty are reported in the table below.

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

Table 1: The results of calibration of relative humidity at 30 °C are reported in table below.  
Calibration Range: 20%RH to 80%RH

| Air Temperature<br>(°C) | Standard Reading<br>(%RH) | UUC Reading<br>(%RH) | Error<br>(%RH) | Uncertainty<br>(%RH) |
|-------------------------|---------------------------|----------------------|----------------|----------------------|
| 29.72                   | 51.94                     | 51.8                 | -0.3           | 0.79                 |
| 29.79                   | 51.26                     | 51.0                 | -0.3           | 0.8                  |
| 29.74                   | 62.85                     | 62.7                 | -0.3           | 0.8                  |

UUC's Unit Under Calibration:



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## CERTIFICATE OF CALIBRATION

Certificate No. : JPA-002-08

Page 1 of 2 Pages

**MEASUREMENT ITEM** : Digital barometer  
**MANUFACTURER** : Navision  
**MODEL/TYPE** : Sensor: 110-WB-20MP  
Data logger: 110-WB-21DL-D  
**SERIAL NUMBER** : Sensor: SP-A0077  
Data logger: A0077  
**ID NUMBER** : RYC\_130047  
**CONDITION AS-RECEIVED** : Used item  
**CUSTOMER** : AIS Laboratory group (Thailand) Co., Ltd.  
104 Phatthanaburi Rd, Phatthanaburi Rd,  
Klongkum Suburb, Klongkum Suburb,  
Bangkok 10110 Thailand

**RECEIVED DATE** : 10 Jan 2025  
**MEASUREMENT DATE** : 15 Jan 2025  
**ISSUE DATE** : 20 Jan 2025

**Calibration procedure:**  
The Digital barometer was calibrated against  
Digital pressure calibration, 110-WB-21DL-D  
was used as a calibration reference.

**Traceability:**  
The measurement results were traceable to  
the international system of units (SI) through  
the NIST (National Agency Institute of  
Thailand) and the Thai Standard: SP-0000-04

**Reference Unit Under Calibration:**  
1. Absolute Pressure Transducer  
Model: 110-WB-20MP, Serial No.: 110000000

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

### CONDITION OF THIS RESULT OF CALIBRATION:

- Calibration effort for calibration sequence C
- The UUC\* was installed in vertical orientation above reference standard instrument and center of UUC\* was used as the reference level.
- Calibration conditions:  
4. Conditions:  
Temperature: 15.0 Normal  
Pressure: 1013.25 hPa  
Humidity: 45-55% RH  
Air flow: 0.5-1.0 m/s  
Air flow: 0.5-1.0 m/s
- The certificate is valid only for the item specified on date and place of calibration



Calibrated by:  
Jirananthepan (Thailand)  
Jirananthepan (Thailand)

Approved signature:  
Mr. Jirananthepan  
Jirananthepan (Thailand)

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IN WRITING FROM THE LABORATORY

## CERTIFICATE OF CALIBRATION

Certificate No. : JPA-002-08

Page 1 of 2 Pages

**MEASUREMENT RESULTS** : ☐ Without adjustment ☒ With adjustment  
**CALIBRATION IN THE RANGE OF** : 950 mbar to 1050 mbar

The results of calibration and associated measurement uncertainties are reported in the table below.

| STD<br>(mbar) | UUC*<br>(mbar) | Error<br>(mbar) | Uncertainty<br>(mbar) |
|---------------|----------------|-----------------|-----------------------|
| 950.00        | 951.4          | 1.4             | 0.37                  |
| 975.00        | 976.3          | 1.3             | 0.36                  |
| 1000.00       | 1001.2         | 1.2             | 0.36                  |
| 1025.00       | 1026.1         | 1.1             | 0.36                  |
| 1050.00       | 1051.0         | 1.0             | 0.37                  |

**Note:** UUC\* Unit Under Calibration  
\* To convert the result in report unit to Pa should be multiply by 100

\*End of Certificate\*



## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

**MEASUREMENT ITEM** : Cup anemometer  
**MANUFACTURER** : Navision  
**MODEL/TYPE** : Sensor: WS-02P  
Data logger: 110-WB-21DL-D  
**SERIAL NUMBER** : Sensor: WS-02P  
Data logger: A0077  
**ID NUMBER** : RYC\_130047  
**CONDITION AS-RECEIVED** : Used item  
**CUSTOMER** : AIS Laboratory group (Thailand) Co., Ltd.  
104 Phatthanaburi Rd, Phatthanaburi Rd,  
Klongkum Suburb, Klongkum Suburb,  
Bangkok 10110 Thailand

**RECEIVED DATE** : 10 Dec 2024  
**MEASUREMENT DATE** : 10 Dec 2024  
**ISSUE DATE** : 10 Dec 2024

### ENVIRONMENTAL CONDITIONS:

Actual condition in the laboratory are as follows:  
Temperature : 22.0 ± 0.3 °C  
Relative Humidity : 45-55% RH  
Atmospheric Pressure : 1013.25 hPa

**PLACE OF CALIBRATION** : Open-type wind tunnel of Jirananthepan Co., Ltd.

**CALIBRATION CONDITIONS** : Wind tunnel cross section area: 900 cm<sup>2</sup>  
Cup anemometer initial value: 100 cm/s  
Direction of measuring flow: 0°  
Blockage ratio of test object: 0.111 [-]

**Preconditioning** : 24 hours at ambient conditions.  
**Measurement Condition** : (The average value during measurement are 25.0 °C, 48.0% RH and 1013.25 hPa)

**Tabulation of Results:**  
The table on next page give the measured values.



Calibrated by:  
Jirananthepan (Thailand)  
Jirananthepan (Thailand)

**Remarks:**  
\* The measurement area of the wind tunnel  
\* The measurement area of the wind tunnel  
\* The measurement area of the wind tunnel  
\* The measurement area of the wind tunnel

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Page 1 of 2 Pages

### MEASUREMENT RESULTS

The Cup anemometer, Unit Under Calibration (UUC) was tested at 10 m/s for 1 minute prior to calibration being performed. The standard air velocity (U.S. m/s) to 1 m/s was calculated by a standard air velocity transducer which was installed 50 mm away from wind tunnel nozzle and installed 40 mm away from top of the test section and the standard air velocity (U.S. m/s) was calculated by a pitot tube with pressure differential pressure meter which was installed 10 mm away from wind tunnel nozzle and installed 40 mm away from top of the test section. UUC was mounted on a round vertical tube of the power plate at center of test section. The calibration was carried out under both rising and falling air velocity in the range of 1 m/s to 16 m/s at calibration interval of 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

| UUC<br>(m/s) | Temp. wind tunnel<br>(°C) | Temp. room<br>(°C) | Hum.<br>(m/s) | Error<br>(m/s) | Uncertainty<br>(m/s) |
|--------------|---------------------------|--------------------|---------------|----------------|----------------------|
| 1.00         | 24.04                     | 24.50              | 0.9           | -0.1           | 0.31                 |
| 2.00         | 24.38                     | 24.50              | 0.9           | -0.2           | 0.31                 |
| 3.00         | 24.64                     | 24.50              | 0.9           | -0.3           | 0.31                 |
| 4.00         | 24.88                     | 24.50              | 0.9           | -0.4           | 0.31                 |
| 5.00         | 25.12                     | 24.50              | 0.9           | -0.5           | 0.31                 |
| 6.00         | 25.36                     | 24.50              | 0.9           | -0.6           | 0.31                 |
| 7.00         | 25.60                     | 24.50              | 0.9           | -0.7           | 0.31                 |
| 8.00         | 25.84                     | 24.50              | 0.9           | -0.8           | 0.31                 |
| 9.00         | 26.08                     | 24.50              | 0.9           | -0.9           | 0.31                 |
| 10.00        | 26.32                     | 24.50              | 0.9           | -1.0           | 0.31                 |
| 11.00        | 26.56                     | 24.50              | 0.9           | -1.1           | 0.31                 |
| 12.00        | 26.80                     | 24.50              | 0.9           | -1.2           | 0.31                 |
| 13.00        | 27.04                     | 24.50              | 0.9           | -1.3           | 0.31                 |
| 14.00        | 27.28                     | 24.50              | 0.9           | -1.4           | 0.31                 |
| 15.00        | 27.52                     | 24.50              | 0.9           | -1.5           | 0.31                 |
| 16.00        | 27.76                     | 24.50              | 0.9           | -1.6           | 0.31                 |

**Remarks:**  
\* Calibration results are correct for the tested conditions and environmental conditions during calibration test place  
\* Uncertainty of measurement  
\* Uncertainty of Unit Under Calibration

### PHOTO OF CALIBRATION SET-UP



Calibration set-up of the Cup anemometer calibration in the wind tunnel of Jirananthepan Co., Ltd. The Cup anemometer shown may differ from the calibrated one. Remarks: The proportion of the set-up is not true to scale due to imaging geometry.



## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS-RECEIVED  
CUSTOMER

**RECEIVED DATE**  
**MEASUREMENT DATE**  
**ISSUE DATE**

**ENVIRONMENTAL CONDITIONS**  
Ambient condition in the laboratory are as follow:  
Temperature  
Relative Humidity  
Atmospheric Pressure

**PLACE OF CALIBRATION**

**CALIBRATION CONDITION**

**Pre-conditioning**  
**Measurement Condition**

**TABULATION OF RESULTS**  
The table on next page give the measured values.

Calibrated by:  
Mr. Sanyut Thairat  
Ms. Jiraporn Lertsoontorn  
Ms. Jiraporn Lertsoontorn

**Notes:**  
1. This certificate is valid only for the item calibrated on date and place of calibration.  
2. Required measurement area of the tested item include mounting plate.  
3. Example of mounting plate.  
4. Item 1 to 1.

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## CERTIFICATE OF CALIBRATION

Certificate No. : CHS-002-40

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS-RECEIVED  
CUSTOMER

**RECEIVED DATE**  
**MEASUREMENT DATE**  
**ISSUE DATE**

**ENVIRONMENTAL CONDITIONS**  
Ambient condition in the laboratory are as follow:  
Temperature  
Relative Humidity

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

**TABULATION OF RESULTS**  
The table on next page give the measured values.

Calibrated by:  
Mr. Sanyut Thairat  
Ms. Jiraporn Lertsoontorn  
Ms. Jiraporn Lertsoontorn

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### MEASUREMENT RESULTS

The wind direction sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 45° intervals in clockwise and counter-clockwise directions after initial adjustment has been made. The flow speed of wind tunnel (staticly 5 m/s) is kept constant while the sensor is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.

| At speed<br>m/s | D <sub>100</sub><br>Degree (°) | D <sub>100</sub><br>Degree (°) | Error<br>Degree (°) | U (k=2)<br>Degree (°) |
|-----------------|--------------------------------|--------------------------------|---------------------|-----------------------|
| 5.01            | 0.000                          | 0                              | 0                   | 0.00                  |
|                 | 45.000                         | 45                             | 0                   | 0.00                  |
|                 | 90.000                         | 90                             | -2                  | 0.00                  |
|                 | 135.000                        | 135                            | -3                  | 0.00                  |
|                 | 180.000                        | 180                            | -2                  | 0.00                  |
|                 | 225.000                        | 225                            | -2                  | 0.00                  |
|                 | 270.000                        | 270                            | 0                   | 0.00                  |

## CERTIFICATE OF CALIBRATION

Certificate No. : CRT-085-49

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER

Relative humidity with data logger  
Novelty  
Data logger: 110-W5-250K-0  
Sensor: HW50  
Data logger: A5511  
Sensor: UHF1245  
KFM, P10000  
Used item  
ALS Laboratory group (Thailand) Co., Ltd.  
104 Phrasimung 40, Phrasimung Rd, Khwaeng Suan Luang,  
Khet Suan Luang, Bangkok 10250 Thailand

RECEIVED DATE  
MEASUREMENT DATE  
ISSUE DATE

29 Dec 2025  
06 Jan 2026  
06 Jan 2026

**ENVIRONMENTAL CONDITIONS:**  
Ambient condition in the laboratory was as follows:  
Temperature  
Relative Humidity

23.0 ± 3.0 °C  
55.0 ± 5.0 %RH

**Calibration procedure:**  
The Relative Humidity and Air Temperature calibration was done by In-House Calibration method as ISO-G-003 and ISO-G-010 according to comparison method with: National Calibration Mirror Temperature with temperature point and standard humidity generator chamber.

**Traceability:**  
The measurements were traceable to the International System of Units (SI) through National Institute of Metrology (NIMT) (India). Certificate number: W0249-24 and Jiranatee Associates Co., Ltd. Certificate number: CRT-020-48.

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

NOTES: The certificate is valid only for the item calibrated on date and place of calibration.

**TABULATION OF RESULTS:**  
The table on next page give the measured values.

Calibrated by:  
☐ Mr. Sanyat Hachet  
☐ Mr. Jirananate Lertsomphol  
☐ Mr. Jirananate Lertsomphol



Approved signature:

Mr. Pannya Booncharoen  
Calibration Department Manager

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Continuation of Certificate of Calibration Number: CRT-085-49

Page 2 of 2 Pages

### Measurement Results:

The results of calibration and associated measurement uncertainties are reported in the table below.

**Result of Calibration:** ☐ Without Adjustment ☒ With Adjustment

Table 1: The results of calibration of relative humidity at 50 °C are reported in table below.  
Calibration Range: 20%RH to 90%RH

| Air Temperature (°C) | Standard Reading (RH) | UUC Reading (RH) | Error (RH) | Uncertainty (k=2) (RH) |
|----------------------|-----------------------|------------------|------------|------------------------|
| 30.00                | 28.00                 | 21.1             | 7.0        | 0.70                   |
| 30.00                | 50.00                 | 49.9             | -0.1       | 0.10                   |
| 30.00                | 80.00                 | 78.2             | -1.8       | 0.10                   |

UUC\*: Used Under Calibration

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



## CERTIFICATE OF CALIBRATION

Certificate No. : CPM-001-03

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER

Digital transducer  
Novelty  
Sensor: 110-W5-250P  
Data logger: 110-W5-250K-0  
Sensor: SP-A5511  
Data logger: A5511  
KFM, P10000  
Used item  
ALS Laboratory group (Thailand) Co., Ltd.  
104 Phrasimung 40, Phrasimung Rd, Khwaeng Suan Luang,  
Khet Suan Luang, Bangkok 10250 Thailand

RECEIVED DATE  
MEASUREMENT DATE  
ISSUE DATE

29 Dec 2025  
06 Jan 2026  
06 Jan 2026

**Calibration procedure:**  
The digital transducer was calibrated against digital pressure calibration. The 101-01-003 was used as a calibration guideline.

**Traceability:**  
The measurement results were traceable to the International System of Units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MP-0037-21.

**Reference Used during Calibration:**  
1. Absolute Pressure Transducer Model: CPM-001, Serial No.: 4100121P

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

### CONDITION OF THIS RESULT OF CALIBRATION:

- Calibration effort for calibration sequence C.
- The UUC\* was installed in vertical orientation above reference standard instrument and center of UUC\* was used as the reference level.
- Calibration conditions:
- Condition: ☒ Normal ☐ Abnormal  
Pressure transmitting medium: Air  
P (20°C, 1 bar): 1.37 kPa  
P (50°C, 1 bar): 1.37 kPa  
P (80°C, 1 bar): 1.37 kPa  
P (100°C, 1 bar): 1.37 kPa  
P (120°C, 1 bar): 1.37 kPa  
P (140°C, 1 bar): 1.37 kPa  
P (160°C, 1 bar): 1.37 kPa  
P (180°C, 1 bar): 1.37 kPa  
P (200°C, 1 bar): 1.37 kPa  
P (220°C, 1 bar): 1.37 kPa  
P (240°C, 1 bar): 1.37 kPa  
P (260°C, 1 bar): 1.37 kPa  
P (280°C, 1 bar): 1.37 kPa  
P (300°C, 1 bar): 1.37 kPa  
P (320°C, 1 bar): 1.37 kPa  
P (340°C, 1 bar): 1.37 kPa  
P (360°C, 1 bar): 1.37 kPa  
P (380°C, 1 bar): 1.37 kPa  
P (400°C, 1 bar): 1.37 kPa  
P (420°C, 1 bar): 1.37 kPa  
P (440°C, 1 bar): 1.37 kPa  
P (460°C, 1 bar): 1.37 kPa  
P (480°C, 1 bar): 1.37 kPa  
P (500°C, 1 bar): 1.37 kPa  
P (520°C, 1 bar): 1.37 kPa  
P (540°C, 1 bar): 1.37 kPa  
P (560°C, 1 bar): 1.37 kPa  
P (580°C, 1 bar): 1.37 kPa  
P (600°C, 1 bar): 1.37 kPa  
P (620°C, 1 bar): 1.37 kPa  
P (640°C, 1 bar): 1.37 kPa  
P (660°C, 1 bar): 1.37 kPa  
P (680°C, 1 bar): 1.37 kPa  
P (700°C, 1 bar): 1.37 kPa  
P (720°C, 1 bar): 1.37 kPa  
P (740°C, 1 bar): 1.37 kPa  
P (760°C, 1 bar): 1.37 kPa  
P (780°C, 1 bar): 1.37 kPa  
P (800°C, 1 bar): 1.37 kPa  
P (820°C, 1 bar): 1.37 kPa  
P (840°C, 1 bar): 1.37 kPa  
P (860°C, 1 bar): 1.37 kPa  
P (880°C, 1 bar): 1.37 kPa  
P (900°C, 1 bar): 1.37 kPa  
P (920°C, 1 bar): 1.37 kPa  
P (940°C, 1 bar): 1.37 kPa  
P (960°C, 1 bar): 1.37 kPa  
P (980°C, 1 bar): 1.37 kPa  
P (1000°C, 1 bar): 1.37 kPa
- The certificate is valid only for the item calibrated on date and place of calibration.

Calibrated by:  
☒ Mr. Sanyat Hachet  
☐ Mr. Jirananate Lertsomphol  
☐ Mr. Jirananate Lertsomphol



Approved signature:

Mr. Pannya Booncharoen  
Calibration Department Manager

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## CERTIFICATE OF CALIBRATION

Certificate No. : CPM-001-03

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**MEASUREMENT RESULTS:** ☐ Without adjustment ☒ With adjustment

**CALIBRATION IN THE RANGE OF:** 100 mbar to 1000 mbar

The results of calibration and associated measurement uncertainties are reported in the table below.

| STD (mbar) | UUC* (mbar) | Error (mbar) | Uncertainty (k=2) (mbar) |
|------------|-------------|--------------|--------------------------|
| 100.05     | 95.1        | 4.9          | 0.37                     |
| 500.00     | 500.0       | 0.0          | 0.37                     |
| 900.00     | 900.0       | 0.0          | 0.37                     |
| 1000.00    | 1000.0      | 0.0          | 0.37                     |
| 1000.00    | 1000.0      | 0.0          | 0.37                     |
| 1000.00    | 1000.0      | 0.0          | 0.37                     |

Notes: UUC\* Used Under Calibration.

To convert the result in report unit to Pa should be multiply by 100

\*\*\*End of certificate\*\*\*



## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
Newly  
**MANUFACTURER**  
Model: W5-03P  
**DATE/TYPE**  
Data: 11/10/2023  
**SERIAL NUMBER**  
Serial: W503-00012  
**ID NUMBER**  
Data: 11/10/2023  
**CONDITION AS RECEIVED**  
Customer: JNAC Laboratory Group (Thailand) Co., Ltd.  
104 Phatthanasak Rd, Phatthanasak Rd,  
Klongkum Suburb, Bangkok 10110 Thailand

**RECEIVED DATE**  
11 Nov 2023  
**MEASUREMENT DATE**  
16 Nov 2023  
**ISSUE DATE**  
16 Nov 2023

**ENVIRONMENTAL CONDITIONS:**  
Ambient conditions in the laboratory are as follows:  
Temperature: 23.0 ± 0.2 °C  
Relative Humidity: 55.0 ± 5.0 %RH  
Atmospheric Pressure: 1013.0 ± 0.5 hPa

**PLACE OF CALIBRATION**  
104 Phatthanasak Rd, Phatthanasak Rd, Bangkok 10110 Thailand

**CALIBRATION CONDITIONS**  
Wind tunnel cross-section area: 300 cm²  
Cup anemometer frontal area: 100 cm²  
Diameter of mounting pipe: 10 mm  
Blockage ratio of test object: 0.11

**Preconditioning**  
Measurement Condition: 24 hours at ambient conditions.  
(The average values during measurement are 24.4 °C, 55.0 %RH and 1013.0 hPa)

**TABULATION OF RESULTS:**  
The table on next page give the measured values.

Calibrated by:  
[Signature] Mr. Panyas Boonchom  
[Signature] Mr. Panyas Boonchom  
[Signature] Mr. Panyas Boonchom

**Remarks:**  
\* Actual collection area of the wind tunnel  
\* Possible error within area of the tested object include mounting pipe  
\* Diameter of mounting pipe  
\* Auto "1"

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## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
Newly  
**MANUFACTURER**  
Model: W5-03P  
**DATE/TYPE**  
Data: 11/10/2023  
**SERIAL NUMBER**  
Serial: W503-00012  
**ID NUMBER**  
Data: 11/10/2023  
**CONDITION AS RECEIVED**  
Customer: JNAC Laboratory Group (Thailand) Co., Ltd.  
104 Phatthanasak Rd, Phatthanasak Rd,  
Klongkum Suburb, Bangkok 10110 Thailand

**RECEIVED DATE**  
11 Nov 2023  
**MEASUREMENT DATE**  
16 Nov 2023  
**ISSUE DATE**  
16 Nov 2023

**ENVIRONMENTAL CONDITIONS:**  
Ambient conditions in the laboratory are as follows:  
Temperature: 23.0 ± 0.2 °C  
Relative Humidity: 55.0 ± 5.0 %RH  
Atmospheric Pressure: 1013.0 ± 0.5 hPa

**PLACE OF CALIBRATION**  
104 Phatthanasak Rd, Phatthanasak Rd, Bangkok 10110 Thailand

**CALIBRATION CONDITION**  
Wind tunnel cross-section area: 300 cm²  
Wind direction (upstream): 120°  
Diameter of mounting pipe: 10 mm  
Blockage ratio of test object: 0.143

**Preconditioning**  
Measurement Condition: 24 hours at ambient conditions.  
(The average values during measurement are 24.7 °C, 55.0 %RH and 1013.0 hPa)

**TABULATION OF RESULTS:**  
The table on next page give the measured values.

Calibrated by:  
[Signature] Mr. Panyas Boonchom  
[Signature] Mr. Panyas Boonchom  
[Signature] Mr. Panyas Boonchom

**Remarks:**  
\* Actual collection area of the wind tunnel  
\* Possible error within area of the tested object include mounting pipe  
\* Diameter of mounting pipe  
\* Auto "1"

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Page 2 of 2 Pages

### MEASUREMENT RESULTS<sup>1</sup>

The Cup anemometer (Unit 1) was calibrated against standard air velocity transducer which was installed 30 mm away from wind tunnel nozzle and installed 30 mm away from top of the test section and the standard air velocity 5 m/s to 30 m/s was calculated by a pitot tube with pressure differential pressure meter which was installed 30 mm away from wind tunnel nozzle and installed 30 mm away from top of the test section. U/V was measured on a round vertical tube of thickness plate at center of test section. The calibration was carried out under both rising and falling air velocity in the range of 1 m/s to 30 m/s at calibration interval of 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

| Ref.<br>(m/s) | Temp. wind tunnel<br>(°C) | Temp. sensor<br>(°C) | Ref.<br>(m/s) | Issue<br>(m/s) | U (k=2)<br>(m/s) |
|---------------|---------------------------|----------------------|---------------|----------------|------------------|
| 1.00          | 24.42                     | 24.35                | 1.0           | 0.9            | 0.31             |
| 2.00          | 24.30                     | 24.31                | 2.0           | 1.9            | 0.31             |
| 3.00          | 24.30                     | 24.30                | 3.0           | 2.8            | 0.31             |
| 4.00          | 24.46                     | 24.35                | 4.0           | 3.9            | 0.31             |
| 5.00          | 24.30                     | 24.30                | 5.0           | 4.9            | 0.31             |
| 6.00          | 24.30                     | 24.30                | 6.0           | 5.9            | 0.31             |
| 7.00          | 24.30                     | 24.30                | 7.0           | 6.9            | 0.31             |
| 8.00          | 24.30                     | 24.30                | 8.0           | 7.9            | 0.31             |
| 9.00          | 24.30                     | 24.30                | 9.0           | 8.9            | 0.31             |
| 10.00         | 24.30                     | 24.30                | 10.0          | 9.9            | 0.31             |
| 11.00         | 24.30                     | 24.30                | 11.0          | 10.9           | 0.31             |
| 12.00         | 24.30                     | 24.30                | 12.0          | 11.9           | 0.31             |
| 13.00         | 24.30                     | 24.30                | 13.0          | 12.9           | 0.31             |
| 14.00         | 24.30                     | 24.30                | 14.0          | 13.9           | 0.31             |
| 15.00         | 24.30                     | 24.30                | 15.0          | 14.9           | 0.31             |
| 16.00         | 24.30                     | 24.30                | 16.0          | 15.9           | 0.31             |

**Remarks:**  
<sup>1</sup> Calibration results only valid for the test conditions and environmental conditions during which calibration test was performed.  
<sup>2</sup> Uncertainty of standard  
<sup>3</sup> Uncertainty of test section calibration

### PHOTO OF CALIBRATION SET UP



Calibration set-up of the Cup anemometer calibration in the wind tunnel of Jiranatee Associates Co., Ltd. The Cup anemometer shown may differ from the calibrated one. Remark: The proportion of the set-up is not true to scale due to imaging geometry.



Page 2 of 2 Pages

### MEASUREMENT RESULTS<sup>1</sup>

The wind direction sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 45° intervals in clockwise and counter-clockwise directions after offset adjustment has been made. The flow speed of wind tunnel facility 5 m/s is kept constant while the sensor is rotated around its central axis. The results of calibration and associated measurement uncertainties are reported in the table below.

| Air speed<br>m/s | U <sub>meas</sub><br>Degree (°) | U <sub>ref</sub><br>Degree (°) | Error<br>Degree (°) | U (k=2)<br>Degree (°) |
|------------------|---------------------------------|--------------------------------|---------------------|-----------------------|
| 5.00             | 0                               | 0                              | 0                   | 0.07                  |
| 10.00            | 45                              | 45                             | -1                  | 0.07                  |
| 15.00            | 90                              | 90                             | -1                  | 0.07                  |
| 20.00            | 135                             | 135                            | -1                  | 0.07                  |
| 25.00            | 180                             | 180                            | -1                  | 0.07                  |
| 30.00            | 225                             | 225                            | -1                  | 0.07                  |
| 35.00            | 270                             | 270                            | 1                   | 0.07                  |
| 40.00            | 315                             | 315                            | 1                   | 0.07                  |

**Remarks:**  
<sup>1</sup> Calibration results only valid for the test conditions and environmental conditions during which calibration test was performed.  
<sup>2</sup> Direction of rotation  
<sup>3</sup> Direction of test section calibration



## CERTIFICATE OF CALIBRATION

Certificate No.: CDT-002-08

Page 1 of 2 Pages

### MEASUREMENT ITEM

### MANUFACTURER

### MODEL/TYPE

### SERIAL NUMBER

### ID NUMBER

### CONDITION AS RECEIVED

### CUSTOMER

### RECEIVED DATE

### MEASUREMENT DATE

### ISSUE DATE

### ENVIRONMENTAL CONDITIONS

Ambient condition in the laboratory are as follow:

Temperature:  $23.0 \pm 0.5$  °C

Relative Humidity:  $55.0 \pm 15.0$  %RH

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

### TABULATION OF RESULTS

The table on next page give the measured values.

- Data Logger with Temperature sensor

- Resistance

- 150 W5-T50A-0

- ASR12

- 9952\_750611

- Used Item

- ALS Laboratory group (Thailand) Co., Ltd.

- 104 Phatthanasak 40, Phatthanasak Rd.,

- Chawang Suan Luang, Khwa Suan Luang,

- Bangkok 10250 Thailand.

- 19 Dec 2025

- 06 Jan 2026

- 06 Jan 2026

### Calibration procedure

The temperature calibration with density in liquid substance (liquid up) W5-CL (02) according to comparison method with standard digital temperature indicator and standard temperature probe. The temperature scale was based on ITS-90.

### Traceability

The measurement results are traceable to the International System of Units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: 17-1013-25, Certificate number: PA-0001-25.

### Reference Used During Calibration

1. Standard Temperature Probe

Model: STS-300 ANO, Serial No.: 867682-06,

Due date: 8 Apr 2026

2. Digital Temperature Indicator

Model: DTI-3000-A MY-5, Serial No.: 872407

(NMI) Due date: 22 Apr 2026

### Uncertainty of Measurement

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

Calibrated by:  
Mr. Sirawat Thachakul  
Mr. Sirawat Thachakul  
Mr. Sirawat Thachakul



Approved signature

Mr. Panyee Booncharoen  
Calibration Department Manager

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Continuation of Certificate of Calibration Number CDT-002-08

Page 2 of 2 Pages

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range:  $20^{\circ}\text{C}$  to  $40^{\circ}\text{C}$

### Function

Table 1: This equipment was connected with temperature sensor Model: HMP60 5/16" US911247, Dimension: Diameter 22 mm, Length 80 mm.

| Immersion Depth (mm) | Standard Reading (°C) | ASIC Reading (°C) | Error (°C) | Uncertainty (°C) |
|----------------------|-----------------------|-------------------|------------|------------------|
| 80                   | 20.059                | 19.7              | -0.4       | 0.009            |
| 80                   | 21.043                | 20.6              | -0.4       | 0.009            |
| 80                   | 21.005                | 20.7              | -0.3       | 0.009            |
| 80                   | 21.022                | 20.6              | -0.4       | 0.009            |
| 80                   | 21.998                | 21.5              | -0.5       | 0.009            |

ASIC: Unit Under Calibration

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



## CERTIFICATE OF CALIBRATION

Certificate No.: CRT-002-08

Page 1 of 2 Pages

### MEASUREMENT ITEM

### MANUFACTURER

### MODEL/TYPE

### SERIAL NUMBER

### ID NUMBER

### CONDITION AS RECEIVED

### CUSTOMER

### RECEIVED DATE

### MEASUREMENT DATE

### ISSUE DATE

### ENVIRONMENTAL CONDITIONS

Ambient condition in the laboratory are as follow:

Temperature:  $23.0 \pm 0.5$  °C

Relative Humidity:  $55.0 \pm 15.0$  %RH

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

### TABULATION OF RESULTS

The table on next page give the measured values.

- Relative Humidity with data logger

- Humidity

- Data Logger: 110-465-252A-0

- Sensor: HANNO

- Data Logger: AR002

- Sensor: US911247

- RTH, P04011

- Used Item

- ALS Laboratory group (Thailand) Co., Ltd.

- 104 Phatthanasak 40, Phatthanasak Rd., Chawang Suan Luang,

- Khwa Suan Luang, Bangkok 10250 Thailand.

- 19 Dec 2025

- 06 Jan 2026

- 06 Jan 2026

### Calibration procedure

The Relative Humidity and Air Temperature calibration was done by in-house calibration method as W5-CL (02) and W5-CL (02) according to comparison method with standard digital temperature indicator and standard humidity generator device.

### Traceability

The measurement results are traceable to the International System of Units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: 17-1013-25 and Hiranatee Associates Co., Ltd. Certificate number: CDT-001-08.

### Uncertainty of Measurement

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

Calibrated by:  
Mr. Sirawat Thachakul  
Mr. Sirawat Thachakul  
Mr. Sirawat Thachakul



Approved signature

Mr. Panyee Booncharoen  
Calibration Department Manager

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Continuation of Certificate of Calibration Number CRT-002-08

Page 2 of 2 Pages

### Measurement Results

The results of calibration and associated measurement uncertainties are reported in the table below.

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Table 1: The results of calibration of relative humidity at  $20^{\circ}\text{C}$  are reported in table below.

Calibration Range:  $20\%RH$  to  $80\%RH$

| Air Temperature (°C) | Standard Reading (%RH) | ASIC Reading (%RH) | Error (%RH) | Uncertainty (%RH) |
|----------------------|------------------------|--------------------|-------------|-------------------|
| 20.01                | 20.01                  | 20.0               | -0.0        | 0.70              |
| 20.06                | 20.09                  | 20.5               | -0.5        | 1.5               |
| 20.05                | 20.04                  | 20.5               | -0.5        | 2.1               |

ASIC: Unit Under Calibration

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



## CERTIFICATE OF CALIBRATION

Certificate No. : CPN-002-18

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
**SERIAL NUMBER**  
**ID NUMBER**  
**CONDITION AS-RECEIVED**  
**CUSTOMER**

Digital barometer  
Newlyn  
Sensor: 110 WS-250P  
Data logger: 110 WS-250L-D  
Sensor: SP-A012  
Data logger: A012  
RPS, F006-1  
Used item  
ALS Laboratory group (Thailand) Co., Ltd.  
104 Prathumwan Rd, Prathumwan Rd,  
Khlong San Luang, Khlong San Luang,  
Bangkok 10250 Thailand.

**RECEIVED DATE**  
**MEASUREMENT DATE**  
**ISSUE DATE**

18 Dec 2020  
06 Jan 2021  
06 Jan 2021

**Calibration procedure:**  
The Digital barometer was calibrated against  
Digital pressure calibration, The JN-TIS-17025  
was used as a calibration guideline.

**Traceability:**  
The measurement results are traceable to  
the international system of units (SI) through  
the NIST (National Institute of Standards and  
Technology) Calibration Service: NIST-002-22

**Reference Used during Calibration:**  
1. Absolute Pressure Transducer  
Model: (SP-A012), Serial No.: 4200100P

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

### CONDITION OF THIS RESULT OF CALIBRATION:

1. Calibration effort for calibration sequence C
2. The UUC\* was installed in vertical orientation above reference standard instrument and center of UUC\* was used as the reference level.
3. Calibration conditions:
4. Condition:  
☒ Normal ☐ Abnormal  
Pressure transmitting medium: Air  
Atmosphere: 1.01325 bar  
Relative humidity: (53.145-22) %  
Temperature: (23.0-26.2) °C  
Pressure: (1013.25-1013.25) mbar
5. The certificate is valid only to the item calibrated on date and place of calibration

Calibrated by:  
JN-TIS-TIS 17025  
Jiranan Road, Bangkok



Approved signature:  
Mr. Pannap Booncharon  
Calibration Department Manager

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IN WRITING FROM THE LABORATORY.

## CERTIFICATE OF CALIBRATION

Certificate No. : CPN-012-18

Page 2 of 2 Pages

**MEASUREMENT RESULTS** : ☐ Without adjustment ☒ With adjustment  
**CALIBRATION IN THE RANGE OF** : 950 mbar to 1050 mbar

The results of calibration and associated measurement uncertainties are reported in the table below.

| STD<br>(mbar) | UUC*<br>(mbar) | Error<br>(mbar) | Uncertainty (k=2)<br>(mbar) |
|---------------|----------------|-----------------|-----------------------------|
| 950.05        | 950.1          | 1.3             | 0.37                        |
| 970.01        | 970.0          | 0.9             | 0.40                        |
| 990.02        | 990.0          | 0.5             | 0.37                        |
| 1010.00       | 1010.0         | 0.2             | 0.37                        |
| 1029.94       | 1029.9         | -0.3            | 0.41                        |
| 1049.94       | 1049.3         | -0.7            | 0.37                        |

**Note:** UUC\* Unit Under Calibration  
\* To convert the result in report unit to Pa should be multiply by 100



## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
**SERIAL NUMBER**  
**ID NUMBER**  
**CONDITION AS-RECEIVED**  
**CUSTOMER**

Cup anemometer  
Newlyn  
Sensor: WS-027  
Data logger: 110 WS-250L-D  
Sensor: WS-027  
Data logger: A012  
RPS, F006-1  
Used item  
ALS Laboratory group (Thailand) Co., Ltd.  
104 Prathumwan Rd, Prathumwan Rd,  
Khlong San Luang, Khlong San Luang,  
Bangkok 10250 Thailand.

**RECEIVED DATE**  
**MEASUREMENT DATE**  
**ISSUE DATE**

18 Mar 2021  
02 Apr 2021  
02 Apr 2021

### ENVIRONMENTAL CONDITIONS:

Ambient conditions at the laboratory are as follows:  
Temperature: (23.0-25.0) °C  
Relative humidity: (53.145-22) %  
Atmospheric pressure: (1013.25-1013.25) mbar

**PLACE OF CALIBRATION** : Wind type wind tunnel of Jiranan Associates Co., Ltd.

**CALIBRATION CONDITIONS**  
Wind tunnel cross section area: 800 cm<sup>2</sup>  
Cup anemometer diameter: 200 mm  
Diameter of mounting plate: 100 mm  
Blockage ratio of test object: 0.111

**Preconditioning**  
Measurement conditions:  
The average values during measurement are (24.5) °C, (48.4) %RH and (1008.3) hPa.

**TERMINATION OF RESULTS:**  
The table on next page gives the measured results.

Calibrated by:  
JN-TIS-TIS 17025  
Jiranan Road, Bangkok



Approved signature:  
Mr. Pannap Booncharon  
Calibration Department Manager

REVIEW BY: [Signature]  
APPROVED BY: [Signature]  
NEXT CAL DATE: 01 Apr 2022

**Note:**  
1. Please refer to the area of the wind tunnel.  
2. Please refer to the area of the wind tunnel.  
3. Please refer to the area of the wind tunnel.  
4. Please refer to the area of the wind tunnel.

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IN WRITING FROM THE LABORATORY.

Page 2 of 2 Pages

### MEASUREMENT RESULTS\*

The Cup anemometer, Wind Under Calibration (UUC) was received at 10 m/s for 5 minutes prior to calibration being performed. The standard air velocity 6.5 m/s to 5 m/s was calculated by a standard air velocity transducer which was installed 30 mm away from wind tunnel nozzle and installed 40 mm away from top of the test section and the standard air velocity 5 m/s to 10 m/s was calculated by a pitot tube with precision of 0.05 m/s which was installed 30 mm away from wind tunnel nozzle and installed 40 mm away from top of the test section. UUC was mounted on a stand vertical face of the test plate at center of test section. The calibration was carried out under both static and falling air velocity in the range of 5 m/s to 10 m/s at calibration interval of 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

| UUC<br>(m/s) | Temp. wind tunnel<br>(°C) | Temp. room<br>(°C) | UUC<br>(m/s) | Error<br>(m/s) | Uncertainty (k=2)<br>(m/s) |
|--------------|---------------------------|--------------------|--------------|----------------|----------------------------|
| 5.00         | 24.88                     | 24.93              | 0.9          | 0.3            | 0.31                       |
| 5.25         | 24.54                     | 24.50              | 1.0          | 0.2            | 0.31                       |
| 5.50         | 24.66                     | 24.53              | 1.0          | 0.1            | 0.31                       |
| 5.75         | 24.68                     | 24.50              | 1.0          | 0.1            | 0.31                       |
| 6.00         | 24.44                     | 24.50              | 1.0          | 0.0            | 0.31                       |
| 6.25         | 24.62                     | 24.50              | 1.0          | 0.1            | 0.31                       |
| 6.50         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 6.75         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 7.00         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 7.25         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 7.50         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 7.75         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 8.00         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 8.25         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 8.50         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 8.75         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 9.00         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 9.25         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 9.50         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 9.75         | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |
| 10.00        | 24.50                     | 24.50              | 1.1          | 0.1            | 0.31                       |

**Note:**  
\* Calibration results are given for the tested measurement and environmental conditions during the calibration test.  
\* Uncertainty of standard  
\* Uncertainty of test object Calibration

### PHOTO OF CALIBRATION SET-UP



Calibration set-up of the Cup anemometer calibration in the wind tunnel of Jiranan Associates Co., Ltd. The Cup anemometer is shown in the photo below. The photograph of the set-up is not to be used for any other purpose.



## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
WIND DIRECTION SENSOR  
**MANUFACTURER**  
Rovinsky  
**MODEL/TYPE**  
Datanet WS-027  
**SERIAL NUMBER**  
Data logger: 118145-2508-01  
Sensor: WS0-027A  
**ID NUMBER**  
Data logger: A0010  
**CONDITION AS RECEIVED**  
118145-2508-01  
**CUSTOMER**  
A/S Laboratory group (Thailand) Co., Ltd.  
324 Phatthana 40, Phatthana 40, Khwaeng Suan Luang,  
Bangkok 10250 Thailand

**Calibration procedure**  
The wind direction sensor was calibrated against standard rotary anemometer. The sensor was calibrated against the standard rotary anemometer (Type: 118145-2508-01) according to the standard ISO/IEC 17025:2017. The sensor was calibrated against the standard rotary anemometer (Type: 118145-2508-01) according to the standard ISO/IEC 17025:2017. The sensor was calibrated against the standard rotary anemometer (Type: 118145-2508-01) according to the standard ISO/IEC 17025:2017.

**Uncertainty**  
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM (Guide to the Expression of Uncertainty in Measurement).

**Environmental conditions**  
The ambient conditions in the laboratory are as follows:  
Temperature: 23.0 ± 0.5 °C  
Relative Humidity: 55.0 ± 5.0 %RH  
Atmospheric Pressure: 1013.0 ± 0.1 hPa

**PLANT OF CALIBRATION**  
118145-2508-01

**CALIBRATION CONDITION**  
Wind tunnel cross section area: 900 cm<sup>2</sup>  
Wind direction: 118145-2508-01  
Direction of measuring pipe: 118145-2508-01  
Measurement of wind speed: 118145-2508-01

**Preconditioning**  
The sensor was preconditioned for 24 hours at ambient conditions.  
**Measurement condition**  
The average values during measurement are 24.6 °C, 55.0 %RH and 1013.0 hPa.

**TABULATION OF RESULTS**  
The table on next page gives the measured values.



Approved signature: M. Pinyakornchai  
Calibration Department Manager

**Notes:**  
1. Validity of calibration area of the wind tunnel.  
2. Required cross-section area of the tested object inside measuring pipe.  
3. Direction of measuring pipe.  
4. Note: 1 m/s

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Page 2 of 2 Pages

### MEASUREMENT RESULTS

The wind direction sensor was calibrated against standard rotary anemometer by comparison method. During calibration, the measurement was carried out at 47 intervals in clockwise and counter-clockwise directions after effort adjustment has been made. The flow speed of wind tunnel (usually 5 m/s) is kept constant while the sensor is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.

| Wind speed | D <sub>1</sub> (m) | D <sub>2</sub> (m) | Error | Uncertainty |
|------------|--------------------|--------------------|-------|-------------|
| 4.30       | 47.000             | 47.000             | -4    | 0.03        |
|            | 47.000             | 47.000             | -3    | 0.03        |
|            | 47.000             | 47.000             | -2    | 0.03        |
|            | 47.000             | 47.000             | 1     | 0.03        |
|            | 47.000             | 47.000             | 2     | 0.03        |
|            | 47.000             | 47.000             | 3     | 0.03        |
|            | 47.000             | 47.000             | 4     | 0.03        |
|            | 47.000             | 47.000             | 5     | 0.03        |
|            | 47.000             | 47.000             | 6     | 0.03        |

### Remarks

1. Calibration uncertainty based on the tested circumstances and environmental conditions during which calibration took place.

2. Direction of standard.

3. Direction of wind under calibration.

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



## CERTIFICATE OF CALIBRATION

Certificate No.: CDT-039-08

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
Data Logger with Temperature sensor  
**MANUFACTURER**  
Novolyte  
**MODEL/TYPE**  
112-WS-250L-D  
**SERIAL NUMBER**  
A0010  
**ID NUMBER**  
118145-2508-01  
**CONDITION AS RECEIVED**  
Used item  
**CUSTOMER**  
A/S Laboratory group (Thailand) Co., Ltd.  
324 Phatthana 40, Phatthana 40, Khwaeng Suan Luang,  
Bangkok 10250 Thailand

**Calibration procedure**  
The temperature calibration was carried out by the comparison method. The sensor was calibrated against the standard temperature probe (Type: 118145-2508-01) according to the standard ISO/IEC 17025:2017. The sensor was calibrated against the standard temperature probe (Type: 118145-2508-01) according to the standard ISO/IEC 17025:2017. The sensor was calibrated against the standard temperature probe (Type: 118145-2508-01) according to the standard ISO/IEC 17025:2017.

**Uncertainty**  
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM (Guide to the Expression of Uncertainty in Measurement).

**RECEIVED DATE**  
14 Mar 2025  
**MEASUREMENT DATE**  
12 Apr 2025  
**ISSUE DATE**  
12 Apr 2025

**ENVIRONMENTAL CONDITIONS**  
Ambient condition in the laboratory are as follows:  
Temperature: 23.0 ± 0.5 °C  
Relative Humidity: 55.0 ± 5.0 %RH

**NOTED:** The certificate is valid only to the item calibrated as stated on page of calibration.

**TABULATION OF RESULTS**  
The table on next page gives the measured values.



Approved signature: M. Pinyakornchai  
Calibration Department Manager

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Continuation of Certificate of Calibration Number CDT-039-08

Page 2 of 2 Pages

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

**Calibration Range:** 20 °C to 40 °C

### Function

Table 1: This equipment was connected with temperature sensor Model: 118145-2508-01, Diameter: 12 mm, Length: 80 mm.

| Immersion Depth (mm) | Standard Reading (°C) | LMC Reading (°C) | Error (°C) | Uncertainty (°C) |
|----------------------|-----------------------|------------------|------------|------------------|
| 80                   | 20.019                | 19.6             | -0.5       | 0.039            |
| 80                   | 25.049                | 24.6             | -0.4       | 0.039            |
| 80                   | 30.079                | 29.6             | -0.4       | 0.039            |
| 80                   | 35.109                | 34.6             | -0.5       | 0.039            |
| 80                   | 40.139                | 39.6             | -0.5       | 0.039            |

LMC: Unit Under Calibration

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









Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER

**RECEIVED DATE**  
**MEASUREMENT DATE**  
**VALID DATE**

**ENVIRONMENTAL CONDITIONS**  
Ambient condition in the laboratory is as follow:  
Temperature: (23.0 ± 0.5) °C  
Relative Humidity: (55.0 ± 15.0) %RH  
Atmospheric Pressure: (1013.0 ± 0.1) hPa

**PLACE OF CALIBRATION**  
(Wind type wind tunnel of Jiranatee Associates Co., Ltd.)

**CALIBRATION CONDITIONS**  
(Wind tunnel cross-section area) 900 cm<sup>2</sup>  
(Cup anemometer frontal area) 100 cm<sup>2</sup>  
(Diameter of mounting pipe) - mm  
(Blockage ratio of test object) 0.11 [-]

**Preconditioning**  
(24 hours at ambient conditions)  
(The average values during measurement are (23.3) °C, (60.8) %RH and (1014.5) hPa)

**MEASUREMENT CONDITION**  
(The average values during measurement are (23.3) °C, (60.8) %RH and (1014.5) hPa)

**TABULATION OF RESULTS**  
The table on next page give the following values:

Calibrated by:  
[1] Mr. Somchai Thongkiet  
[2] Miss Atthaporn Lertkarnjanakul

**Remarks:**  
1. Possible cross-section area of the wind tunnel  
2. Possible cross-section area of the tested object include mounting pipe  
3. The center of mounting pipe  
4. Ratio "a/b"

**CERTIFICATE OF CALIBRATION**

**Calibration procedure:**  
The Cup anemometer was calibrated against standard air velocity transducer model 8653-02 and calibration with precision differential pressure meter model DMS2102 to evaluate calibration of (Cup-type wind tunnel) with (60 kPa) cross test section size. The AN-03-007 tested in the ISO 6140-12-1, Wind energy generator system - Part 12-1, Power performance measurements of electricity producing wind turbines, March 2017 was used as a reference procedure.

**Traceability:**  
This certificate provides a traceability of the measurement to recognized the national standards and to realization of the international system of units (SI) through the NMVT (National Metrology Institute of Thailand) via Certificate Number: NMV-0019-01 and NMV-0020-01

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

**Approved signature:**  
Mr. Panyas Booncharoen  
Calibration Department Manager

**Calibration Date:** 01/02/27

**Remarks:**  
1. Possible cross-section area of the wind tunnel  
2. Possible cross-section area of the tested object include mounting pipe  
3. The center of mounting pipe  
4. Ratio "a/b"

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

Page 2 of 2 Pages

**MEASUREMENT RESULTS**

The Cup anemometer, Unit Under Calibration (UUC) was exercised at 10 m/s for 5 minutes prior to calibration being performed. The standard air velocity 0.5 m/s to 5 m/s was calculated by a standard air velocity transducer which was installed 50 mm away from wind tunnel nozzle and installed 40 mm away from top of the test section and the standard air velocity 5 m/s to 30 m/s was calculated by a pitot tube with precision differential pressure sensor which was installed 50 mm away from wind tunnel nozzle and installed 40 mm away from top of the test section. UUC was mounted as a round vertical tube of the pitot tube at center of test section. The calibration was carried out while both rising and falling air velocity in the range of 1 m/s to 35 m/s at calibration interval of 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

| U <sub>ref</sub><br>[m/s] | Temp. wind tunnel<br>[°C] | Temp. room<br>[°C] | P <sub>ref</sub><br>[hPa] | U <sub>meas</sub><br>[m/s] | Error<br>[m/s] | U <sub>ref</sub> [m/s] |
|---------------------------|---------------------------|--------------------|---------------------------|----------------------------|----------------|------------------------|
| 1.000                     | 23.30                     | 23.45              | 1014.5                    | 0.9                        | -0.1           | 0.70                   |
| 2.004                     | 23.30                     | 23.45              | 1014.5                    | 1.9                        | -0.1           | 0.70                   |
| 3.008                     | 23.34                     | 23.46              | 1014.5                    | 2.9                        | -0.1           | 0.80                   |
| 4.179                     | 23.48                     | 23.46              | 1014.5                    | 3.9                        | -0.3           | 0.80                   |
| 5.540                     | 23.50                     | 23.45              | 1014.5                    | 4.9                        | -0.6           | 0.80                   |
| 7.000                     | 23.46                     | 23.45              | 1014.5                    | 6.0                        | -1.0           | 0.70                   |
| 8.500                     | 23.30                     | 23.45              | 1014.5                    | 7.0                        | -1.5           | 0.70                   |
| 10.000                    | 23.30                     | 23.45              | 1014.5                    | 8.1                        | -1.9           | 0.70                   |
| 11.500                    | 23.28                     | 23.46              | 1014.5                    | 9.1                        | -2.4           | 0.80                   |
| 13.000                    | 23.50                     | 23.45              | 1014.5                    | 10.1                       | -2.9           | 0.80                   |
| 14.500                    | 23.38                     | 23.45              | 1014.5                    | 11.2                       | -3.3           | 0.80                   |
| 16.000                    | 23.30                     | 23.45              | 1014.5                    | 12.3                       | -3.7           | 0.70                   |
| 17.500                    | 23.40                     | 23.45              | 1014.5                    | 13.3                       | -4.2           | 0.70                   |
| 19.000                    | 23.40                     | 23.45              | 1014.5                    | 14.3                       | -4.7           | 0.80                   |
| 20.500                    | 23.40                     | 23.46              | 1014.5                    | 15.4                       | -5.1           | 0.80                   |
| 22.000                    | 23.46                     | 23.46              | 1014.5                    | 16.4                       | -5.6           | 0.80                   |

**Remarks:**  
1. Calibration results only valid for the stated circumstances and environmental conditions during which calibration took place  
2. Velocity of standard  
3. Velocity of Unit Under Calibration

**PHOTO OF CALIBRATION SET-UP**



Calibration setup of the Cup anemometer calibration in the wind tunnel of Jiranatee Associates Co., Ltd. The Cup anemometer shown may differ from the calibrated one. Remark: The proportion of the set-up is not true to scale due to imaging geometry.

**Test of Certificate of Calibration**

**J NAC**  
JIRANATEE ASSOCIATES CO., LTD.

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER

**RECEIVED DATE**  
**MEASUREMENT DATE**  
**VALID DATE**

**ENVIRONMENTAL CONDITIONS**  
Ambient condition in the laboratory is as follow:  
Temperature: (23.0 ± 0.5) °C  
Relative Humidity: (55.0 ± 15.0) %RH  
Atmospheric Pressure: (1013.0 ± 0.1) hPa

**PLACE OF CALIBRATION**  
(Wind type wind tunnel of Jiranatee Associates Co., Ltd.)

**CALIBRATION CONDITIONS**  
(Wind tunnel cross-section area) 900 cm<sup>2</sup>  
(Wind direction span) 120 cm<sup>2</sup>  
(Diameter of mounting pipe) - mm  
(Blockage ratio of test object) 0.140 [-]

**Preconditioning**  
(24 hours at ambient conditions)  
(The average values during measurement are (23.4) °C, (61.3) %RH and (1017.4) hPa)

**TABULATION OF RESULTS**  
The table on next page give the following values:

Calibrated by:  
[1] Mr. Somchai Thongkiet  
[2] Miss Atthaporn Lertkarnjanakul

**Remarks:**  
1. Possible cross-section area of the wind tunnel  
2. Possible cross-section area of the tested object include mounting pipe  
3. Diameter of mounting pipe  
4. Ratio "a/b"

**CERTIFICATE OF CALIBRATION**

**Calibration procedure:**  
The wind direction sensor was calibrated against standard rotary encoder model: ABB00075-00000-01-0-0-0 in a clean laboratory of (Jiranatee Associates Co., Ltd.) with (100 cm<sup>2</sup>) cross test section area. The W-01-000 tested in the ISO 6140-12-1, Wind energy generator system - Part 12-1, Power performance measurements of electricity producing wind turbines, March 2017 was used as a reference procedure.

**Traceability:**  
This certificate provides a traceability of the measurement to recognized the national standards and to realization of the international system of units (SI) through the NMVT (National Metrology Institute of Thailand) via Certificate Number: NMV-0019-01 and NMV-0020-01

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

**Approved signature:**  
Mr. Panyas Booncharoen  
Calibration Department Manager

**Calibration Date:** 01/02/27

**Remarks:**  
1. Possible cross-section area of the wind tunnel  
2. Possible cross-section area of the tested object include mounting pipe  
3. Diameter of mounting pipe  
4. Ratio "a/b"

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

Page 2 of 2 Pages

**MEASUREMENT RESULTS**

The wind direction sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 90° intervals in clockwise and counter-clockwise directions after offset adjustment has been made. The flow speed of wind tunnel (locally 5 m/s) is kept constant while the sensor is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.

| Air speed<br>[m/s] | U <sub>ref</sub><br>Degree (°) | U <sub>meas</sub><br>Degree (°) | Error<br>Degree (°) | U <sub>ref</sub> [m/s] |
|--------------------|--------------------------------|---------------------------------|---------------------|------------------------|
| 5.000              | 41                             | 41                              | -4                  | 0.80                   |
| 5.000              | 47                             | 47                              | -4                  | 0.80                   |
| 5.000              | 118                            | 118                             | -2                  | 0.4                    |
| 5.000              | 160                            | 160                             | 2                   | 0.80                   |
| 5.000              | 226                            | 226                             | 4                   | 1.4                    |
| 5.000              | 274                            | 274                             | 4                   | 0.80                   |
| 5.000              | 317                            | 317                             | 2                   | 0.80                   |
| 5.000              | 359                            | 359                             | -1                  | 0.80                   |

**Remarks:**  
1. Calibration results only valid for the stated circumstances and environmental conditions during which calibration took place  
2. Direction of standard  
3. Direction of Unit Under Calibration

**Test of Certificate of Calibration**

**J NAC**  
JIRANATEE ASSOCIATES CO., LTD.

## CERTIFICATE OF CALIBRATION

Certificate No. : CDT-133-68

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER : Data Logger with Temperature sensor  
MODEL/TYPE : Novelette  
SERIAL NUMBER : 200-W5-2503  
ID NUMBER : A12-04  
CONDITION AS RECEIVED : 100, 100007  
CUSTOMER : (A) Laboratory group (Thailand) Co., Ltd.  
101 Prathumwan 40, Prathumwan Rd.,  
Khwaeng Sam Luang, Khet Sam Luang,  
Bangkok 10250 Thailand

RECEIVED DATE : 25 Jul 2025  
MEASUREMENT DATE : 01 Aug 2025  
ISSUE DATE : 01 Aug 2025

**ENVIRONMENTAL CONDITIONS:**  
Ambient condition in the laboratory are as follow:  
Temperature : 23.0 ± 0.5 °C  
Relative Humidity : 55.0 ± 15.0 %RH

**NOTES:** The certificate is valid only to the item collected on date and place of collection.

**TABULATION OF RESULTS:**  
The table on next page give the measured values.

Calibrated by:  
☐ Mr. Sanyat Thachalad  
☐ Mr. Jiranan Lertthongthai  
☐ Mr. Rungnarp Phoomont



Approved signature:  
Mr. Patsy Booncharoen  
Calibration Department Manager

THIS CERTIFICATE MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

## CERTIFICATE OF CALIBRATION

Certificate No. : CDT-028-68

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER : Relative Humidity with data logger  
MODEL/TYPE : Novelette  
SERIAL NUMBER : Data Logger 200-W5-2503  
ID NUMBER : Sensor: RH60  
CONDITION AS RECEIVED : Data Logger: 05244  
CUSTOMER : Sensor: RH300702  
100, 100007  
Used item:  
(A) Laboratory group (Thailand) Co., Ltd.  
101 Prathumwan 40, Prathumwan Rd., Khwaeng Sam Luang,  
Khet Sam Luang, Bangkok 10250 Thailand

RECEIVED DATE : 25 Jul 2025  
MEASUREMENT DATE : 01 Aug 2025  
ISSUE DATE : 01 Aug 2025

**ENVIRONMENTAL CONDITIONS:**  
Ambient condition in the laboratory are as follow:  
Temperature : 23.0 ± 0.5 °C  
Relative Humidity : 55.0 ± 15.0 %RH

**NOTES:** The certificate is valid only to the item collected on date and place of collection.

**TABULATION OF RESULTS:**  
The table on next page give the measured values.

Calibrated by:  
☐ Mr. Sanyat Thachalad  
☐ Mr. Jiranan Lertthongthai  
☐ Mr. Rungnarp Phoomont



Approved signature:  
Mr. Patsy Booncharoen  
Calibration Department Manager

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

Continuation of Certificate of Calibration Number CDT-133-68

Page 2 of 2 Pages

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

**Calibration Range:** 20 °C to 40 °C

**Function:**

Table 1: This equipment was connected with temperature sensor Model: RH60SE 5/16 M3310702.  
Dimension: Diameter 12 mm, length 80 mm.

| Immersion Depth (mm) | Standard Reading (°C) | LMC Reading (°C) | Error (°C) | Uncertainty (°C) |
|----------------------|-----------------------|------------------|------------|------------------|
| 80                   | 20.058                | 20.3             | -0.2       | 0.099            |
| 80                   | 25.044                | 24.8             | -0.2       | 0.099            |
| 80                   | 30.027                | 29.8             | -0.2       | 0.099            |
| 80                   | 35.011                | 34.8             | -0.2       | 0.099            |
| 80                   | 40.026                | 39.8             | -0.2       | 0.099            |

LMC\*: Limit Under Calibration

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



Continuation of Certificate of Calibration Number CDT-028-68

Page 2 of 2 Pages

**Measurement Results:**

The results of calibration and associated measurement uncertainties are reported in the table below:

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

Table 1: The results of calibration of relative humidity at 30 °C are reported in table below.  
Calibration Range: 20RH to 80RH

| Air Temperature (°C) | Standard Reading (%RH) | LMC Reading (%RH) | Error (%RH) | Uncertainty (%RH) |
|----------------------|------------------------|-------------------|-------------|-------------------|
| 30.05                | 60.04                  | 59.5              | -0.5        | 0.76              |
| 30.05                | 60.13                  | 59.5              | -0.6        | 1.5               |
| 30.05                | 60.14                  | 59.5              | -0.6        | 2.2               |

LMC\*: Limit Under Calibration

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







**MEASUREMENT ITEM**  
ANEMOMETER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER  
RECEIVED DATE  
MEASUREMENT DATE  
ISSUE DATE

**ENVIRONMENTAL CONDITIONS**  
Ambient condition in the laboratory are as follows:  
Temperature  
Relative Humidity  
Atmospheric Pressure

**PLACE OF CALIBRATION**

**CALIBRATION CONDITIONS**  
Wind tunnel cross section area  
Cup anemometer diameter  
Diameter of mounting pipe  
Blockage ratio of test object

**Preconditioning**  
Measurement Condition

**SUMMARY OF RESULTS:**  
The table on next page give the measured values.

Calibrated by:  
By Mr. Somchai Thairakul  
By Miss Jirananee Jirananate  
Approved signature:  
Mr. Panyas Boonchaisri  
Calibration Department Manager

**Remarks:**  
1. Verify measurement area of the wind tunnel  
2. Projected cross-section area of the tested object include mounting pipe  
3. Diameter of mounting pipe  
4. Test 1 to 1

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

**Calibration procedure:**  
The Cup anemometer was calibrated against standard air velocity transducer model 8010-02 and pitot tube with precision differential pressure meter model 3760-101 in velocity calibration of Pitot-type wind tunnel with 100 mm cross test section area. The WTC-300 based on IEC 62-12-1, Wind energy generator systems - Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as reference standard.

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

RECEIVED BY: Panyas Boonchaisri  
APPROVED BY: Somchai Thairakul  
TEST DATE: 08/09/27

J NAC  
JIRANATEE ASSOCIATES CO., LTD.

**MEASUREMENT RESULTS**

The Cup anemometer, Unit 1 (Unit Calibration 1002) was received at 10 m/s for 1 month prior to calibration being performed. The standard air velocity 0.5 m/s to 5 m/s was calibrated by a standard air velocity transducer which was installed 10 mm away from wind tunnel walls and installed 40 mm away from top of the test section and the standard air velocity 5 m/s to 30 m/s was calibrated by a pitot tube with precision differential pressure meter which was installed 10 mm away from wind tunnel walls and installed 40 mm away from top of the test section. Unit 2 was mounted on a round vertical tube of the lower part of center of test section. The calibration was carried out under both rising and falling air velocity in the range of 1 m/s to 16 m/s at calibration starting of 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

| $V_{ref}$<br>(m/s) | Static wind tunnel<br>(°C) | Temp. tower<br>(°C) | $V_{ref}$<br>(m/s) | Error<br>(m/s) | $U$ (m/s) |
|--------------------|----------------------------|---------------------|--------------------|----------------|-----------|
| 1.029              | 19.80                      | 16.80               | 8.8                | -0.1           | 0.11      |
| 2.122              | 14.30                      | 14.80               | 2.0                | -0.2           | 0.11      |
| 3.015              | 23.60                      | 14.80               | 2.9                | -0.1           | 0.11      |
| 4.255              | 23.52                      | 14.80               | 4.9                | -0.3           | 0.11      |
| 4.30               | 23.40                      | 14.80               | 6.9                | -0.9           | 0.15      |
| 5.30               | 23.70                      | 14.80               | 8.6                | -0.1           | 0.11      |
| 7.01               | 19.80                      | 14.80               | 7.1                | 0.1            | 0.11      |
| 8.01               | 19.80                      | 14.80               | 8.7                | -0.2           | 0.11      |
| 8.40               | 23.52                      | 14.80               | 9.3                | -0.5           | 0.11      |
| 10.00              | 23.50                      | 14.80               | 10.3               | -0.2           | 0.11      |
| 10.00              | 23.40                      | 14.80               | 11.2               | -0.2           | 0.11      |
| 11.00              | 23.40                      | 14.80               | 12.4               | -0.4           | 0.15      |
| 12.00              | 23.40                      | 14.80               | 13.6               | -0.5           | 0.11      |
| 14.00              | 23.40                      | 14.80               | 14.5               | -0.5           | 0.11      |
| 14.00              | 23.50                      | 14.80               | 15.5               | -0.5           | 0.11      |
| 16.00              | 23.50                      | 14.80               | 16.5               | -0.5           | 0.15      |

**Remarks:**  
1. Calibration results only valid for the tested circumstances and environmental conditions during which calibration took place.  
2. Uncertainty of standard.  
3. Uncertainty of Unit Under Calibration.

**PHOTO OF CALIBRATION SET-UP**



Calibration setup of the Cup anemometer calibration in the wind tunnel of Jiranatee Associates Co., Ltd. The Cup anemometer shown may differ from the calibrated one. Remarks: The appearance of the set-up is not true to scale due to imaging geometry.

Final of Certificate of Calibration  
J NAC  
JIRANATEE ASSOCIATES CO., LTD.

**MEASUREMENT ITEM**  
ANEMOMETER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER  
RECEIVED DATE  
MEASUREMENT DATE  
ISSUE DATE

**ENVIRONMENTAL CONDITIONS**  
Ambient condition in the laboratory are as follows:  
Temperature  
Relative Humidity  
Atmospheric Pressure

**PLACE OF CALIBRATION**

**CALIBRATION CONDITIONS**  
Wind tunnel cross-section area  
Wind direction (horizontal)  
Diameter of mounting pipe  
Blockage ratio of test object

**Preconditioning**  
Measurement Condition

**SUMMARY OF RESULTS:**  
The table on next page give the measured values.

Calibrated by:  
By Mr. Somchai Thairakul  
By Miss Jirananee Jirananate  
Approved signature:  
Mr. Panyas Boonchaisri  
Calibration Department Manager

**Remarks:**  
1. Verify measurement area of the wind tunnel  
2. Projected cross-section area of the tested object include mounting pipe  
3. Diameter of mounting pipe  
4. Test 1 to 1

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

**Calibration procedure:**  
The wind direction sensor was calibrated against standard rotary encoder model 8010-02 in velocity calibration of Pitot-type wind tunnel with 100 mm cross test section area. The WTC-300 based on IEC 62-12-1, Wind energy generator systems - Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a reference standard.

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

RECEIVED BY: Panyas Boonchaisri  
APPROVED BY: Somchai Thairakul  
TEST DATE: 08/09/27

J NAC  
JIRANATEE ASSOCIATES CO., LTD.

**MEASUREMENT RESULTS**

The wind direction sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 45° intervals to clockwise and counter-clockwise direction after offset adjustment has been made. The flow speed of wind tunnel (staticly 5 m/s) is kept constant while the sensor is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.

| Air speed<br>$v_{ref}$ | $D_{ref}$<br>Degree (°) | $D_{ref}$<br>Degree (°) | Error<br>Degree (°) | $U$ (°) |
|------------------------|-------------------------|-------------------------|---------------------|---------|
| 5.00                   | 19.80                   | 45                      | -5                  | 0.05    |
| 5.00                   | 19.80                   | 61                      | -5                  | 0.05    |
| 5.00                   | 116.00                  | 141                     | -4                  | 0.05    |
| 5.00                   | 180.00                  | 178                     | -2                  | 0.02    |
| 5.00                   | 215.00                  | 216                     | 1                   | 0.02    |
| 5.00                   | 270.00                  | 273                     | 3                   | 0.06    |
| 5.00                   | 315.00                  | 310                     | 5                   | 0.06    |
| 5.00                   | 340.00                  | 359                     | -1                  | 0.05    |

**Remarks:**  
1. Calibration results only valid for the tested circumstances and environmental conditions during which calibration took place.  
2. Division of standard.  
3. Division of Unit Under Calibration.

Final of Certificate of Calibration  
J NAC  
JIRANATEE ASSOCIATES CO., LTD.

## CERTIFICATE OF CALIBRATION

Certificate No. : CRT-075-09

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER : Novolyte  
MODEL/TYPE : 110-WS-250C-0  
SERIAL NUMBER : A5081  
ID NUMBER : RR\_731438  
CONDITION AS RECEIVED : Used item  
CUSTOMER : All Laboratory group (Thailand) Co., Ltd.  
104 Phatthanaburi Rd., Phatthanaburi Rd.,  
Khaeng San Luang, Khaeng San Luang,  
Bangkok 10250 Thailand.

RECEIVED DATE : 27 Feb 2026  
MEASUREMENT DATE : 04 Mar 2026  
ISSUE DATE : 09 Mar 2026

**ENVIRONMENTAL CONDITIONS:**  
Ambient condition in the laboratory are as follows:  
Temperature :  $23.0 \pm 0.5$  °C  
Relative Humidity :  $55.0 \pm 5.0$  %RH

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

**TABULATION OF RESULTS:**  
The table on next page give the measured values.

Calibrated by:  
☐ Mr. Somchai Thirakul  
☒ Mr. Jiraporn Jiraporn  
☐ Mr. Rungroj Pongmanee



Approved signature:  
Mr. Pongmanee Pongmanee  
Calibration Department Manager

THIS CERTIFICATE MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

## CERTIFICATE OF CALIBRATION

Certificate No. : CRT-012-08

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER : Novolyte  
MODEL/TYPE : Data Logger: 110-WS-250C-0  
SERIAL NUMBER : A5081  
ID NUMBER : RR\_731438  
CONDITION AS RECEIVED : Used item  
CUSTOMER : All Laboratory group (Thailand) Co., Ltd.  
104 Phatthanaburi Rd., Phatthanaburi Rd., Khaeng San Luang,  
Khaeng San Luang, Bangkok 10250 Thailand.

RECEIVED DATE : 27 Feb 2026  
MEASUREMENT DATE : 04 Mar 2026  
ISSUE DATE : 09 Mar 2026

**ENVIRONMENTAL CONDITIONS:**  
Ambient condition in the laboratory are as follows:  
Temperature :  $23.0 \pm 0.5$  °C  
Relative Humidity :  $55.0 \pm 5.0$  %RH

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

**TABULATION OF RESULTS:**  
The table on next page give the measured values.

Calibrated by:  
☐ Mr. Somchai Thirakul  
☒ Mr. Jiraporn Jiraporn  
☐ Mr. Rungroj Pongmanee



Approved signature:  
Mr. Pongmanee Pongmanee  
Calibration Department Manager

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range:  $20$  °C to  $40$  °C

Function:

Table 1: This equipment was connected with temperature sensor Model: HMP165/16 W250076.  
Dimension: Diameter 12 mm, Length 60 mm.

| Immersion Depth (mm) | Standard Reading (°C) | UUC Reading (°C) | Error (°C) | Uncertainty (°C) |
|----------------------|-----------------------|------------------|------------|------------------|
| 80                   | 20.224                | 19.8             | -0.2       | 0.009            |
| 80                   | 25.008                | 24.8             | -0.2       | 0.009            |
| 80                   | 30.000                | 29.8             | -0.2       | 0.009            |
| 80                   | 34.997                | 34.8             | -0.2       | 0.009            |
| 80                   | 39.990                | 39.7             | -0.3       | 0.009            |

UUC\*: Link Under Calibration

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



Measurement Results

The results of calibration and associated measurement uncertainty are reported in the table below.

Result of Calibration: ☐ Without Adjustment ☒ With Adjustment

Table 1: The results of calibration of relative humidity at  $23$  °C are reported in table below.  
Calibration Range:  $20$  %RH to  $80$  %RH

| Air Temperature (°C) | Standard Reading (%RH) | UUC Reading (%RH) | Error (%RH) | Uncertainty (%RH) |
|----------------------|------------------------|-------------------|-------------|-------------------|
| 20.00                | 20.04                  | 22.5              | 2.5         | 0.18              |
| 30.07                | 50.00                  | 50.0              | -0.1        | 2.8               |
| 30.06                | 60.00                  | 59.2              | -0.8        | 2.1               |

UUC\*: Link Under Calibration

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



## CERTIFICATE OF CALIBRATION

Certificate No.: CPM-014-08

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
: Digital barometer  
: Novosigma  
: Sensor: T10-W5-250P  
: Data logger: T10-W5-250C-0  
: Serial: 8P-A5881  
: Data logger: A5282  
: ID NUMBER  
: 888\_751408  
: CONDITION AS RECEIVED  
: Customer  
: ALS Laboratory group (Thailand) Co., Ltd.  
: 104 Prathumwan Rd., Prathumwan Rd.  
: Bangkok 10250 Thailand.

**RECEIVED DATE**  
: 27 Feb 2020  
**MEASUREMENT DATE**  
: 28 Feb 2020  
**ISSUE DATE**  
: 29 Feb 2020

### CONDITION OF THIS RESULT OF CALIBRATION

1. Calibration effort for calibration sequence C
2. The UUC\* was installed in vertical orientation along reference standard instrument and center of UUC\* was used as the reference level
3. Calibration conditions
4. Condition
  - ☒ Normal ☐ Abnormal
  - Pressure transmitting medium: Air
  - Pressure: 1 bar
  - Temp: 23°C, 1 bar
  - Humidity: 50% RH
  - Temp: 23°C, 1 bar
  - Humidity: 50% RH
5. The certificate is valid only to the item calibrated on date and place of calibration

Calibrated by:  
☒ Mr. Jiranan Thairat  
☐ Mrs. Jiranan Thairat



Approved signature:  
Mr. Jiranan Thairat  
Calibration Department Manager

THIS CERTIFICATE REPORT MAY NOT BE REPRODUCED EXCEPT IN FULL, UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

## CERTIFICATE OF CALIBRATION

Certificate No.: CPM-014-08

Page 2 of 2 Pages

**MEASUREMENT RESULTS**  
: ☒ Without adjustment ☐ With adjustment  
**CALIBRATION IN THE RANGE OF**  
: 550 mbar to 1050 mbar

The results of calibration and associated measurement uncertainties are reported in the table below

| STD<br>(mbar) | UUC*<br>(mbar) | Error<br>(mbar) | Uncertainty (k=2)<br>(mbar) |
|---------------|----------------|-----------------|-----------------------------|
| 550.00        | 951.9          | 1.9             | 0.37                        |
| 570.00        | 971.3          | 1.3             | 0.37                        |
| 590.00        | 990.5          | 0.5             | 0.37                        |
| 1010.00       | 1010.0         | 0.0             | 0.40                        |
| 1020.00       | 1020.1         | 0.1             | 0.37                        |
| 1030.00       | 1040.7         | -8.3            | 0.37                        |

Note: UUC\* Unit Under Calibration

To convert the result in report unit to Pa should be multiply by 100

\*End of certificate\*



## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
: Cup anemometer  
: Novosigma  
: Sensor: WS-50P  
: Data logger: T10-W5-250C-0  
: Serial: 8P-A5881  
: Data logger: A5282  
: ID NUMBER  
: 888\_751408  
: CONDITION AS RECEIVED  
: Customer  
: ALS Laboratory group (Thailand) Co., Ltd.  
: 104 Prathumwan Rd., Prathumwan Rd.  
: Bangkok 10250 Thailand.

**RECEIVED DATE**  
: 15 May 2020  
**MEASUREMENT DATE**  
: 16 May 2020  
**ISSUE DATE**  
: 18 May 2020

### ENVIRONMENTAL CONDITIONS

Ambient condition in the laboratory are as follows:  
Temperature: 23.0 ± 0.5 °C  
Relative Humidity: 50.0 ± 1.0 %RH  
Atmospheric Pressure: 1013.25 hPa

**PLACE OF CALIBRATION**  
: 1. Wind tunnel of Jirananate Associates Co., Ltd.

**CALIBRATION CONDITIONS**  
: Wind tunnel (wind speed) 100 m/s  
: Cup anemometer (rotational speed) 1000 rpm  
: Diameter of mounting plate 100 mm  
: Diameter of cup 100 mm

**Preconditioning**  
: 24 hours at ambient conditions.  
**Measurement Condition**  
: The average values during measurement are (24.0 ± 0.5) °C, (49.0 ± 0.5) %RH and (1013.25 ± 0.5) hPa

**TABULATION OF RESULTS**  
The table on next page give the measured values.

Calibrated by:  
☒ Mr. Jiranan Thairat  
☐ Mrs. Jiranan Thairat



Approved signature:  
Mr. Jiranan Thairat  
Calibration Department Manager

**Remarks:**  
\* Speed of rotation of the wind tunnel  
\* Pressure of rotation of the wind tunnel  
\* Diameter of mounting plate  
\* Note: 1 m/s = 3.6 km/h

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL, UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

Page 2 of 2 Pages

### MEASUREMENT RESULTS\*

The Cup anemometer, Unit Under Calibration (UUC) was exposed to 10 m/s for 5 minutes prior to calibration being performed. The standard air velocity 0.5 m/s to 1 m/s was calibrated by a standard air velocity transducer which was installed 30 mm away from wind tunnel nozzle and installed 40 mm away from top of the test section and the standard air velocity 1 m/s to 10 m/s was calibrated by a probe tube with pressure differential pressure sensor which was installed 30 mm away from wind tunnel nozzle and installed 40 mm away from top of the test section. UUC was mounted on a stand vertical tube of the probe tube at center of test section. The calibration was carried out under both rising and falling air velocity in the range of 0 m/s to 10 m/s at calibration interval of 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

| UUC<br>m/s | Temp. wind tunnel<br>°C | Temp. room<br>°C | UUC<br>m/s | Error<br>m/s | U (k=2)<br>m/s |
|------------|-------------------------|------------------|------------|--------------|----------------|
| 0.5        | 24.0                    | 24.0             | 0.5        | -0.1         | 0.31           |
| 1.0        | 24.0                    | 24.0             | 1.0        | 0.1          | 0.31           |
| 1.5        | 24.0                    | 24.0             | 1.5        | 0.1          | 0.31           |
| 2.0        | 24.0                    | 24.0             | 2.0        | 0.1          | 0.31           |
| 2.5        | 24.0                    | 24.0             | 2.5        | 0.1          | 0.31           |
| 3.0        | 24.0                    | 24.0             | 3.0        | 0.1          | 0.31           |
| 3.5        | 24.0                    | 24.0             | 3.5        | 0.1          | 0.31           |
| 4.0        | 24.0                    | 24.0             | 4.0        | 0.1          | 0.31           |
| 4.5        | 24.0                    | 24.0             | 4.5        | 0.1          | 0.31           |
| 5.0        | 24.0                    | 24.0             | 5.0        | 0.1          | 0.31           |
| 5.5        | 24.0                    | 24.0             | 5.5        | 0.1          | 0.31           |
| 6.0        | 24.0                    | 24.0             | 6.0        | 0.1          | 0.31           |
| 6.5        | 24.0                    | 24.0             | 6.5        | 0.1          | 0.31           |
| 7.0        | 24.0                    | 24.0             | 7.0        | 0.1          | 0.31           |
| 7.5        | 24.0                    | 24.0             | 7.5        | 0.1          | 0.31           |
| 8.0        | 24.0                    | 24.0             | 8.0        | 0.1          | 0.31           |
| 8.5        | 24.0                    | 24.0             | 8.5        | 0.1          | 0.31           |
| 9.0        | 24.0                    | 24.0             | 9.0        | 0.1          | 0.31           |
| 9.5        | 24.0                    | 24.0             | 9.5        | 0.1          | 0.31           |
| 10.0       | 24.0                    | 24.0             | 10.0       | 0.1          | 0.31           |

**Remarks:**

- \* Calibration is only valid for the intended conditions and measurement results during which calibration was performed.
- \* Velocity of standard
- \* Velocity of Unit Under Calibration

### PHOTO OF CALIBRATION SET UP



Calibration setup of the Cup anemometer calibration in the wind tunnel of Jirananate Associates Co., Ltd. The Cup anemometer shown may differ from the calibrated one. Remarks: The proportion of the set-up is not true to scale due to imaging distortion.



## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONVENTION AS RECEIVED  
CUSTOMER

1. Wind direction sensor  
2. Novosyna  
3. Sensor: WY-801  
4. Data logger: 130-W5-252L-D  
5. Sensor: W52-A0444  
6. Data logger: A0444  
7. W52-PS405  
8. Used item  
9. ACS Laboratory group (Thailand) Co., Ltd.  
104 Phatthanaburi Rd., Phatthanaburi Rd., Khwaeng Suan Luang, Bangkok 10250 Thailand

**Calibration procedure**  
The wind direction sensor was calibrated against standard battery (nominal model: AF40001) - (nominal 1.5V) in an open field location of 100m type wind tunnel with 200 cm<sup>2</sup> open and vertical area. The W52-PS405 is used as a standard 1.5V. Wind energy generation system - Part 12-1. Power performance measurement of electricity producing wind turbine, March 2017 was used as a calibration guideline.

**Traceability**  
This certificate provides a traceability of the measurement to the International System of Units (SI) through the National Metrology Institute of Thailand via Certificate number 24-0527-24.

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

**RECEIVED DATE**  
**MEASUREMENT DATE**  
**ISSUE DATE**

15 May 2025  
20 May 2025  
20 May 2025

### ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:  
Temperature: 23.0 ± 3.0 °C  
Relative Humidity: 55.0 ± 5.0 %RH  
Atmospheric Pressure: 1013.0 hPa

**PLACE OF CALIBRATION**  
100 Type wind tunnel of Jiranatee Associates Co., Ltd.

**CALIBRATION CONDITION**  
1. Wind tunnel cross-section area: 300 cm<sup>2</sup>  
2. Wind direction frontal area: 120 cm<sup>2</sup>  
3. Diameter of measuring area: 3.348 m

**Preconditioning**  
24 hours of ambient conditions.  
**Measurement Condition**  
The average values during measurement are 23.0 °C, 55.0 %RH and 1013.0 hPa.

### TABULATION OF RESULTS:

The tabulation used page give the measured values.

**Calibrated by:**  
1. Mr. Sanyat Thachalad  
2. Mr. Jiraporn Lertsumphol



Approved signature:

Mr. Parinya Booncharoen  
Calibration Department Manager

### Remarks:

- 1. Windy inspection area of the wind tunnel.
- 2. Measured values are in the form of the measured value.
- 3. Uncertainty of measurement.
- 4. Page 2 of 2

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

Certificate Number

CWB-015-00

Page 2 of 2 Pages

### MEASUREMENT RESULTS<sup>1</sup>

The wind direction sensor was calibrated against standard battery (nominal model: AF40001) - (nominal 1.5V) in an open field location of 100m type wind tunnel with 200 cm<sup>2</sup> open and vertical area. The W52-PS405 is used as a standard 1.5V. Wind energy generation system - Part 12-1. Power performance measurement of electricity producing wind turbine, March 2017 was used as a calibration guideline.

| Air speed | D <sub>1</sub> | D <sub>2</sub> | Flow       | U (m/s)    |
|-----------|----------------|----------------|------------|------------|
| m/s       | Degree (°)     | Degree (°)     | Degree (°) | Degree (°) |
| 45.000    | 42             | 42             | 3          | 0.00       |
| 90.000    | 87             | 87             | -3         | 3.6        |
| 135.000   | 131            | 131            | -4         | 0.00       |
| 180.000   | 176            | 176            | -2         | 3.4        |
| 225.000   | 216            | 216            | 7          | 5.4        |
| 270.000   | 274            | 274            | 3          | 0.00       |
| 315.000   | 319            | 319            | 4          | 5.4        |
| 360.000   | 359            | 359            | -1         | 0.00       |

### Remarks:

- 1. Calibration was only used for the listed condition and measurement condition during which calibration had place.
- 2. Direction of standard.
- 3. Direction of Wind Under Calibration.



## CERTIFICATE OF CALIBRATION

Certificate No.: COT-088-08

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONVENTION AS RECEIVED  
CUSTOMER

1. Data Logger with Temperature sensor  
2. Novosyna  
3. 130-W5-252L-D  
4. 45444  
5. RYG-750475  
6. Used item  
7. ACS Laboratory group (Thailand) Co., Ltd.  
104 Phatthanaburi Rd., Phatthanaburi Rd., Khwaeng Suan Luang, Bangkok 10250 Thailand

**Calibration procedure**  
The temperature calibration was done by in-house calibration (digital 100 °C/100 °C) according to comparison method with standard digital temperature indicator and standard temperature probe. The temperature scale was used based on ITS-90.

**Traceability**  
The measurement results are traceable to the International System of Units (SI) through National Metrology Institute of Thailand (NMIT) Certificate number: IT-0542-25, Certificate number: IT-0542-25.

### Reference Used During Calibration:

- Standard Temperature Probe Model: ITS-100 A100, Serial No.: 067602-03, Due date: 3 Apr 2026
- Digital Temperature Indicator Model: DTS-1000-A-W-E, Serial No.: 071407-00001 Due date: 23 Apr 2026

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

### ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:  
Temperature: 23.0 ± 3.0 °C  
Relative Humidity: 55.0 ± 5.0 %RH

**NOTE:** The certificate is valid only to the item calibrated on the day of calibration.

### TABULATION OF RESULTS:

The table on next page give the measured values.

**Calibrated by:**  
1. Mr. Sanyat Thachalad  
2. Mr. Jiraporn Lertsumphol  
3. Mr. Jiraporn Lertsumphol



Approved signature:

Mr. Parinya Booncharoen  
Calibration Department Manager

Continuation of Certificate of Calibration Number COT-088-08

Page 2 of 2 Pages

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

**Calibration Range:** 20 °C to 40 °C

### Function:

Table 1. This equipment was connected with temperature sensor Model: HMW0 3/N: 83331112.  
Dimension: Diameter 12 mm, Length 80 mm.

| Immersion Depth (mm) | Standard Reading (°C) | LMC Reading (°C) | Error (°C) | Uncertainty (°C) |
|----------------------|-----------------------|------------------|------------|------------------|
| 80                   | 20.039                | 23.6             | -3.5       | 0.039            |
| 80                   | 25.049                | 24.5             | -0.5       | 0.039            |
| 80                   | 30.033                | 29.5             | -0.5       | 0.039            |
| 80                   | 35.005                | 34.5             | -0.5       | 0.039            |
| 80                   | 39.994                | 39.5             | -0.5       | 0.039            |

LMC: Unit Under Calibration

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



## CERTIFICATE OF CALIBRATION

Certificate No. : CRT-002-AB

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER  
RECEIVED DATE  
MEASUREMENT DATE  
ISSUE DATE

Relative Humidity with data logger  
Humidity  
Data logger: HI-965-2008-01  
Sensor: HI-965-2008-01  
Data logger: AS4M  
Sensor: HI-965-2008-01  
Used item  
All laboratory group (Thailand) Co., Ltd.  
104 Phatthana 1, 1st, 4th Fl.  
Bangkok 10110, Thailand

**Calibration procedure:**  
The Relative Humidity and Air Temperature calibration was done by in-house reference method as per ISO 9001 and ISO 17025 according to comparison method with Standard Climate Monitor Hypocenter with Temperature sensor and standard Humidity generator chamber.

**Traceability:**  
The measurements are traceable to the International System of Units (SI) through National Institute of Metrology (NMI) Certificate number: TH045-21 and Jirananatee Associates Co., Ltd. Certificate number: CRT-002-AB.

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

**ENVIRONMENTAL CONDITIONS:**  
Ambient condition in the laboratory are as follows:  
Temperature  
Relative Humidity

$23.0 \pm 0.5$  °C  
 $55.0 \pm 10.0$  %RH

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

### TABLE OF RESULTS

The table on next page gives the measured values.



Calibrated by:  
☒ Mr. Jirananatee  
☒ Mr. Jirananatee  
☒ Mr. Jirananatee

Approved signature:  
Mr. Jirananatee  
Calibration Department Manager

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

### Measurement Results

The results of calibration and associated measurement uncertainties are reported in the table below.

**Result of Calibration:** ☐ Without Adjustment ☒ With Adjustment

**Table 1:** The results of calibration of relative humidity at 20 °C are reported in table below.  
Calibration Range: 20%RH to 80%RH

| Air Temperature (°C) | Standard Reading (RH) | UUC Reading (RH) | Error (RH) | Uncertainty (RH) |
|----------------------|-----------------------|------------------|------------|------------------|
| 20.43                | 20.07                 | 21.8             | 1.7        | 0.8              |
| 20.45                | 55.52                 | 51.8             | 0.4        | 1.5              |
| 20.48                | 81.11                 | 81.9             | 0.8        | 2.1              |

UUC: Unit Under Calibration

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



## CERTIFICATE OF CALIBRATION

Certificate No. : CRT-002-GB

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER  
RECEIVED DATE  
MEASUREMENT DATE  
ISSUE DATE

Digital barometer  
Barometer  
Sensor: HI-965-2008-01  
Data logger: HI-965-2008-01  
Sensor: SP-AS4M  
Data logger: AS4M  
Used item  
All laboratory group (Thailand) Co., Ltd.  
104 Phatthana 1, 1st, 4th Fl.  
Bangkok 10110, Thailand

**Calibration procedure:**  
The Digital barometer was calibrated against Digital pressure calibration. The HI-965-2008-01 was used as a reference calibration.

**Traceability:**  
The measurements are traceable to the International System of Units (SI) through the NMI (National Institute of Metrology) Certificate number: TH045-21 and Jirananatee Associates Co., Ltd. Certificate number: CRT-002-GB.

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

### CONDITION OF THIS RESULT OF CALIBRATION:

1. Calibration effort for calibration sequence C
2. The UUC was installed in vertical orientation above reference standard instrument and center of UUC was used as the reference level.
3. Calibration conditions:
4. Condition:
  - ☒ Normal ☐ Abnormal
  - Pressure transmitting medium: Air
  - Pressure: 1.18 kg/cm<sup>2</sup>
  - Temperature: 23.0 ± 0.5 °C
  - Relative Humidity: 55.0 ± 10.0 %RH
5. The certificate is valid only for the item calibrated on date and place of calibration



Calibrated by:  
☒ Mr. Jirananatee  
☒ Mr. Jirananatee

Approved signature:  
Mr. Jirananatee  
Calibration Department Manager

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## CERTIFICATE OF CALIBRATION

Certificate No. : CRT-002-GB

Page 2 of 2 Pages

**MEASUREMENT RESULTS**  
**CALIBRATION IN THE RANGE OF**

The results of calibration and associated measurement uncertainties are reported in the table below.

| STD (mbar) | UUC (mbar) | Error (mbar) | Uncertainty (mbar) |
|------------|------------|--------------|--------------------|
| 950.01     | 951.3      | 1.3          | 0.37               |
| 970.04     | 970.9      | 0.9          | 0.41               |
| 990.07     | 990.5      | 0.5          | 0.53               |
| 1010.01    | 1010.2     | 0.2          | 0.53               |
| 1030.02    | 1030.6     | 0.6          | 0.57               |
| 1049.99    | 1049.1     | 0.8          | 0.40               |

**Note:** UUC: Unit Under Calibration  
To convert the result in report unit to Pa should be multiply by 100









Certificate Number

0367-042-08

## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER

(Wind Direction Sensor)  
Kewell  
Sensor WS-22P  
Data logger: LIO-WS-220L-N  
Sensor WS2-AS480  
Data logger: AS480  
Model: F2020  
Used Item  
ACS Laboratory group (Thailand) Co., Ltd.  
334 Phatthanakarn Rd., Phatthanakarn Rd.,  
Khuang San Luang, Khwaeng San Luang,  
Bangkok 10250 Thailand.

**RECEIVED DATE**  
**MEASUREMENT DATE**  
**ISSUE DATE**

10 Dec 2023  
08 Dec 2023  
12 Dec 2023

**ENVIRONMENTAL CONDITIONS:**  
Ambient condition in the laboratory are as follows:  
Temperature  
Relative Humidity  
Atmospheric Pressure

22.8 ± 3.0 °C  
55.0 ± 15.0 %RH  
1010 ± 10 hPa

**PLACE OF CALIBRATION**  
L: Phatthanakarn Rd. (Thailand) Co., Ltd.

**CALIBRATION CONDITION**

|                                  |      |     |
|----------------------------------|------|-----|
| Wind speed measurement range     | 0.00 | m/s |
| Wind direction measurement range | 0.00 | °   |
| Measurement of wind speed        | 0.00 | m/s |
| Measurement of wind direction    | 0.00 | °   |

**Preconditioning**  
**Measurement Condition**

24 hours at ambient conditions  
The average value during measurement are (22.8 ± 3.0) °C, (55.0 ± 15.0) %RH and (1010 ± 10) hPa.

**TABULATION OF RESULTS:**  
The table on next page give the measured values.

Calibrated by:  
Mr. Somchai Thiraporn  
Mr. Jiraporn Lertsomphol

**Remarks:**  
\* Only valid within area of the wind sensor.  
\* Result of measurement are of the latest report include recording page.  
\* Example of recording data.  
\* Note: "m/s"

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Page 2 of 2 Pages

### MEASUREMENT RESULTS

The wind direction sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 40° intervals in clockwise and counter-clockwise directions after offset adjustment has been made. The flow speed of wind tunnel (usually 5 m/s) is kept constant while the wheel is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.

| Air speed | 2°         | 2°         | Error      | 1° (k=2)   |
|-----------|------------|------------|------------|------------|
| m/s       | Degree (°) | Degree (°) | Degree (°) | Degree (°) |
| 0.000     | 0          | 0          | 0          | 0.00       |
| 41.000    | 42         | -2         | -2         | 0.00       |
| 82.000    | 84         | -2         | -2         | 0.00       |
| 123.000   | 126        | 0          | 0          | 0.00       |
| 164.000   | 168        | 0          | 0          | 0.00       |
| 205.000   | 210        | 0          | 0          | 0.00       |
| 246.000   | 252        | 0          | 0          | 0.00       |
| 287.000   | 294        | 0          | 0          | 0.00       |
| 328.000   | 336        | 0          | 0          | 0.00       |

**Remarks:**  
\* Calibration results are valid for the tested instruments and environmental conditions during which calibration was made.  
\* Example of standard.  
\* Example of standard under calibration.

**J NAC**  
HIRANATEE ASSOCIATES CO., LTD.

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

## CERTIFICATE OF CALIBRATION

Certificate No. : CDT-211-08

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONDITION AS RECEIVED  
CUSTOMER

(Data logger with Temperature sensor)  
Kewell  
LIO-WS-220L-N  
AS480  
NH\_150253  
Used Item  
ACS Laboratory group (Thailand) Co., Ltd.  
334 Phatthanakarn Rd., Phatthanakarn Rd.,  
Khuang San Luang, Khwaeng San Luang,  
Bangkok 10250 Thailand.

**RECEIVED DATE**  
**MEASUREMENT DATE**  
**ISSUE DATE**

03 Dec 2023  
08 Dec 2023  
10 Dec 2023

**ENVIRONMENTAL CONDITIONS:**  
Ambient condition in the laboratory are as follows:  
Temperature  
Relative Humidity

21.0 ± 3.0 °C  
55.0 ± 15.0 %RH

**NOTES:** The certificate is valid only to the item collected on date and place of collection.

**TABULATION OF RESULTS:**  
The table on next page give the measured values.

Calibrated by:  
Mr. Somchai Thiraporn  
Mr. Jiraporn Lertsomphol  
Mr. Ruangsakorn Phrasom

THIS CERTIFICATE MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

Continuation of Certificate of Calibration Number CDT-211-08

Page 2 of 2 Pages

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

**Calibration Range:** 20 °C to 40 °C

### Function:

Table 1: This equipment was connected with temperature sensor Model: HMP68 S/N: R3140618, Dimension: Diameter 12 mm, Length 80 mm.

| Temperature Depth (mm) | Standard Reading (°C) | UUC Reading (°C) | Error (°C) | Uncertainty (°C) |
|------------------------|-----------------------|------------------|------------|------------------|
| 80                     | 25.000                | 25.0             | 0.0        | 0.009            |
| 80                     | 25.000                | 25.0             | 0.0        | 0.009            |
| 80                     | 30.000                | 30.0             | 0.0        | 0.009            |
| 80                     | 35.000                | 35.0             | 0.0        | 0.009            |
| 80                     | 40.000                | 40.0             | 0.0        | 0.009            |

UUC: Unit Under Calibration

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

**J NAC**  
HIRANATEE ASSOCIATES CO., LTD.



Instrument Association Co., Ltd.  
15/14-15, NAKH 26  
Rachaburi 111, 101 (Rachaburi, Bangkok)  
Bangkok 10111 (Thailand)  
Tel: +662-000-0000  
Mobile: +662-000-0000  
E-mail: jiranatee@jiranatee.com  
Web site: www.jiranatee.com

Accredited calibration laboratory  
ISO/IEC 17025:2017  
MSC-T01-T017025  
CALIBRATION 0367

Approved measurement laboratory  
Calibration services department

Certificate Number

CNS-046-68

## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONVEYOR AS RECEIVED  
CUSTOMER

1 Cup anemometer  
1 Newtype  
1 Sensor: WS-82P  
Data logger: 120-W5-2510-0  
1 Sensor: W50-45445  
Data logger: AS-445  
1 W50-45445  
1 Used item  
ACS Laboratory group (Thailand) Co., Ltd.  
134 Phatthanaburi Rd., Phatthanaburi Rd.  
Bangkok 10111, Bangkok 10111, Thailand

RECEIVED DATE  
MEASUREMENT DATE  
QUAL DATE

18 Dec 2025  
18 Dec 2025  
18 Dec 2025

**ENVIRONMENTAL CONDITIONS:**  
Ambient condition in the laboratory are as follows:  
Temperature  
Relative Humidity  
Atmospheric Pressure

23.0 ± 3.0 °C  
55.0 ± 15.0 %RH  
1010 ± 10 hPa

**PLACE OF CALIBRATION**

1 Effect type wind tunnel of Jiranatee Associates Co., Ltd.

**CALIBRATION CONDITIONS**

1 Wind tunnel cross-section area<sup>1</sup> 100 cm<sup>2</sup>  
1 Cup anemometer frontal area 100 cm<sup>2</sup>  
1 Diameter of mounting pipe<sup>2</sup> 10 mm  
1 Backsight ratio of test object<sup>3</sup> 0.111 H

**Preconditioning**  
**Measurement Condition**

1 24 hours of ambient conditions.  
1 The average values during measurement are 23.0 °C, 55.0 %RH and 1010.0 hPa

**TABULATION OF RESULTS:**  
The table on next page gives the required values.

Calibrated by:  
J NAC  
JIRANATEE ASSOCIATES CO., LTD.

Approved Agency  
Mr. Pongthorn Boonwong  
Calibration Department Manager

**Remarks:**  
1. Inside cross-section area of the wind tunnel.  
2. Projected cross-section area of the tested object inside mounting pipe.  
3. Backsight ratio of mounting pipe.  
4. Same as 1.

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

Instrument Association Co., Ltd.  
15/14-15, NAKH 26  
Rachaburi 111, 101 (Rachaburi, Bangkok)  
Bangkok 10111 (Thailand)  
Tel: +662-000-0000  
Mobile: +662-000-0000  
E-mail: jiranatee@jiranatee.com  
Web site: www.jiranatee.com

Accredited calibration laboratory  
ISO/IEC 17025:2017  
MSC-T01-T017025  
CALIBRATION 0367

Approved measurement laboratory  
Calibration services department

Certificate Number

CNS-046-68

## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER  
MODEL/TYPE  
SERIAL NUMBER  
ID NUMBER  
CONVEYOR AS RECEIVED  
CUSTOMER

1 Wind direction sensor  
1 Newtype  
1 Sensor: WS-82P  
Data logger: 120-W5-2510-0  
1 Sensor: W50-45445  
Data logger: AS-445  
1 W50-45445  
1 Used item  
ACS Laboratory group (Thailand) Co., Ltd.  
134 Phatthanaburi Rd., Phatthanaburi Rd.  
Bangkok 10111, Bangkok 10111, Thailand

RECEIVED DATE  
MEASUREMENT DATE  
QUAL DATE

18 Dec 2025  
18 Dec 2025  
18 Dec 2025

**ENVIRONMENTAL CONDITIONS:**  
Ambient condition in the laboratory are as follows:  
Temperature  
Relative Humidity  
Atmospheric Pressure

23.0 ± 3.0 °C  
55.0 ± 15.0 %RH  
1010 ± 10 hPa

**PLACE OF CALIBRATION**

1 Effect type wind tunnel of Jiranatee Associates Co., Ltd.

**CALIBRATION CONDITIONS**

1 Wind tunnel cross-section area<sup>1</sup> 100 cm<sup>2</sup>  
1 Wind direction sensor frontal area 129 cm<sup>2</sup>  
1 Diameter of mounting pipe<sup>2</sup> 10 mm  
1 Backsight ratio of test object<sup>3</sup> 0.111 H

**Preconditioning**  
**Measurement Condition**

1 24 hours of ambient conditions.  
1 The average values during measurement are 23.0 °C, 55.0 %RH and 1010.0 hPa

**TABULATION OF RESULTS:**  
The table on next page gives the required values.

Calibrated by:  
J NAC  
JIRANATEE ASSOCIATES CO., LTD.

Approved Agency  
Mr. Pongthorn Boonwong  
Calibration Department Manager

**Remarks:**  
1. Inside cross-section area of the wind tunnel.  
2. Projected cross-section area of the tested object inside mounting pipe.  
3. Backsight ratio of mounting pipe.  
4. Same as 1.

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

Page 2 of 2 Pages

### MEASUREMENT RESULTS<sup>1</sup>

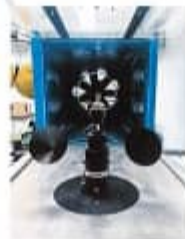
The Cup anemometer, Unit Under Calibration (UUC) was mounted at 10 m/s for 5 minutes prior to calibration being performed. The standard air velocity 0.5 m/s to 5 m/s was calculated by a standard air velocity transducer which was installed 10 mm away from wind tunnel nozzle and installed 40 mm away from top of the test section and the standard air velocity 5 m/s to 20 m/s was calculated by a pitot tube with pressure differential pressure meter which was installed 10 mm away from wind tunnel nozzle and installed 40 mm away from top of the test section. UUC was mounted on a round vertical tube of the lower plate at center of test section. The calibration was carried out under both rising and falling air velocity in the range of 1 m/s to 20 m/s at calibration interval of 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

| UUC<br>m/s | True Air Speed<br>m/s | True Air Speed<br>m/s | UUC<br>m/s | Error<br>m/s | U (%) |
|------------|-----------------------|-----------------------|------------|--------------|-------|
| 1.044      | 23.34                 | 23.30                 | 0.9        | -0.1         | 9.31  |
| 1.301      | 23.32                 | 23.30                 | 1.0        | -0.3         | 6.31  |
| 1.624      | 23.34                 | 23.30                 | 1.0        | -0.1         | 6.31  |
| 4.254      | 23.34                 | 23.30                 | 4.0        | -0.3         | 6.31  |
| 6.06       | 23.34                 | 23.30                 | 6.0        | -0.3         | 4.60  |
| 8.01       | 23.34                 | 23.30                 | 8.0        | -0.3         | 3.61  |
| 9.96       | 23.34                 | 23.30                 | 9.0        | -0.3         | 3.33  |
| 11.91      | 23.34                 | 23.30                 | 11.0       | -0.3         | 2.50  |
| 13.86      | 23.34                 | 23.30                 | 13.0       | -0.3         | 2.17  |
| 15.81      | 23.34                 | 23.30                 | 15.0       | -0.3         | 1.89  |
| 17.76      | 23.34                 | 23.30                 | 17.0       | -0.3         | 1.67  |
| 19.71      | 23.34                 | 23.30                 | 19.0       | -0.3         | 1.50  |
| 21.66      | 23.34                 | 23.30                 | 21.0       | -0.3         | 1.33  |

**Remarks:**

<sup>1</sup> Calibration results only valid for the tested circumstances and environmental conditions during which calibration was performed.  
<sup>2</sup> Velocity of standard.  
<sup>3</sup> Velocity of Unit Under Calibration.

### PHOTO OF CALIBRATION SET-UP



Calibration set-up of the Cup anemometer calibration in the wind tunnel of Jiranatee Associates Co., Ltd. The Cup anemometer shown may differ from the calibrated one. Remarks: The presentation of the set-up is not true to scale due to imaging geometry.



Page 2 of 2 Pages

### MEASUREMENT RESULTS<sup>1</sup>

The wind direction sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 45° intervals in clockwise and counter clockwise directions after offset adjustment has been made. The true wind speed of wind tunnel facility is 5 m/s in test section while the sensor is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.

| 45° speed<br>m/s | W <sub>45°</sub><br>Degree (°) | W <sub>45°</sub><br>Degree (°) | Error<br>Degree (°) | U (%) |
|------------------|--------------------------------|--------------------------------|---------------------|-------|
| 5.00             | 45.000                         | 45                             | -0.00               | 0.00  |
|                  | 90.000                         | 90                             | -0.00               | 0.00  |
|                  | 135.000                        | 135                            | -0.00               | 0.00  |
|                  | 180.000                        | 180                            | -0.00               | 0.00  |
|                  | 225.000                        | 225                            | -0.00               | 0.00  |
|                  | 270.000                        | 270                            | -0.00               | 0.00  |
|                  | 315.000                        | 315                            | -0.00               | 0.00  |
|                  | 360.000                        | 360                            | -0.00               | 0.00  |

**Remarks:**

<sup>1</sup> Calibration results only valid for the tested circumstances and environmental conditions during which calibration was performed.  
<sup>2</sup> Direction of standard.  
<sup>3</sup> Direction of Unit Under Calibration.



THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL, UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED BY WRITING FROM THE LABORATORY

## CERTIFICATE OF CALIBRATION

Certificate No. : CFB-034-68

Page 1 of 2 Pages

**MEASUREMENT ITEM** : Digital barometer  
**MANUFACTURER** : Navalyte  
**MODEL/TYPE** : Sensor: 120-W5-250P  
Data logger: 110-W5-250L-0  
**SERIAL NUMBER** : Sensor: BP-A5445  
Data logger: A5445  
**ID NUMBER** : NYL\_750436  
**CONDITION AS-RECEIVED** : Used item  
**CUSTOMER** : ALS Laboratory group (Thailand) Co., Ltd.  
104 Phatthanasiri 40, Phatthanasiri Rd,  
Bangkok Suan Luang, Khwaet Suan Luang,  
Bangkok 10250 Thailand.

**RECEIVED DATE** : 10 Dec 2025  
**MEASUREMENT DATE** : 10 Dec 2025  
**ISSUE DATE** : 10 Dec 2025

### Calibration procedure:

The Digital barometer was calibrated against Digital pressure calibrator. The (W-C-001) was used as a calibration guideline.

### Traceability:

The measurement results are traceable to the International system of units (SI) through the NIST (National Institute of Standards and Technology) via Certificate number: NIST-0017-25

### Reference Used During Calibration:

1. Absolute Pressure Transducer  
Model: (W-C-001), Serial No.: 410026P

### Uncertainty of Measurement:

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

### CONDITION OF THIS RESULT OF CALIBRATION:

1. Calibration effort for calibration sequence C
2. The UUC\* was installed in vertical orientation above reference standard instrument and center of UUC\* was used as the reference level.
3. Calibration conditions:
4. Condition:
  - ☒ Normal ☐ Abnormal
  - Pressure transmitting medium: Air
  - $p_0$  (DPC, 1 bar): 1.181 kgf/cm<sup>2</sup>
  - $p_{max}$ : 149.2 kgf/cm<sup>2</sup>
  - Temp: 23.646°C
  - Hum: 55.14 hPa
5. The certificate is valid only to the item calibrated on date and place of calibration

Calibrated by:  
Mr. Pichay Boonchuan  
Mr. Pichay Boonchuan  
Mr. Pichay Boonchuan



Approved signature:

Mr. Pichay Boonchuan  
Calibration Department Manager

THIS CERTIFICATE REPORT MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY

## CERTIFICATE OF CALIBRATION

Certificate No. : CFB-034-68

Page 2 of 2 Pages

**MEASUREMENT RESULTS** : ☐ Without adjustment ☒ With adjustment

**CALIBRATION IN THE RANGE OF** : 1250 mbar to 1550 mbar

The results of calibration and associated measurement uncertainties are reported in the table below.

| STD<br>(mbar) | UUC*<br>(mbar) | Error<br>(mbar) | Uncertainty (k=2)<br>(mbar) |
|---------------|----------------|-----------------|-----------------------------|
| 950.00        | 950.8          | 0.8             | 0.28                        |
| 950.55        | 951.5          | 0.5             | 0.37                        |
| 950.65        | 952.2          | 0.2             | 0.37                        |
| 1000.01       | 1000.9         | -0.1            | 0.37                        |
| 1000.00       | 1000.8         | -0.4            | 0.37                        |
| 1049.97       | 1049.0         | -0.0            | 0.37                        |

Note: UUC\* Unit Under Calibration

To convert the result in report unit to Pa should be multiply by 100

\*End of certificate\*



## CALIBRATION REPORT

Calibration Number: PD-04122025  
Page 1 of 2 Pages

**Measurement Item** : Flow gauge with data logger  
**Manufacturer** : Data logger: Navalyte  
Flow gauge: Navalyte  
**Model/Type** : Data logger: 110-W5-250L-0  
Flow gauge: 110-W5-250P  
**Serial Number** : Data logger: A5445  
Flow gauge: PD-A5445  
**ID NO** : NYL\_750436  
**Customer** : ALS Laboratory group (Thailand) Co., Ltd.  
104 Phatthanasiri 40, Phatthanasiri Rd, Bangkok Suan Luang, Khwaet Suan Luang,  
Bangkok 10250, Thailand.

### Environmental Condition:

The measurement was carried out in an ambient temperature of 23.64°C and relative humidity of 55.14%.

### Measurement Method:

The flow gauge (Unit Under Calibration: UUC) was calibrated by Thomson reference bottle with flow equal to one rate (1.5 m³ per minute) in 10 seconds. The flow gauge was determined by procedure below.

1. Obtain flow gauge test item:  
Flow gauge (nominal diameter in mm = Diameter) = 1.5 m³  
Flow gauge area = 110.7514 (3.66 diameter) = 0.01 m²  
Flow gauge area = 330.17 cm²
2. Obtain theoretical correct flow gauge (flow) (number of filling) using 330.17 cm² and area and 0.5 L of rate:  
a) 10.000 cm³ / 330.17 cm² flow area = 30.29 (cm³ per cm²)  
b) 30.29 \* 0.5 L, volume = 15.145 cm³ area of flow area 1 m² surface 0.5 L of rate volume on the flow gauge area = 15.145 cm³ of rate  
c) Number of filling = 15.145 / 0.25 = 61 fillings

Note: Flow gauge is fully cleaned and flushing prior the calibration performed.

**Measurement Date** : Oct 14, 2025  
**Issue Date** : Oct 15, 2025

Performed by:  
Mr. Pichay Boonchuan  
Mr. Pichay Boonchuan



Approved signature:

Mr. Pichay Boonchuan  
Calibration Department Manager

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Continuation of Calibration of Calibration Number

Calibration Number: PD-04122025  
Page 2 of 2 Pages

**Result of Calibration:** ☐ Without Adjustment ☒ With Adjustment  
The results of calibration are reported in table below.

| Quantity of H <sub>2</sub> O<br>(ml) | Observed Tipping | Tipping count | Accepted Tipping count |
|--------------------------------------|------------------|---------------|------------------------|
| 500                                  | 61               | 61            | 59 - 63                |
| 500                                  | 61               | 61            | 59 - 63                |
| 500                                  | 61               | 61            | 59 - 63                |
| 500                                  | 61               | 61            | 59 - 63                |
| 500                                  | 61               | 61            | 59 - 63                |

Remark: The procedure is made to verify the correct reading of the Unit Under Calibration flow gauge when a precise volume of water (500 ml) is used. We suggest that the number of tipping should be within 10% allowed from the 61 tipping (correct range 59-63) tipping if more than the flow gauge needs the manufacturer acceptable (61).

\*\*End of calibration report\*\*





## CERTIFICATE OF CALIBRATION

Certificate No. : CDT-139-48

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER : Data Logger with Temperature sensor  
MODEL/TYPE : Niveline  
SERIAL NUMBER : 200-W5-25.8  
ID NUMBER : NS263  
CONDITION AS-RECEIVED : NOL\_0010

**RECEIVED DATE** : 20 Nov 2025  
**MEASUREMENT DATE** : 27 Nov 2025  
**ISSUE DATE** : 28 Nov 2025

### ENVIRONMENTAL CONDITIONS

Ambient condition in the laboratory are as follow:  
Temperature :  $23.0 \pm 0.5$  °C  
Relative Humidity :  $55.0 \pm 5.0$  %RH

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

### TABULATION OF RESULTS

The table on next page give the measured values.

**Calibration procedure:**  
The temperature calibration was done by In-House calibration method (ISO 9001:2015) according to comparison method with standard digital temperature indicator and standard temperature probe. The perspective scale was used based on ITS-90.

**Traceability:**  
The measurement results are traceable to the International System of Units (SI) through National Institute of Metrology (Thailand) (NIMT) Certificate number: 17-1023-25, Certificate number: EN-0063-25.

### Reference Used During Calibration:

1. Standard Temperature Probe  
Model: STS-100-A300, Serial No.: 887602-01, Due date: 8 Apr 2026  
2. Digital Temperature Indicator  
Model: DTI-1000-A-MV1, Serial No.: 873407-0003, Due date: 22 Apr 2026

### Uncertainty of Measurement:

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

Calibrated by:  
☒ Mr. Sereeth Thairat  
☒ Mr. Nattaporn Lertsomphol  
☒ Mr. Nattaporn Lertsomphol



Approved signature

Mr. Panyee Booncharoen  
Calibration Department Manager

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Continuation of Certificate of Calibration Number CDT-139-48

Page 2 of 2 Pages

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

**Calibration Range:**  $20\text{ }^{\circ}\text{C}$  to  $40\text{ }^{\circ}\text{C}$

### RESULTS

Table 1: This equipment was connected with temperature sensor Model: HMW60 S/N: H0330796, Dimensions: Diameter 12 mm, Length 80 mm.

| Immersion Depth (mm) | Standard Reading (°C) | LMC Reading (°C) | Error (°C) | Uncertainty (°C) |
|----------------------|-----------------------|------------------|------------|------------------|
| 80                   | 20.096                | 20.7             | -0.6       | 0.019            |
| 80                   | 25.055                | 24.7             | -0.4       | 0.019            |
| 80                   | 30.039                | 29.7             | -0.3       | 0.019            |
| 80                   | 35.024                | 34.7             | -0.3       | 0.019            |
| 80                   | 40.008                | 39.5             | -0.5       | 0.019            |

LMC: Unit Under Calibration

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



## CERTIFICATE OF CALIBRATION

Certificate No. : CDT-036-68

Page 1 of 2 Pages

**MEASUREMENT ITEM**  
MANUFACTURER : Niveline  
MODEL/TYPE : Data Logger: D00-W5-23.8  
Sensor: HMW60  
SERIAL NUMBER : Data Logger: M0268  
Sensor: H0330796  
ID NUMBER : REC\_P00002  
CONDITION AS-RECEIVED : NOL\_0010

**RECEIVED DATE** : 28 Nov 2025  
**MEASUREMENT DATE** : 27 Nov 2025  
**ISSUE DATE** : 28 Nov 2025

### ENVIRONMENTAL CONDITIONS

Ambient condition in the laboratory are as follow:  
Temperature :  $23.0 \pm 0.5$  °C  
Relative Humidity :  $55.0 \pm 5.0$  %RH

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

### TABULATION OF RESULTS

The table on next page give the measured values.

**Calibration procedure:**  
The Relative Humidity and Air Temperature calibration was done by In-House calibration method as per ISO 9001:2015 and ISO 17025:2017 according to comparison method with standard digital humidity meter and standard temperature probe. The perspective scale was used based on ITS-90.

**Traceability:**  
The measurement results are traceable to the International System of Units (SI) through National Institute of Metrology (Thailand) (NIMT) Certificate number: 17-1023-24 and Jirantee Associates Co., Ltd. Certificate number: CDT-036-68.

### Uncertainty of Measurement:

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

Calibrated by:  
☒ Mr. Sereeth Thairat  
☒ Mr. Nattaporn Lertsomphol  
☒ Mr. Nattaporn Lertsomphol



Approved signature

Mr. Panyee Booncharoen  
Calibration Department Manager

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Continuation of Certificate of Calibration Number CDT-036-68

Page 2 of 2 Pages

### Measurement Results

The results of calibration and associated measurement uncertainties are reported in the table below.

**Result of Calibration:** ☒ Without Adjustment ☐ With Adjustment

Table 1: The results of calibration of relative humidity at  $20\text{ }^{\circ}\text{C}$  are reported in table below.  
Calibration Range: 20%RH to 80%RH

| Air Temperature (°C) | Standard Reading (%RH) | LMC Reading (%RH) | Error (%RH) | Uncertainty (%RH) |
|----------------------|------------------------|-------------------|-------------|-------------------|
| 20.04                | 55.06                  | 55.3              | -0.3        | 0.79              |
| 20.08                | 59.05                  | 59.4              | -0.4        | 1.3               |
| 20.08                | 60.05                  | 60.4              | -0.4        | 1.7               |

LMC: Unit Under Calibration

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



## Certificate of System Qualification

GC-QC - GCMS-QC

System ID: RYG\_EN0136  
Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.  
Organization Location: 615/10, Moo 5, Tambon Mae Nam Kho, Phrak Daeng, Rayong 21140, Thailand  
Date: July 4, 2025 10:49:25 AM  
EOP Name: AgilentRecommended - AgilentRecommended  
EOP Revision: GC-02-04, GCMS-02-04  
Overall Qualification Status: Pass

REVIEW BY Chantida  
APPROVED BY D. K.  
NEXT CAL DATE 01/01/27

## CDS Logon Verification - GC

Logon: dronkida.thunkase

## Overall CDS Logon Verification - GC Test Status

Pass

## System Inspection and Basic Safety and Operation

Name: 7892

Setpoint Status: Pass

## Overall System Inspection and Basic Safety and Operation Test Status

Pass

## Inlet Pressure Accuracy

Name: 7892

From: SSL

Setpoint Status: Pass

|                 | Setpoint | Actual   |
|-----------------|----------|----------|
| Inlet Pressure: | 25.0 psi | 24.9 psi |

|                      |           |
|----------------------|-----------|
| Accuracy:            | 0.1 psi   |
| Agilent Recommended: | ± 1.2 psi |

Date: July 4, 2025 10:49:25 AM  
System ID: RYG\_EN0136

Page 1 of 10

## Overall Inlet Pressure Accuracy Test Status

Pass

## GC Oven Temperature Accuracy

Name: 7892

Setpoint Status: Pass

Zone: Oven

|              |       |     |    |
|--------------|-------|-----|----|
| Temperature: | 230.0 | 231 | °C |
|--------------|-------|-----|----|

Accuracy: 1.0 °C

|                      |         |                 |             |
|----------------------|---------|-----------------|-------------|
| Agilent Recommended: | >= -1.0 | % setpoint in K | ( -5.0 °C ) |
|                      | <= 1.0  | % setpoint in K | ( 5.0 °C )  |

Setpoint Status: Pass

Zone: Oven

|              |       |      |    |
|--------------|-------|------|----|
| Temperature: | 100.0 | 99.8 | °C |
|--------------|-------|------|----|

Accuracy: -0.2 °C

|                      |       |                 |             |
|----------------------|-------|-----------------|-------------|
| Agilent Recommended: | ± 1.0 | % setpoint in K | ( -3.7 °C ) |
|                      | ± 1.0 | % setpoint in K | ( 3.7 °C )  |

## Overall GC Oven Temperature Accuracy Test Status

Pass

## GC Oven Temperature Stability

Name: 7892

Setpoint Status: Pass

|              |       |          |    |
|--------------|-------|----------|----|
| Temperature: | 100.0 | 99.81667 | °C |
|--------------|-------|----------|----|

Stability: 0.1 °C

Agilent Recommended: ± 0.5

## Overall GC Oven Temperature Stability Test Status

Pass

Date: July 4, 2025 10:49:25 AM  
System ID: RYG\_EN0136

Page 2 of 10

## Log Amp

Tested Combination: Front SSL / External SQ

Name: 5877B

Setpoint Status: Pass

## Overall Log Amp Test Status

Pass

## RPPA

Tested Combination: Front SSL / External SQ

Name: 5877B

Setpoint Status: Pass

|       |      |    |                           |   |    |               |     |    |
|-------|------|----|---------------------------|---|----|---------------|-----|----|
| Ampl: | 1050 | mV | Drift After Five Minutes: | 7 | mV | RPPA Voltage: | 993 | mV |
|-------|------|----|---------------------------|---|----|---------------|-----|----|

Agilent Recommended: ± 100 and ± 100 ± 1100

## Overall RPPA Test Status

Pass

## Time EI

Tested Combination: Front SSL / External SQ

Name: 5877B

Setpoint Status: Pass

Flame: 1

Setpoint Status: Pass

Flame: 2

## Overall Time EI Test Status

Pass

## Scouting Run

Date: July 4, 2025 10:49:25 AM  
System ID: RYG\_EN0136

Page 3 of 10

Tested Combination: Front SSL / External SQ

Manual Injection

Name: Not applicable

Source: EI - Extractor

Setpoint Status: Completed

Injection Volume on Column: 1.0 µL

## Overall Scouting Run Status

Completed

## Signal to Noise EI

Tested Combination: Front SSL / External SQ

Name: 5877B

Source: EI - Extractor

Flame: 1

Setpoint Status: Pass

Signal to Noise: 1882

Agilent Recommended: ± 1200

Source: EI - Extractor

Flame: 2

Setpoint Status: Pass

Signal to Noise: 1542

Agilent Recommended: ± 1200

## Overall Signal to Noise EI Test Status

Pass

Date: July 4, 2025 10:49:25 AM  
System ID: RYG\_EN0136

Page 4 of 10





User Name: nsk2024\_junggoe  
Report Generated by: NIST/EN15188

System ID: NIST\_202408  
Print Date: July 4, 2025 10:48:27 AM

ALA, EN, ISO, EN15188, ISO Temperature log:

| Date                     | Transaction | Activity  | Type of Transaction | Optional Information          |
|--------------------------|-------------|-----------|---------------------|-------------------------------|
| July 4, 2025 10:11:28 AM | Start       | Reporting | Session             | None                          |
| July 4, 2025 10:36:25 AM | Apply       | Reporting | Session             | Report Generated: Certificate |
| July 4, 2025 10:36:02 AM | Apply       | Reporting | Session             | Report Generated: Report      |
| July 4, 2025 10:35:03 AM | Apply       | Reporting | Session             | Report Generated: Certificate |
| July 4, 2025 10:43:07 AM | Apply       | Reporting | Session             | Report Generated: Report      |
| July 4, 2025 10:47:04 AM | Apply       | Reporting | Session             | Report Generated: Certificate |
| July 4, 2025 10:47:40 AM | Apply       | Reporting | Session             | Report Generated: Report      |

Page 3/10

Date: July 4, 2025 10:48:25 AM  
System ID: NIST\_202408

Page 10/11

### Certificate of Calibration

#### Customer

Name: ALB Laboratory Group Thailand Co., Ltd.

Address: 100 Soi Phatthanasak 46, Phatthanasak Road, Suan Luang, Bangkok

HSN:

Certificate No.: 25-AFM-218

Request No.: Req-2025-1968

#### Unit Under Calibration Details

Measurement Item: Air Flow Meter

Manufacturer: Mesa Lab

Model: 200-310M

Serial Number: 151114

ID: BCK, 250614

Location of Calibration: LAB 4 AIR VELOCITY METER

#### Calibration Environment and Details

Temperature: 25 °C ± 0.5 °C

Humidity: 55 %RH ± 20 %RH

Barometric Pressure: 1013 hPa ± 10 hPa

Received Date: 3 September 2025

Calibration Date: 10 September 2025

Calibration Procedure: In-house method CP-ATM-01 by Comparison technique with Standard Primary Flow Calibration

| Reference Standard | Model                      | Serial Number   | Traceable | Due Calibration |
|--------------------|----------------------------|-----------------|-----------|-----------------|
| Air Flow Meter     | Gilibrator 3 Low Flow      | 10301010006     | Senolytic | 3 May 2026      |
| Air Flow Meter     | Gilibrator 3 Standard Flow | 19031010010     | Senolytic | 6 May 2026      |
| Temperature sensor | GT 11                      | 00000007        | Quintec   | 15 October 2025 |
| Pressure sensor    | CPG2400                    | 410000001451002 | TPA       | 21 October 2025 |

#### Traceability:

This Certificate is traceable to SI Unit through Senolytic A2LA Accreditation No. 1943-01 and MET NIST-TIS-TIS Accreditation No. 0022

#### Note:

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

Calibration By:

Mr. Nopphol Junggoe

Service Calibration Engineer

Approved By:

Mr. Pich Mahaveen

Calibration Engineer Supervisor

Issue Date:

10 September 2025

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

FM-728-AFM-01 Rev.05 Issue Date 21/2/25

Certificate No.: 25-AFM-218

Request No.: Req-2025-1968

#### Result of Calibration: Without Adjustment

| STD Reading         |                   |                  | UUC Reading         |                   |                  | Error<br>(cc/min) | Uncertainty |      |       |
|---------------------|-------------------|------------------|---------------------|-------------------|------------------|-------------------|-------------|------|-------|
| Temperature<br>(°C) | Pressure<br>(kPa) | Flow<br>(cc/min) | Temperature<br>(°C) | Pressure<br>(kPa) | Flow<br>(cc/min) |                   | (cc/min)    | (°C) | (kPa) |
| 25.5                | 100.54            | 100              | -                   | -                 | 100.02           | 0.0               | 3.6         | 1.0  | 0.50  |
| 25.7                | 100.47            | 303              | -                   | -                 | 300.81           | -2.2              | 4.5         | 1.0  | 0.50  |
| 25.8                | 100.49            | 1003             | -                   | -                 | 1000.4           | -3                | 19          | 1.0  | 0.50  |
| 26.1                | 100.58            | 2000             | -                   | -                 | 2001.9           | 2                 | 38          | 1.0  | 0.50  |
| 26.5                | 100.65            | 3004             | -                   | -                 | 3002.2           | -12               | 57          | 1.0  | 0.50  |
| 26.7                | 100.81            | 4027             | -                   | -                 | 4000.9           | -26               | 76          | 1.0  | 0.50  |
| 27.8                | 100.74            | 5048             | -                   | -                 | 5001.8           | -46               | 95          | 1.0  | 0.50  |

Note: STD: Standard UUC: Unit Under Calibration  
- UUC Reference Condition: At atmospheric pressure and room temperature condition, Air  
- Flow Rate was corrected for non-standard operating condition by using equation:

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P_{meas}} \times \frac{T_{meas}}{T_{ref}}$$

Where: Q = Flow Rate P = Absolute Pressure T = Absolute Temperature  
meas = Measurement Condition ref = Standard Condition

\* 2025/09/06, corrected

Total of Certificate

### Certificate of Calibration

#### Customer

Name: ALB Laboratory Group Thailand Co., Ltd.

Address: 100 Soi Phatthanasak 46, Phatthanasak Road, Suan Luang, Bangkok

HSN:

Certificate No.: 25-AFM-218

Request No.: Req-2025-1968

#### Unit Under Calibration Details

Measurement Item: Air Flow Meter

Manufacturer: Mesa Lab

Model: 200-310M

Serial Number: 151114

ID: BCK, 250614

Location of Calibration: LAB 4 AIR VELOCITY METER

#### Calibration Environment and Details

Temperature: 25 °C ± 0.5 °C

Humidity: 55 %RH ± 20 %RH

Barometric Pressure: 1013 hPa ± 10 hPa

Received Date: 3 September 2025

Calibration Date: 10 September 2025

Calibration Procedure: In-house method CP-ATM-01 by Comparison technique with Standard Primary Flow Calibration

| Reference Standard | Model                      | Serial Number   | Traceable | Due Calibration |
|--------------------|----------------------------|-----------------|-----------|-----------------|
| Air Flow Meter     | Gilibrator 3 Low Flow      | 10301010006     | Senolytic | 3 May 2026      |
| Air Flow Meter     | Gilibrator 3 Standard Flow | 19031010010     | Senolytic | 6 May 2026      |
| Temperature sensor | GT 11                      | 00000007        | Quintec   | 15 October 2025 |
| Pressure sensor    | CPG2400                    | 410000001451002 | TPA       | 21 October 2025 |

#### Traceability:

This Certificate is traceable to SI Unit through Senolytic A2LA Accreditation No. 1943-01 and MET NIST-TIS-TIS Accreditation No. 0022

#### Note:

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

Calibration By:

Mr. Nopphol Junggoe

Service Calibration Engineer

Approved By:

Mr. Pich Mahaveen

Calibration Engineer Supervisor

Issue Date:

10 September 2025

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

FM-728-AFM-01 Rev.05 Issue Date 21/2/25



Standard References (Table 1)

| Standard                                    | Certificate No. | Vendor | Due date  |
|---------------------------------------------|-----------------|--------|-----------|
| Oxygen (O <sub>2</sub> ) 2.50 % Vol         | 2412/23         | Uncle  | 27-Aug-27 |
| Oxygen (O <sub>2</sub> ) 9.994 % Vol        | CG-0113-24      | Nest   | 01-Aug-25 |
| Oxygen (O <sub>2</sub> ) 21.02 % Vol        | CG-0061-22      | Nest   | 10-Feb-27 |
| Carbon monoxide (CO) 80.18 ppm              | CG-0062-24      | Nest   | 11-Jun-25 |
| Carbon monoxide (CO) 302 ppm                | 1815/23         | Uncle  | 16-Jun-25 |
| Carbon monoxide (CO) 1007 ppm               | 1810/24         | Uncle  | 17-Jun-26 |
| Nitric Oxide (NO) 30.0 ppm                  | CG-0063-24      | Nest   | 06-May-26 |
| Nitric Oxide (NO) 151.5 ppm                 | 0161/23         | Uncle  | 27-Jun-25 |
| Nitric Oxide (NO) 322.5 ppm                 | 1974/23         | Uncle  | 17-Jul-25 |
| Sulfur Dioxide (SO <sub>2</sub> ) 50.36 ppm | 2001/23         | Uncle  | 17-Jul-25 |
| Sulfur Dioxide (SO <sub>2</sub> ) 100.8 ppm | 2007/23         | Uncle  | 09-Nov-24 |
| Sulfur Dioxide (SO <sub>2</sub> ) 600.8 ppm | 2003/23         | Uncle  | 17-Jul-25 |

Measured room conditions

Temperature : 23.8 °C Humidity : 59.7 %RH Pressure : 1013.1 mbar

Calibration conditions

Gas Temperature : 23 °C Flow rate : 600 mL/min Gas pressure : 1012.4 mbar

Calibration Results (Before adjustment) (Table 2)

| Parameter of Standard | Standard Values | Mean of UUC | Error  | Uncertainty (1) |
|-----------------------|-----------------|-------------|--------|-----------------|
| O <sub>2</sub> (%Vol) | 2.50            | 2.47        | -0.03  | 0.15            |
| O <sub>2</sub> (%Vol) | 9.994           | 9.92        | -0.074 | 0.20            |
| O <sub>2</sub> (%Vol) | 21.02           | 21.11       | 0.09   | 0.30            |
| CO (ppm)              | 80.18           | 77          | -3.18  | 3.0             |
| CO (ppm)              | 302             | 295         | -7     | 6.0             |
| CO (ppm)              | 1007            | 986         | -21    | 12              |
| NO (ppm)              | 30.0            | 27          | -3.0   | 8.0             |
| NO (ppm)              | 151.5           | 147         | -4.5   | 8.0             |
| NO (ppm)              | 322.5           | 311         | -11.5  | 12              |
| SO <sub>2</sub> (ppm) | 50.36           | 51          | 0.64   | 6.0             |
| SO <sub>2</sub> (ppm) | 100.8           | 102         | 1.2    | 6.0             |
| SO <sub>2</sub> (ppm) | 600.8           | 603         | 2.2    | 13              |

Calibration Results (After adjustment) (Table 3)

| Parameter of Standard | Standard Values | Mean of UUC | Error  | Uncertainty (1) |
|-----------------------|-----------------|-------------|--------|-----------------|
| O <sub>2</sub> (%Vol) | 2.50            | 2.47        | -0.03  | 0.15            |
| O <sub>2</sub> (%Vol) | 9.994           | 9.92        | -0.074 | 0.20            |
| O <sub>2</sub> (%Vol) | 21.02           | 21.11       | 0.09   | 0.30            |
| CO (ppm)              | 80.18           | 80          | -0.18  | 3.0             |
| CO (ppm)              | 302             | 302         | 0      | 6.0             |
| CO (ppm)              | 1007            | 1004        | -3     | 12              |
| NO (ppm)              | 30.0            | 31          | 1.0    | 8.0             |
| NO (ppm)              | 151.5           | 153         | 1.5    | 8.0             |
| NO (ppm)              | 322.5           | 321         | -1.5   | 12              |
| SO <sub>2</sub> (ppm) | 50.36           | 51          | 0.64   | 6.0             |
| SO <sub>2</sub> (ppm) | 100.8           | 100         | -0.8   | 6.0             |
| SO <sub>2</sub> (ppm) | 600.8           | 603         | 2.2    | 13              |

Remark : 1 cmol/mol = 1 %mol, 1 ppm/mol = 1 ppm.

End of Report

Certificate of Calibration

Customer

Name : ALS Laboratory Group Thailand Co., Ltd.  
Address : 104 Soi Phothongkarn 48, Phothongkarn Road, Nong Luang,  
Bangkok 10250

Certificate No : 25-A158-023

Request No : Req-2023-0169

Unit Under Calibration Details

Measurement Item : Air Flow Meter  
Manufacturer : Mesa Labs  
Model : 200-210L  
Serial Number : 110027  
ID : XYG\_P30208

Accuracy : (% of Reading)

Serial Model : -

Serial Serial Number : -

Instrument Status : Good

Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : 25 °C ± 0.5 °C  
Humidity : 55 %RH ± 20 %RH  
Barometric Pressure : 1013 hPa ± 10 hPa  
Received Date : 21 January 2025  
Calibration Date : 27 January 2025

Calibration Procedure : Reference method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator

| Reference Standard | Model                      | Serial Number  | Traceable | Due Calibration |
|--------------------|----------------------------|----------------|-----------|-----------------|
| Air Flow Meter     | GRF Series 3 Low Flow      | 18301110808    | Senolyne  | 6 August 2025   |
| Air Flow Meter     | GRF Series 3 Standard Flow | 18401011003    | Senolyne  | 2 August 2025   |
| Temperature meter  | QT 11                      | 18060037       | Qchere    | 1 March 2025    |
| Pressure meter     | CPG2400                    | 43000600010402 | TPA       | 21 October 2025 |

Traceability :

This Certificate is traceable to SI Unit through Senolyne A2LA Accreditation No. 3043 01

Note :

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

Calibration By :  
Mr. Noppakorn Uengsart  
Service Calibration Engineer

Approved By :  
Mr. Pook Mathayom  
Calibration Engineer Supervisor

Issue Date : 27 January 2025

Certificate No : 25-A158-023

Request No : Req-2023-0169

Results of Calibration : Without Adjustment

| Temperature<br>(°C) | Pressure<br>(kPa) | STD<br>(cc/min) | UUC<br>(cc/min) | Error<br>(cc/min) | Uncertainty<br>(cc/min) | MPE<br>(cc/min) | Result |
|---------------------|-------------------|-----------------|-----------------|-------------------|-------------------------|-----------------|--------|
| 22.20               | 108.00            | 20              | 18.624          | -0.1              | 1.3                     | 0.2             | Pass   |
| 22.20               | 108.00            | 50              | 48.732          | -0.3              | 3.2                     | 0.5             | Pass   |
| 22.60               | 108.00            | 100             | 106.77          | -0.2              | 2.5                     | 1.0             | Pass   |
| 22.70               | 108.00            | 125             | 130.23          | -0.8              | 4.2                     | 1.5             | Pass   |
| 22.70               | 108.00            | 300             | 286.39          | -0.8              | 9.6                     | 2.0             | Pass   |
| 22.70               | 108.00            | 500             | 586.69          | -0.3              | 8.4                     | 3.0             | Pass   |
| 22.80               | 108.00            | 600             | 682.86          | 3.8               | 11                      | 4.0             | Pass   |
| 23.10               | 108.00            | 800             | 884.62          | 4.8               | 7.2                     | 5.0             | Pass   |

Note

STD : Standard UUC : Unit Under Calibration  
- UUC Reference Condition : At atmospheric pressure and room temperature condition  
- Flow Rate was corrected for non-standard operating condition by using equation :

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P_{meas}} \times \frac{T_{meas}}{T_{ref}}$$

where :  $Q$  = Flow Rate  $P$  = Absolute Pressure  $T$  = Absolute Temperature  
Meas = Measurement Condition ref = Standard Condition

\* Indicates non accredited

MPE = Maximum Permissible Error (Specified in Manufacturer's Specifications)

N/A = Not Available, Customer does not require a statement of conformity

Certificate No : 25-AFM-023  
Request No : Req-2023-0169

#### Decision Rule for Statements of Conformity

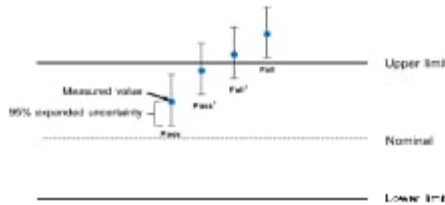
The standard decision rule employed for the statements of conformity to each calibration result will be applied using ILAC-G8:2019, Guidelines on the Reporting of Compliance with Specification as following Fig. and statements

$P_{me}$  = The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

$P_{me}^1$  = The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit.

$P_{me}^2$  = The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement at 95% is within the limit.

$P_{me}$  = The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



End of Certificate

This is valid only for the instrument calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev.04 Issue date 17/6/24

#### Certificate of Calibration

Certificate No : 24-AFM-178  
Request No : Req-2024-0187

Customer : AJS Laboratory Group Thailand Co., Ltd.  
Address : 104 Soi Phatthanakorn 46, Phatthanakorn Road, Nong Luang,  
Bangkok 10250

#### Calibration Details

Measurement Item : Air Flow Meter  
Manufacturer : Misco, Inc.  
Model : Deluder 110-M  
Serial Number : 331118  
ID : BUK\_P50614  
Location of Calibration : LAB 4-AJS VELOCITY METER

Accuracy : 1% of Reading  
Sensor Model :  
Sensor Serial Number :  
Instrument Status : Good

#### Calibration Environment and Details

Temperature : 23.1 °C ± 0.5 °C  
Humidity : 55.5%RH ± 2.0%RH  
Barometric Pressure : 1013 hPa ± 10 hPa  
Revised Date : 01 August 2024  
Calibration Date : 09 September 2024

Calibration Procedure : In house method (JIS-AFM-01) by Comparison technique with Standard Primary Flow Calibration

| Reference Standard | Model                      | Serial Number  | Traceable | Due Calibration  |
|--------------------|----------------------------|----------------|-----------|------------------|
| Air Flow Meter     | Calibrator 3 Low Flow      | 1870101000     | Standard  | 04 August 2025   |
| Air Flow Meter     | Calibrator 3 Standard Flow | 1901011001     | Standard  | 02 August 2025   |
| Temperature sensor | GT 11                      | 99000077       | Quincy    | 01 March 2025    |
| Pressure sensor    | CPG3404                    | 41000610101182 | TFA       | 09 November 2024 |

#### Traceability :

This Certificate is traceable to SI Unit through Singapore A2LA Accreditation No. 1947.01

#### Note :

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

Calibration By :   
Mr. Suppachon Luangman  
Service Calibration Engineer

Approved By :   
Mr. Panch Mahachon  
Calibration Engineer Supervisor  
Issue Date : 09 September 2024

This certificate valid only for the instrument calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev.04 Issue date 17/6/24

Certificate No : 24-AFM-178  
Request No : Req-2024-0187

#### Result of Calibration (Without Adjustment)

| Temperature<br>(°C) | Pressure<br>(kPa) | STD<br>(m/min) | UUC<br>(m/min) | Error<br>(m/min) | Uncertainty<br>(m/min) | MPE<br>(m/min) | Result |
|---------------------|-------------------|----------------|----------------|------------------|------------------------|----------------|--------|
| 24.70               | 100.95            | 108            | 101.43         | 0.4              | 2.8                    | 3.0            | N/A    |
| 24.90               | 100.96            | 102            | 100.47         | -1.0             | 3.1                    | 3.0            | N/A    |
| 24.98               | 100.97            | 100            | 100.3          | -2               | 14                     | 10.0           | N/A    |
| 25.04               | 100.97            | 101.4          | 100.8          | 4                | 29                     | 30.1           | N/A    |
| 25.20               | 101.01            | 104.5          | 105.2          | 17               | 44                     | 30.4           | N/A    |
| 25.34               | 101.10            | 404.5          | 405.1          | -16              | 57                     | 44.6           | N/A    |
| 25.39               | 101.13            | 102            | 100.9          | -40              | 16                     | 30.2           | N/A    |

Note : STD : Measured UUC : Uncertainty Calibration  
- UUC Reference Condition : At atmospheric pressure and room temperature condition  
- Flow Rate was corrected for more standard operating condition by using equation :

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P_{me}} \times \frac{T_{me}}{T_{ref}}$$

where :  $Q$  = Flow Rate  $P$  = Absolute Pressure  $T$  = Absolute Temperature  
Meas = Measurement Condition ref = Standard Condition

\* Indication was recorded

MPE = Maximum Permissible Error (Specified in Manufacturer's Specification)

N/A = Not Available, Customer does not require a statement of conformity.

Certificate No : 24-AFM-178  
Request No : Req-2024-0187

#### Decision Rule for Statements of Conformity

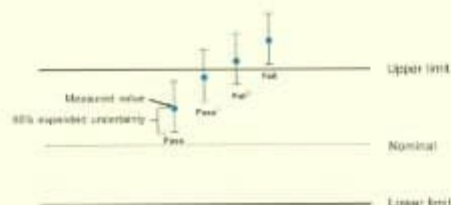
The standard decision rule employed for the statements of conformity to each calibration result will be applied using ILAC-G8:2019, Guidelines on the Reporting of Compliance with Specification as following Fig. and statements

$P_{me}$  = The measurement result plus the expanded uncertainty with a 95% coverage probability were within the limit.

$P_{me}^1$  = The measurement result was within the limit. However, a portion of the expanded uncertainty of measurement at 95% exceeds the limit.

$P_{me}^2$  = The measurement result was out of the limit. However, a portion of the expanded uncertainty of measurement at 95% is within the limit.

$P_{me}$  = The measurement result plus the expanded uncertainty with a 95% coverage probability were outside the limit.



End of Certificate

This certificate valid only for the instrument calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev.04 Issue date 17/6/24

This certificate valid only for the instrument calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev.04 Issue date 17/6/24



## Certificate of Calibration

Certificate No. C-00025-RYG\_FS0519

### Air Sampling Pump Detail

|                |                            |                       |            |
|----------------|----------------------------|-----------------------|------------|
| Equipment name | Personal Air Sampling Pump | Equipment ID          | RYG_FS0519 |
| Brand          | Grain                      | Serial No.            | 2000110090 |
| ModelType      | Grain Plus                 | Calibration Date      | 22-Jun-25  |
|                |                            | Next calibration date | 22-Oct-25  |

### Reference Standard Low Flow Meter

|                |                |                  |            |
|----------------|----------------|------------------|------------|
| Equipment name | Air Flow Meter | Equipment ID     | RYG_FS0208 |
| Brand          | Metal-ite      | Serial No.       | 130007     |
| ModelType      | Defender 510-L | Calibration Date | 27-Jan-25  |
|                |                | Due Date         | 25-Apr-25  |

### Reference Standard High Flow Meter

|                |                |                  |            |
|----------------|----------------|------------------|------------|
| Equipment name | Air Flow Meter | Equipment ID     | RYG_FS0814 |
| Brand          | Metal-ite      | Serial No.       | 151116     |
| ModelType      | Defender 510-M | Calibration Date | 3-Sep-24   |
|                |                | Due Date         | 3-Sep-25   |

### Calibration Data

| Air Sampling Pump setting (cc/min) | Reference Std. Flow Reading (cc/min) |        |        | Avg. (cc/min) | %Error acceptance | Acceptable range (cc/min) | Evaluation (Pass/Fail) |
|------------------------------------|--------------------------------------|--------|--------|---------------|-------------------|---------------------------|------------------------|
|                                    | 1                                    | 2      | 3      |               |                   |                           |                        |
| <b>Low Flow</b>                    |                                      |        |        |               |                   |                           |                        |
| 20                                 | 20.4                                 | 20.0   | 20.2   | 20.5          | 5%                | 18 - 21                   | Pass                   |
| 50                                 | 49.2                                 | 51.1   | 50.9   | 50.4          | 5%                | 48 - 53                   | Pass                   |
| 100                                | 99.3                                 | 104.3  | 102.1  | 101.9         | 5%                | 95 - 105                  | Pass                   |
| 200                                | 199.8                                | 201.1  | 210.9  | 203.3         | 5%                | 190 - 210                 | Pass                   |
| <b>High Flow</b>                   |                                      |        |        |               |                   |                           |                        |
| 500                                | 495.9                                | 497.8  | 498.5  | 497.7         | 3%                | 495 - 515                 | Pass                   |
| 1000                               | 999.8                                | 1008.6 | 1006.3 | 1004.2        | 3%                | 970 - 1030                | Pass                   |
| 2000                               | 1999.8                               | 2001.8 | 2002.2 | 2001.3        | 3%                | 1940 - 2060               | Pass                   |
| 2500                               | 2496.7                               | 2492.8 | 2499.1 | 2496.2        | 3%                | 2425 - 2575               | Pass                   |

### END OF REPORT

Calibrated By:   
(Mr. Natchapon Thumkang)  
RYG Field Services Scientist (1)  
Issue Date: 24-Jun-25

Approved By:   
(Mr. Supot Salakun)  
Field Services Section Head

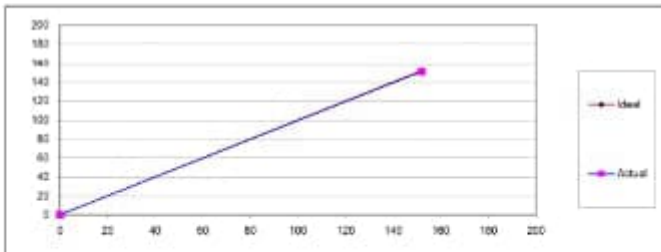


## CALIBRATION REPORT

|                      |              |              |                |
|----------------------|--------------|--------------|----------------|
| Calibration Date     | 1-Jul-25     | Equipment ID | BKK_FS0758     |
| Equipment Name       | FID Analyzer | Manufacturer | Baseline Mocon |
| Model                | 9000H        | Serial No.   | 0315EF0047     |
| Std. Gas Conc. (ppm) | 152          | Cylinder No. | DS78173        |
| Certified Date       | 27-Jun-18    | Expired Date | 27-Jun-26      |

### CALIBRATION RESULTS

| Point       | CALIBRATION RESULTS |        |       |        |
|-------------|---------------------|--------|-------|--------|
|             | Ideal               | Actual | Error | %Error |
| ZERO        | 0.00                | 0.10   | 0.10  | 0.10   |
| SPAN        | 152.00              | 151.30 | -0.70 | -0.46  |
| AVERAGE (%) |                     |        |       | -0.18  |



Calibrated By

Approved By

(Mr. Apisit Singha)  
Field Environmental Scientist (4)

(Mr. Sarayuth Jittrant)  
Assistant General Manager



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES  
53/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL. 0-2717-3000 FAX 0-2719-5484



## Certificate of Calibration

Cert. No.: 25LM10  
Page: 1 of 2

Equipment: DO Meter with Sensor  
Manufacturer: YSI  
Model: 5000-115V  
Serial No.: 15E102750  
ID No.: RYG\_EN0032

REVIEW BY:   
APPROVED BY:   
NEXT CAL DATE: 20/07/25

Submitted by: ALS Laboratory Group (Thailand) Co., Ltd.  
(Rayong Branch)  
616/10 Moo 5 T. Maenam Khu. A. Phatthanaeng,  
Rayong 21140 Thailand  
Location: TPA On Site Calibration Laboratory  
Received Order: 17 January 2025  
Calibrated Date: 20 January 2025  
Ambient Temperature: (26 ± 10) °C  
Relative Humidity: (50 ± 30) %  
AC Line Voltage: (220 ± 22) V

Calibrated by: Warakorn Lemnagtrakul

Approved by:   
Approved Signatory

( ) Chakrit Wawianjan  
( ) Suwit Injai  
( ) Kunchit Promrat

Issue Date: 23 January 2025

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment: DO Meter with Sensor  
Condition As-Received: Used Item  
Reference: 2501-0600DSG-2

Cert. No.: 25LM10  
Page: 2 of 2

### Procedure Used:-

Calibration were conducted using in-house calibration procedure GP-0101 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.  
The temperature scale used was based on ITS-90.

### Condition of this result of calibration

1. Reference standard instrument:-

| Instrument             | Serial No. | Cert. No. | Traceable | Due Date    |
|------------------------|------------|-----------|-----------|-------------|
| 1) Digital Thermometer | 2188088    | 241022    | TPA       | 17 Sep 2025 |

2. This certificate is valid only to the item calibrated on date and place of calibration.  
3. This certification is traceable to the International System of Unit.

Remark: TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration:- ( ) Without Adjustment

Function: Temperature measurement

This instrument was connected with temperature sensor, S/N: 15E100464

| Calibration Point (°C) | Immersion Depth (mm) | Standard Temperature (°C) | UUC* Reading (°C) | Error (°C) | Uncertainty (± °C) | Coverage Factor k |
|------------------------|----------------------|---------------------------|-------------------|------------|--------------------|-------------------|
| 20.00                  | 60                   | 20.002                    | 19.91             | -0.192     | 0.15               | 2.00              |

UUC\* : Unit Under Calibration

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

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## Certificate of Testing

Cert.No.: 25TW15  
Page: 1 of 2

Equipment : DO Meter  
Manufacturer : YSI  
Model : 5000-115V  
Serial No. : 15E102796  
ID No. : RYG\_EN0032  
Received Date : 17 January 2025  
Test Date : 20 January 2025  
Reference : 2001-000006C-1  
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.  
(Rayong Branch)  
616/10 Moo 5, T.Maenam Koo, A.Phuakdaeng,  
Rayong 21140, Thailand  
Laboratory Condition : Temperature (25 ± 5) °C  
Humidity (50 ± 20) %  
Test Procedure : In-house method : CP-CH9  
by Comparison Technique with Azide Modification Method

Tested by : Walukak Srimuan

Approved by :   
Approved Signatory

( ) Ponthapa Tameyakul  
( ) Pongpan Palpin  
(✓) Sathip Meengmai

Issue Date : 21 January 2025



Cert.No.: 25TW15  
Page: 2 of 2

### Condition of this result of calibration

1. Reference Standard Instruments  
This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

| Instruments | Serial No. | ID No.   | Certificate No. | Due Date     |
|-------------|------------|----------|-----------------|--------------|
| 1. Burette  | -          | 1506U10  | 23CG1172        | 22 Mar 2025  |
| 2. Balance  | 14233821   | 110RC001 | 24MM131         | 04 July 2025 |

2. Standard Material >

| Material                        | Manufacturer | Lot No.    | Assay |
|---------------------------------|--------------|------------|-------|
| Sodium Thiosulfate 5-Hydrate AR | KEMAUS       | 2203182447 | 99.8% |

Result : Dissolved Oxygen Meter Adjustment With Air 100 %  
Dissolved Oxygen Probe No.: 15E100464

| Titration Method<br>(Azide Modification Method) | DO Meter<br>Reading | Standard Deviation |
|-------------------------------------------------|---------------------|--------------------|
| (mg/L)                                          | (mg/L)              | (mg/L)             |
| 8.20                                            | 8.20                | 0.0084             |

This report was certified only for the instrument we tested. It is allowable to use for study  
intend to use for advertising and referral purpose is prohibited. This report may not be reproduced  
other in full, without written approval of the laboratory

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## Certificate of Calibration

Cert. No.: 26TM481  
Page: 1 of 3

Equipment : Low Temp. Incubator  
Manufacturer : Memmert  
Model : IPP750  
Serial No. : V818.0084  
ID No. : RYG\_EN0154  
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd. Rayong Branch  
616/10 Moo 5, T.Maenamkoo, A.Phuakdaeng,  
Rayong 21140, Thailand  
Location : BOD Room  
Received Order : 18 March 2026  
Calibration Date : 18 March 2026  
Ambient Temperature : (26 ± 10) °C  
Relative Humidity : (50 ± 30) %  
AC Line Voltage : (220 ± 22) V  
Calibrated by : Preecha Hishb  
Approved by :   
Approved Signatory  
( ) Chakrit Waeenarajua  
( ) Suwit Injai  
(✓) Kunchit Promngat  
Issue Date : 31 March 2026

REVIEW BY:

APPROVED BY:

NEXT CAL DATE: 18/09/27



Equipment : Low Temp. Incubator  
Condition As-Received : New Item  
Reference : 2603-0502CG-2  
Procedure Used :-

Cert. No.: 26TM481  
Page: 2 of 3

Calibration were conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).  
The temperature scale used was based on ITS-90.

### Condition of this result of calibration

1. Reference standard instrument:-

| Instrument           | Serial No. | Cert. No. | Traceable | Due Date    |
|----------------------|------------|-----------|-----------|-------------|
| 1.) Data Acquisition | MY46028932 | 35LM121   | TPA       | 27 Jul 2026 |

2. This certificate is valid only to the item calibrated on date and place of calibration.  
3. This measurement result is traceable to the International System of Unit maintained through :

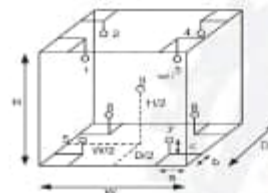
Remark : TPA : Technology Promotion Association ( Thailand - Japan )

Result of Calibration :- ( ° ) Without Adjustment

Function of UUC\* : Temperature Source

Fresh air setting : Not Available

| Environment during calibration |           |          |
|--------------------------------|-----------|----------|
|                                | Beginning | Finished |
| Temp. ( °C )                   | 23        | 21       |
| REL Humid. ( % )               | 37        | 33       |
| AC Supply ( Volt )             | 220       | 221      |



Probe Installation Details :

|     |    |    |
|-----|----|----|
| a = | 10 | cm |
| b = | 10 | cm |
| c = | 10 | cm |

Dimension of Chamber :

|            |      |    |
|------------|------|----|
| D =        | 0.88 | m  |
| W =        | 1.0  | m  |
| H =        | 1.2  | m  |
| Capacity = | 0.72 | m³ |

| Position : | Ref. Std. ID No.: |
|------------|-------------------|
| 1          | 19-16RTD-01       |
| 2          | 19-16RTD-02       |
| 3          | 19-16RTD-03       |
| 4          | 23-16RTD-04       |
| 5          | 19-16RTD-05       |
| 6          | 19-16RTD-06       |
| 7          | 21-16RTD-07       |
| 8          | 19-16RTD-08       |
| 9 (ref)    | 19-16RTD-09       |

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : Low Temp. Incubator  
Condition As-Received : New Item  
Reference : 2003-050200-2  
Result of Calibration :- ( \* ) Without Adjustment  
Function of UUC\* : Temperature Source  
Fresh air setting : Not Available

Cert. No.: 2515M61  
Page : 3 of 3

| Calibration Point ( °C ) | UUC* Setting ( °C ) | UUC* Reading ( °C ) | Temperature stability ( ± °C ) | Temperature uniformity ( °C ) | Overall Variation ( °C ) | Coverage Factor k |
|--------------------------|---------------------|---------------------|--------------------------------|-------------------------------|--------------------------|-------------------|
| 20.0                     | 20.0                | 20.0                | 0.019                          | 0.19                          | 0.34                     | 2                 |

| Calibration Point ( °C ) | Measured Temperature ( °C ) |        |        |        |        |        |        |        |          | Uncertainty ( ± °C ) |
|--------------------------|-----------------------------|--------|--------|--------|--------|--------|--------|--------|----------|----------------------|
|                          | 1                           | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9 (ref.) |                      |
| 20.0                     | 20.185                      | 20.132 | 20.303 | 20.160 | 20.001 | 20.054 | 19.983 | 20.060 | 20.163   | 0.30                 |

Average\* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.  
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.  
UUC\* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity.

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

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
5044 PATTANAKARN ROAD 1001 18, SURABHANG, SURABHANG BANGKOK 10250  
TEL: 0-2717-3000-29 FAX: 0-2718-9488



## Certificate of Calibration

Cert.No.: 250G3658  
Page : 1 of 2

Equipment : Burnts  
Capacity : 50 mL  
Serial No. :  
ID. No. : RYG\_EN0218  
Manufacturer : Wieg  
Made in : Germany  
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.  
Rayong Branch  
616/10 Moo 5 T.Mae-Nam, A.Phuakdaeng  
Rayong 21140, Thailand

Ambient Temperature : (20 ± 2.5) °C  
Relative Humidity : (50 ± 10) %  
Barometric Pressure : 753 mmHg  
Calibration Procedure : ASTM E 842 - 01

Calibrated by : Srivada Khamtha

Approved by :  
[ ] Fongon Pajpin  
[x] Chakrit Weerawatjan

Issue Date : 19 September 2025

The Uncertainties are for a confidence probability of approximately 95%

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



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
5044 PATTANAKARN ROAD 1001 18, SURABHANG, SURABHANG BANGKOK 10250  
TEL: 0-2717-3000-29 FAX: 0-2718-9488



## Certificate of Calibration

Certificate No.: 2511030  
Page : 1 of 2

Equipment : Digital Thermometer With Sensor  
Manufacturer : Teco  
Model : 106  
Serial No. : S116297811  
ID No. : RYG\_F00419

Condition As-Received : Used Item

Received Date : 30 September 2025

Calibration Date : 09 October 2025

Reference : 2509-101905C

Ambient Temperature : ( 25 ± 2 ) °C

Relative Humidity : ( 55 ± 20 ) %

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

Submitted by : ALS Laboratory Group (Thailand) Co., Ltd. Rayong Branch  
616/10 Moo 5 T.Mae-Nam, A.Phuakdaeng, Rayong 21140, Thailand

Procedure used : Calibration were conducted using in-house calibration procedure CP-T01 according to comparison with industrial Platinum Resistance Thermometer (IPRT) into liquid bath temperature controller.  
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instruments :

| Instrument                                    | Model   | Serial No. | Certificate No. | Due Date    |
|-----------------------------------------------|---------|------------|-----------------|-------------|
| 1) Block Block Thermometer                    | 1660    | 8C454      | 250625          | 06 Jun 2026 |
| 2) IPT Scanner Module                         | 2542    | A01303     | 250625          | 06 Jun 2026 |
| 3) Industrial Platinum Resistance Thermometer | 5627-12 | 521603     | 250625          | 06 Jun 2026 |

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

3. This measurement result is traceable to the International System of Unit maintained through:

-Technology Promotion Association (Thailand-Japan), NQI-CHNC Accredited No. Calibration 0009

REVIEW BY : Pitthaya T.  
APPROVED BY : S.T.S.  
NEXT CAL DATE : 09/10/26

Calibrated by : Theerapong Anon  
Issue Date : 20 October 2025

Approved Signatory :  
[ ] Phakorn Phatpajap  
[ ] Chatchawan Khunpluek  
[x] Watsup Larpnien



Equipment : Burnts  
Received Date : 16 September 2025  
Condition As-Received : Used Item  
Calibration Date : 18 September 2025  
Reference : 2506-036405C-3

Cert.No.: 250G3658  
Page: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :

| Instruments            | Model     | Serial No. | ID. No.  | Certificate No. | Traceability | Due date     |
|------------------------|-----------|------------|----------|-----------------|--------------|--------------|
| 1) Balance             | XP205     | 3134230712 | 1408C017 | 25MM298         | TFA          | 16 July 2026 |
| 2) Humidity/BioTemp    | MH6-382SD | AM42289    | 140EC016 | 25H1616         | TFA          | 14 Aug 2026  |
| 3) Digital Thermometer | HH376     | 230926555  | 140EC013 | 25H1740         | TFA          | 17 Jan 2026  |

This measurement result is traceable to SI Unit

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

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

Calibration result:

| Nominal capacity ( mL ) | Reading ( mL ) | Uncertainty ( ± mL ) | k Factor |
|-------------------------|----------------|----------------------|----------|
| 10                      | 10.0284        | 0.0052               | 2.00     |
| 25                      | 25.0141        | 0.0057               | 2.00     |
| 50                      | 49.9952        | 0.016                | 2.00     |

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

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

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## Certificate of Calibration

Cert.No.: 25CH709/1  
Page.: 1 of 3

This Certificate was issued to replace the Certificate No.25CH708

Equipment : pH Meter  
Manufacturer : Mettler Toledo  
Model : SevenExcellence  
Serial No. : B034291445  
ID No. : RYG\_EN0152  
Condition As-Received: Used Item  
Received Date : 12 June 2025  
Calibration Date : 18 June 2025  
Reference : 2506-0407(DSC-2)  
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.  
Ryong Branch  
616/10 Moo 5, 7, Maenam Khu,  
A.Pluksong, Rayong 21140, Thailand  
Ambient Temperature : (25 ± 2.5) °C  
Relative Humidity : (50 ± 15) %  
Calibration Procedure : In-house method  
- CP-CH5 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM)  
- CP-CH6 by comparison with temperature standard  
Calibrated by : Witak Sirthean  
Approved by :  
( ) Chakrit Weewang  
( ) Porpan Palaim  
(✓) Sathip Moongmal  
Issue Date : 1 July 2025

REVIEW BY: Phatchana S  
APPROVED BY: D  
NEXT CAL DATE: 18/12/26

The Uncertainties are for a confidence probability of approximately 95%

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

### Condition of this calibration result

1. Reference Standard Instrument
- | Instrument                     | Serial No. | ID No.   | Cert. No. | Due Date     |
|--------------------------------|------------|----------|-----------|--------------|
| 1) Document Process Calibrator | 54000048   | 130RC116 | 24E2758   | 25 Aug 2025  |
| 2) Ref. Standard Thermometer   | 4802054    | 110RC044 | 240757    | 14 July 2025 |
- This measurement result is traceable to SI through Technology Promotion Association (Thailand-Japan)

2. Certified Reference Materials : The measurement results are traceable to SI through Hach Lange GmbH Ltd., Deutsche Anwerbeagentur, Accredited No.D-RI-15184-01-00  
(The measurement results are traceable to SI through CPA chem Ltd., ANS-ASQ National Accreditation Board, Accredited No. AN-1635)

| Buffer Solution | Manufacturer    | Lot No. | Exp. date   |
|-----------------|-----------------|---------|-------------|
| pH 4.007        | CPA chem        | 1006065 | 18 Jan 2027 |
| pH 7.005        | Hach Lange GmbH | C03232  | 03 Dec 2026 |
| pH 10.010       | CPA chem        | 1006069 | 18 Jan 2026 |

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

### Calibration Results

Function : mV Measurement

Performing standard curve by Document Process Calibrator at pH (4,7,10)

| Unit Under Calibration      | Nominal Value | Standard Voltage Input | Actual Reading |        | Uncertainty of Measurement<br>(mV) | Coverage factor<br>k |
|-----------------------------|---------------|------------------------|----------------|--------|------------------------------------|----------------------|
|                             | pH            | mV                     | mV             | pH     |                                    |                      |
| pH Meter<br>SVL: B034291445 | 4.000         | 177.48                 | 177.3          | 4.000  | 0.058                              | 2.00                 |
|                             | 7.000         | 0.00                   | -0.1           | 7.000  | 0.058                              | 2.00                 |
|                             | 10.000        | -177.48                | -177.5         | 10.000 | 0.058                              | 2.00                 |



Cert.No.: 25CH709/1  
Page.: 3 of 3

### Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7,10)

| Unit Under Calibration       | Standard pH Buffer Solution | Actual pH Reading | Actual mV Reading (mV) | Uncertainty of pH Measurement (pH) | Coverage factor k |
|------------------------------|-----------------------------|-------------------|------------------------|------------------------------------|-------------------|
| pH Electrode<br>SVL: 5211504 | 4.007                       | 4.006             | 181.1                  | 0.0044                             | 2.00              |
|                              | 7.000                       | 7.000             | 4.9                    | 0.0064                             | 2.00              |
|                              | 10.010                      | 10.007            | -170.6                 | 0.0066                             | 2.00              |

Function : Temperature Measurement

(\*) Without adjustment

This equipment was connected with Temperature Probe:

- Model : InLabExpert Pro-45M  
- Serial No. : 5211504

Dimension of probe

- Length : 120 mm  
- Diameter : 12 mm  
- Immersion Depth : 100 mm

| Calibration Point (°C) | Standard Temperature (°C) | UUC* Reading (°C) | Error (°C) | Uncertainty of measurement (°C) | Coverage factor k |
|------------------------|---------------------------|-------------------|------------|---------------------------------|-------------------|
| 25.0                   | 25.001                    | 25.1              | 0.099      | 0.13                            | 2.00              |

Remark : UUC\* = Unit Under Calibration

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

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## Certificate of Calibration

Certificate No.: 25E1827/1  
Page.: 1 of 2

This Certificate was issued to replace the Certificate No. 20E1979

Equipment : pH Meter  
Manufacturer : Mettler Toledo  
Model : SevenExcellence  
Serial No. : B034291445  
ID No. : RYG\_EN0152  
Condition As-Received: Used Item  
Received Date : 12 June 2025  
Calibration Date : 18 June 2025  
Reference : 2506-0407(DSC-2)  
Ambient Temperature : ( 23 ± 2 ) °C  
Relative Humidity : ( 55 ± 10 ) %  
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. Ryong Branch  
616/10 Moo 5, 7, Maenam Khu, A.Pluksong,  
Rayong 21140, Thailand

Procedure used: Calibration were conducted using calibration procedure No. CP-E17 According to EURAMET cg-15.

### Condition of this result of calibration

1. Reference standard Instruments :
- | Instrument                | Model | Serial No. | Certificate No. | Due Date    |
|---------------------------|-------|------------|-----------------|-------------|
| 1) Sub-Product Calibrator | 5600A | 6019011    | 25E1827         | 19 May 2025 |
2. This result of calibration was made on requested at the point specified by customer.
3. The certificate is valid only to the item calibrated on date and place of calibration.
4. This measurement result is traceable to the International System of Unit maintained through:  
- Technology Promotion Association (Thailand-Japan), NIST-JTCC Accredited No. Calibration 0008

Calibrated by : Witthasaporn Peethong  
Issue Date : 01 July 2025

Approved Signatory :  
( ) Phakorn Phatpatt  
(✓) Narasat Khamsai  
( ) Porngsarn Boonyaporn



Cert. No.: 25619/171  
Page: 2 of 2

Result of calibration: ( ) Without adjustment ( ) After adjustment

| Function: DC voltage measurement | Range: 2000 mV | 2000 mV |             |
|----------------------------------|----------------|---------|-------------|
| Standard Value                   | UUC* Reading   | Error   | Uncertainty |
| ( mV )                           | ( mV )         | ( mV )  | ( ± µV )    |
| -200.0000                        | -199.9         | 0.1     | 68          |
| -150.0000                        | -150.0         | 0.0     | 65          |
| -100.0000                        | -100.0         | 0.0     | 62          |
| -50.0000                         | -50.0          | 0.0     | 61          |
| 0.0000                           | 0.0            | 0.0     | 58          |
| 50.0000                          | 50.0           | 0.0     | 61          |
| 100.0000                         | 100.0          | 0.0     | 63          |
| 150.0000                         | 149.9          | -0.1    | 65          |
| 200.0000                         | 199.9          | -0.1    | 68          |

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

UUC\* = Unit Under Calibration.

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SARTORIUS



Accredited by

NSC-TISI-TIS 17025  
Calibration 0426

## Calibration certificate

Calibration Certificate No.: 26BC0064

|                        |                                                           |                                                                                                                                                                    |
|------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Object                 | Electronic non-automatic weighing instrument              | This calibration certificate documents the traceability to national standards.                                                                                     |
| Manufacturer           | Sartorius                                                 | Uncertainties of measurements are taken into account when only statements of compliance are made.                                                                  |
| Type                   | MCE224S-2500-U                                            | This certificate was prepared by Sartorius Corporation in accordance to the current ISO/IEC 17025:2017 standard and Sartorius Work Instruction (Method) SOP WI 06. |
| Serial / OM Ident. no. | 38101399 / RYG_END163                                     | This certificate reads and apply this equipment only.                                                                                                              |
| Customer               | ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch) |                                                                                                                                                                    |
| Order no.              | 278579                                                    |                                                                                                                                                                    |
| Number of pages        | 4                                                         |                                                                                                                                                                    |
| Date of calibration    | 03 Feb 2026                                               |                                                                                                                                                                    |

REVIEW BY: *Tharitak*  
APPROVED BY: *D*  
NEXT CAL DATE: 03/02/27

This calibration certificate may not be reproduced other than in full except with the permission of NSC-TISI-TIS-17025 and the issuing laboratory. Calibration certificates without signature are not valid.

The user is obliged to have the object recalibrated at appropriate intervals.

|               |             |                                         |                         |
|---------------|-------------|-----------------------------------------|-------------------------|
| Date of issue | 03 Feb 2026 | Approval of the Calibration Certificate | Person in charge        |
|               |             | <i>Chonchai Inthana</i>                 | <i>Chonchai Inthana</i> |
|               |             | Mr. Chonchai Inthana                    | Chonchai Inthana        |

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129 Rama 9 Road, Huaykwang  
10310 Bangkok

Verical®  
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Calibration certificate No.: 26BC0064

Calibration Certificate

## Calibration object

### Single range instrument

|                               |                |
|-------------------------------|----------------|
| Model                         | MCE224S-2500-U |
| Serial Number                 | 38101399       |
| QM Ident. no. / Inventory no. | RYG_END163 / — |
| Maximum capacity (Max. load)  | 220.0000 g     |
| Measured up to                | 220.0000 g     |
| Scale interval                | 0.0001 g       |

## Place of calibration

|                                           |                           |
|-------------------------------------------|---------------------------|
| Address                                   | According to page 1       |
| Department / Cost center                  | Laboratory Department / — |
| Building / Floor                          | — / 1st Floor.            |
| Room                                      | Balance Room.             |
| Maximum temperature and relative humidity | 5 °C                      |

## Calibration procedure

EURAMET Calibration Guide for (S, Version 4.0 (11/2015)) - O-List no. 10: The Calibration of Non-Automatic Weighing Instruments

## Test equipment

| Test equipment type        | Test equipment ID                                                            | Valid until  |
|----------------------------|------------------------------------------------------------------------------|--------------|
| Thermometer                | Therm 174H - TDS0743 (Thermometer & Image ENTECH)                            | 18 Nov 2026  |
| Test weight or GEM B111 F2 | Certified Reference Weights, F2, Traceable to SI and in accordance with OIML | 18 Aug. 2027 |

Calibration certificate No.: 26BC0064

Calibration Certificate

## Adjustment Status

Instrument was zeroed before adjustment.

## Environmental and measuring conditions

|                                                   |                                                                                                  |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Date of calibration                               | 03 Feb 2026                                                                                      |
| Temperature at place of calibration / Temp. diff. | 23 °C / 0.6 K                                                                                    |
| Relative humidity                                 | 46 %                                                                                             |
| Atmospheric pressure                              | 1013.25 hPa                                                                                      |
| Measurement conditions                            | One calibration site location. The above stated tolerance was followed up to Max. load for test. |
| Measurement                                       | Humidity: 46.0 % RH                                                                              |

## Measurement results | Measurement uncertainties

| Test load | Indication | Error    | Expansion factor | Uncertainty | Uncertainty relative |
|-----------|------------|----------|------------------|-------------|----------------------|
| 10 g      | 10.0000 g  | 0.0000 g | 2.00             | 0.00012 g   | 1.2 %                |
| 200 g     | 200.0000 g | 0.0000 g | 2.00             | 0.00017 g   | 0.17 %               |
| 1         | 10.0000 g  | 0.0000 g | 2.00             | 0.00017 g   | 0.017 %              |
| 2         | 10.0000 g  | 0.0000 g | 2.00             | 0.00017 g   | 0.017 %              |
| 4         | 10.0000 g  | 0.0000 g | 2.00             | 0.00017 g   | 0.017 %              |
| 5         | 10.0000 g  | 0.0000 g | 2.00             | 0.00017 g   | 0.017 %              |
| 7         | 10.0000 g  | 0.0000 g | 2.00             | 0.00017 g   | 0.017 %              |
| 9         | 10.0000 g  | 0.0000 g | 2.00             | 0.00017 g   | 0.017 %              |
| 10        | 10.0000 g  | 0.0000 g | 2.00             | 0.00017 g   | 0.017 %              |

| Test load  | Indication | Error    | Expansion factor | Uncertainty | Uncertainty relative |
|------------|------------|----------|------------------|-------------|----------------------|
| 0.0100 g   | 0.0100 g   | 0.0000 g | 2.00             | 0.00012 g   | 1.2 %                |
| 0.1000 g   | 0.1000 g   | 0.0000 g | 2.00             | 0.00017 g   | 0.17 %               |
| 0.5000 g   | 0.5000 g   | 0.0000 g | 2.00             | 0.00017 g   | 0.034 %              |
| 1.0000 g   | 1.0000 g   | 0.0000 g | 2.00             | 0.00017 g   | 0.017 %              |
| 5.0000 g   | 5.0000 g   | 0.0000 g | 2.00             | 0.00017 g   | 0.0034 %             |
| 10.0000 g  | 10.0000 g  | 0.0000 g | 2.00             | 0.00017 g   | 0.0017 %             |
| 20.0000 g  | 20.0000 g  | 0.0000 g | 2.00             | 0.00018 g   | 0.0008 %             |
| 50.0000 g  | 50.0000 g  | 0.0000 g | 2.00             | 0.00019 g   | 0.00037 %            |
| 100.0000 g | 100.0000 g | 0.0001 g | 2.00             | 0.00021 g   | 0.00021 %            |
| 200.0000 g | 200.0000 g | 0.0000 g | 2.00             | 0.00030 g   | 0.00015 %            |
| 220.0000 g | 220.0000 g | 0.0001 g | 2.00             | 0.00034 g   | 0.00015 %            |

Maximum error of indication: (E<sub>max</sub> = 0.0001 g)

Use of U is the quotient of U/E and test load L. The uncertainty of measurement (U/E) is valid only if error E is considered. You will find reference notes on the uncertainty of measurement in use under Appendix to the calibration certificate. Interpretation of measurement results.

Reference note: The reported expanded uncertainty of measurement is stated on the standard uncertainty of measurement multiplied by the documented expansion factor, which is in accordance with the European Calibration Machine EN ISO 17025:2017, 7.6.3. There is a 95 % probability that the value of the measurement will be in the expanded value range.

## End of calibration certificate

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## Certificate of Calibration



Certificate No.: C06250108 Page 2 of 3

Equipment: SPECTROPHOTOMETER  
Model: DR6000  
Serial No. (or ID.): 1627845 (RYG\_EN0037)  
Manufacturer: HACH  
Condition: In Condition

Certificate No.: C06250108  
Issued Date: 18 March 2025  
Job No.: WO-00064379  
Page: 1 of 3

Customer: ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
616/10 Moo 5 T.Maenam Khu,  
A.Pluakdaeng, Rayong 21140, Thailand.



Environment Condition: Temperature 24.4 °C ± 0.3 °C  
Humidity 60.8 %RH ± 3.5 %RH

Calibration Place: ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
(Wat Chemistry Lab)  
616/10 Moo 5 T.Maenam Khu, A.Pluakdaeng, Rayong 21140, Thailand.

Calibration By: Mr.Preecha Phooasol  
Calibration Date: 18 March 2025  
The Method used: In house method, CAL-WI-24, base on ASTM E 275-08 and ASTM E 387-04  
Traceability: This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Sams Scientific Limited.

The standard for Wavelength Certificate No. 111583 and 111584  
The standard for Photometric Certificate No. 9114984 and 111588  
The standard for Stray light Certificate No. 111585 and 111585  
The standard for Spectral resolution Certificate No. 111587

(Mr. Preecha Phooasol)  
Person in charge

(Miss Kaewkan Suradech)  
Authorized signatory

This certificate is based on the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standards or other recognized national standard laboratories.  
The measurement is normally stated in the expected uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).  
These results may be affected by deviations from specified conditions. The results relate only to the items tested, collected or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.  
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2525 Sukhumvit Road Bangkok, Thailand 10110  
Phone: +66 2025 1000 Email: info@als-dksh.com Website: www.als-dksh.com/thailand

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CAL-FM-C06-10: 11 Mar 2024

## Calibration Results: Without Adjustment

| Wavelength Accuracy (nm), The spectral bandwidth of filter at 2 nm and UUC at 2 nm |                        |                        |             |             |
|------------------------------------------------------------------------------------|------------------------|------------------------|-------------|-------------|
| Standard Wavelength                                                                | Unit Under Calibration | Correction             | Uncertainty |             |
| 410.01                                                                             | 410.0                  | 0.11                   | 0.13        |             |
| 536.68                                                                             | 536.7                  | -0.04                  | 0.13        |             |
| 637.96                                                                             | 638.3                  | -0.32                  | 0.13        |             |
| 748.48                                                                             | 748.8                  | -0.32                  | 0.13        |             |
| 807.03                                                                             | 807.5                  | -0.47                  | 0.13        |             |
| Photometric Accuracy (Absorbance)                                                  |                        |                        |             |             |
| Wavelength                                                                         | Standard absorbance    | Unit Under Calibration | Correction  | Uncertainty |
| 420 nm                                                                             | 0.0200                 | 0.020                  | 0.0000      | 0.0045      |
|                                                                                    | 0.2930                 | 0.291                  | 0.0020      | 0.0045      |
|                                                                                    | 0.5168                 | 0.518                  | -0.0012     | 0.0045      |
|                                                                                    | 1.0298                 | 1.031                  | -0.0012     | 0.0045      |
| 440 nm                                                                             | 0.0200                 | 0.020                  | 0.0000      | 0.0045      |
|                                                                                    | 0.2867                 | 0.285                  | 0.0017      | 0.0045      |
|                                                                                    | 0.5073                 | 0.508                  | -0.0007     | 0.0045      |
|                                                                                    | 1.0083                 | 1.008                  | -0.0007     | 0.0045      |
| 460 nm                                                                             | 0.0200                 | 0.020                  | 0.0000      | 0.0045      |
|                                                                                    | 0.2516                 | 0.250                  | 0.0016      | 0.0045      |
|                                                                                    | 0.4595                 | 0.461                  | -0.0015     | 0.0045      |
|                                                                                    | 0.8334                 | 0.835                  | -0.0016     | 0.0045      |
| 546.1 nm                                                                           | 0.0200                 | 0.020                  | 0.0000      | 0.0045      |
|                                                                                    | 0.2481                 | 0.248                  | 0.0001      | 0.0045      |
|                                                                                    | 0.4652                 | 0.466                  | -0.0008     | 0.0045      |
|                                                                                    | 0.9468                 | 0.948                  | -0.0012     | 0.0045      |
| 590 nm                                                                             | 0.0200                 | 0.020                  | 0.0000      | 0.0045      |
|                                                                                    | 0.2584                 | 0.259                  | 0.0004      | 0.0045      |
|                                                                                    | 0.5040                 | 0.505                  | -0.0010     | 0.0045      |
|                                                                                    | 1.0032                 | 1.004                  | -0.0008     | 0.0045      |
| 635 nm                                                                             | 0.0200                 | 0.020                  | 0.0000      | 0.0045      |
|                                                                                    | 0.2579                 | 0.258                  | -0.0001     | 0.0045      |
|                                                                                    | 0.4871                 | 0.487                  | 0.0001      | 0.0045      |
|                                                                                    | 0.9720                 | 0.973                  | -0.0010     | 0.0045      |

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CAL-FM-C06-10: 11 Mar 2024



Certificate No.: C06250108 Page 3 of 3

## Calibration Results: Without Adjustment

| Photometric Accuracy (Absorbance) |                      |                        |                |             |
|-----------------------------------|----------------------|------------------------|----------------|-------------|
| Wavelength                        | Standard absorbance  | Unit Under Calibration | Correction     | Uncertainty |
| 230 nm                            | 0.0200               | 0.020                  | 0.0000         | 0.0080      |
|                                   | 0.7355               | 0.738                  | -0.0025        | 0.0080      |
| 257 nm                            | 0.0200               | 0.020                  | 0.0000         | 0.0080      |
|                                   | 0.8574               | 0.857                  | 0.0004         | 0.0080      |
| 313 nm                            | 0.0200               | 0.020                  | 0.0000         | 0.0080      |
|                                   | 0.2864               | 0.290                  | -0.0036        | 0.0080      |
| 350 nm                            | 0.0200               | 0.020                  | 0.0000         | 0.0080      |
|                                   | 0.6374               | 0.637                  | 0.0004         | 0.0080      |
| Stray light *                     |                      |                        |                |             |
| Standard: cut-off                 | UUC: Wavelength (nm) | UUC: Transmission (%)  | Absorbance (A) |             |
| 260.62 +/- 0.11 nm                | 260.6                | 1.7                    | 1.770          |             |
| 391.44 +/- 0.11 nm                | 391.4                | 1.4                    | 1.854          |             |
| Spectral Resolution *             |                      |                        |                |             |
| Nominal Concentration 0.02 % w/v  | Peak                 | Trough                 | Ratio          | SRW         |
| Standard Wavelength ( nm )        | 268.68               | 268.88                 | 1.38           | 2.00        |
| UUC: Wavelength (nm)              | 269.2                | 269.2                  |                |             |
| Std Absorbance ( A )              | 0.4588               | 0.2780                 |                |             |
| UUC: Absorbance (A)               | 0.413                | 0.299                  |                |             |

\* Calibration Marked \* Not TISI-Accredited \* In this Certificate have been included for completeness.

The End of Certificate

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## ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: WO-00064379

| ชนิดเครื่องวัด: SPECTROPHOTOMETER รุ่น: DR6000 |                                     | หมายเลขเครื่อง: 1627845                           |                                     |
|------------------------------------------------|-------------------------------------|---------------------------------------------------|-------------------------------------|
| ตรวจสอบ (ปี)                                   | รายการตรวจเช็ค                      | ตรวจสอบ (ปี)                                      | ผลการตรวจ                           |
| 18 Mar 2025                                    |                                     | 18 Mar 2025                                       |                                     |
| ปกติ                                           | ปกติ                                | ปกติ                                              | ปกติ                                |
| General                                        |                                     |                                                   |                                     |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 1. ความถูกต้องเครื่อง                             | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-ภายนอก)      | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 3. เกจเปิด/ปิด - เปิด/ปิด (On-Off Switch)         | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 4. ปุ่มกด (Keypad)                                | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 5. หน้าจอ (Display, Screen Contrast)              | <input checked="" type="checkbox"/> |
| Spectrophotometer                              |                                     |                                                   |                                     |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 6. แบตเตอรี่สำรอง (Battery Backup) >= 2.5 VDC     | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. ระบบเลือกความยาวคลื่น (Wavelength Control)     | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. การสอบเทียบ (Wavelength Check)                 | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 9. เวลาใช้งาน (UV < 3,000 hour)                   | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 10. เวลาใช้งาน (Visible < 5,000 hour)             | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 11. ช่องใส่ตัวอย่าง (Cuvette Module)              | <input checked="" type="checkbox"/> |
| pH Meter and Conductivity Meter                |                                     |                                                   |                                     |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 12. อิเล็กโทรด (Electrode and Connection Cable)   | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 13. ระดับสารละลาย (Electrode Level KCl)           | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 14. ฝาปิดป้องกัน Electrode (Dust Protection Hood) | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 15. ขาตั้งอิเล็กโทรด (Stand)                      | <input checked="" type="checkbox"/> |
| Turbidimeter                                   |                                     |                                                   |                                     |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 16. ความขุ่นตัวอย่าง (No Sample)                  | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 17. ระดับการกลั่นกรองตัวอย่าง (>= 2.5 ไมครอน 3.0) | <input checked="" type="checkbox"/> |
| Automatic Striker                              |                                     |                                                   |                                     |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 18. สายวัด Picon Burettes                         | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 19. Function Rinsing and Casing                   | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/>            | <input checked="" type="checkbox"/> | 20. ระบบทำความสะอาดอุปกรณ์วิเคราะห์               | <input checked="" type="checkbox"/> |

ผลการตรวจวัด: \* 656.1nm = 656.1nm

\* 486.6nm = 486.7nm

Mr.Preecha Phooasol  
Service Engineer

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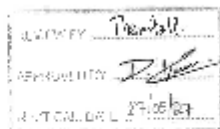
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CAL-FM-C06-10: 31 Jul 2023

## Certificate of Calibration

Page 1 of 4

Equipment : Chamber ( Cold Room )  
 Manufacturer : MODULAR  
 Model : IREVC0HCOO  
 Serial No. : C00351459  
 Customer Code : RVC\_EN0184  
 ID No. : T1939A5  
 Customer : ATS Laboratory Group (Thailand) Co., Ltd. ( Rayong Branch )  
 616/10 Moo 5, T.Muennumkoo,  
 A.Pluakdaeng, Rayong 21140  
 Customer Location : ENVIRONMENT LABORATORY  
 Date of Receipt : 19 November 2025  
 Calibrated By : Sujjar Nakakred ( Site Calibration Manager )  
 Approved By : *[Signature]* Boonchai Sirinyawong (Site Calibration Manager)  
 Date of Issue : 5 DEC 2025



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

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

FM-TL07 102/27-03-68

## Calibration Report

Equipment : Chamber ( Cold Room )  
 Date of Calibration : 27 November 2025  
 Environment : Temperature : 24.7 25.6 °C  
 Line Voltage : 222.3-226.3 V  
 Relative Humidity : 55 - 65 %RH

## Condition of this results of calibration :

1. This equipment was calibrated by insert into standard thermocouple type T into its chamber, the other one standard thermocouple type T use for ambient temperature measurement. The calibration was done in accordance with ISO based on AS E28145-94 ( Reciprocal 2019 ) and AS2853-1986.  
 All data shown below were first values and the final data from customer request. The temperature only used was based on ITS-90.

## 2. Reference Standard Instrument :

| Instrument  | Model  | Instrument No. | Certificate No. | Date Issue      |
|-------------|--------|----------------|-----------------|-----------------|
| TC          | TYPE T | TN161-TN170    | T251760         | 17 October 2026 |
| TC          | TYPE T | TN171-TN180    | T251760         | 17 October 2026 |
| DATA LOGGER | 34970A | T261           | T251760         | 17 October 2026 |

## 3. This certificate is traceable to :

National Institute of Metrology ( Thailand ) through Metrology Center ( NSC-TSI-TIS 17025 CALIBRATION 0244 )

## 4. Condition of calibrated item : good

## Equipment Description :

|                  |                                                                                                                          |           |         |
|------------------|--------------------------------------------------------------------------------------------------------------------------|-----------|---------|
| Time Constant    | 1 Hour                                                                                                                   | 12 Minute | At 3 °C |
| Fresh Air Damper | <input type="checkbox"/> Open <input type="checkbox"/> 5Min <input type="checkbox"/> Medium <input type="checkbox"/> Max |           |         |
|                  | <input type="checkbox"/> Close                                                                                           |           |         |
|                  | <input checked="" type="checkbox"/> Not Available                                                                        |           |         |

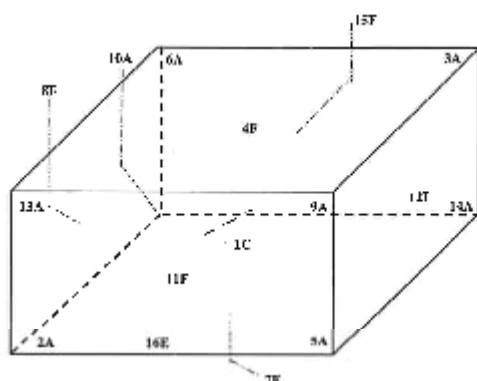
## 5. Adjustment :

( ) without adjustment ( X ) after adjustment

Approved By: *[Signature]*

FM-TL07 102/27-03-68

## Calibration Report



C = Centre, F = Centre of Face, A = Corner, E = Centre of Edge

|             |
|-------------|
| 1C = TN161  |
| 2A = TN162  |
| 3A = TN163  |
| 4F = TN164  |
| 5A = TN165  |
| 6A = TN166  |
| 7F = TN167  |
| 8F = TN168  |
| 9A = TN169  |
| 10A = TN170 |

|             |
|-------------|
| 11F = TN171 |
| 12F = TN172 |
| 13A = TN173 |
| 14A = TN174 |
| 15F = TN175 |
| 16E = TN176 |

Approved By: *[Signature]*

FM-TL07 102/27-03-68

## Calibration Report

## Measurement Results:

| Calibration Point | Average Standard Reading at each position (°C) |              |              |              |              |              |             |             |             |              |
|-------------------|------------------------------------------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|--------------|
|                   | 1C<br>TN161                                    | 2A<br>TN162  | 3A<br>TN163  | 4F<br>TN164  | 5A<br>TN165  | 6A<br>TN166  | 7F<br>TN167 | 8F<br>TN168 | 9A<br>TN169 | 10A<br>TN170 |
| 3                 | 2.59                                           | 2.00         | 2.54         | 2.82         | 2.92         | 2.44         | 2.11        | 2.54        | 2.59        | 2.44         |
|                   | 11F<br>TN171                                   | 12F<br>TN172 | 13A<br>TN173 | 14A<br>TN174 | 15F<br>TN175 | 16E<br>TN176 |             |             |             |              |
|                   | 1.11                                           | 1.56         | 1.16         | 2.21         | 2.92         | 2.16         |             |             |             |              |

| Chamber ( Cold Room ) |              | Temperature Distribution |              |                |                |                   |
|-----------------------|--------------|--------------------------|--------------|----------------|----------------|-------------------|
| Setting (°C)          | Reading (°C) |                          | Average (°C) | Stability(±°C) | Uniformity(°C) | Uncertainty(±°C)  |
|                       | Min, Max     | Average                  |              |                |                |                   |
| 3.0                   | 2.9 , 4.1    | 3.7                      | 3.21         | 1.25           | 1.92           | 1.85              |
|                       |              |                          |              |                |                | Coverage Factor k |
|                       |              |                          |              |                |                | 2.00              |

\* The quoted uncertainty exclude " uniformity "

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 %.

End of Certificate

Approved By: *[Signature]*

FM-TL07 102/27-03-68



Certificate No. T251529

Page 1 of 3

## Certificate of Calibration

**Equipment** : DIGESTION UNIT  
**Manufacturer** : Gerhardt, Germany  
**Model** : KT - 205  
**Serial No.** : 572021009  
**Customer Code** : RYG\_EN0188  
**ID No.** : T6452A5  
**Customer** : ALS Laboratory Group (Thailand) Co.,Ltd. ( Rayong Branch)



616/10 Moo 5 T.Maenamkoo,

A.Pluakdaeng, Rayong 21140

**Customer Location** : ENVIRONMENT LABORATORY

**Date of Receipt** : 3 September 2025

**Calibrated By** : Sujjar Nakhakred ( Site Calibration Manager )

**Approved By** : ( Boonchal Suriyawong (Site Calibration Manager) )

**Date of Issue** : 17 SEP 2025

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

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

PM-TL05 30227-03-08



Certificate No. T251529

Page 2 of 3

## Calibration Report

**Equipment** : DIGESTION UNIT  
**Date of Calibration** : 10 September 2025  
**Environment** : Temperature : 21.7 - 24.3 °C  
Line Voltage : 226.9 - 232.1 V  
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

- This equipment was calibrated by insert four standard thermocouples type S into its chamber , the other one thermocouple type T use for ambient temperature measurement . The calibration was done in according to WI-T10.
- Reference Standard Instrument :

| Instrument  | Model  | Instrument No.  | Certificate No. | Due Date    |
|-------------|--------|-----------------|-----------------|-------------|
| TC          | Type S | M20A1 (CH1-CH4) | T250750         | 14 May 2026 |
| DATA LOGGER | 34970A | T261            | T250750         | 14 May 2026 |
- This certificate is traceable to :  
National Institute of Metrology ( Thailand ) through Metrological Center ( NSC-TIS1-TIS 17025 CALIBRATION 0244 ).
- Condition of calibrated item : good  
Equipment Description :  
Time Constant : ☒ 1 Hour ☐ 46 Minute At 350 °C  
Fresh Air Damper : ☐ Open ☐ Min ☐ Medium ☐ Max  
☐ Close  
☒ Not Available
- Adjustment :  
☐ ( X ) without adjustment ☐ ( ) after adjustment

Approved By.

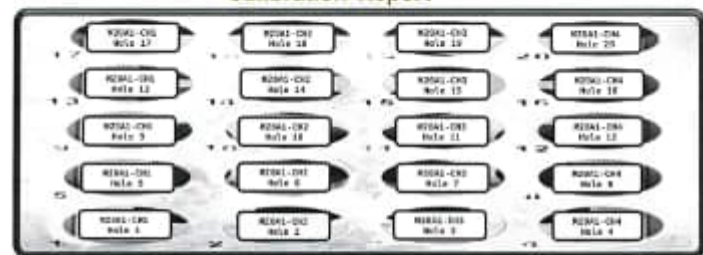
PM-TL05 30227-03-08



Certificate No. T251529

Page 3 of 3

## Calibration Report



DISPLAY CONTROL (FRONT)

### Measurement Results

| Cal.Point | Setting | Reading | STD.    | Position of Standards at Block |                     |                     |                     |                     |                     |                     |                     |                     |                      |       |
|-----------|---------|---------|---------|--------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|-------|
| (°C)      | (°C)    | (°C)    | Reading | R20A1 - CH1 Hole 1             | R20A1 - CH2 Hole 2  | R20A1 - CH3 Hole 3  | R20A1 - CH4 Hole 4  | R20A1 - CH5 Hole 5  | R20A1 - CH6 Hole 6  | R20A1 - CH7 Hole 7  | R20A1 - CH8 Hole 8  | R20A1 - CH9 Hole 9  | R20A1 - CH10 Hole 10 |       |
| 350       | 350     | 350     |         | Max °C                         | 361.2               | 360.9               | 361.0               | 361.0               | 379.2               | 369.8               | 362.3               | 377.7               | 362.0                | 361.9 |
|           |         |         |         | Min °C                         | 360.7               | 360.0               | 360.4               | 360.0               | 379.6               | 369.3               | 362.0               | 377.3               | 362.0                | 360.9 |
|           |         |         |         | Average °C                     | 361.0               | 360.5               | 360.7               | 360.5               | 379.4               | 369.6               | 362.1               | 377.5               | 362.0                | 361.4 |
|           |         |         |         | Uncertainty %                  | 0.2                 | 0.2                 | 0.2                 | 0.2                 | 0.2                 | 0.2                 | 0.2                 | 0.2                 | 0.2                  | 0.2   |
| Cal.Point | Setting | Reading | STD.    | Position of Standards at Block |                     |                     |                     |                     |                     |                     |                     |                     |                      |       |
| (°C)      | (°C)    | (°C)    | Reading | R20A1 - CH1 Hole 11            | R20A1 - CH2 Hole 12 | R20A1 - CH3 Hole 13 | R20A1 - CH4 Hole 14 | R20A1 - CH5 Hole 15 | R20A1 - CH6 Hole 16 | R20A1 - CH7 Hole 17 | R20A1 - CH8 Hole 18 | R20A1 - CH9 Hole 19 | R20A1 - CH10 Hole 20 |       |
| 350       | 350     | 350     |         | Max °C                         | 362.5               | 377.2               | 370.7               | 370.0               | 370.5               | 370.8               | 369.3               | 369.0               | 362.6                | 361.1 |
|           |         |         |         | Min °C                         | 361.7               | 376.5               | 370.5               | 370.0               | 370.5               | 370.5               | 368.6               | 369.0               | 362.4                | 360.4 |
|           |         |         |         | Average °C                     | 362.1               | 376.8               | 370.6               | 370.0               | 370.5               | 370.7               | 369.0               | 369.0               | 362.5                | 360.8 |
|           |         |         |         | Uncertainty %                  | 0.4                 | 0.4                 | 0.2                 | 0.2                 | 0.2                 | 0.2                 | 0.3                 | 0.3                 | 0.4                  | 0.4   |

The expanded uncertainty of temperature measurement was : ± 1.8 °C

This calibration result apply only the above calibrated item.

The result of test was found accurate as shown as date and place of test only.

This report expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2 , providing a level of confidence of approximately 95 %.

End of Certificate

Approved By.

PM-TL05 30227-03-08



Agilent Technologies (Thailand) Public Co., Ltd.  
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Website : www.als.co.th

### SERVICE REPORT

|                                 |                       |
|---------------------------------|-----------------------|
| Customer Purchase Order Number: | Customer Number:      |
| Service Request:                | Service Request Date: |
| Service Order:                  | Service Confirmation: |

### Delivery Site

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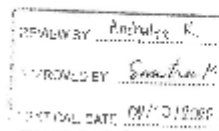
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Email : sales@als.co.th

Website : www.als.co.th

### Direct Inquiry to:

Contact Name :  
Contact Email :  
Contact Tel :  
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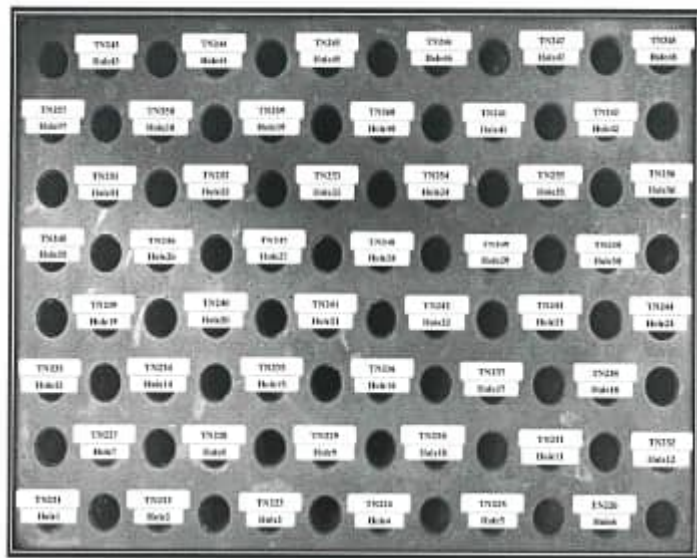
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Page 1 of 1



## Calibration Report



FRONT CONTROL

Approved By: 

FM-L13 BR/30-05-57

## Calibration Report

### Measurement Results

| Calibration Point |         | Average Standard Reading at each position (°C) |       |       |       |       |       |
|-------------------|---------|------------------------------------------------|-------|-------|-------|-------|-------|
| R1 Hole1-Hole6    |         | TN221                                          | TN222 | TN223 | TN224 | TN225 | TN226 |
| CAL POINT         | Max     | 94.85                                          | 95.27 | 95.33 | 95.23 | 95.22 | 94.72 |
|                   | Min     | 94.17                                          | 94.66 | 94.39 | 94.53 | 94.87 | 94.12 |
|                   | Average | 94.51                                          | 95.02 | 94.79 | 94.88 | 95.20 | 94.43 |
| R2 Hole7-Hole12   |         | TN227                                          | TN228 | TN229 | TN230 | TN231 | TN232 |
|                   | Max     | 94.71                                          | 94.56 | 94.79 | 95.32 | 95.44 | 95.06 |
|                   | Min     | 94.25                                          | 93.88 | 94.10 | 94.63 | 94.80 | 94.65 |
|                   | Average | 94.48                                          | 94.22 | 94.44 | 94.99 | 95.12 | 94.85 |
| R3 Hole13-Hole18  |         | TN233                                          | TN234 | TN235 | TN236 | TN237 | TN238 |
|                   | Max     | 95.26                                          | 95.43 | 95.40 | 95.71 | 95.41 | 95.06 |
|                   | Min     | 94.54                                          | 94.84 | 94.71 | 95.10 | 94.88 | 94.42 |
|                   | Average | 94.90                                          | 95.13 | 95.06 | 95.41 | 95.13 | 94.74 |
| R4 Hole19-Hole24  |         | TN239                                          | TN240 | TN241 | TN242 | TN243 | TN244 |
|                   | Max     | 95.13                                          | 95.08 | 95.18 | 95.18 | 95.33 | 95.08 |
|                   | Min     | 94.59                                          | 94.43 | 94.56 | 95.11 | 94.88 | 95.12 |
|                   | Average | 94.76                                          | 94.75 | 94.87 | 95.12 | 95.12 | 95.46 |
| R5 Hole25-Hole30  |         | TN245                                          | TN246 | TN247 | TN248 | TN249 | TN250 |
|                   | Max     | 94.59                                          | 95.31 | 95.39 | 95.32 | 95.65 | 95.66 |
|                   | Min     | 94.47                                          | 95.03 | 94.67 | 94.99 | 94.84 | 94.87 |
|                   | Average | 94.71                                          | 95.42 | 95.03 | 95.41 | 95.25 | 95.27 |
| R6 Hole31-Hole36  |         | TN251                                          | TN252 | TN253 | TN254 | TN255 | TN256 |
|                   | Max     | 94.07                                          | 95.34 | 95.39 | 95.39 | 94.95 | 95.12 |
|                   | Min     | 93.28                                          | 94.29 | 95.11 | 94.62 | 94.13 | 94.35 |
|                   | Average | 93.67                                          | 94.95 | 95.25 | 95.00 | 94.54 | 94.73 |
| R7 Hole37-Hole42  |         | TN257                                          | TN258 | TN259 | TN260 | TN261 | TN262 |
|                   | Max     | 95.15                                          | 95.61 | 96.11 | 95.09 | 95.34 | 95.51 |
|                   | Min     | 94.31                                          | 94.88 | 95.32 | 94.28 | 94.54 | 94.72 |
|                   | Average | 94.76                                          | 95.22 | 95.71 | 94.69 | 94.94 | 95.11 |
| R8 Hole43-Hole48  |         | TN263                                          | TN264 | TN265 | TN266 | TN267 | TN268 |
|                   | Max     | 95.84                                          | 95.87 | 95.48 | 95.72 | 95.63 | 95.75 |
|                   | Min     | 95.06                                          | 95.18 | 94.60 | 94.95 | 94.87 | 94.98 |
|                   | Average | 95.45                                          | 95.48 | 95.02 | 95.34 | 95.26 | 95.30 |

Approved By: 

FM-L13 BR/30-05-57

## Calibration Report

### Measurement Results

| Calibration Point | Average Standard Reading at each position (°C) |        |        |        |        |        |
|-------------------|------------------------------------------------|--------|--------|--------|--------|--------|
| R1 Hole1-Hole6    | TN221                                          | TN222  | TN223  | TN224  | TN225  | TN226  |
| CAL POINT         | Max                                            | 104.48 | 104.40 | 104.80 | 105.24 | 105.19 |
|                   | Min                                            | 104.13 | 104.02 | 104.25 | 104.94 | 104.91 |
|                   | Average                                        | 104.32 | 104.21 | 104.42 | 105.10 | 105.08 |
| R2 Hole7-Hole12   | TN227                                          | TN228  | TN229  | TN230  | TN231  | TN232  |
|                   | Max                                            | 105.20 | 105.45 | 105.58 | 105.86 | 105.81 |
|                   | Min                                            | 104.92 | 105.14 | 105.29 | 105.64 | 105.53 |
|                   | Average                                        | 105.06 | 105.29 | 105.43 | 105.80 | 105.67 |
| R3 Hole13-Hole18  | TN233                                          | TN234  | TN235  | TN236  | TN237  | TN238  |
|                   | Max                                            | 105.08 | 105.14 | 105.83 | 106.25 | 105.87 |
|                   | Min                                            | 105.80 | 105.89 | 105.57 | 106.09 | 105.69 |
|                   | Average                                        | 105.94 | 105.81 | 105.70 | 106.12 | 105.77 |
| R4 Hole19-Hole24  | TN239                                          | TN240  | TN241  | TN242  | TN243  | TN244  |
|                   | Max                                            | 105.87 | 105.39 | 105.30 | 105.87 | 105.22 |
|                   | Min                                            | 105.82 | 105.52 | 105.12 | 104.90 | 105.49 |
|                   | Average                                        | 105.74 | 105.63 | 105.21 | 104.96 | 105.14 |
| R5 Hole25-Hole30  | TN245                                          | TN246  | TN247  | TN248  | TN249  | TN250  |
|                   | Max                                            | 105.62 | 105.54 | 105.32 | 105.75 | 105.97 |
|                   | Min                                            | 105.47 | 105.58 | 105.81 | 105.57 | 105.81 |
|                   | Average                                        | 105.53 | 105.44 | 105.41 | 105.66 | 105.89 |
| R6 Hole31-Hole36  | TN251                                          | TN252  | TN253  | TN254  | TN255  | TN256  |
|                   | Max                                            | 106.18 | 106.34 | 106.47 | 105.96 | 105.76 |
|                   | Min                                            | 106.02 | 106.16 | 106.31 | 105.77 | 105.59 |
|                   | Average                                        | 106.10 | 106.25 | 106.39 | 105.87 | 105.67 |
| R7 Hole37-Hole42  | TN257                                          | TN258  | TN259  | TN260  | TN261  | TN262  |
|                   | Max                                            | 106.21 | 105.29 | 105.45 | 105.30 | 106.09 |
|                   | Min                                            | 106.04 | 105.42 | 105.29 | 105.20 | 105.90 |
|                   | Average                                        | 106.12 | 105.31 | 105.37 | 105.28 | 106.00 |
| R8 Hole43-Hole48  | TN263                                          | TN264  | TN265  | TN266  | TN267  | TN268  |
|                   | Max                                            | 106.34 | 106.31 | 105.78 | 105.78 | 106.42 |
|                   | Min                                            | 106.34 | 105.18 | 105.80 | 105.21 | 105.53 |
|                   | Average                                        | 106.46 | 105.25 | 105.80 | 105.20 | 105.81 |

Approved By: 

FM-L13 BR/30-05-57

## Calibration Report

### Measurement Results:

| Setting (°C) | HEATING BLOCK |       | Temperature Distribution |                  |
|--------------|---------------|-------|--------------------------|------------------|
|              | Reading (°C)  |       | Stability (°C)           | Uncertainty (°C) |
|              | Min           | Max   |                          |                  |
| 102.0        | -             | 102.0 | 0.03                     | 0.23             |
| 107.0        | -             | 107.0 | 0.20                     | 0.70             |

\* The quoted uncertainty exclude " uniformity "

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on data and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k, which for a t-distribution, providing a level of confidence of approximately 95 %.

Approved By: 

FM-L13 BR/30-05-57

Certificate No. T250873

Page 2 of 4

## Calibration Report

Certificate No. T250873

Page 1 of 4

## Certificate of Calibration

Equipment : Chamber (Cooling Room)

Manufacturer : KOLDTECH

Model : KM 320

Serial No. : TBN-1012061/05

Customer Code : BKK\_EN0167

ID No. : T2463A3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.

104 Phatthanakun 40, Phatthanakun Rd., Khwaeng Phatthanakun,

Khet Suan Luang, Bangkok 10250

Customer Location : Laboratory Room

Date of Receipt : 28 May 2025

Calibrated By : Atiphong Rongrat (Technician)

Approved By :  / Boonchai Suriyawong (Site Calibration Manager)

Date of Issue : 19 JUN 2025

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

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

REVIEW BY: 

APPROVED BY: 

NEXT CAL DATE: 04/12/26

Equipment : Chamber (Cooling Room)

Date of Calibration : 4 June 2025

Environment : Temperature : 23.4-24.9 °C

Line Voltage : 221.4-230.2 V

Relative Humidity : 55 - 65 %RH

## Condition of this results of calibration :

- This equipment was calibrated by insert 16 standard thermocouples type T into its chamber, the other one standard thermocouples type T was for ambient temperature measurement. The calibration was done in according to WI-T20 (based on ASTM E145-94 (Reapproved 2001) and ASZK53-1986). All data show below were final values and the initial data from customer request. The temperature scale used was based on ITS - 90.
- Reference Standard Instrument :
 

| Instrument  | Model  | Instrument No. | Certificate No. | Due Date        |
|-------------|--------|----------------|-----------------|-----------------|
| TC          | TYPE T | TN91-TN100     | T242036         | 3 December 2025 |
| TC          | TYPE T | TN101-TN110    | T242036         | 3 December 2025 |
| DATA LOGGER | 34970A | T121           | T242036         | 3 December 2025 |
- This certificate is transmit to : National Institute of Metrology (Thailand) through Metrology Center (NSC-TISI-TIS 17025 CALIBRATION 0244).
- Condition of calibrated item : good
 

Equipment Description :

Time Constant : 2 Hour 20 Minute At 1 °C

Flush Air Damper : ☐ Open ☐ Min ☐ Medium ☐ Max

☐ Close

☒ Not Available
- Adjustment : ( X ) without adjustment ( ) after adjustment

Approved By: 

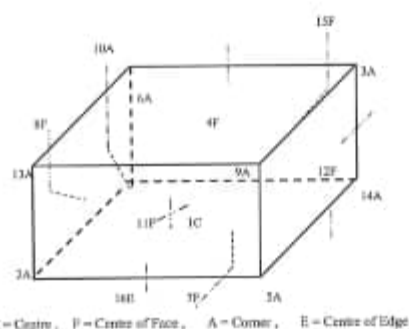
FM-TL07 102/23-03-08

FM-TL07 102/23-03-08

Certificate No. T250873

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## Calibration Report



|             |             |
|-------------|-------------|
| 1C = TN91   | 12F = TN102 |
| 2A = TN92   | 13A = TN103 |
| 3A = TN93   | 14A = TN104 |
| 4F = TN94   | 15F = TN105 |
| 5A = TN95   | 16E = TN106 |
| 6A = TN96   |             |
| 7F = TN97   |             |
| 8F = TN98   |             |
| 9A = TN99   |             |
| 10A = TN100 |             |
| 11F = TN101 |             |

Approved By: 

FM-TL07 102/23-03-08

Certificate No. T250873

Page 4 of 4

## Calibration Report

## Measurement Results

| Calibration Point | Average Standard Reading at each position (°C) |       |       |       |      |      |      |      |      |       |       |       |
|-------------------|------------------------------------------------|-------|-------|-------|------|------|------|------|------|-------|-------|-------|
|                   | TN91                                           | TN92  | TN93  | TN94  | TN95 | TN96 | TN97 | TN98 | TN99 | TN100 | TN101 | TN102 |
| 3.0               | 2.95                                           | 2.93  | 3.01  | 2.92  | 3.16 | 3.30 | 3.48 | 3.03 | 3.14 | 2.98  | 3.44  | 3.13  |
|                   | TN103                                          | TN104 | TN105 | TN106 |      |      |      |      |      |       |       |       |
|                   | 3.19                                           | 3.09  | 3.46  | 2.82  |      |      |      |      |      |       |       |       |

| Chamber (Cooling Room) |              |     | Temperature Distribution |                  |                 |                    |                   |
|------------------------|--------------|-----|--------------------------|------------------|-----------------|--------------------|-------------------|
| Setting (°C)           | Reading (°C) |     | Average (°C)             | Stability (± °C) | Uniformity (°C) | Uncertainty (± °C) | Coverage Factor k |
|                        | Min          | Max |                          |                  |                 |                    |                   |
| 5.8                    | 2.8          | 3.9 | 3.4                      | 3.14             | 1.29            | 1.30               | 2.04              |

The calibration result apply only the above calibrated item.

The result of test was based accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k, which has a t-distribution, providing a level of confidence of approximately 95 %.

Approved By: 

FM-TL07 102/23-03-08

**Automatic Mercury Analyzer  
RA-7000A with SANPRA™3**

**Preventive Maintenance Report**

In warranty 1 of 3

REVIEW BY: Wanida B.  
APPROVED BY: Sunthorn  
NEXT CAL. DATE: 07 April 2023

SERIAL No. RA-7000A : 241040226

Soft version : Ver 1.4.1.0

ROM version : Ver 1.4.0.00

SERIAL No. SANPRA 3 : 231050049

ROM version : Ver 1.4.2.00

DATE : 09 APRIL 2023

DUE DATE : 09 APRIL 2027

INSPECTED BY : Chayanan T.  
(Chayanan T.)

APPROVED BY : Nattaphong P.  
(Nattaphong P.)

**Kinetic Solutions Company Limited.**  
2, Soi Lat Krabang 1, Lat Krabang Subdistrict,  
Lat Krabang District, Bangkok 10125  
Tel. (+66)062-789-5221

**Inspection**

| ITEMS                         |                        | SPECIFICATIONS                                 | RESULT           | JUDGE    |
|-------------------------------|------------------------|------------------------------------------------|------------------|----------|
| 1. Quantity                   | -                      | Accessories are completed.                     | GOOD             | OK       |
| 2. Appearance                 | 2.1 Overall Appearance | No visible damage.                             | GOOD             | OK       |
|                               | 2.2 Parts / Calives    | Correctly placed and connected.                | GOOD             |          |
| 3. Indication                 | Nameplate / Label      | Plate and Label are indicated.                 | GOOD             | OK       |
| 4. Self check                 |                        |                                                |                  |          |
| 4.1 GLP Counter<br>(RA-7000A) | Mercury Lamp           | 5000 hours                                     | 1631 hr          | OK       |
|                               | Membrane Filter        | 2000 hours or 1 year after replace             | 0 hr             | OK       |
|                               | Air Pump               | 2000 hours or 2 years after replace            | 536 hr           | OK       |
|                               | Drain Pump Tube        | 700 hours or 1 year after replace              | 0 hr             | OK       |
|                               | Absorbent Hg           | 1000 mg                                        | 0.27723 mg       | OK       |
| 4.2 GLP Counter<br>(SANPRA™3) | P1 Tube                | 700 hours or 1 year after replace              | < 1 hr           | OK       |
|                               | P2 Tube                | 700 hours or 1 year after replace              | < 1 hr           | OK       |
|                               | P3 Tube                | 700 hours or 1 year after replace              | < 1 hr           | OK       |
|                               | P4 Tube                | 700 hours or 1 year after replace              | < 1 hr           | OK       |
|                               | P5 Tube                | 700 hours or 1 year after replace              | < 1 hr           | OK       |
| 4.3 Check/Test<br>(RA-7000A)  | Flow rate Adjustment   | Flow rate of 0.20 L/min                        | PASS             | OK       |
|                               | Signal Detector        | V.DIG is 3.3 ~ 4.5 V.<br>V.REP is 3.5 ~ 4.5 V. | 4.01 V<br>4.00 V | OK<br>OK |
| 4.4 Check/Test<br>(SANPRA™3)  | Sample Tube Sensor     | Tube is detected sample tube                   | PASS             | OK       |
|                               | Dust Fan               | Check the operation of dust fan                | PASS             | OK       |
| 5. Calibration Curve          | no pretreatment        | 0-100ng / Max.Dev. 5.0%                        | 4.70%            | OK       |
| 7. Repeatability              | 5 ng, (n=5)            | Average: 5ng ± 0.25 ng<br>C.V. ± 5.0%          | 4.850ng<br>0.71% | OK       |
| 8. Blank                      | no pretreatment        | Less than 0.03 (AREA)                          | 0.017373 AREA    | OK       |

**Appendix**

| NAME                                                                 | Date Tested    | Expiration     |
|----------------------------------------------------------------------|----------------|----------------|
| Mercury DCP Standard (1000 µg/mL)<br>AccuStandard, Inc. Lot 22935027 | March 20, 2023 | March 25, 2028 |

**Inspection details**

| Remark                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Cleaning Mercury Analyzer RA-7000A with Autosample SANPRA3<br>- Body case, Reagent Tube, Cell Detector, Tube of Sample, Measurement Probe, Rinse Tube                                                                                                |
| 3. Checking Mercury Analyzer RA-7000A<br>- Mercury Lamp - Outlet Activated Carbon Filter<br>- Membrane Filter - Flow Adjustment Valve<br>- Air Pump - Flow Sensor<br>- Drain Pump Tube - Valves V1 and V2<br>- Drain Pump unit - Instrument Performance |
| 4. Checking Auto Sample SANPRA™3<br>- Reagent Pump Tube - Motor of Lift<br>- Reagent Pump - Dust Fan<br>- Motor of Arm<br>- Motor of Table                                                                                                              |
| 5. Inspection Calibration curve and Reproducibility of Mercury Analyzer RA-7000A with SANPRA™3                                                                                                                                                          |

TITLE Preventive Maintenance in warranty 1of3 Mercury Analyzer RA-7000A SN241040226 with SANPRA3  
SN241070080  
DATE 2023/04/09 09:28  
UNIT RA-7000A(SN:241040226) + SANPRA 3 (SN:1 A) (SN: 241070080)  
OPERATOR Kinetic solutions

**METHOD**

Method Name : Method1

Pretreatment : No

P1: (1)-(1)H2SO4

P2: 10u/vs SnCl2

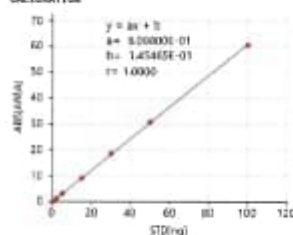
**CALIBRATION**

$y = ax + b$

$a = 0.00000001$

$b = 1.45465E-01$

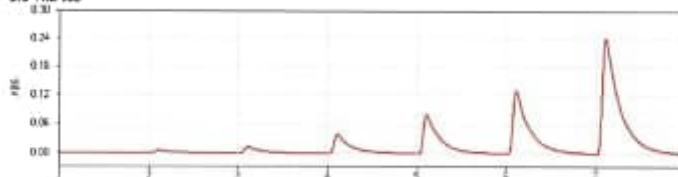
$r = 1.00000$



**STD. TABLE**

| No. | SNP NO. | STD (µg/L) | SVOL (mL) | CVOL (mL) | DVOL (mL) | STD (mg) | AREA (DN) | MEAN (mg) | DEV (%) | NOTE |
|-----|---------|------------|-----------|-----------|-----------|----------|-----------|-----------|---------|------|
| 1   | 1       | 5.000      | 0.050     | 0.050     | 0.050     | 0.000    | 0.017373  | -0.2104   | -       |      |
| 2   | 2       | 100.000    | 0.050     | 0.050     | 0.050     | 2.000    | 1.305177  | 1.9067    | 4.7     |      |
| 3   | 3       | 100.000    | 0.050     | 0.050     | 0.050     | 5.000    | 3.135473  | 4.9115    | 1.0     |      |
| 4   | 4       | 1000.000   | 0.050     | 0.050     | 0.050     | 15.000   | 9.185458  | 14.6493   | 1.0     |      |
| 5   | 5       | 1000.000   | 0.050     | 0.050     | 0.050     | 30.000   | 18.69723  | 30.4283   | 1.4     |      |
| 6   | 6       | 1000.000   | 0.050     | 0.050     | 0.050     | 50.000   | 30.948728 | 50.4324   | 2.9     |      |
| 7   | 7       | 1000.000   | 0.100     | 0.050     | 0.050     | 100.000  | 60.803321 | 98.6948   | 0.2     |      |

**STD PROFILE**



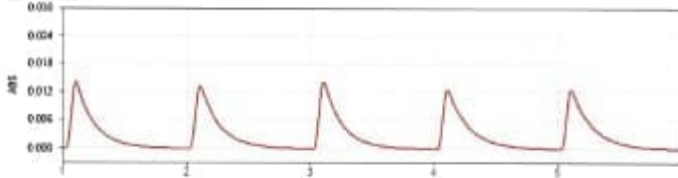
**SNP. TABLE**

| No. | SNP NO. | NAME            | SVOL (mL) | CVOL (mL) | DVOL (mL) | AREA (DN) | MEAN (mg) | CONC (mg/L) | NOTE |
|-----|---------|-----------------|-----------|-----------|-----------|-----------|-----------|-------------|------|
| 1   | 11      | Repeat STD 5 ng | 5.000     | 5.000     | 5.000     | 3.182189  | 4.9380    | 0.998       |      |
| 2   | 14      | Repeat STD 5 ng | 5.000     | 5.000     | 5.000     | 2.144640  | 4.9254    | 0.985       |      |
| 3   | 10      | Repeat STD 5 ng | 5.000     | 5.000     | 5.000     | 3.171135  | 4.9599    | 0.994       |      |
| 4   | 16      | Repeat STD 5 ng | 5.000     | 5.000     | 5.000     | 2.132687  | 4.9587    | 0.981       |      |
| 5   | 17      | Repeat STD 5 ng | 5.000     | 5.000     | 5.000     | 2.144645  | 4.9761    | 0.985       |      |

## STATISTICS

| No. | NAME            | DATA POINTS | AVE. [mg] | SD [mg] | CV [%] |
|-----|-----------------|-------------|-----------|---------|--------|
| 1   | Repeat STD 5 ng | 5           | 4.953     | 0.0359  | 0.71   |

## SMP PROFILE



## SELF CHECK

Date : 2026/04/09 08:13:29

Q.P. Counter : PASS 1421hr (2025/03/18)

Mercury Lamp (5000hr) : PASS 5hr (2025/04/09)

Mercury Filter (2000hr) : PASS 500hr (2025/03/19)

Air Pump (2000hr) : PASS 5hr (2025/04/09)

Drain Pump Tube (700hr) : PASS 5hr (2025/04/09)

No. of Measurements : 5259

Adjusted Hg (1500ng) : PASS 0.3173mg (2025/03/18)

P1 Tube (700hr) : PASS 5hr (2025/04/09)

P2 Tube (700hr) : PASS 5hr (2025/04/09)

P3 Tube (700hr) : PASS 5hr (2025/04/09)

P4 Tube (700hr) : PASS 5hr (2025/04/09)

P5 Tube (700hr) : PASS 5hr (2025/04/09)

Check/Test Result : PASS (FLOW=0.23L/min)(OUT= 431)

Flow Rate Adjustment : PASS (Sig=4.03V, Ref: 4.03V)

Sig/Ref : PASS (DIFF= ABS= 0.000174)

Drift : PASS

Sample Tube Sensor : PASS

TITLE Preventive Maintenance in warranty InFS Mercury Analyzer RA-7000A SN241040226 with SANPRA3  
 DATE 2026/04/09 09:26  
 UNIT RA-7000A(SN:241040226) + SANPRA 3 (UNIT A) (SN:241070880)  
 OPERATOR Kinetic solutions

## STD TABLE

| No. | SMP NO. | STD [ug/L] | SVEL [mL] | CVEL [mL] | DVEL [mL] | STD [mg] | AREA [a.u.] | REAS [mg] | DEV [%] | NOTE  |
|-----|---------|------------|-----------|-----------|-----------|----------|-------------|-----------|---------|-------|
| 1   | 1       | 0.000      | 5.000     | 5.000     | 5.000     | 0.000    | 0.017313    | nan       |         | Blank |

## STD PROFILE



100 Market Street  
New Haven, CT 06510  
USA

Tel: (203) 760-0200  
Fax: (203) 760-0201  
www.AccuStandard.com

## AccuStandard, Inc.

### CERTIFICATE OF ANALYSIS

**AccuTrace™ Reference Standard**

Catalog No: KCH-2474-1  
Description: Mercury ICP Standard  
Element: Mercury (Hg)  
SRM: 3133  
Lot: 223000027  
Matrix: 10% Nitric acid  
Hazards: Refer to SDS for complete safety information

Date Certified: Mar 10, 2023  
Expiration: Mar 10, 2028  
Density: 1.012 g/mL  
Sample Size: 100 mL  
Components: 1  
Storage Condition: Ambient (>5 °C)

**Certified Reference Material**

**Certified Concentration: 1000 µg/mL**

| Trace Elements in µg/mL |             |             |             |             |             |             |  |
|-------------------------|-------------|-------------|-------------|-------------|-------------|-------------|--|
| Ag: nd+0.02             | Ce: nd+0.2  | Ge: nd+0.02 | La: nd+0.02 | Pb: nd+0.2  | Se: nd+0.02 | Ti: nd+0.02 |  |
| Al: nd+0.02             | Co: nd+0.02 | Hf: nd+0.2  | Mg: nd+0.02 | Pd: nd+0.2  | Sn: nd+0.2  | Tr: nd+0.2  |  |
| As: nd+0.2              | Cr: nd+0.02 | Ir: nd+0.02 | Mo: nd+0.02 | Pv: nd+0.2  | Bi: N/A     | Th: nd+0.02 |  |
| Au: nd+0.02             | Cu: N/A     | Rb: *       | Nb: nd+0.02 | Pl: nd+0.2  | Sb: nd+0.2  | U: nd+0.2   |  |
| B: nd+0.2               | Ca: nd+0.02 | Sr: nd+0.02 | Na: nd+0.02 | Ni: N/A     | Br: nd+0.02 | V: nd+0.02  |  |
| Be: nd+0.02             | Dy: nd+0.02 | Sc: nd+0.2  | Nr: nd+0.2  | Nm: nd+0.2  | Cl: nd+0.02 | W: nd+0.2   |  |
| Ba: nd+0.02             | Zr: nd+0.02 | Y: nd+0.2   | Md: nd+0.02 | Rh: nd+0.2  | Ta: nd+0.2  | X: nd+0.02  |  |
| Br: nd+0.2              | Eu: nd+0.02 | K: nd+0.2   | Nd: nd+0.02 | Ru: nd+0.02 | Tb: nd+0.02 | Yb: nd+0.02 |  |
| Cd: nd+0.02             | Fe: nd+0.02 | Li: nd+0.02 | Os: N/A     | S: N/A      | Tm: nd+0.2  | Zn: nd+0.02 |  |
| Ce: nd+0.02             | Na: nd+0.02 | U: nd+0.02  | P: N/A      | Sb: nd+0.2  | Tl: nd+0.02 | Zr: nd+0.02 |  |

This Certified Reference Material was prepared according to ISO 9001:2015 (A17:2015) and ISO 17034 (A17:2015).  
 The solution was prepared gravimetrically, using a balance calibrated against weight standards, NIST 4862, traceable to NIST.  
 A product with a suffix (A, B, C, etc.) or a lot number has been supplied; data entered and a label is the same lot number without the suffix.  
 This product contains mercury and must be handled with care according to all federal, state and local regulations.  
 The guaranteed uncertainty for this product is ±0.24%. The CRM uncertainty is ±0.24%.  
 In order to verify the concentration, the final product was checked by plasma emission spectroscopy (PES) against standard solutions by the plasma test (PES).  
 We use the highest purity reagents available to minimize impurity levels in the final solution. Typically 99.999% pure starting materials are used as well as high purity water and ATO (Type 1) reagents wherever possible.  
 All trace level elements impurities were determined via plasma emission spectroscopy on the same instrument.  
 All weights are traceable through NIST. Test No. 384221244-18 & 384222244-18.  
 All glassware used in preparation is Class A.  
 All certified are acid washed and kept stored with deionized water prior to use.  
 Please handle with care and do not pipette directly out of the bottle. Use only certified Class A volumetric glassware. Keep bottle tightly capped.

Certified by: *[Signature]*  
Karl L. Hach

For use in routine laboratory analysis.

Page 1 of 1

AccuStandard is accredited to ISO 17034, ISO/IEC 17025 and certified to ISO 9001:2015.

## 1. Quality Standards:

ISO 17034:2016 – General Requirements for the Competence of Reference Material Producers  
 ISO/IEC 17025:2017 – General Requirements for the Competence of Testing and Calibration Laboratories  
 ISO 9001:2015 – Quality Management System – Requirements  
 Eagle Registrations

2. **Intended Use:** The product covered by this certificate is designed for calibration or for use in quality control procedures for the specified chemical compounds listed on the reverse side. This product can be used for quantification and/or identification. This product can also be used as a reference material to validate analytical procedures, subject to the conditions under Section 7.

3. **Manufacturing:** All balances are calibrated daily using an in-house procedure with weights that are compared annually to master weights and traceable to NIST. The balances are also calibrated annually by an ISO/IEC 17025 accredited calibration laboratory. Please refer to the NIST test number listed on the front of this certificate. Class A glassware is used in the manufacture and quality control of all standards. Good Laboratory Practices have been used throughout the preparation of this Standard.

4. **Homogeneity:** This product is sufficiently homogeneous and any sample also would be within the uncertainty budget.

5. **Stability:** The manufacturer guarantees the stability of this solution through the expiration date stated on the label, when handled and stored according to the conditions stated on the label.

6. **Uncertainty:** The uncertainty values as stated on the face of this certificate have been determined using the EURACHEM/CITAC Guide. We report a combined expanded uncertainty equal to the positive square root of the total variance of the uncertainty of the components using the following formula:  $u_c = \sqrt{(u_1)^2 + (u_2)^2 + (u_3)^2 + (u_4)^2 + (u_5)^2}$ . This formula represents uncertainty components from the mass, volume, short-term stability, long-term stability and homogeneity factors associated with the production of this product. The expanded uncertainty assumes a normal distribution and a coverage factor of k=2 is chosen using approximately a 95% confidence level.

7. **Legal Notice and Limit of Liability:** This product is for routine laboratory analysis and research purposes only. The company's liability will be limited to replacement of product or refund of purchase price. Notice of claims must be made within thirty (30) days from date of delivery.

Certificate No. T250353

Page 1 of 4

## Certificate of Calibration

Equipment : Autoclave

Manufacturer : TOYOT

Model : SX-700

Serial No. : 48134190

Customer Code : BKK\_ML0041

ID No. : T7725A3

Customer : ALS Laboratory Group (Thailand) Co., Ltd.

104 Phatthanasakul 40, Phatthanasakul Rd., Khwaeng Phatthanasakul,

Khet Sukt Lukang, Bangkok 10250

Customer Location : Washing Room

Date of Receipt : 26 February 2025

Calibrated By : Boonchai Suriyawong (Site Calibration Manager)

Approved By : / Sujjar Naimakred (Site Calibration Manager)

Date of Issue : 16 Mar 2025

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

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

TM-L15 118/50-05-06

Certificate No. T250353

Page 2 of 4

## Calibration Report

Equipment : Autoclave  
 Date of Calibration : 4 March 2025  
 Environment : Temperature : 23.2-25.4 °C  
 Line Voltage : 221.1-224.7 V  
 Relative Humidity : 55-65 %RH

## Condition of this results of calibration :

1. This equipment was calibrated by using 3 standard temperature recorder (due to chamber and test accuracy, 1. RTD above method based on BS 2646 1 : 2021)  
 All data show below were first values not their initial data from customer request. The temperature scale used was based on ITS-90.

## 2. Reference Standard Information :

| Instrument              | Model | Standard No. | Certificate No. | Due Date         |
|-------------------------|-------|--------------|-----------------|------------------|
| 1. Temperature recorder | RTD   | T210         | T242028         | 11 December 2025 |
| 2. Temperature recorder | RTD   | T211         | T242029         | 11 December 2025 |
| 3. Temperature recorder | RTD   | T212         | T242030         | 11 December 2025 |

## 3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TIS-TIS 17025 CALIBRATION 0244)

## 4. Condition of calibrated item : good

Equipment Description :

Pressure Indicator : 0.11-0.12 MPa At 121 °C Holding time 20 minute

## 5. Adjustment :

( X ) without adjustment

( ) after adjustment

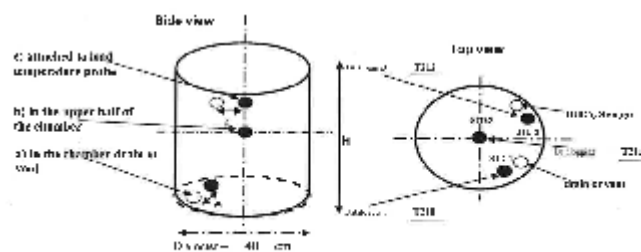
Approved By:

TM-L15 118/50-05-06

Certificate No. T250353

Page 3 of 4

## Calibration Report



## Remark :

Size of installed Standard sensor STD.1 : Distance the chamber drain or vent :  $e \leq 10$  cm (Less than or be equal to 10 cm.)

Size of installed Standard sensor STD.2 : Geometric Center (upper half of the chamber)

Size of installed Standard sensor STD.3 : Distance UUC's Sensor :  $f = 2$  cm.

## Measurement Results :

| Calibration Point | Average Standard Reading at each position (°C) |       |       |
|-------------------|------------------------------------------------|-------|-------|
|                   | T210                                           | T211  | T212  |
| 121               | 121.2                                          | 121.3 | 121.3 |

| Autoclave    |              |     | Temperature Distribution |                 |                  |                   |                   |
|--------------|--------------|-----|--------------------------|-----------------|------------------|-------------------|-------------------|
| Setting (°C) | Reading (°C) |     | Average (°C)             | Stability (±°C) | Uniformity (±°C) | Uncertainty (±°C) | Coverage Factor k |
|              | Min.         | Max |                          |                 |                  |                   |                   |
| 121          | -            | 121 | 121.2                    | 0.1             | 0.1              | 0.65              | 2.00              |

\* The quoted uncertainty exclude "uniformity"

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 %.

End of Certificate

Approved By:

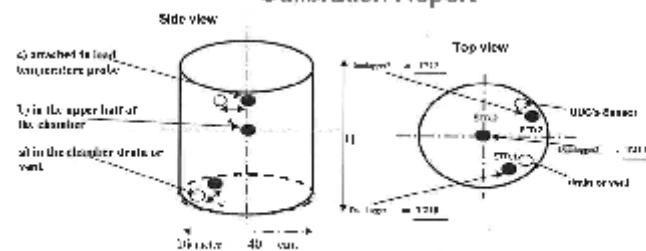
TM-L15 118/50-05-06

Certificate No. T250353

TEST REPORT (BKK\_ML0041)

Page 4 of 4

## Calibration Report



## Remark :

Size of installed Standard sensor STD.1 : Distance the chamber drain or vent :  $e \leq 10$  cm (Less than or be equal to 10 cm.)

Size of installed Standard sensor STD.2 : Geometric Center (upper half of the chamber)

Size of installed Standard sensor STD.3 : Distance UUC's Sensor :  $f = 2$  cm.

## Measurement Results :

| Calibration Point | Average Standard Reading at each position (°C) |        |        |
|-------------------|------------------------------------------------|--------|--------|
|                   | T210                                           | T211   | T212   |
| 121               | 121.38                                         | 121.32 | 121.32 |

| Autoclave    |              |     | Temperature Distribution |                 |                  |                   |                   |
|--------------|--------------|-----|--------------------------|-----------------|------------------|-------------------|-------------------|
| Setting (°C) | Reading (°C) |     | Average (°C)             | Stability (±°C) | Uniformity (±°C) | Uncertainty (±°C) | Coverage Factor k |
|              | Min.         | Max |                          |                 |                  |                   |                   |
| 121          | -            | 121 | 121.34                   | 0.10            | 0.10             | 0.65              | 2.00              |

\* The quoted uncertainty exclude "uniformity"

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 %.

End of Certificate

Approved By:

TM-L15 118/50-05-07



Equipment : Incubator  
Condition As-Received : Used Item  
Reference : 2508-045900-2  
Procedure Used :-

Cert. No.: 25TM1235  
Page : 2 of 3

## Certificate of Calibration

Cert. No.: 25TM1235  
Page : 1 of 3

Equipment : Incubator  
Manufacturer : Memmert  
Model : IPP750eco  
Serial No. : V821.0172  
ID No. : BKK\_ML0031

Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.  
104 Phatthanakan 40, Phatthanakan Rd.,  
Khwang Phatthanakan, Khet Suan Luang,  
Bangkok 10250, Thailand  
Location : Incubator & Microbiological Reading

Received Order : 21 August 2025  
Calibration Date : 21 August 2025  
Ambient Temperature : ( 26 ± 10 ) °C  
Relative Humidity : ( 50 ± 30 ) %  
AC Line Voltage : ( 220 ± 22 ) V

Calibrated by : Kitti Rattanasapachai

Approved by :  
( ) Chakrit Waeerwanua  
( ) Suwit Imjai  
(✓) Kunchit Promnoi

Issue Date : 25 August 2025

The Uncertainties are for a confidence probability of approximately 95%

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

REVIEW BY: Silthichok T.  
APPROVED BY: [Signature]  
NEXT CAL DATE: 21/08/26

1. Reference standard instrument:-  
Instrument Serial No. Cert. No. Traceable Due Date  
1 ) Data Acquisition MY44073381 25LM82 TPA 17 May 2026  
2. This certificate is valid only to the item calibrated on date and place of calibration.  
3. This measurement result is traceable to the International System of Unit maintained through :

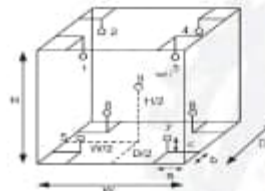
Remark : TPA : Technology Promotion Association ( Thailand - Japan )

Result of Calibration :- ( ° ) Without Adjustment

Function of UUC\* : Temperature Source

Fresh air setting : Not Available

| Environment during calibration |           |          |
|--------------------------------|-----------|----------|
|                                | Beginning | Finished |
| Temp. ( °C )                   | 21        | 20       |
| REL. Humid. ( % )              | 62        | 65       |
| AC Supply ( Volt )             | 222       | 221      |



Probe Installation Details :

a = 10 cm  
b = 10 cm  
c = 10 cm

Dimension of Chamber :

D = 0.60 m  
W = 1.0 m  
H = 1.2 m  
Capacity = 0.75 m<sup>3</sup>

| Position : | Ref. Std. ID No.: |
|------------|-------------------|
| 1          | 25-01RTD-01       |
| 2          | 25-01RTD-02       |
| 3          | 25-01RTD-03       |
| 4          | 25-01RTD-04       |
| 5          | 25-01RTD-05       |
| 6          | 25-01RTD-06       |
| 7          | 25-01RTD-07       |
| 8          | 25-01RTD-08       |
| 9 (ref.)   | 25-01RTD-09       |



Equipment : Incubator  
Condition As-Received : Used Item  
Reference : 2508-045900-2  
Result of Calibration :- ( ° ) Without Adjustment  
Function of UUC\* : Temperature Source  
Fresh air setting : Not Available

Cert. No.: 25TM1235  
Page : 3 of 3

| Calibration Point ( °C ) | UUC* Setting ( °C ) | UUC* Reading ( °C ) | Temperature stability ( ± °C ) | Temperature uniformity ( °C ) | Overall Variation ( °C ) | Coverage Factor k |
|--------------------------|---------------------|---------------------|--------------------------------|-------------------------------|--------------------------|-------------------|
| 35.0                     | 35.0                | 35.0                | 0.12                           | 0.37                          | 0.43                     | 2                 |
| 37.0                     | 37.0                | 37.0                | 0.15                           | 0.47                          | 0.49                     | 2                 |
| 41.5                     | 41.5                | 41.5                | 0.13                           | 0.79                          | 0.84                     | 2                 |

| Calibration Point ( °C ) | Measured Temperature ( °C ) |        |        |        |        |        |        |        |          | Uncertainty ( ± °C ) |
|--------------------------|-----------------------------|--------|--------|--------|--------|--------|--------|--------|----------|----------------------|
|                          | 1                           | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9 (ref.) |                      |
| 35.0                     | 34.834                      | 34.929 | 34.924 | 34.869 | 34.856 | 34.954 | 35.002 | 35.002 | 35.127   | 0.30                 |
| 37.0                     | 36.940                      | 37.055 | 37.010 | 36.921 | 36.883 | 36.973 | 37.043 | 37.045 | 37.235   | 0.31                 |
| 41.5                     | 41.541                      | 41.838 | 41.742 | 41.484 | 41.249 | 41.427 | 41.466 | 41.485 | 41.926   | 0.34                 |

Average\* : The average of 30 values in each position

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location, which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

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

UUC\* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

-00a-



## Certificate of Calibration

Cert. No.: 25TM525  
Page : 1 of 3

Equipment : Hot Air Oven  
Manufacturer : Binder  
Model : ED 340/E2  
Serial No. : 00-15503  
ID No. : BKK\_ML0013

Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.  
104 Phatthanakan 40, Phatthanakan Rd.,  
Khwang Phatthanakan, Khet Suan Luang,  
Bangkok 10250, Thailand  
Location : Media Preparation Room

Received Order : 08 October 2025  
Calibration Date : 09 October 2025  
Ambient Temperature : ( 26 ± 10 ) °C  
Relative Humidity : ( 50 ± 30 ) %  
AC Line Voltage : ( 220 ± 22 ) V

Calibrated by : Uthair Karkwan

Approved by :  
( ) Chakrit Waeerwanua  
( ) Suwit Imjai  
(✓) Kunchit Promnoi

Issue Date : 16 October 2025

The Uncertainties are for a confidence probability of approximately 95%

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

REVIEW BY: Silthichok T.  
APPROVED BY: [Signature]  
NEXT CAL DATE: 09/04/27



Equipment : Hot Air Oven  
Condition As-Received : Used Item  
Reference : 2510-0042CG-3

Cert. No.: 251MS25  
Page : 2 of 3

#### Procedure Used :-

Calibration was conducted using calibration procedure CP-OT02 based on TLAS G-20 according to direct measurement method with Data Acquisition which connected with Thermocouple Type T.

The temperature scale used was based on ITS-90.

#### Condition of this result of calibration

##### 1. Reference standard instrument-

Instrument : Serial No. : Cert. No. : Traceable : Due Date :  
1 ) Data Acquisition : MY5003411 : 24LM192 : TPA : 24 Dec 2025

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

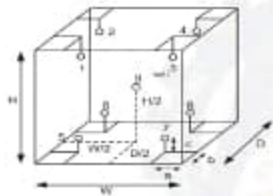
3. This measurement result is traceable to the International System of Unit maintained through :

Remark : TPA : Technology Promotion Association ( Thailand - Japan )

Result of Calibration :- ( ° ) Without Adjustment

Function of UUC\* : Temperature Source

Fresh air setting : Close



#### Probe Installation Details :

a = 5.0 cm  
b = 5.0 cm  
c = 5.0 cm

#### Dimension of Chamber :

D = 0.50 m  
W = 0.60 m  
H = 0.60 m  
Capacity = 0.24 m<sup>3</sup>

| Environment during calibration |           |          |
|--------------------------------|-----------|----------|
|                                | Beginning | Finished |
| Temp. ( °C )                   | 23        | 24       |
| REL Humid. ( % )               | 54        | 56       |
| AC Supply ( Volt )             | 220       | 221      |

| Position : | Ref. Std. ID No.: |
|------------|-------------------|
| 1          | 23-20TC-01        |
| 2          | 23-20TC-02        |
| 3          | 23-20TC-03        |
| 4          | 23-20TC-04        |
| 5          | 23-20TC-05        |
| 6          | 23-20TC-06        |
| 7          | 23-20TC-07        |
| 8          | 23-20TC-08        |
| 9 (ref.)   | 23-20TC-09        |



Equipment : Hot Air Oven  
Condition As-Received : Used Item  
Reference : 2510-0042CG-3

Cert. No.: 251MS25  
Page : 3 of 3

#### Result of Calibration :-

( ° ) Without Adjustment

Function of UUC\* : Temperature Source

Fresh air setting : Close

| Calibration Point ( °C ) | UUC* Setting ( °C ) | UUC* Reading ( °C ) | Temperature stability ( ± °C ) | Temperature uniformity ( °C ) | Overall Variation ( °C ) | Coverage Factor k: |
|--------------------------|---------------------|---------------------|--------------------------------|-------------------------------|--------------------------|--------------------|
| 170                      | 170                 | 170                 | 0.45                           | 1.3                           | 2.3                      | 2                  |

| Calibration Point ( °C ) | Measured Temperature ( °C ) |         |         |         |         |         |         |         |          | Uncertainty ( ± °C ) |
|--------------------------|-----------------------------|---------|---------|---------|---------|---------|---------|---------|----------|----------------------|
|                          | 1                           | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9 (ref.) |                      |
| 170                      | 169.565                     | 170.427 | 168.486 | 168.900 | 169.725 | 169.499 | 168.946 | 169.327 | 169.529  | 1.3                  |

Average<sup>a</sup> : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern of homogeneity within the chamber under steady-state conditions.

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

UUC\* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity.

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

-000-

Agilent Technologies

Agilent Calibration Compliance Services

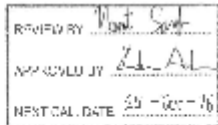
## Certificate of System Qualification

CP-002 - 12.025-00

Scope ID : DRG 240526000-0  
Operational Name : MS1 primary loop (Tribond) On, US  
Operational Location : 164 Industrial Way, Bunnbrook Rd., Downing Street, Bunnbrook, Bunnbrook, Bunnbrook

Date : June 05 2025 10:40 PM  
ERP Name : Agilent Technologies, Inc. for Research and Development

ERP Result : PASS  
Overall Qualification Status : Pass



#### System Inspection and Test Safety and Operation

Name : 2500  
Self-test Status : Pass

Overall System Inspection and Basic Safety and Operation Test Status : Pass

#### Input Power to the System

Name : 1000  
Power : 55

Self-test Status : Pass

Input Power to the System : 1000  
Power : 55

Input Power to the System : 1000  
Power : 55

Input Power to the System : 1000  
Power : 55

Input Power to the System : 1000  
Power : 55

Input Power to the System : 1000  
Power : 55

Input Power to the System : 1000  
Power : 55

Input Power to the System : 1000  
Power : 55

Input Power to the System : 1000  
Power : 55

Agilent Technologies

Agilent Calibration Compliance Services

Name : 2500  
Self-test Status : Pass  
Date : 2025

Temperature : 120.0 ± 0.2 °C

Accuracy : ± 0.2 °C

Agilent Recommended : ± 0.2 °C

Self-test Status : Pass

Power : 1000

Temperature : 120.0 ± 0.2 °C

Accuracy : ± 0.2 °C

Agilent Recommended : ± 0.2 °C

Overall GC Oven Temperature Accuracy Test Status : Pass

GC Oven Temperature Accuracy Test Status : Pass

Name : 2500

Self-test Status : Pass

Temperature : 120.0 ± 0.2 °C

Accuracy : ± 0.2 °C

Agilent Recommended : ± 0.2 °C

Overall GC Oven Temperature Stability Test Status : Pass

GC Oven Temperature Stability Test Status : Pass

Name : 2500

Self-test Status : Pass

Temperature : 120.0 ± 0.2 °C

Date : June 05 2025 10:40 PM  
System ID : DRG 240526000-0

Page 1 of 6

Date : June 05 2025 10:40 PM  
System ID : DRG 240526000-0

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**Electronic Signature**

## Future

[illegible]

Figure 2

Full Name: \_\_\_\_\_

Small Group 24-26

Source: *Author's survey*.

### Keywords

Suppose  $\mathbf{b}$  is a unit vector

www.journalofmanagement.com

17.2 31.58

Executive summary, and published in a national newspaper of circulation

ACE Cell Differentiation Media

The breeder members of ACL used to follow the same standard quality control process to be approved for importation *in vivo*. The *in vivo* and *in vitro* assays were applied to evaluate if the same quality control process (ADQC) was able to detect all carriers.

### Regulatory Oversight

[illegible]

### Summary

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DOI: 10.1002/for

2256247

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1. The first step is to identify the problem.

[illegible]

Unit 4: Global Environmental Issues

[illegible]

DOI: 10.1002/for  
 1000-1000

0-00000000

[illegible][illegible]

PAUL SMITH is a novelist.

[illegible]

17842

Date: 22-06-2023 12:43 PM  
 Session ID: 265-54847461

— 2011 —

© 2006 Blackwell Publishing Ltd  
Journal of Internal Medicine 260: 401–410

2010年12月25日

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[illegible]

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|                           |                                    |
|---------------------------|------------------------------------|
| Notes:                    | 1. R <sup>2</sup> = 0.276, 624.781 |
| Adjusted R <sup>2</sup> : | 0.25, 601.490                      |

1999: 241-256.





Setpoint Status: **Pass**

Zone: **Oven**

Temperature: **100.0** °C

Actual: **100.3**

Accuracy: **0.3** °C

Agilent Recommended: **±4.0**

## Overall Headspace Heated Zones Temperature Accuracy Test

**Pass**

## GC Oven Temperature Accuracy

Name: **7590**

Setpoint Status: **Pass**

Zone: **Oven**

Setpoint/Actual: **230.0** / **230.4** °C

Accuracy: **0.4** °C

Agilent Recommended: **±1.0** °C

Setpoint Status: **Pass**

Zone: **Oven**

Setpoint/Actual: **100.0** / **100.1** °C

Accuracy: **0.1** °C

Agilent Recommended: **±1.0** °C

## Overall GC Oven Temperature Accuracy Test Status

**Pass**

## GC Oven Temperature Stability

Name: **7590**

Date: **January 3, 2023 9:06:38 AM**

System ID: **GM-6**

Setpoint Status: **Pass**

Setpoint/Average: **100.0** / **100.1333** °C

Temperature: **100.0** °C

Stability: **0.1** °C

Agilent Recommended: **±0.5**

## Overall GC Oven Temperature Stability Test Status

**Pass**

## Log Amp

Tested Combination: **Front** **SSL** / **External** **SQ**

Name: **5975C Inert XL with TAD**

Setpoint Status: **Pass**

## Overall Log Amp Test Status

**Pass**

## RPPA

Tested Combination: **Front** **SSL** / **External** **SQ**

Name: **5975C Inert XL with TAD**

Setpoint Status: **Pass**

Area: **1090** mV

Drift After Five Minutes: **57** mV

RPPA Voltage: **500** mV

Agilent Recommended: **±100** and **±100** ±1100

## Overall RPPA Test Status

**Pass**

## Tune EI

Tested Combination: **Front** **SSL** / **External** **SQ**

Name: **5975C Inert XL with TAD**

Setpoint Status: **Pass**

Filament: **1**

Setpoint Status: **Pass**

Filament: **2**

## Overall Tune EI Test Status

**Pass**

## Scouting Run

Tested Combination: **Front** **SSL** / **External** **SQ**

Name: **7697A with Tray**

Source: **EI - Inert**

Setpoint Status: **Completed**

Injection Volume on Column: **1000** µL

Overall Scouting Run Status: **Completed**

## Injection Precision

Tested Combination: **Front** **SSL** / **External** **SQ**

Name: **7697A with Tray**

Source: **EI - Inert**

Setpoint Status: **Pass**

Injection Volume on Column: **1000** µL

Area RSD: **1.46** %

Retention Time RSD: **0.01** %

Agilent Recommended: **±5.00** and **±1.00**

## Overall Injection Precision Test Status

**Pass**

## Mass Ratio Precision

Tested Combination: **Front** **SSL** / **External** **SQ**

Name: **Headspace**

Source: **7697A with Tray**

Setpoint Status: **Pass**

Injection Volume on Column: **1000** µL

Area/Mass 1: **1.77** %

Mass Ratio: **0.29** %

Agilent Recommended: **±5.00** and **±5.00**

## Overall Mass Ratio Precision Test Status

**Pass**

## Injection Carry Over

Tested Combination: **Front** **SSL** / **External** **SQ**

Name: **7697A with Tray**

Source: **EI - Inert**

Setpoint Status: **Pass**

Injection Volume on Column: **1000** µL

Area Carry Over: **0.01** %

Agilent Recommended: **±1.00**

## Overall Injection Carry Over Test Status

**Pass**

## Instrument Details

## Purpose

This section describes the as-found system configuration.

## Details

## System

|                        |                                   |
|------------------------|-----------------------------------|
| System ID              | GM-6                              |
| Manufacturer           | Agilent Technologies              |
| Name                   | 7890                              |
| Flow Data Input        | Manual Data                       |
| Temperature Data Input | Manual Data or Other Data Logging |

## Tested Configuration

|                     |           |
|---------------------|-----------|
| Injection Technique | Headspace |
| Inlet               | Front     |
| Detector            | External  |
| LTM Included?       | No        |

## Sampler 1

|                            |                      |
|----------------------------|----------------------|
| Manufacturer               | Agilent Technologies |
| Type                       | Headspace            |
| Name                       | 7897A with Tray      |
| Model Number               | 04857A               |
| Serial Number              | CN13025003           |
| Firmware Revision          | A.01.05.1            |
| Sampling System            | Loop Fill            |
| Location                   | Front                |
| Injection Volume (µL)      | 1000                 |
| Headspace to GC Connection | EPIC Headspace       |

Date: January 3, 2023 9:06:38 AM  
System ID: GM-6

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## Manufacturer 1

|                   |                      |
|-------------------|----------------------|
| Manufacturer      | Agilent Technologies |
| Name              | 7790                 |
| Model Number      | 024747A              |
| Serial Number     | US130231185          |
| Firmware Revision | A.01.04              |
| Driver Type       | Standard             |

## Inlet 1

|               |                                   |
|---------------|-----------------------------------|
| Manufacturer  | Agilent Technologies              |
| Name          | 7790                              |
| Type          | GC                                |
| Location      | Front                             |
| Detector Area | 100.00                            |
| Control Type  | Electronic Pressure Control (EPC) |
| Auto Tolerate | No                                |

## Detector 1

|              |                      |
|--------------|----------------------|
| Manufacturer | Agilent Technologies |
| Name         | Mass Spectrometer    |
| Type         | Mass Spectrometer    |
| Location     | External             |

## Mass Spectrometer 1

|                       |                         |
|-----------------------|-------------------------|
| Manufacturer          | Agilent Technologies    |
| Type                  | MS                      |
| Name                  | 8875C Inert XL with TAD |
| Model Number          | 03172A                  |
| Serial Number         | US13023A30              |
| Firmware Revision     | 7.02.09                 |
| High Vacuum System    | Turbo Pump              |
| Scouting Run Standard | MRP Std                 |

Date: January 3, 2023 9:06:38 AM  
System ID: GM-6

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## Manufacturer 1

|                    |                      |
|--------------------|----------------------|
| Manufacturer       | Agilent Technologies |
| GC Model Type      | 1100                 |
| Number of Channels | 1                    |

## Electronic Signature

## Purpose

This signature page was created and published because the ACE sign-off action was executed, which is valid for the entire document, including attachments. The ACE sign-off is an electronic signature that requires two distinct identification components: unique username and personal password. The Agilent representative who has delivered this service understands the meaning and legal status of an electronic signature. As a trained official operator, the Agilent representative has a unique password and login to access ACE and electronically sign this document. (Other e-signatures can be applied to this document using a Document Content Management or other suitable method defined in your data access and control procedures.)

## Details

|                          |                                                                   |
|--------------------------|-------------------------------------------------------------------|
| Full Name of Signer:     | Sukesh Marra                                                      |
| Logged On User Name:     | sukesh.marra@agilent.com                                          |
| Signature Creation Date: | January 3, 2023                                                   |
| Reason for Signature:    | Executed protocol and published this original version of document |

## Regulatory Disclaimer

This document provides a protocol to verify and record instrument configuration and evidence of proper operation. It has been prepared from our interpretation of applicable regulations as well as industry best practices. The document is designed to provide an important component of a complete compliance package. Validation depends upon many factors and use of this protocol alone does not assure compliance. Agilent Technologies makes no promises or representations as to its sufficiency for any specific regulatory program.

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Date: January 3, 2023 9:06:38 AM  
System ID: GM-6

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Date: January 3, 2023 9:06:38 AM  
System ID: GM-6

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[illegible]

Date: January 2, 2025 9:08:38 AM  
System ID: (84.0)

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[illegible]

Date: January 3, 2023 8:08:39 AM  
System ID: 084.0

Figure 13.1-24

| Time                        | Transaction State | Activity Performed | Type of Transaction                                                                                                                                          | Optional Information |
|-----------------------------|-------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| January 3, 2025 11:11:21 AM | End               | Execution          | Headroom Heated Zones<br>Temperature Accuracy - 700%<br>with Tray (Sample T) - Zone 1<br>Transducer - B, 118.0°C - L ==<br>+1.0% adjustment == 5.2%<br>error | Run Count = 1        |
| January 3, 2025 11:11:20 AM | Start             | Execution          | Headroom Heated Zones<br>Temperature Accuracy - 700%<br>with Tray (Sample T) - Zone 1<br>Sample Loop - B, 118.0°C - L ==<br>+0.0% and == +0.0%               | None                 |
| January 3, 2025 11:10:47 AM | Start             | Execution          | Boasting Box - 700% with Tray<br>Headroom, Front SLL, SCL -<br>Status - 01 - Init. PWR of<br>DCMS System Preparation                                         | None                 |
| January 3, 2025 11:05:44 AM | Start             | Execution          | Injection Headroom - 700% with<br>Tray Headroom, Front SLL,<br>DQ - Status - 01 - Init. L<br>(press) == 5.06% - L (Ref.<br>Time) == 1.00%                    | None                 |
| January 3, 2025 11:05:10 AM | Start             | Execution          | Mass Ratio Precision - 700%<br>with Tray Headroom, Front<br>SLL, SCL - Status - 01 - L<br>(T33) == 5.08%                                                     | None                 |
| January 3, 2025 11:00:20 AM | Start             | Execution          | Headroom Heated Zones<br>Temperature Accuracy - 700%<br>with Tray (Sample T) - Zone 1<br>Sample Loop - B, 118.0°C - L ==<br>+0.0% and == +0.0%               | None                 |
| January 3, 2025 11:57:05 AM | Auto              | Stop               | Headroom Heated Zones<br>Temperature Accuracy - 700%<br>with Tray (Sample T) - Zone 1<br>Sample Loop - B, 118.0°C - L ==<br>+0.0% and == +0.0%               | Manual Status by     |

Date: January 2, 2025 3:08:38 AM  
System ID: 084.0

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| Time                           | Transaction State | Activity Performed | Type of Transaction                                                                                                                                 | Optional Information |
|--------------------------------|-------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| January 2, 2025 11:07:00<br>AM | End               | Execution          | Headspace Heated Zones<br>Temperature Accuracy: -7001%<br>with Tray (Standard 1) : Zone :<br>Sample Loop - S: 100.0°C - L :<br>⇒ -4.0°C and ⇒ 4.0°C | Run Count: 1         |
| January 2, 2025 11:07:07<br>AM | Start             | Execution          | Headspace Heated Zones<br>Temperature Accuracy: -7001%<br>with Tray (Standard 1) : Zone :<br>Oven - S: 100.0°C - L : ⇒<br>-4.0°C and ⇒ 4.0°C        | None                 |
| January 2, 2025 11:21:00<br>AM | Auto              | Data               | Headspace Heated Zones<br>Temperature Accuracy: -7001%<br>with Tray (Standard 1) : Zone :<br>Oven - S: 100.0°C - L : ⇒<br>-4.0°C and ⇒ 4.0°C        | Manual Data Entry    |
| January 2, 2025 11:21:09<br>AM | End               | Execution          | Headspace Heated Zones<br>Temperature Accuracy: -7001%<br>with Tray (Standard 1) : Zone :<br>Oven - S: 100.0°C - L : ⇒<br>-4.0°C and ⇒ 4.0°C        | Run Count: 1         |
| January 2, 2025 11:23:07<br>AM | Start             | Execution          | GC Oven Temperature<br>Accuracy: -7000% : Temperature<br>(Oven - S: 250.0°C - L : ⇒ -4.0<br>AND ⇒ 4.0 is assigned to it)                            | None                 |
| January 2, 2025 11:27:00<br>AM | Auto              | Data               | GC Oven Temperature<br>Accuracy: -7000% : Temperature<br>(Oven - S: 250.0°C - L : ⇒ -4.0<br>AND ⇒ 4.0 is assigned to it)                            | Manual Data Entry    |
| January 2, 2025 11:27:30<br>AM | End               | Execution          | GC Oven Temperature<br>Accuracy: -7000% : Temperature<br>(Oven - S: 250.0°C - L : ⇒ -4.0<br>AND ⇒ 4.0 is assigned to it)                            | Run Count: 1         |

Date: January 3, 2025 8:08:38 AM  
System ID: 0440

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Page 15 of 24Figure 10.1.24Page 17 / 24Figure 15.1-24

User Name: lab01\user  
Report Generated by Software: AG-SCS00000000  
Print Date: January 3, 2025 9:18:57 AM

608666214\_ALS\_OG\_SMI Transaction log:

| Time                       | Transaction State | Activity Performed | Type of Transaction                                                                                    | Optional Information                                                             |
|----------------------------|-------------------|--------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| January 2, 2025 4:09:28 PM | End               | Execution          | Injection Precheck - 7857A with Tray Headspace, From 55L, 50L - Source III - Inlet - L (P12) -> 5.00%  | Run Count: 1                                                                     |
| January 2, 2025 4:10:18 PM | Start             | Execution          | Mass Ratio Precheck - 7857A with Tray Headspace, From 55L, 50L - Source III - Inlet - L (P12) -> 5.00% | None                                                                             |
| January 2, 2025 4:11:31 PM | Abort             | Data               | Derivatization                                                                                         | Derivatization error in a data collection state but the user chose to start over |
| January 2, 2025 4:12:08 PM | Abort             | Data               | Mass Ratio Precheck - 7857A with Tray Headspace, From 55L, 50L - Source III - Inlet - L (P12) -> 5.00% | Data Run Path: F:\AGS2025\AL\608666214\ (P12) -> 5.00%                           |
| January 2, 2025 4:13:18 PM | Abort             | Data               | Mass Ratio Precheck - 7857A with Tray Headspace, From 55L, 50L - Source III - Inlet - L (P12) -> 5.00% | Data Run Path: F:\AGS2025\AL\608666214\ (P12) -> 5.00%                           |
| January 2, 2025 4:13:18 PM | Abort             | Data               | Mass Ratio Precheck - 7857A with Tray Headspace, From 55L, 50L - Source III - Inlet - L (P12) -> 5.00% | Data Run Path: F:\AGS2025\AL\608666214\ (P12) -> 5.00%                           |
| January 2, 2025 4:13:18 PM | Abort             | Data               | Mass Ratio Precheck - 7857A with Tray Headspace, From 55L, 50L - Source III - Inlet - L (P12) -> 5.00% | Data Run Path: F:\AGS2025\AL\608666214\ (P12) -> 5.00%                           |
| January 2, 2025 4:13:18 PM | Abort             | Data               | Mass Ratio Precheck - 7857A with Tray Headspace, From 55L, 50L - Source III - Inlet - L (P12) -> 5.00% | Data Run Path: F:\AGS2025\AL\608666214\ (P12) -> 5.00%                           |
| January 2, 2025 4:13:18 PM | Abort             | Data               | Mass Ratio Precheck - 7857A with Tray Headspace, From 55L, 50L - Source III - Inlet - L (P12) -> 5.00% | Data Run Path: F:\AGS2025\AL\608666214\ (P12) -> 5.00%                           |

Page 1 of 1

Date: January 3, 2025 9:06:38 AM  
System ID: G64-6

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User Name: lab01\user  
Report Generated by Software: AG-SCS00000000  
Print Date: January 3, 2025 9:18:57 AM

608666214\_ALS\_OG\_SMI Transaction log:

| Time                       | Transaction State | Activity Performed | Type of Transaction                                                                                            | Optional Information                                   |
|----------------------------|-------------------|--------------------|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| January 2, 2025 4:10:18 PM | Abort             | Data               | Mass Ratio Precheck - 7857A with Tray Headspace, From 55L, 50L - Source III - Inlet - L (P12) -> 5.00%         | Data Run Path: F:\AGS2025\AL\608666214\ (P12) -> 5.00% |
| January 2, 2025 4:11:31 PM | Abort             | Execution          | Mass Ratio Precheck - 7857A with Tray Headspace, From 55L, 50L - Source III - Inlet - L (P12) -> 5.00%         | Run Count: 1                                           |
| January 2, 2025 4:11:31 PM | Start             | Execution          | Injection Carry Over - 7857A with Tray Headspace, From 55L, 50L - Headspace Sampler - (D) - Inlet - L -> 1.00% | None                                                   |
| January 2, 2025 4:12:08 PM | Abort             | Data               | Injection Carry Over - 7857A with Tray Headspace, From 55L, 50L - Headspace Sampler - (D) - Inlet - L -> 1.00% | Data Run Path: F:\AGS2025\AL\608666214\ (P12) -> 5.00% |
| January 2, 2025 4:12:08 PM | Abort             | Data               | Injection Carry Over - 7857A with Tray Headspace, From 55L, 50L - Headspace Sampler - (D) - Inlet - L -> 1.00% | Data Run Path: F:\AGS2025\AL\608666214\ (P12) -> 5.00% |
| January 2, 2025 4:13:18 PM | Abort             | Execution          | Injection Carry Over - 7857A with Tray Headspace, From 55L, 50L - Headspace Sampler - (D) - Inlet - L -> 1.00% | Run Count: 1                                           |
| January 2, 2025 4:17:54 PM | Abort             | AcqControl         | Sequence                                                                                                       | None                                                   |
| January 3, 2025 9:12:03 AM | Abort             | AcqControl         | Sequence                                                                                                       | None                                                   |
| January 3, 2025 9:12:03 AM | Abort             | Sequence Reloaded  | Sequence                                                                                                       | None                                                   |
| January 3, 2025 9:13:18 PM | Start             | Qualification      | Sequence                                                                                                       | OG                                                     |

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Date: January 3, 2025 9:06:38 AM  
System ID: G64-6

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User Name: lab01\user  
Report Generated by Software: AG-SCS00000000  
Print Date: January 3, 2025 9:18:57 AM

608666214\_ALS\_OG\_SMI Transaction log:

| Time                       | Transaction State | Activity Performed | Type of Transaction | Optional Information          |
|----------------------------|-------------------|--------------------|---------------------|-------------------------------|
| January 3, 2025 9:23:48 AM | End               | Qualification      | Sequence            | OG                            |
| January 3, 2025 9:23:48 AM | Start             | Reporting          | Sequence            | None                          |
| January 3, 2025 9:28:07 AM | Abort             | Reporting          | Sequence            | Report Generated: Certificate |
| January 3, 2025 9:28:07 AM | Abort             | AcqControl         | Sequence            | None                          |
| January 3, 2025 9:28:07 AM | Abort             | Sequence Reloaded  | Sequence            | None                          |
| January 3, 2025 9:28:07 AM | Start             | Qualification      | Sequence            | OG                            |
| January 3, 2025 9:28:07 AM | Abort             | Reporting          | Sequence            | Report Generated: Certificate |
| January 3, 2025 9:28:07 AM | Abort             | Reporting          | Sequence            | Report Generated: Report      |

Page 1 of 1

Date: January 3, 2025 9:06:38 AM  
System ID: G64-6

Page 2 of 2



Agilent Technologies

Agilent Technologies (Thailand) Limited  
9/100, LAMBO BLDG, 20/1 UNIT 4/D  
NO. 100/100, LAMBO BLDG, 20/1 UNIT 4/D  
Bangkok 10200 Thailand

Tel: +662 637 6383  
Fax: +662 637 6384  
Email: [osr@agilent.com](mailto:osr@agilent.com)  
Website: [www.agilent.com/thailand](http://www.agilent.com/thailand)

#### Customer Contact:

ALB Laboratory Group (Thailand) Co  
Ltd Head Office

104 Phatthanakan 45 Phatthanakan Rd  
Klongkum Phatthanakan Khet Nuan

TAX ID: 0105040814839

Charontagapornchai@albglobal.com

27882066

#### Service To:

ALB Laboratory Group (Thailand) Co  
Ltd Head Office

104 Phatthanakan 45 Phatthanakan Rd  
Klongkum Phatthanakan Khet Nuan

#### Delivery Site:

ALB Laboratory Group (Thailand) Co  
Ltd Head Office

104 Phatthanakan 45 Phatthanakan Rd  
Klongkum Phatthanakan Khet Nuan

#### Location:

Room  
Bldg  
Lab  
Dept

#### SERVICE REPORT

|                                 |                       |
|---------------------------------|-----------------------|
| Customer Purchase Order Number: | Customer Number:      |
| 33371013                        |                       |
| Service Request:                | Service Request Date: |
|                                 |                       |
| Service Order:                  | Service Confirmation: |
| 6035070011                      | 6035070103            |

REVIEW BY: Pongthorn C.  
APPROVED BY: Sunthorn C.  
NEXT CAL. DATE: 21 Mar 2025

#### Direct inquiries to:

Contact Name: Customer Contact Center  
Contact E-mail: [osr@agilent.com](mailto:osr@agilent.com)  
Contact Telephone: +662 637 6383  
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Bangkok 10200 Thailand  
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Fax: 010-04108000

ENR0506

Service Instrument:

| Model Number | Model Description                         | Serial Number | System Update | Panel Asset |
|--------------|-------------------------------------------|---------------|---------------|-------------|
| 875-10-5100  | ICP-OES 5100/5 - 3 System                 |               |               |             |
| 845104       | Agilent ICP-OES 5100 ICP-OES Spectrometer | WY1000003     | ICP-OES 5100  | 875-0-5100  |
| 845104       | ICP-OES 5100/5                            | 000560104     | ICP-OES 5100  | 875-0-5100  |

Service Item:

| Item | Service/Part | Description                           | Qty  | Unit Price               | Service Start | Service End |
|------|--------------|---------------------------------------|------|--------------------------|---------------|-------------|
| 000  | EQ           | Exchange Gas control Installation     | 1.00 | Agreement: 100 % covered | 22.09.2024    | 22.09.2024  |
| 010  | ICP-OES 5100 | ICP-OES 5100/5                        | 1.00 | Agreement: 100 % covered |               |             |
| 020  | 6100-7001    | Calibration blank solution Spec 11003 | 1.00 | Agreement: 100 % covered |               |             |

Additional Information:

Service Information:

|                                                                                                                                             |                                                                                                                                                |                             |
|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>Problem Description:</b><br>ALU-ICP-OES 5100-101552655                                                                                   |                                                                                                                                                |                             |
| <b>Service Provided:</b><br>Service: CALIBRATION ICP-OES<br>Equipment ID: 875-0-5100, all test results                                      |                                                                                                                                                |                             |
| <b>Service History Code:</b><br>Process Code: Scheduled Service<br>Signature Code: Instrument Service<br>Resolution Code: Scheduled Service |                                                                                                                                                |                             |
| <b>Reported Hours:</b><br>4.0                                                                                                               | <b>Travel Hours:</b><br>2.0                                                                                                                    |                             |
| <b>Customer Field Service Representative Name:</b><br>Sowmi: Gokhale                                                                        | <b>Customer Field Service Representative Signature:</b><br> | <b>Date:</b><br>23 Sep 2024 |
| <b>Customer Name:</b><br>CHANNATTAGARN IMCROM                                                                                               | <b>Customer Signature:</b><br>                              | <b>Date:</b><br>23 Sep 2024 |
| <b>Additional Comments:</b>                                                                                                                 |                                                                                                                                                |                             |

analytikjena

|               |             |
|---------------|-------------|
| REVIEW BY     | Sudhakar T. |
| APPROVED BY   | Sudhakar T. |
| NEXT CAL DATE | 12/06/2026  |

## Maintenance Protocol

Atomic Fluorescence Spectrometer  
mercur DUO /  
mercur DUO plus

analytikjena

Serial-No.: K170A0143 Customer-No.:  
Date: 12 December 2024 Carried out by: Srichai Fak-on

Maintenance with following Operational Qualification (OQ)  
(requires a separate OQ protocol) ☐

|                |                                                       |
|----------------|-------------------------------------------------------|
| Company        | บริษัท เอแอนด์เอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด |
| User           |                                                       |
| Department     | ห้องแล็บปฏิบัติการ                                    |
| Street         | 104 ซอย 40 ถนนพัฒนาการ แขวงสวนหลวง เขตสวนหลวง         |
| Zip Code, City | กรุงเทพมหานคร 10250                                   |
| Country        | ประเทศไทย                                             |
| Phone          |                                                       |
| Fax            |                                                       |
| E-mail         |                                                       |

**□ □ □ □ □ □ □ □ □ □**

□□□□□□□□

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## Mercur

Report file: C:\WVAAS\TMP\2024\DecPro\_008  
 Program version: 4.7.10.0 Printed on: 12/12/2024 11:37  
 Recording started on 12/12/2024 11:27 GMT+7.0

Operator: PSU.OTA  
 Laboratory: ALS-BKK  
 Code: B\_Hg067\_2024

Remarks:  
 Food/water

## Method parameters Hg

Method: Without enrichment / FBR 30ng/L\_PM24052023

Created on 5/24/2023 Time 12:27

Program: —

## Parameters Mercur Technique: Hg fluorescence

|                  |             |                 |         |
|------------------|-------------|-----------------|---------|
| Line             | 253.7 nm    |                 |         |
| Lamp type        | Hg-LP       |                 |         |
| Integr. mode     | Peak height | Integr. time    | 30 s    |
| PMT              | 350 V       |                 |         |
| AZ time          | 5 s         | Peak smoothing  | 12/11   |
| Delay            | 0 s         |                 |         |
|                  | —           |                 |         |
| Working mode     | w/o enrich. | System cleaning | Acid    |
| FBR technique    | on          | Wash time acid  | 10 s    |
| Pump speed       | 3           | Soaking time    | 20 s    |
| Sample load time | 10 s        | Gas load time   | 5 NL/h  |
| Reaction time    | 10 s        |                 |         |
| Waiting time AZ  | 5 s         |                 |         |
| Delay            | 0 s         |                 |         |
| Purge time1      | 25 s        |                 |         |
| Purge time2      | 15 s        | Gas wash time2  | 10 NL/h |

|              |            |           |        |
|--------------|------------|-----------|--------|
| Autosampler  |            |           |        |
| Autosampler  | A5515(f)   | Tray type | 57/139 |
| Working mode | continuous |           |        |

Dilution: —

Mercur

## QC parameters

|                    |                 |                  |                 |
|--------------------|-----------------|------------------|-----------------|
| QC type            | Conc. check     |                  |                 |
| QC check amp. 1    | —               | QC check amp. 2  | —               |
| Conc.              | —               | Conc.            | —               |
| Error limit        | —               | Error limit      | —               |
| Rep. measurement   | off             | Reaction         | flag + continue |
| QC std.1 no.       | 1(30.000 ng/L)  | QC std.2 no.     | 1(30.000 ng/L)  |
| QC std.1 limit     | ± 50.00%        | QC std.2 limit   | ± 50.00%        |
| QC std. act.       | flag + continue |                  |                 |
| Expect. blank abs. | 0.0100± 0.0100  | Reaction         | flag + continue |
| QC precision       | off             | Reaction         | off             |
|                    |                 | QC Recal. factor | Off             |

## Calibration settings

|                     |                 |                   |            |
|---------------------|-----------------|-------------------|------------|
| Calib. meth         | Standard calib. | Calib. unit       | ng/L       |
| No. standards       | 1               | Conversion fac.   | 1000000    |
| Type of standards   | —               | Standard prep.    | Premixed   |
|                     |                 | Blank correct.    | —          |
|                     |                 | Recalib. std. no. | —          |
| Output unit         | µg/L            | Conversion fac.   | 1000       |
| Calib. stat.        | Mean            | Meas. cycles      | 3          |
|                     |                 | Blind cycles      | 1          |
| Stock sol. 1        | —               | Stock sol. 2      | —          |
| Stock sol. 3        | —               | Stock sol. 4      | —          |
| Type of cal. curve  | linear          | Intercept         | calculated |
| Weighted cal.       | off             | Crabbs stat.      | off        |
| Check of cal. curve | no outlier test |                   |            |

## Sample statistics

|              |        |              |   |
|--------------|--------|--------------|---|
| Stat. mode   | Mean   | Meas. cycles | 2 |
| Confd. level | 95.4 % | Blind cycles | 1 |
| Crabbs stat. | —      |              |   |

## Calibration standards Hg

| No | Name     | State | Pos | Conc./ng/L | Ints                       | SD                   | RSD%           |
|----|----------|-------|-----|------------|----------------------------|----------------------|----------------|
| 1  | Cal-Zero | (—)   | 79  | 0.000      | H: 0.000445<br>A: 0.000414 | 0.000017<br>0.000140 | 3.813<br>1.497 |
| 2  | Cal-Std1 | (—)   | 80  | 30.000     | H: 0.002375<br>A: 0.00403  | 0.000031<br>0.000423 | 1.306<br>1.244 |

Mercur

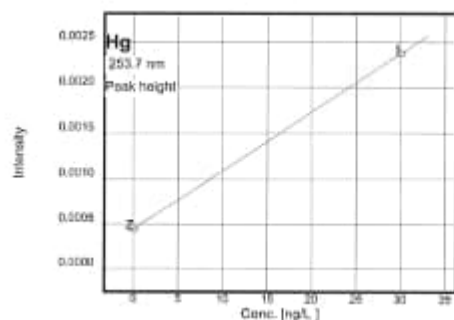
## Calibration function 1 12/12/2024 11:36 Calibration (Peak height)

Intercept+k2\*conc

k1=0.000446 k2=0.000064

Recal. factor: —

|                 |                     |              |           |
|-----------------|---------------------|--------------|-----------|
| Slope           | 0.00006 Ints/(ng/L) | R2-adjusted  | 1.0000    |
| sd              | 1.00000 ng/L        |              |           |
| Lower limit     | 0 ng/L              | Upper limit  | 33.0 ng/L |
| Detection limit | —                   | Deter. limit | —         |

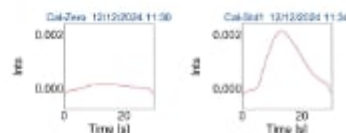


## Measurements and events (sorted by time)

| Hg          | Without enrichment / FBR 30ng/L_PM 24052023 | 12/12/2024 | 11:28             |
|-------------|---------------------------------------------|------------|-------------------|
| ID          | Conc.                                       | Ints       | SD                |
| Cal-Zero    |                                             | 0.000436   |                   |
|             |                                             | 0.000436   |                   |
|             |                                             | 0.000465   |                   |
|             | 30ng/L                                      | 0.000445   | 0.000017050 3.813 |
| Cal-Std1    |                                             | 0.002402   |                   |
|             |                                             | 0.002341   |                   |
|             |                                             | 0.002381   |                   |
|             | 30.00ng/L                                   | 0.002375   | 0.000031020 1.306 |
| Calibration | Calibration function: 01                    |            | 11:38             |

Mercur

## Peak plots



Mercur

## Mercur

Report file: C:\WinAAS\TMP\2024\Dec\PM\_010  
 Program version: 4.7.10.0 Printed on: 12/12/2024 13:31  
 Recording started on: 12/12/2024 13:16 GMT+7.0

Operator: PSU,DTA  
 Laboratory: ALS-BKK  
 Code: II\_Hg067\_2024

Remarks:  
 Food,water

## Method parameters Hg

Method: Without enrichment / Abs / FBR 100 ng/L, PM 24052023  
 Created on: 12/12/2024 Time: 12:42  
 Program: —

## Parameters Mercur Technique (Hg absorption)

|                  |             |                 |         |
|------------------|-------------|-----------------|---------|
| Line             | 253.7 nm    |                 |         |
| Lamp type        | Hg-LP       |                 |         |
| Integr. mode     | Peak height | Integr. time    | 55 s    |
| PMT              | 225 V       |                 |         |
| AZ time          | 5 s         | Peak smoothing  | 8/5     |
| Delay            | 8 s         |                 |         |
|                  | —           |                 |         |
| Working mode     | w/o enrich. | System cleaning | Acid    |
| FBR technique    | on          | Wash time acid  | 15 s    |
| Pump speed       | 4           | Soaking time    | 20 s    |
| Sample load time | 8 s         | Gas load time   | 5 NL/h  |
| Reaction time    | 12 s        |                 |         |
| Waiting time AZ  | 15 s        |                 |         |
| Delay            | 10 s        |                 |         |
| Purge time1      | 50 s        |                 |         |
| Purge time2      | 10 s        | Gas wash time2  | 10 NL/h |
| Autosampler      |             |                 |         |
| Autosampler      | AS515/F     | Tray type       | 87/139  |
| Working mode     | continuous  |                 |         |
|                  |             |                 |         |
| Dilution         | —           |                 |         |

Mercur

## QC parameters

|                    |                 |                 |                 |
|--------------------|-----------------|-----------------|-----------------|
| QC type            | Conc. check     |                 |                 |
| QC check amp. 1    | —               | QC check amp. 2 | —               |
| Conc.              | —               | Conc.           | —               |
| Error limit        | —               | Error limit     | —               |
| Rep. measurement   | off             | Reaction        | flag + continue |
| QC std.1 no.       | 1(100.00 ng/L)  | QC std.2 no.    | 1(100.00 ng/L)  |
| QC std.1 limit     | ± 50.00%        | QC std.2 limit  | ± 0.00%         |
| QC std. act.       | flag + continue |                 |                 |
| Expect. blank abs. | 0.0100s 0.0100  | Reaction        | flag + continue |
| QC precision       | off             | Reaction        | off             |
|                    |                 | QC Recal.factor | Off             |

## Calibration settings

|                     |                 |                   |            |
|---------------------|-----------------|-------------------|------------|
| Calib. meth         | Standard calib. | Calib. unit       | ng/L       |
| No. standards       | 1               | Conversion fac.   | 1000000    |
| Type of standards   | —               | Standard prep.    | Premixed   |
|                     |                 | Blank correct.    | —          |
|                     |                 |                   |            |
|                     |                 | Recalib. std. no. | —          |
| Output unit         | µg/L            | Conversion fac.   | 1000       |
| Calib. stat.        | Mean            | Meas. cycles      | 3          |
|                     |                 | Blank cycles      | 1          |
| Stock sol. 1        | —               | Stock sol. 2      | —          |
| Stock sol. 3        | —               | Stock sol. 4      | —          |
| Type of cal. curve  | linear          | Intercept         | calculated |
| Weighted cal.       | off             | Grubbs stat.      | off        |
| Check of cal. curve | no outlier test |                   |            |

## Sample statistics

|               |        |              |   |
|---------------|--------|--------------|---|
| Stat. mode    | Mean   | Meas. cycles | 2 |
| Confid. level | 95.4 % | Blank cycles | 1 |
| Grubbs stat.  | —      |              |   |

## Calibration standards

| No. | Name     | State | Pds | Conc./ng/L | Abs                        | SD                   | RSD%           |
|-----|----------|-------|-----|------------|----------------------------|----------------------|----------------|
| 1   | Cal-Zero | (—)   | 79  | 0.00       | H: 0.001129<br>A: 0.009764 | 0.002036<br>0.004386 | 7.666<br>11.03 |
| 2   | Cal-Std1 | (—)   | 81  | 100.00     | H: 0.003950<br>A: 0.070560 | 0.002118<br>0.004290 | 2.993<br>0.081 |

Mercur

## Calibration function 1 12/12/2024 13:31 Calibration (Peak height)

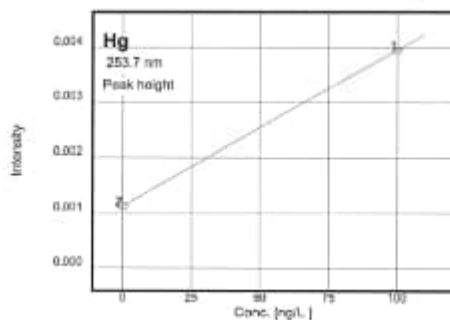
Abs=k1+k2\*conc

k1=0.001130 k2=0.000028

Recal. factor:

—

|                 |                    |                |                   |
|-----------------|--------------------|----------------|-------------------|
| Slope           | 0.00003 Abs/(ng/L) | R2-adjusted    | 1.0000            |
| scd             | 1.00000 ng/L       | Charact. conc. | 154.558 (ng/L)/1% |
| Lower limit     | 0 ng/L             | Upper limit    | 110. ng/L         |
| Detection limit | —                  | Deter. limit   | —                 |

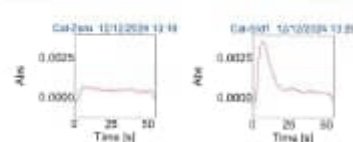


## Measurements and events (sorted by time)

| Hg          | Without enrichment / Abs / FBR 100 ng/L, PM 24052023 |          |    |            |       | 12/12/2024 | 13:16 |
|-------------|------------------------------------------------------|----------|----|------------|-------|------------|-------|
| ID          | Conc.                                                | Abs      | QC | SD         | RSD%  | Int. type  | Time  |
| Cal-Zero    |                                                      | 0.001082 |    |            |       | PAH        | 13:18 |
|             |                                                      | 0.001227 |    |            |       |            | 13:20 |
|             |                                                      | 0.001099 |    |            |       |            | 13:22 |
|             | 0ng/L                                                | 0.001129 |    | 0.00006055 | 7.666 |            | 13:22 |
| Cal-Std1    |                                                      | 0.003949 |    |            |       | PAH        | 13:25 |
|             |                                                      | 0.004069 |    |            |       |            | 13:27 |
|             |                                                      | 0.003832 |    |            |       |            | 13:29 |
|             | 100 ng/L                                             | 0.003950 |    | 0.00011625 | 2.993 |            | 13:29 |
| Calibration | Calibration function: 01                             |          |    |            |       |            | 13:31 |

Mercur

## Peak plots



Mercur



## Certificate of Calibration

Cert. No.: 26TM111  
Page : 1 of 3

Equipment : Water Bath  
Manufacturer : Memmert  
Model : WNE 45  
Serial No. : L712.0429  
ID No. : BKK\_ML0056

Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.  
104 Phatthanasak 40, Phatthanasak Rd.,  
Klongwaeng Phatthanasak, Klongwaeng Suburb,  
Bangkok 10250 Thailand

Location : Incubation & Microbiological Reading

Received Order : 04 February 2020  
Calibration Date : 04 - 05 February 2020  
Ambient Temperature :  $(25 \pm 10) ^\circ\text{C}$   
Relative Humidity :  $(50 \pm 30) \%$   
AC Line Voltage :  $(220 \pm 22) \text{V}$

Calibrated by : Preecha Hahib

Approved by :   
Approved Signatory

☐ Chakrit Waiwongwong  
☒ Suwit Injai  
☐ Kunchit Promrat

Issue Date : 16 February 2020

The Uncertainties are for a confidence probability of approximately 95%

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

REVIEW BY:   
APPROVED BY:   
NEXT CAL DATE: 04/02/27



Equipment : Water Bath  
Condition As-Received : Used Item  
Reference : 2502-00260C-1  
Procedure Used :-

Cert. No.: 26TM111  
Page : 2 of 3

Calibration were conducted using in-house calibration procedure CP-0104 Based on ASTM E715 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

The temperature scale used was based on ITS-90

### Condition of this result of calibration

#### 1. Reference standard instrument:-

| Instrument          | Serial No. | Cert. No. | Traceable | Due Date    |
|---------------------|------------|-----------|-----------|-------------|
| 1) Data Acquisition | MY59003411 | 25LM177   | TPA       | 26 Dec 2020 |

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

3. This measurement result is traceable to the International System of Unit maintained through:

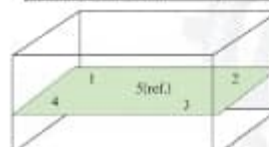
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration : ( \* ) Without Adjustment

Function of UUC\* : Temperature Source

Heat transfer medium used : Water

|                          | Environmental          |           | AC Voltage Supply |
|--------------------------|------------------------|-----------|-------------------|
|                          | ( $^{\circ}\text{C}$ ) | ( %R.H. ) | ( Volt )          |
| Beginning of Calibration | 25                     | 55        | 220               |
| Finished of Calibration  | 20                     | 66        | 220               |



Front

| Position | Ref. Std. ID No. |
|----------|------------------|
| 1        | 4804539-001      |
| 2        | 4804539-002      |
| 3        | 4804539-003      |
| 4        | 4804539-004      |
| 5(ref.)  | 4804539-005      |



Equipment : Water Bath  
Condition As-Received : Used Item  
Reference : 2502-00260C-1  
Result of Calibration : ( \* ) Without Adjustment  
Function of UUC\* : Temperature Source

Cert. No.: 26TM111  
Page : 3 of 3

| Calibration<br>point<br>( °C ) | UUC*<br>Setting<br>( °C ) | UUC*<br>Reading<br>( °C ) | Average* Standard Reading ( °C ) |        |        |        |          | Uncertainty<br>( ± °C ) |
|--------------------------------|---------------------------|---------------------------|----------------------------------|--------|--------|--------|----------|-------------------------|
|                                |                           |                           | Position                         |        |        |        |          |                         |
|                                |                           |                           | 1                                | 2      | 3      | 4      | 5 (ref.) |                         |
| 44.5                           | 44.8                      | 44.8                      | 44.482                           | 44.470 | 44.480 | 44.460 | 44.457   | 0.15                    |
| 45.0                           | 44.9                      | 44.9                      | 44.958                           | 44.971 | 44.983 | 44.965 | 44.966   | 0.15                    |

| Calibration point<br>( $^{\circ}\text{C}$ ) | Uniformity<br>( $^{\circ}\text{C}$ ) | Stability<br>( $\pm$ $^{\circ}\text{C}$ ) | Coverage Factor<br>k |
|---------------------------------------------|--------------------------------------|-------------------------------------------|----------------------|
| 44.5                                        | 0.051                                | 0.025                                     | 2                    |
| 45.0                                        | 0.047                                | 0.032                                     | 2                    |

Average\* : The average of 30 values in each position.

Uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location, which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC\* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity.

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

-00-



## Certificate of Calibration

Equipment : CONDUCTIVITY METER  
Manufacturer : Thermo Scientific  
Model : Orion STAR A215  
Serial No. : XS6021  
ID No. : RYG-ENC000  
Condition of the item : Normal

Certificate No.: C24250274  
Job No.: WO-00205254  
Issued Date: 3 December 2020  
Page: 1 of 2

Customer : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
616/10 Moo 5 T. Maenamiko,  
A. Phukdaeng, Rayong 21140, Thailand.

Environment Condition : Temperature 21.8  $^{\circ}\text{C} \pm 0.5$   $^{\circ}\text{C}$   
Relative Humidity 50.5 %  $\pm 1.8$  %

Calibration Place : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
( Wet Chemistry ) 616/10 Moo 5 T. Maenamiko,  
A. Phukdaeng, Rayong 21140, Thailand.

Calibration By : Mr. Nattapal Rungrueang

Calibration Date : 1 December 2020

The Method Used : In house method, GAL-WI-49, base on ASTM D 1125-14 and D 5391-14

Traceability : This certificate is traceable to the SI Units maintained by CRM of NIST(BRM) through CPA Chem Co., Ltd. (ISO/IEC 17034) Certificate No. 1100180, 1136960, 1100182, 1096029

REVIEW BY:   
APPROVED BY:   
NEXT CAL DATE: 1/12/20

(Mr. Nattapal Rungrueang)  
Person in charge

(Mr. Udon Srichana)  
Authorized signatory

This certificate is issued for the use of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standards or other recognized national standard laboratories.  
The measurement uncertainty stated in this certificate is based on the standard uncertainty multiplied by the coverage factor k=2 to provide a level of confidence of approximately 95%. It is determined in accordance with Evaluation of measurement data - Guide to the expression of uncertainty in measurement (GUM 1995).  
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

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Phone: +66 2016 1000, Email: info@dksh.com, Website: www.dksh.com

Delivering Growth - In Asia and Beyond.

## Calibration Results:

Manufacturer: Thermo Scientific Model: ORION 012005MD Electrode Serial No.: YQ1-11982

## Before Adjustment

| Standard Conductivity Solution | Unit Under Calibration Reading | Correction   | Coverage Factor (k) | Uncertainty (±) |
|--------------------------------|--------------------------------|--------------|---------------------|-----------------|
| 25.000 µS/cm                   | 27.28 µS/cm                    | +2.280 µS/cm | 2.00                | 0.28 µS/cm      |
| 84.047 µS/cm                   | 86.25 µS/cm                    | +2.203 µS/cm | 2.00                | 0.68 µS/cm      |
| 1413.5 µS/cm                   | 1444 µS/cm                     | +30.5 µS/cm  | 2.00                | 11 µS/cm        |
| 12.881 mS/cm                   | 13.26 mS/cm                    | +0.379 mS/cm | 2.00                | 0.098 mS/cm     |

## After Adjustment: at 25.000 µS/cm, 84.047 µS/cm, 1413.5 µS/cm, 12.881 mS/cm

| Standard Conductivity Solution | Unit Under Calibration Reading | Correction   | Coverage Factor (k) | Uncertainty (±) |
|--------------------------------|--------------------------------|--------------|---------------------|-----------------|
| 25.000 µS/cm                   | 25.03 µS/cm                    | +0.030 µS/cm | 2.00                | 0.28 µS/cm      |
| 84.047 µS/cm                   | 84.06 µS/cm                    | +0.013 µS/cm | 2.00                | 0.68 µS/cm      |
| 1413.5 µS/cm                   | 1413 µS/cm                     | 0.5 µS/cm    | 2.00                | 11 µS/cm        |
| 12.881 mS/cm                   | 12.89 mS/cm                    | +0.009 mS/cm | 2.00                | 0.098 mS/cm     |

The End of Certificate

DKSH Technology Limited  
2537 Sukhumvit Road, Bangkok, Thailand 10110  
Phone: +66 2028 1333 Email: dksh@dksh.com Website: www.dksh.com

Delivering Growth - In Asia and Beyond.

CAL-FM-C24-18 30 Jun 2025

## Checklist for Conductivity Meter

Worksheet number: WQ-0009854

Instrument type: Conductivity Meter

Model: Orion STAR A215

S/N: X58821

| Check (receive)                     |                          | Checklist                           | Check (send)                        |                          | Note |
|-------------------------------------|--------------------------|-------------------------------------|-------------------------------------|--------------------------|------|
| 01 Dec 2025                         |                          |                                     | 01 Dec 2025                         |                          |      |
| Normal                              | Defective                |                                     | Normal                              | Defective                |      |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 1. Integrity of the tools           | <input checked="" type="checkbox"/> | <input type="checkbox"/> |      |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2. Cleanliness of tools             | <input checked="" type="checkbox"/> | <input type="checkbox"/> |      |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. On-Off Switch                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |      |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Keypad                           | <input checked="" type="checkbox"/> | <input type="checkbox"/> |      |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5. Display, Screen Contrast         | <input checked="" type="checkbox"/> | <input type="checkbox"/> |      |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 6. Electrode and Connection Cable   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |      |
| <input type="checkbox"/>            | <input type="checkbox"/> | 7. Electrode (Dust Protection Hood) | <input type="checkbox"/>            | <input type="checkbox"/> | -    |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 8. Stand                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |      |

Recommend:

Mr. Natapol Rungsuang  
Service Engineer

DKSH Technology Limited  
2537 Sukhumvit Road, Bangkok, Thailand 10110  
Phone: +66 2028 1333 Email: dksh@dksh.com Website: www.dksh.com

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CAL-FM-R53-08 8 Apr 2025



## Certificate of Calibration

Equipment: Digital Thermometer with Probe

Certificate No.: C15251274

Manufacturer: Thermo Scientific

Job No.: WO-0009854

Model: Orion STAR A215

Issued Date: 04 December 2025

Serial No.: X58821

Page: 1 of 2

ID No.: RYD-EN0200

Condition of the Item: Normal

Customer: ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
618/10 Moo 5 T. Maenamkoo,  
A. Phakdaeng, Rayong 21140, Thailand.

Environment Condition: Temperature: 30 °C ± 10 °C  
Relative Humidity: 55 % ± 25 %  
Voltage: 220 VAC ± 10 %

Calibration Place: ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
(Wet Chemistry) 618/10 Moo 5 T. Maenamkoo,  
A. Phakdaeng, Rayong 21140, Thailand.

Calibration By: Mr. Natapol Rungsuang

Calibration Date: 01 December 2025

The Method Used: In house method, CAL-WH-05, by comparison with standard thermometer

Traceability: This certificate is traceable to the International System of Unit maintained by:  
Quality Reborn Co., Ltd. (QR)(Mr. Natapol Rungsuang)  
Person in charge(Mr. Thawong Thattiang)  
Authorized signatory

This certificate is issued for the sole purpose of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standards or other recognized national standard laboratories.  
The measurement uncertainty stated in the report is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with Evaluation of measurement data - Guide to the expression of uncertainty in measurement (GUM: 1995).  
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or serviced. The report shall not be reproduced or used in full without approval of DKSH Technology Limited.

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CAL-FM-C15-18 30 Jun 2025

Certificate No.: C15251274

Page: 2 of 2

## Reference standard equipment:

| Equipment                      | Certificate no | Cal. date      | Next Cal. date |
|--------------------------------|----------------|----------------|----------------|
| Digital Thermometer with Probe | QR25-2474      | 11 August 2025 | 11 August 2026 |

## Calibration Results:

## Without Adjustment

Sensor Type: RTD Electrode Serial No. YQ1-11982 Channel: -  
Diameter (mm): 15 Length (mm): 120 Immersion (mm): 110

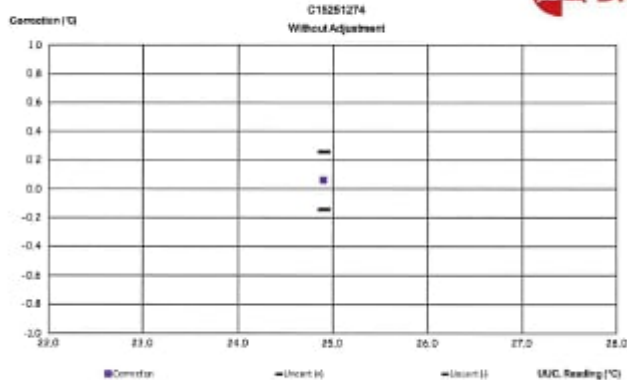
| Calibrate Point (°C) | STD. Reading (°C) | UUC Reading (°C) | Correction of UUC (°C) | Uncertainty (± °C) |
|----------------------|-------------------|------------------|------------------------|--------------------|
| 25.0                 | 24.960            | 24.9             | 0.060                  | 0.20               |

The End of Certificate

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CAL-FM-C15-18 30 Jun 2025



Delivering Growth: In Asia and Beyond.

## ใบตรวจสอบสภาพเครื่องมือวัดอุณหภูมิ (Digital Thermometer Checklist)

Equipment : Digital Thermometer with Probe  
Serial No. : XS8821

Certificate No. : G15251274  
Model : Orion STAR A215

| Check Date                          | 1-Dec-2025               | จากภาพตรวจเช็ค (Description)            | Check before delivery               |                          | หมายเหตุ (Remark) |
|-------------------------------------|--------------------------|-----------------------------------------|-------------------------------------|--------------------------|-------------------|
|                                     |                          |                                         | 1-Dec-2025                          | 1-Dec-2025               |                   |
| Normal                              | Defective                |                                         | Normal                              | Defective                |                   |
| General                             |                          |                                         |                                     |                          |                   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 1. สายไฟ (Electric wire)                | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2. Adaptor / Power supply 220 / 110 VAC | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. การสลับ (On/Off Switch)              | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. การสลับ (Selector Key)               | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5. หน้าจอแสดงผล (Display)               | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                   |
| <input type="checkbox"/>            | <input type="checkbox"/> | 6. แบตเตอรี่ (Battery)                  | <input type="checkbox"/>            | <input type="checkbox"/> | ไม่มี             |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 7. สภาพตัวเครื่อง (Equipment Body)      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 8. อินพุต/เอาต์พุต (Sensor (In/Ex))     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                   |

Note : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Mr. Nattapat Hingruang  
Service Engineer

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
534/1 PATTANAKARN ROAD 3RD FLOOR, SUANLUANG, SUANLUANG (BANGKOK 10250)  
TEL: 0-2717-3000-29 FAX: 0-2719-0408



## Certificate of Calibration

Cert. No.: 25LM131  
Page: 1 of 2

Equipment : DO Meter with Sensor

Manufacturer : Mettler Toledo

Model : SevenGo 50

Serial No. : C131262003

ID No. : RVG\_F50547

Submitted by : ALS Laboratory Group (Thailand) Co., Ltd. Rayong Branch  
616/10 Moo 5, T.Maenam Khu, A.Piwasong,  
Rayong 21140, Thailand

Location : TPA On Site Calibration Laboratory

Received Order : 11 August 2025

Calibrated Date : 13 August 2025

Ambient Temperature : ( 26 ± 10 ) °C

Relative Humidity : ( 50 ± 30 ) %

AC Line Voltage : ( 220 ± 22 ) V

Calibrated by : Warakorn Lemgagrakul

Approved by :

( ) Chakrit Watananajua  
( ) Suwit Injai  
(✓) Kunchit Promrat

Issue Date : 19 August 2025

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the Head of Corporate Services 3: Equipment Calibration and Testing Services.



Equipment : DO Meter with Sensor  
Condition As-Received : Used Item  
Reference : 2508-0360DSG-4

Cert. No.: 25LM131  
Page: 2 of 2

### Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer ( IPRT ) into Temperature Bath.

The temperature scale used was based on ITS-90.

### Condition of this result of calibration

#### 1. Reference standard instrument:-

| Instrument             | Serial No. | Cert. No. | Traceable | Due Date    |
|------------------------|------------|-----------|-----------|-------------|
| 1) Digital Thermometer | 2188080    | 241022    | TPA       | 17 Sep 2025 |

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

3. This measurement result is traceable to the International System of Unit maintained through :

Remark : TPA : Technology Promotion Association ( Thailand - Japan )

Result of Calibration :- ( ° ) Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N : 738560

| Calibration Point ( °C ) | Immersion Depth ( mm ) | Standard Temperature ( °C ) | UUC* Reading ( °C ) | Error ( °C ) | Uncertainty ( ± °C ) | Coverage Factor # |
|--------------------------|------------------------|-----------------------------|---------------------|--------------|----------------------|-------------------|
| 20.0                     | 80                     | 20.003                      | 20.1                | 0.097        | 0.16                 | 2.00              |

UUC\* : Unit Under Calibration

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

-dco-



## Certificate of Testing

Cert.No.: 25TW151  
Page.: 1 of 2

Equipment : DO Meter  
Manufacturer : Mettler Toledo  
Model : SevenGo SE  
Serial No. : C131262003  
ID No. : RYG\_FB0547  
Received Date : 11 August 2025  
Test Date : 13 August 2025  
Reference : 2508-006008C-3  
Submitted by : A/S Laboratory Group (Thailand) Co., Ltd. Rayong Branch  
816/10 Moo 5, T.Maenam Khu. A.Pluakdaeng,  
Rayong 21140, Thailand  
Laboratory Condition : Temperature : ( 25 ± 5 ) °C  
Humidity : ( 50 ± 20 ) %  
Test Procedure : In - house method : GP-GH9  
by Comparison Technique with Azide Modification Method  
Tested by : Walalak Sirithuan  
Approved by :   
Approved Signatory  
(✓) Chalok Watanwanjua  
( ) Porpan Palom  
( ) Sathip Moangmai  
Issue Date : 14 August 2025



### Condition of this result of calibration

1. Reference Standard Instruments :  
This measurement result is traceable to the International System of Unit through the reference standards  
laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

| Instruments | ID No.   | Certificate No. | Due Date     |
|-------------|----------|-----------------|--------------|
| 1. Burette  | 1306U10  | 25CG1126        | 18 Mar 2027  |
| 2. Balance  | 110RC001 | 25KM316         | 02 July 2026 |

2. Standard Material :

| Material                        | Manufacturer | Lot.No.    | Assay |
|---------------------------------|--------------|------------|-------|
| Sodium Thiosulfate 5-Hydrate AR | KEMALIS      | 2203162447 | 99.6% |

Result : Dissolved Oxygen Meter Adjustment With Air 100 %  
Dissolved Oxygen Probe No.: 730590

| Titration Method<br>(Azide Modification Method)<br>(mg/L) | DO Meter<br>Reading<br>(mg/L) | Standard Deviation<br>(mg/L) |
|-----------------------------------------------------------|-------------------------------|------------------------------|
| 8.22                                                      | 8.17                          | 0.0055                       |

This report was certified only for the instrument we tested. It is allowable to use for study  
Intend to use for advertising and referral purpose is prohibited. This report may not be reproduced  
other in full, without written approval of the laboratory

-000-

# ภาคผนวก จ

สำเนาหนังสือใบอนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน





| ลำดับที่ | สารมลพิษ            | วิธีวิเคราะห์                                                                                                                                           |
|----------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 19       | Copper              | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 20       | Cyanide             | Distillation, Colorimetric Method <sup>(4)</sup>                                                                                                        |
| 21       | 2,4'-DDD            | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 22       | 4,4'-DDD            | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 23       | 2,4'-DDE            | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 24       | 4,4'-DDE            | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 25       | 2,4'-DDT            | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 26       | 4,4'-DDT            | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 27       | Dieldrin            | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 28       | Endosulfan Sulfate  | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 29       | Endosulfan I        | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 30       | Endosulfan II       | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 31       | Endrin              | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 32       | Endrin Aldehyde     | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 33       | Formaldehyde        | Distillation, Colorimetric Method <sup>(3)</sup>                                                                                                        |
| 34       | Free Chlorine       | 1) DPD Ferrous Titrimetric Method <sup>(4)</sup><br>2) DPD Colorimetric Method <sup>(4)</sup>                                                           |
| 35       | Heptachlor          | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 36       | Heptachlor Epoxide  | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 37       | Hexavalent Chromium | Colorimetric Method <sup>(4)</sup>                                                                                                                      |
| 38       | 3-Hydroxycarbofuran | High-Performance Liquid Chromatographic Method <sup>(4)</sup>                                                                                           |
| 39       | Lead                | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup> |

40 Manganese...

| ลำดับที่ | สารมลพิษ                | วิธีวิเคราะห์                                                                                                                                                                                                                     |
|----------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 40       | Manganese               | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                           |
| 41       | Mercury                 | 1) Digestion, Cold-Vapor Atomic Absorption<br>Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup>                                                        |
| 42       | Methiocarb              | High-Performance Liquid Chromatographic Method <sup>(4)</sup>                                                                                                                                                                     |
| 43       | Methoxychlor            | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                        |
| 44       | Methomyl                | High-Performance Liquid Chromatographic Method <sup>(4)</sup>                                                                                                                                                                     |
| 45       | Nickel                  | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                           |
| 46       | Oil & Grease            | 1) Liquid-Liquid, Partition-Gravimetric Method <sup>(4)</sup><br>2) Soxhlet Extraction Method <sup>(4)</sup>                                                                                                                      |
| 47       | Oxamyl                  | High-Performance Liquid Chromatographic Method <sup>(4)</sup>                                                                                                                                                                     |
| 48       | Propoxur                | High-Performance Liquid Chromatographic Method <sup>(4)</sup>                                                                                                                                                                     |
| 49       | pH                      | Electrometric Method <sup>(4)</sup>                                                                                                                                                                                               |
| 50       | Phenols                 | 1) Distillation, Chloroform Extraction Method <sup>(4)</sup><br>2) Distillation, Direct Photometric Method <sup>(4)</sup>                                                                                                         |
| 51       | Selenium                | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                           |
| 52       | Sulfide                 | Iodometric Method <sup>(4)</sup>                                                                                                                                                                                                  |
| 53       | Temperature             | Laboratory and Field Methods <sup>(4)</sup>                                                                                                                                                                                       |
| 54       | Total Dissolved Solids  | Dried at 180 °C <sup>(4)</sup>                                                                                                                                                                                                    |
| 55       | Total Kjeldahl Nitrogen | Semi-Micro Kjeldahl Method <sup>(4)</sup>                                                                                                                                                                                         |
| 56       | Total Phosphorous       | Digestion, Colorimetric Method <sup>(4)</sup>                                                                                                                                                                                     |
| 57       | Total Suspended Solids  | Dried from 103-105 °C <sup>(4)</sup>                                                                                                                                                                                              |
| 58       | Toxaphene               | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                        |
| 59       | Trivalent Chromium      | 1) Digestion, Inductively Coupled Plasma Method;<br>Colorimetric Method; Calculation <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method; Colorimetric Method;<br>Calculation <sup>(4)</sup> |
| 60       | Zinc                    | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/Mass<br>Spectrometric Method <sup>(4)</sup>                                                                            |

น้ำได้ดื่ม...

น้ำได้ดื่ม จำนวน 126 รายการ

| ลำดับที่ | สารมลพิษ                | วิธีวิเคราะห์                                                                                                                                           |
|----------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Aceraphthene            | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 2        | Acetone                 | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                        |
| 3        | Aldrin                  | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 4        | Anthracene              | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 5        | Antimony                | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 6        | Arsenic                 | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 7        | Atrazine                | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 8        | Barium                  | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 9        | Benz(a)anthracene       | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 10       | Benzene                 | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                        |
| 11       | Benzo(b)fluoranthene    | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 12       | Benzo(k)fluoranthene    | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 13       | Benzoic Acid            | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 14       | Benzo(a)pyrene          | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 15       | Benzo(g,h,i)perylene    | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |
| 16       | Beryllium               | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 17       | Bis(2-chloroethyl)ether | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                              |

18 Bis(2-ethylhexyl)phthalate...

| ลำดับที่ | สารมลพิษ                   | วิธีวิเคราะห์                                                                                                                                                                                                                     |
|----------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18       | Bis(2-ethylhexyl)phthalate | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                        |
| 19       | Bromodichloromethane       | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                                  |
| 20       | Bromoform                  | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                                  |
| 21       | Butanol                    | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                                  |
| 22       | Butyl benzyl phthalate     | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                        |
| 23       | Cadmium                    | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                           |
| 24       | Carbazole                  | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                        |
| 25       | Carbon disulfide           | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                                  |
| 26       | Carbon tetrachloride       | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                                  |
| 27       | Chlordane                  | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                        |
| 28       | p-Chloroaniline            | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                        |
| 29       | Chlorobenzene              | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                                  |
| 30       | Chlorodibromomethane       | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                                  |
| 31       | Chloroform                 | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                                  |
| 32       | 2-Chlorophenol             | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                        |
| 33       | Chromium                   | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                           |
| 34       | Chromium (III)             | 1) Digestion, Inductively Coupled Plasma Method;<br>Colorimetric Method; Calculation <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method; Colorimetric Method;<br>Calculation <sup>(4)</sup> |
| 35       | Chromium (VI)              | Colorimetric Method <sup>(4)</sup>                                                                                                                                                                                                |

36 Chrysene...

| ลำดับที่ | สารเคมี                    | วิธีวิเคราะห์                                                                              |
|----------|----------------------------|--------------------------------------------------------------------------------------------|
| 36       | Chrysene                   | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 37       | Cyanide                    | Distillation, Colorimetric Method <sup>(4)</sup>                                           |
| 38       | 2,4-D                      | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 39       | DDD                        | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 40       | DDE                        | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 41       | DDT                        | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 42       | Dibenz(a,h)anthracene      | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 43       | Di-n-Butyl Phthalate       | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 44       | 1,2-Dichlorobenzene        | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |
| 45       | 1,3-Dichlorobenzene        | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |
| 46       | 1,4-Dichlorobenzene        | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |
| 47       | 3,3-Dichlorobenzidine      | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 48       | 1,1-Dichloroethane         | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |
| 49       | 1,2-Dichloroethane         | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |
| 50       | 1,1-Dichloroethylene       | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |
| 51       | cis-1,2-Dichloroethylene   | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |
| 52       | trans-1,2-Dichloroethylene | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |
| 53       | 2,4-Dichlorophenol         | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 54       | 1,2-Dichloropropane        | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |
| 55       | 1,3-Dichloropropane        | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |

56 1,3-Dichloropropene...

| ลำดับที่ | สารเคมี                  | วิธีวิเคราะห์                                                                              |
|----------|--------------------------|--------------------------------------------------------------------------------------------|
| 56       | 1,3-Dichloropropene      | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |
| 57       | Dieldrin                 | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 58       | Diethyl Phthalate        | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 59       | 2,4-Dimethylphenol       | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 60       | 2,4-Dinitrophenol        | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 61       | 2,4-Dinitrotoluene       | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 62       | 2,6-Dinitrotoluene       | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 63       | Di-n-octyl phthalate     | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 64       | Endosulfan               | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 65       | Endrin                   | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 66       | Ethylbenzene             | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |
| 67       | Fluoranthene             | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 68       | Fluorene                 | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 69       | Heptachlor               | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 70       | Heptachlor epoxide       | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 71       | Hexachlorobenzene        | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 72       | Hexachloro-1,3-butadiene | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |
| 73       | n-Hexane                 | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>           |
| 74       | α-HCH                    | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 75       | β-HCH                    | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |

76 γ-HCH...

| ลำดับที่ | สารเคมี                   | วิธีวิเคราะห์                                                                                                                                                              |
|----------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 76       | γ-HCH                     | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                 |
| 77       | Hexachlorocyclopentadiene | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                 |
| 78       | Hexachloroethane          | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                 |
| 79       | Indeno(1,2,3-cd)pyrene    | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                 |
| 80       | Isophorone                | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                 |
| 81       | Lead                      | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup>                    |
| 82       | Manganese                 | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup>                    |
| 83       | Mercury                   | 1) Digestion, Cold Vapor Atomic Absorption<br>Spectrometric Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 84       | Methanol                  | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                           |
| 85       | Methoxychlor              | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                 |
| 86       | Methyl bromide            | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                           |
| 87       | Methylene chloride        | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                           |
| 88       | 2-Methylphenol            | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                 |
| 89       | 2-Methylnaphthalene       | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                 |
| 90       | Methyl tert-butyl Ether   | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                           |
| 91       | Naphthalene               | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                 |
| 92       | Nickel                    | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup>                    |
| 93       | Nitrobenzene              | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                 |

94 N-Nitrosodiphenylamine...

| ลำดับที่ | สารเคมี                                                                                                                     | วิธีวิเคราะห์                                                                                                                                                                                                              |
|----------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 94       | N-Nitrosodiphenylamine                                                                                                      | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                 |
| 95       | N-Nitrosodi-n-Propylamine                                                                                                   | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                 |
| 96       | Polychlorinated Biphenyls<br>- PCB 1016<br>- PCB 1221<br>- PCB 1232<br>- PCB 1242<br>- PCB 1248<br>- PCB 1254<br>- PCB 1260 | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                 |
| 97       | Pentachlorophenol                                                                                                           | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                 |
| 98       | pH                                                                                                                          | Electrometric Method <sup>(4)</sup>                                                                                                                                                                                        |
| 99       | Phenanthrene                                                                                                                | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                 |
| 100      | Phenol                                                                                                                      | 1) Distillation, Chloroform Extraction Method <sup>(4)</sup><br>2) Distillation, Direct Photometric Method <sup>(4)</sup><br>3) Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup> |
| 101      | Pyrene                                                                                                                      | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                 |
| 102      | Selenium                                                                                                                    | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                    |
| 103      | Silver                                                                                                                      | 1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                    |
| 104      | Styrene                                                                                                                     | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                           |
| 105      | 1,1,2,2-Tetrachloroethane                                                                                                   | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                           |
| 106      | Tetrachloroethylene                                                                                                         | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                           |
| 107      | Toluene                                                                                                                     | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                           |
| 108      | Toxaphene                                                                                                                   | Liquid-Liquid Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(4)</sup>                                                                                                                                 |
| 109      | TPH (C <sub>8</sub> -C <sub>16</sub> )                                                                                      | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(14,25)</sup>                                                                                                                                       |

110 TPH (C<sub>8</sub>-C<sub>16</sub>)...

| ลำดับที่ | สารมลพิษ                                | วิธีวิเคราะห์                                                                                                                                     |
|----------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 110      | TPH (C <sub>8</sub> -C <sub>16</sub> )  | Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>9,22</sup>                                                            |
| 111      | TPH (C <sub>16</sub> -C <sub>33</sub> ) | Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>9,22</sup>                                                            |
| 112      | 1,2,4-Trichlorobenzene                  | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>41</sup>                                                                       |
| 113      | 1,1,1-Trichloroethane                   | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>41</sup>                                                                       |
| 114      | 1,1,2-Trichloroethane                   | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>41</sup>                                                                       |
| 115      | Trichloroethylene                       | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>41</sup>                                                                       |
| 116      | 2,4,5-Trichlorophenol                   | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>41</sup>                                                             |
| 117      | 2,4,6-Trichlorophenol                   | Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>41</sup>                                                             |
| 118      | 1,3,5-Trimethylbenzene                  | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>41</sup>                                                                       |
| 119      | Vanadium                                | 1) Digestion, Inductively Coupled Plasma Method <sup>42</sup><br>2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>41</sup> |
| 120      | Vinyl acetate                           | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>41</sup>                                                                       |
| 121      | Vinyl chloride                          | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>41</sup>                                                                       |
| 122      | m-Xylene                                | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>41</sup>                                                                       |
| 123      | o-Xylene                                | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>41</sup>                                                                       |
| 124      | p-Xylene                                | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>41</sup>                                                                       |
| 125      | Xylene (Total)                          | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>41</sup>                                                                       |
| 126      | Zinc                                    | 1) Digestion, Inductively Coupled Plasma Method <sup>42</sup><br>2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>41</sup> |

อากาศเสีย...

อากาศเสีย (ปล่อยระบาย) จำนวน 28 รายการ

| ลำดับที่ | สารมลพิษ          | วิธีวิเคราะห์                                                                                                                                                                               |
|----------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Antimony          | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup> |
| 2        | Arsenic           | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup> |
| 3        | Beryllium         | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup> |
| 4        | Cadmium           | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup> |
| 5        | Carbon Monoxide   | 1) Instrumental Analyzer Method <sup>51</sup><br>2) Sampling Bag Non-Dispersive Infrared Method <sup>51</sup>                                                                               |
| 6        | Chlorine          | 1) Adsorption Sampling, Ion Chromatographic Method <sup>51</sup><br>2) Isokinetic Sampling, Ion Chromatographic Method <sup>51</sup>                                                        |
| 7        | Chromium          | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup> |
| 8        | Cobalt            | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup> |
| 9        | Copper            | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup> |
| 10       | Cresol            | Adsorption Sampling, Gas Chromatographic Method <sup>51</sup>                                                                                                                               |
| 11       | Dioxins           | Isokinetic Sampling <sup>51</sup>                                                                                                                                                           |
| 12       | Hydrogen Chloride | 1) Adsorption Sampling, Ion Chromatographic Method <sup>51</sup><br>2) Isokinetic Sampling, Ion Chromatographic Method <sup>51</sup>                                                        |
| 13       | Hydrogen Fluoride | 1) Adsorption Sampling, Ion Chromatographic Method <sup>51</sup><br>2) Isokinetic Sampling, Ion Chromatographic Method <sup>51</sup>                                                        |
| 14       | Hydrogen Sulfide  | Absorption Sampling, Iodometric Method <sup>51</sup>                                                                                                                                        |

15 Lead...

| ลำดับที่ | สารมลพิษ                    | วิธีวิเคราะห์                                                                                                                                                                                              |
|----------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15       | Lead                        | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup>                |
| 16       | Manganese                   | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup>                |
| 17       | Mercury                     | 1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>52</sup><br>2) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>51</sup> |
| 18       | Nickel                      | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup>                |
| 19       | Opacity                     | Ringelmann's Method <sup>51</sup>                                                                                                                                                                          |
| 20       | Oxides of Nitrogen          | 1) Adsorption Sampling, Phenoldisulfonic Acid Method <sup>51</sup><br>2) Adsorption Sampling, Alkaline Permanganate/Colorimetric Method <sup>51</sup><br>3) Instrumental Analyzer Method <sup>51</sup>     |
| 21       | Selenium                    | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup>                |
| 22       | Sulfur Dioxide              | 1) Adsorption Sampling, Barium-Thorin Titrimetric Method <sup>51</sup><br>2) Instrumental Analyzer Method <sup>51</sup>                                                                                    |
| 23       | Sulfuric Acid               | Isokinetic Sampling, Barium-Thorin Titrimetric Method <sup>51</sup>                                                                                                                                        |
| 24       | Tellurium                   | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup>                |
| 25       | Tin                         | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup>                |
| 26       | Total Suspended Particulate | 1) Isokinetic Sampling, Gravimetric Method <sup>51</sup><br>2) Paired Train, Isokinetic Sampling, Gravimetric Method <sup>51</sup>                                                                         |

27 Vanadium...

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์                                                                                                                                                                               |
|----------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 27       | Vanadium | 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>51</sup><br>2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>51</sup> |
| 28       | Xylene   | Adsorption Sampling, Gas Chromatographic Method <sup>51</sup>                                                                                                                               |

สิ่งปกคลุมหรือวัสดุที่ไม่ใช่แล้ว จำนวน 35 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                          |
|----------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Aldrin   | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>1,9,26</sup><br>2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>10,26</sup><br>3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>11,26</sup>                           |
| 2        | Antimony | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>1,6,16</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,6,17</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>7,16</sup><br>4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>7,17</sup> |
| 3        | Arsenic  | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>1,6,16</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,6,17</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>7,16</sup><br>4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>7,17</sup> |
| 4        | Barium   | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>1,6,16</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>1,6,17</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>7,16</sup><br>4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>7,17</sup> |

5 Beryllium...

| ลำดับที่ | สารเคมี       | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10       | Chromium (VI) | 1) Waste Extraction, Colorimetric Method <sup>(1,6,19)</sup>                                                                                                                                                                                                                                                                                                                                                                   |
| 11       | Cobalt        | 1) Alkaline Digestion, Colorimetric Method <sup>(8,15)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,14)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup> |
| 12       | Copper        | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,14)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>                                                                 |
| 13       | 2,4-D         | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup><br>2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>                                                                                             |
| 14       | DDD           | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup><br>2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>                                                                                             |
| 15       | DDE           | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup><br>2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>                                                                                             |
| 16       | DDT           | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup>                                                                                                                                                                                                                                                                                             |

2) Soxhlet...

| ลำดับที่ | สารมลพิษ                                                                                                                                                       | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 22       | Mercury                                                                                                                                                        | 1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[1,6,20]</sup><br>2) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>[1,6,30]</sup><br>3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[20]</sup><br>4) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>[30]</sup><br>5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method <sup>[21]</sup> |
| 23       | Methoxychlor                                                                                                                                                   | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction Gas Chromatographic/Mass Spectrometric Method <sup>[3,9,28]</sup><br>2) Soxhlet Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[10,28]</sup>                                                                                                                                                                                                                                                               |
| 24       | Mirex                                                                                                                                                          | 3) Automated Soxhlet Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[11,26]</sup><br>1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction Gas Chromatographic/Mass Spectrometric Method <sup>[3,9,29]</sup><br>2) Soxhlet Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[10,26]</sup>                                                                                                                                                        |
| 25       | Molybdenum                                                                                                                                                     | 3) Automated Soxhlet Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>[11,26]</sup><br>1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,16]</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1,6,17]</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup><br>4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>                       |
| 26       | Nickel                                                                                                                                                         | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,16]</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>[1,6,17]</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>[7,16]</sup><br>4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>[7,17]</sup>                                                                                                                              |
| 27       | Polychlorinated biphenyls (PCBs)<br>- Aroclor 1016<br>- Aroclor 1221<br>- Aroclor 1232<br>- Aroclor 1242<br>- Aroclor 1248<br>- Aroclor 1254<br>- Aroclor 1260 | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[3,9,28]</sup><br>2) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,26]</sup><br>3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>[11,26]</sup>                                                                                                                                                                                                 |

- 2-Chlorobiphenyl...

| ลำดับที่ | สารมลพิษ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                                 |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 28       | - 2-Chlorobiphenyl<br>- 2,3-Dichlorobiphenyl<br>- 2,2',5'-Trichlorobiphenyl<br>- 2,4',5'-Trichlorobiphenyl<br>- 2,2',3,5'-Tetrachlorobiphenyl<br>- 2,2',5,5'-Tetrachlorobiphenyl<br>- 2,3',4,4'-Tetrachlorobiphenyl<br>- 2,2',3,4,5'-Pentachlorobiphenyl<br>- 2,2',4,5,5'-Pentachlorobiphenyl<br>- 2,3,3',4',6-Pentachlorobiphenyl<br>- 2,2',3,4,4',5'-Hexachlorobiphenyl<br>- 2,2',3,4,5,5'-Hexachlorobiphenyl<br>- 2,2',3,5,5',6-Hexachlorobiphenyl<br>- 2,2',4,4',5,5'-Hexachlorobiphenyl<br>- 2,2',3,3',4,4',5-Heptachlorobiphenyl<br>- 2,2',3,4,4',5,5'-Heptachlorobiphenyl<br>- 2,2',3,4,4',5,6-Heptachlorobiphenyl<br>- 2,2',3,4',5,5',6-Heptachlorobiphenyl<br>- 2,2',3,3',4,4',5,6-Nonachlorobiphenyl<br>Pentachlorophenol | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup><br>2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup><br>Electrometric Method <sup>(23,24)</sup> |
| 29       | pH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                               |
| 30       | Selenium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>                |

31 Silver...

| ลำดับที่ | สารมลพิษ  | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                  |
|----------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 31       | Silver    | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup> |
| 32       | Thallium  | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup> |
| 33       | Toxaphene | 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup><br>2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>                             |
| 34       | Vanadium  | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup> |
| 35       | Zinc      | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup> |

ดิน...

## ดิน จำนวน 125 รายการ

| ลำดับที่ | สารมลพิษ           | วิธีวิเคราะห์                                                                                                                                                                                |
|----------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Acenaphthene       | 1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> |
| 2        | Acetone            | 1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(15,25)</sup><br>2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method <sup>(12)</sup>               |
| 3        | Aldrin             | 1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> |
| 4        | Anthracene         | 1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> |
| 5        | Antimony           | 1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>                                    |
| 6        | Arsenic            | 1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>                                    |
| 7        | Atrazine           | 1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> |
| 8        | Barium             | 1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>                                    |
| 9        | Benzo(a)anthracene | 1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> |
| 10       | Benzene            | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                             |

11 Benzo(b)fluoranthene

| ลำดับที่ | สารมลพิษ                   | วิธีวิเคราะห์                                                                                                                                                                                |
|----------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11       | Benzo(b)fluoranthene       | 1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> |
| 12       | Benzo(k)fluoranthene       | 1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> |
| 13       | Benzoic acid               | 1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> |
| 14       | Benzo(a)pyrene             | 1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> |
| 15       | Benzo(g,h,i)perylene       | 1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> |
| 16       | Beryllium                  | 1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>                                    |
| 17       | Bis(2-chloroethyl)ether    | 1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> |
| 18       | Bis(2-ethylhexyl)phthalate | 1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> |
| 19       | Bromodichloromethane       | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                             |
| 20       | Bromoform                  | Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                             |
| 21       | Butanol                    | Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>                                                                                                      |
| 22       | Butyl Benzyl Phthalate     | 1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup> |

23 Cadmium...

| ลำดับที่ | สารมลพิษ             | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                              |
|----------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 23       | Cadmium              | 1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(7,17)</sup>                                                                                                                                              |
| 24       | Carbazole            | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup>                                                                                                       |
| 25       | Carbon Disulfide     | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                                                                                                       |
| 26       | Carbon tetrachloride | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                                                                                                       |
| 27       | Chlordane            | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup>                                                                                                       |
| 28       | p-Chloroaniline      | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup>                                                                                                       |
| 29       | Chlorobenzene        | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                                                                                                       |
| 30       | Chlorodibromomethane | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                                                                                                       |
| 31       | Chloroform           | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                                                                                                       |
| 32       | 2-Chlorophenol       | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup>                                                                                                       |
| 33       | Chromium             | 1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(7,17)</sup>                                                                                                                                              |
| 34       | Chromium (III)       | 1) Digestion, Inductively Coupled Plasma Method;<br>Alkaline Digestion, Colorimetric Method; Calculation<br>Method <sup>(7,8,16,19)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method; Alkaline Digestion,<br>Colorimetric Method; Calculation Method <sup>(7,8,17,19)</sup> |
| 35       | Chromium (VI)        | Alkaline Digestion, Colorimetric Method <sup>(8,19)</sup>                                                                                                                                                                                                                                                  |

36 Chrysene...

| ลำดับที่ | สารมลพิษ              | วิธีวิเคราะห์                                                                                                                                                                                        |
|----------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 36       | Chrysene              | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 37       | Cyanide               | Extraction, Distillation, Colorimetric Method <sup>(27,28,29)</sup>                                                                                                                                  |
| 38       | 2,4-D                 | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 39       | DDD                   | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 40       | DDE                   | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 41       | DDT                   | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 42       | Dibenz(a,h)anthracene | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 43       | Di-n-Butyl Phthalate  | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 44       | 1,2-Dichlorobenzene   | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 45       | 1,3-Dichlorobenzene   | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 46       | 1,4-Dichlorobenzene   | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 47       | 3,3-Dichlorobenzidine | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 48       | 1,1-Dichloroethane    | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |

49 1,2-Dichloroethane...

| ลำดับที่ | สารมลพิษ                   | วิธีวิเคราะห์                                                                                                                                                                                        |
|----------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49       | 1,2-Dichloroethane         | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 50       | 1,1-Dichloroethylene       | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 51       | cis-1,2-Dichloroethylene   | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 52       | trans-1,2-Dichloroethylene | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 53       | 2,4-Dichlorophenol         | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 54       | 1,2-Dichloropropane        | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 55       | 1,3-Dichloropropane        | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 56       | 1,3-Dichloropropene        | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 57       | Dieldrin                   | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 58       | Diethyl Phthalate          | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 59       | 2,4-Dimethylphenol         | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 60       | 2,4-Dinitrophenol          | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 61       | 2,4-Dinitrotoluene         | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 62       | 2,6-Dinitrotoluene         | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |

63 Di-n-Octyl Phthalate...

| ลำดับที่ | สารมลพิษ                 | วิธีวิเคราะห์                                                                                                                                                                                        |
|----------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 63       | Di-n-Octyl Phthalate     | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 64       | Endosulfan               | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 65       | Endrin                   | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 66       | Ethylbenzene             | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 67       | Fluoranthene             | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 68       | Fluorene                 | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 69       | Heptachlor               | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 70       | Heptachlor epoxide       | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 71       | Hexachlorobenzene        | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,26)</sup> |
| 72       | Hexachloro-1,3-butadiene | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 73       | n-Hexane                 | 1) Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup><br>2) Equilibrium Headspace, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15)</sup>               |

73 n-Hexane...

| ลำดับที่ | สารมลพิษ                  | วิธีวิเคราะห์                                                                                                                                                                                                                                                                    |
|----------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 74       | $\alpha$ -HCH             | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup>                                                                             |
| 75       | $\beta$ -HCH              | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup>                                                                             |
| 76       | $\gamma$ -HCH             | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup>                                                                             |
| 77       | Hexachlorocyclopentadiene | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup>                                                                             |
| 78       | Hexachloroethane          | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup>                                                                             |
| 79       | Indeno(1,2,3-cd)pyrene    | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup>                                                                             |
| 80       | Isophorone                | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup>                                                                             |
| 81       | Lead                      | 1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(7,17)</sup>                                                                                                                    |
| 82       | Manganese                 | 1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(7,17)</sup>                                                                                                                    |
| 83       | Mercury                   | 1) Digestion, Cold-Vapor Atomic Absorption<br>Spectrometric Method <sup>(20)</sup><br>2) Thermal Decomposition, Amalgamation, and<br>Atomic Absorption Spectrophotometry <sup>(21)</sup><br>3) Digestion, Cold-Vapor Atomic Fluorescence<br>Spectrometric Method <sup>(30)</sup> |

84 Methanol...

| ลำดับที่ | สารมลพิษ                  | วิธีวิเคราะห์                                                                                                                                                                                        |
|----------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 84       | Methanol                  | 1) Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup><br>2) Equilibrium Headspace, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(13,25)</sup>            |
| 85       | Methoxychlor              | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup> |
| 86       | Methyl Bromide            | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 87       | Methylene Chloride        | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 88       | 2-methylphenol            | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup> |
| 89       | 2-Methylnaphthalene       | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup> |
| 90       | Methyl tert-Butyl Ether   | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                 |
| 91       | Naphthalene               | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup> |
| 92       | Nickel                    | 1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(7,17)</sup>                                        |
| 93       | Nitrobenzene              | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup> |
| 94       | N-Nitrosodiphenylamine    | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup> |
| 95       | N-Nitrosodi-n-propylamine | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup> |

96 Polychlorinated biphenyls (PCBs)

| ลำดับที่ | สารมลพิษ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                                                                |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 96       | Polychlorinated biphenyls<br>(PCBs)<br>- Aroclor 1016<br>- Aroclor 1221<br>- Aroclor 1232<br>- Aroclor 1242<br>- Aroclor 1248<br>- Aroclor 1254<br>- Aroclor 1260<br>- 2-Chlorobiphenyl<br>- 2,2',3,5'-Tetrachlorobiphenyl<br>- 2,2',5,5'-Tetrachlorobiphenyl<br>- 2,3',4,4'-Tetrachlorobiphenyl<br>- 2,2',3,4,5'-Pentachlorobiphenyl<br>- 2,2',4,5,5'-Pentachlorobiphenyl<br>- 2,3,3',4,6-Pentachlorobiphenyl<br>- 2,2',3,4,4',5'-Hexachlorobiphenyl<br>- 2,2',3,4,5,5'-Hexachlorobiphenyl<br>- 2,2',3,5,5',6'-Hexachlorobiphenyl<br>- 2,2',4,4',5,5'-Hexachlorobiphenyl<br>- 2,2',3,3',4,4',5'-Heptachlorobiphenyl<br>- 2,2',3,4,4',5,5'-Heptachlorobiphenyl<br>- 2,2',3,4,4',5,6'-Heptachlorobiphenyl<br>- 2,2',3,4',5,5',6'-Heptachlorobiphenyl<br>- 2,2',3,3',4,4',5,6'-Nonachlorobiphenyl<br>Pentachlorophenol | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup><br>1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup> |
| 97       | Phenanthrene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup>                                                                                                                                                                                                         |

99 Phenol...

| ลำดับที่ | สารมลพิษ                                | วิธีวิเคราะห์                                                                                                                                                                                                            |
|----------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 99       | Phenol                                  | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup>                     |
| 100      | Pyrene                                  | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup>                     |
| 101      | Selenium                                | 1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(7,17)</sup>                                                            |
| 102      | Silver                                  | 1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(7,17)</sup>                                                            |
| 103      | Styrene                                 | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                     |
| 104      | 1,1,2,2-Tetrachloroethane               | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                     |
| 105      | Tetrachloroethylene                     | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                     |
| 106      | Toluene                                 | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                     |
| 107      | Toxaphene                               | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup>                     |
| 108      | TPH (C <sub>5</sub> -C <sub>9</sub> )   | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                     |
| 109      | TPH (C <sub>8</sub> -C <sub>16</sub> )  | 1) Automate Extraction, Gas Chromatographic Method <sup>(11,22)</sup><br>2) Solvent Extraction, Gas Chromatographic Method <sup>(11,22)</sup><br>3) Ultrasonic Extraction, Gas Chromatographic Method <sup>(11,22)</sup> |
| 110      | TPH (C <sub>16</sub> -C <sub>35</sub> ) | 1) Automate Extraction, Gas Chromatographic Method <sup>(11,22)</sup><br>2) Solvent Extraction, Gas Chromatographic Method <sup>(11,22)</sup><br>3) Ultrasonic Extraction, Gas Chromatographic Method <sup>(11,22)</sup> |
| 111      | 1,2,4-Trichlorobenzene                  | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                     |
| 112      | 1,1,1-Trichloroethane                   | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                     |
| 113      | 1,1,2-Trichloroethane                   | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                     |
| 114      | Trichloroethylene                       | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,25)</sup>                                                                                                                                     |

115 2,4,5-Trichlorophenol...

| ลำดับที่ | สารเคมี                | วิธีวิเคราะห์                                                                                                                                                                                        |
|----------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 115      | 2,4,5-Trichlorophenol  | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup> |
| 116      | 2,4,6-Trichlorophenol  | 1) Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(10,26)</sup><br>2) Automated Soxhlet Extraction, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(11,24)</sup> |
| 117      | 1,3,5-Trimethylbenzene | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,23)</sup>                                                                                                                 |
| 118      | Vanadium               | 1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(7,17)</sup>                                        |
| 119      | Vinyl Acetate          | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,23)</sup>                                                                                                                 |
| 120      | Vinyl Chloride         | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,23)</sup>                                                                                                                 |
| 121      | m-Xylene               | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,23)</sup>                                                                                                                 |
| 122      | o-Xylene               | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,23)</sup>                                                                                                                 |
| 123      | p-Xylene               | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,23)</sup>                                                                                                                 |
| 124      | Xylene (Total)         | Purge and Trap, Gas Chromatographic/<br>Mass Spectrometric Method <sup>(15,23)</sup>                                                                                                                 |
| 125      | Zinc                   | 1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(7,17)</sup>                                        |

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20. United States...

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กระทรวงทรัพยากรธรรมชาติและสิ่งแวดล้อม

กรมส่งเสริมการเกษตร  
กรมการตรวจประเมินผลกระทบสิ่งแวดล้อม  
กรมการตรวจประเมินผลกระทบสิ่งแวดล้อม

๒๕ เมษายน ๒๕๖๕

เรื่อง ขออนุญาตใช้พื้นที่บริเวณ...

เรียน กรมส่งเสริมการเกษตร...

ตามที่...

ขอเรียน...

กรมส่งเสริมการเกษตร...

ขอเรียน...

ขอเรียน...

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๒๕ เมษายน ๒๕๖๕

ที่ ๑๓๐๑(๑)/ ๑๒๓๖ ๘

กรมโรงงานอุตสาหกรรม

ถนนพระรามที่ ๒ แขวงทุ่งพญาไท

เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขณิสากรมสิทธิของห้องปฏิบัติการวิเคราะห์เอกชน

ลงวันที่ ๒ ธันวาคม ๒๕๖๗

ตามที่ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔-๖-๐๑๐๘ ขอพัฒนาการ ๕๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอยกเลิกบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์เอกชน ราย ได้แก่

- |                                 |                            |
|---------------------------------|----------------------------|
| ๑) นายประพนธ์ วรรณชัย           | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๒) นายจิรวัฒน์ ขาวละเอียด       | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๓) นายพิรพัฒน์ คำคำ             | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๔) นางสาวอรุณ คำคำ              | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๕) นายกิตติพงศ์ แซ่ลี           | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๖) นายจิรเมธ ประเสริฐศิริพงษ์   | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๗) นายภัทรพงษ์ มณฑาทอง          | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๘) นางสาวจารุวรรณ กระทั่งพันธุ์ | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีรวัฒน์ อิศรางกูร ณ อยุธยา)  
รองอธิบดี ปฏิบัติราชการแทน  
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๓๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๓๒ ต่อ ๒๑๐๓

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th

"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



กรมโรงงานอุตสาหกรรม กระทรวงอุตสาหกรรม



กรมโรงงานอุตสาหกรรม กระทรวงอุตสาหกรรม



ที่ ๑๓๐๑(๑)/ ๑๒๓๖ ๘



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๒ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขณิสากรมสิทธิของห้องปฏิบัติการวิเคราะห์เอกชน

ลงวันที่ ๒ ธันวาคม ๒๕๖๗

ตามที่ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔-๖-๐๑๐๘ ขอพัฒนาการ ๕๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอยกเลิกบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์เอกชน ราย ได้แก่

- |                                   |                            |
|-----------------------------------|----------------------------|
| ๑) นายธีรวัฒน์ อิศรางกูร ณ อยุธยา | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๒) นายธีรวัฒน์ อิศรางกูร ณ อยุธยา | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีรวัฒน์ อิศรางกูร ณ อยุธยา)  
รองอธิบดี ปฏิบัติราชการแทน  
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๓๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๓๒ ต่อ ๒๑๐๓

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



กรมโรงงานอุตสาหกรรม กระทรวงอุตสาหกรรม



ที่ ๑๓๐๑(๑)/ ๑๒๓๖ ๘



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๒ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขณิสากรมสิทธิของห้องปฏิบัติการวิเคราะห์เอกชน

ลงวันที่ ๗ พฤษภาคม ๒๕๖๘

ตามที่ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔-๖-๐๑๐๘ ขอพัฒนาการ ๕๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑๑ ราย ได้แก่

- |                        |                            |
|------------------------|----------------------------|
| ๑) นายศุภมิตร มั่นชื่น | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๒) นายธีรเมธ เสนาบุตร  | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๓) นายธีรเมธ เสนาบุตร  | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๔) นายธีรเมธ เสนาบุตร  | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๕) นายธีรเมธ เสนาบุตร  | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๖) นายธีรเมธ เสนาบุตร  | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๗) นายธีรเมธ เสนาบุตร  | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๘) นายธีรเมธ เสนาบุตร  | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๙) นายธีรเมธ เสนาบุตร  | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๑๐) นายธีรเมธ เสนาบุตร | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |
| ๑๑) นายธีรเมธ เสนาบุตร | ทะเบียนเลขที่ ๖-๒๐๔-๖-๐๑๐๘ |

อนึ่ง หนังสือฉบับนี้ส่งมอบพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

ในวันที่ ๑ กันยายน ๒๕๖๘

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีรวัฒน์ อิศรางกูร ณ อยุธยา)  
รองอธิบดี ปฏิบัติราชการแทน  
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๓๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๓๒ ต่อ ๒๑๐๓

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



กรมโรงงานอุตสาหกรรม กระทรวงอุตสาหกรรม



ที่ อก ๐๓๑๐(๑)/ ๒๕๐๘



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๐๐๐

๒๑ สิงหาคม ๒๕๖๔

เรื่อง เปลี่ยนแปลงสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๒๗ มิถุนายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๖ แผ่น

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ  
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ  
เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงสารมลพิษที่วิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้อำนาจ เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด  
เพิ่มขอขึ้นทะเบียนชนิดสารมลพิษที่วิเคราะห์ในน้ำใต้ดิน สิ่งปลูกสร้างและวัสดุที่ไม่ใช่แล้ว และดิน ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะสิ้นสุดพร้อมหนังสือต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
ในวันที่ ๒ กันยายน ๒๕๖๔

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางสาวปัทมวรรณ คุณประเสริฐ)  
ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษโรงงาน  
ปฏิบัติงานตามมอบหมายจากกรมโรงงานอุตสาหกรรม

กองวิจัยและเฝ้าระวังมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๕๙

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ๖-๒๐๔

ที่ อก ๐๓๑๐(๑)/ ๒๕๐๘

ลงวันที่ ๒๑ สิงหาคม ๒๕๖๔

ขอขึ้นทะเบียนชนิดสารมลพิษที่วิเคราะห์ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๔๐ รายการ

น้ำใต้ดิน จำนวน ๔ รายการ

| ลำดับที่ | สารมลพิษ   | วิธีวิเคราะห์                                                                      |
|----------|------------|------------------------------------------------------------------------------------|
| 1        | Aluminum   | Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(2)</sup> |
| 2        | Copper     | Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(2)</sup> |
| 3        | Iron       | Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(2)</sup> |
| 4        | Molybdenum | Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(2)</sup> |

สิ่งปลูกสร้างหรือวัสดุที่ไม่ใช่แล้ว จำนวน 17 รายการ

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                        |
|----------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Antimony | 1) Waste Extraction, Digestion, Inductively Coupled<br>Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled<br>Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup> |
| 2        | Arsenic  | 1) Waste Extraction, Digestion, Inductively Coupled<br>Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled<br>Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup> |
| 3        | Barium   | 1) Waste Extraction, Digestion, Inductively Coupled<br>Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled<br>Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup> |

เบริลเลียม

Beryllium

- ๒ -

| ลำดับที่ | สารมลพิษ       | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4        | Beryllium      | 1) Waste Extraction, Digestion, Inductively Coupled<br>Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled<br>Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                                                                                                                                                            |
| 5        | Cadmium        | 1) Waste Extraction, Digestion, Inductively Coupled<br>Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled<br>Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                                                                                                                                                            |
| 6        | Chromium       | 1) Waste Extraction, Digestion, Inductively Coupled<br>Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled<br>Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                                                                                                                                                            |
| 7        | Chromium (III) | 1) Waste Extraction, Digestion, Inductively Coupled<br>Plasma Method; Waste Extraction, Colorimetric<br>Method; Calculation Method <sup>(1,3,6,8)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled<br>Plasma/Mass Spectrometric Method; Waste Extraction,<br>Colorimetric Method; Calculation Method <sup>(1,3,7,8)</sup><br>3) Digestion, Inductively Coupled Plasma Method;<br>Alkaline Digestion, Colorimetric Method; Calculation<br>Method <sup>(4,5,6,8)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method; Alkaline Digestion,<br>Colorimetric Method; Calculation Method <sup>(4,5,7,8)</sup> |
| 8        | Cobalt         | 1) Waste Extraction, Digestion, Inductively Coupled<br>Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled<br>Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                           |

3) Digestion...

- ๓ -

| ลำดับที่ | สารมลพิษ   | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9        | Copper     | 3) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup><br>1) Waste Extraction, Digestion, Inductively Coupled<br>Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled<br>Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup> |
| 10       | Lead       | 1) Waste Extraction, Digestion, Inductively Coupled<br>Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled<br>Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                                                |
| 11       | Molybdenum | 1) Waste Extraction, Digestion, Inductively Coupled<br>Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled<br>Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                                                |
| 12       | Nickel     | 1) Waste Extraction, Digestion, Inductively Coupled<br>Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled<br>Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                                                |
| 13       | Selenium   | 1) Waste Extraction, Digestion, Inductively Coupled<br>Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled<br>Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                                                |

เงิน

14 Silver...

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                                                                                  |
|----------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14       | Silver   | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(9,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(9,7)</sup> |
| 15       | Thallium | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(9,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(9,7)</sup> |
| 16       | Vanadium | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(9,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(9,7)</sup> |
| 17       | Zinc     | 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,3,6)</sup><br>2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,3,7)</sup><br>3) Digestion, Inductively Coupled Plasma Method <sup>(9,6)</sup><br>4) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(9,7)</sup> |

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์                                                                                                                                               |
|----------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Aluminum | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup> |
| 2        | Antimony | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup> |

| ลำดับที่ | สารมลพิษ       | วิธีวิเคราะห์                                                                                                                                                                                                                                                                                          |
|----------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3        | Arsenic        | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                            |
| 4        | Barium         | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                            |
| 5        | Beryllium      | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                            |
| 6        | Cadmium        | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                            |
| 7        | Chromium       | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                            |
| 8        | Chromium (III) | 1) Digestion, Inductively Coupled Plasma Method;<br>Alkaline Digestion, Colorimetric Method; Calculation<br>Method <sup>(4,5,6,8)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method; Alkaline Digestion,<br>Colorimetric Method; Calculation Method <sup>(4,5,7,8)</sup> |
| 9        | Copper         | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                            |
| 10       | Iron           | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                            |
| 11       | Lead           | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                            |
| 12       | Manganese      | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                            |
| 13       | Molybdenum     | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                            |
| 14       | Nickel         | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup>                                                                                                                                            |

| ลำดับที่ | สารมลพิษ | วิธีวิเคราะห์                                                                                                                                               |
|----------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15       | pH       | Electrometric Method <sup>(9)</sup>                                                                                                                         |
| 16       | Selenium | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup> |
| 17       | Silver   | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup> |
| 18       | Vanadium | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup> |
| 19       | Zinc     | 1) Digestion, Inductively Coupled Plasma Method <sup>(4,6)</sup><br>2) Digestion, Inductively Coupled Plasma/<br>Mass Spectrometric Method <sup>(4,7)</sup> |

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ที่ ออ ๐๑๙๐/๒๕๖๑ ๑๑๑



กรมโรงงานอุตสาหกรรม  
ถนนพรหมามที่ ๒ แขวงทุ่งยั้ง  
สตทราบุรี กรุงเทพฯ ๑๐๑๐๐

**๒๒ กันยายน ๒๕๖๑**

เรียน เปลี่ยนแปลงบุคลากร ชื่อตัวและชื่อสกุลของบุคลากร

เรียน กรรมการผู้จัดการ บริษัท แอสเสท แกลเลอรี่ จำกัด (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนชื่อตัว/เปลี่ยนแปลงบุคลากร และขออนุญาตสิทธิขอทำใบปฏิบัติการวิเคราะห์ดิน

วันที่ ๒๑ สิงหาคม ๒๕๖๑

ตามคำขอที่อ้างถึง บริษัท แอสเสท แกลเลอรี่ จำกัด (ประเทศไทย) จำกัดต้องปฏิบัติตาม  
วิเคราะห์ดินตาม เลขทะเบียน ๖-๒๐๙ สถานที่ตั้งเลขที่ ๑๐๙ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ  
แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ชื่อตัวและชื่อสกุลของบุคลากร  
ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

1. ให้อยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒ ราย
 

|                        |                            |
|------------------------|----------------------------|
| ๑) นางสาวพายุ ศุภณภ    | ทะเบียนเลขที่ ๖-๒๐๙-๖-๐๑๙๙ |
| ๒) นางสาวอรนิต เวียงคำ | ทะเบียนเลขที่ ๖-๒๐๙-๖-๐๑๙๙ |
๒. ให้เปลี่ยนชื่อตัวและชื่อสกุลของเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จากเดิม  
นายอาทิตย์ ศรีเคน เป็น นายวิฑูริ์ วิฑูริ์จรรยาพร ทะเบียนเลขที่ ๖-๒๐๙-๖-๐๐๙๙

อนึ่ง หนังสือฉบับนี้ละเมิดอายุหนังสืออนุญาตฉบับนี้และเปลี่ยนห้องปฏิบัติการวิเคราะห์เอกสาร  
ในวันที่ ๒ กันยายน ๒๕๖๑

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นางสาวปัทมวรรณ คุณประเสริฐ)  
ผู้อำนวยการสำนักงานสิ่งแวดล้อมและจัดการ  
ปฏิบัติการและเคมีภัณฑ์โรงงานอุตสาหกรรม

กองวิจัยและพัฒนากิจการโรงงาน  
กลุ่มมาตรฐานปฏิบัติการวิเคราะห์ทดสอบเคมีและทะเบียนห้องปฏิบัติการ  
โทร. ๐ ๒๕๖๐ ๖๒๑๒ ต่อ ๒๐๑๔-๕  
โทรสาร ๐ ๒๕๖๐ ๖๒๑๒ ต่อ ๒๑๑๔  
ไปรษณีย์อิเล็กทรอนิกส์ sarabon@dfw.mail.go.th



“อุตสาหกรรมก้าวไกล ประสานใจกันก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมเพื่อไทย”



อากาศเสีย (ปล่อยระบาย) จำนวน 7 รายการ

| ลำดับ<br>ที่ | สารมลพิษ                    | วิธีวิเคราะห์                                                                                                                      |
|--------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| 1            | Carbon Monoxide             | 1) Sampling Bag, Non-Dispersive Infrared Method <sup>(5)</sup><br>2) Instrumental Analyzer Method <sup>(9)</sup>                   |
| 2            | Hydrogen Sulfide            | Absorption Sampling, Iodometric Method <sup>(5)</sup>                                                                              |
| 3            | Opacity                     | Ringelmann's Method <sup>(3,4)</sup>                                                                                               |
| 4            | Oxide of Nitrogen           | 1) Absorption Sampling, Phenoldisulfonic Acid<br>Method <sup>(6)</sup><br>2) Instrumental Analyzer Method <sup>(10)</sup>          |
| 5            | Sulfur Dioxide              | 1) Absorption Sampling, Barium-Thorin Titrimetric<br>Acid Method <sup>(5)</sup><br>2) Instrumental Analyzer Method <sup>(11)</sup> |
| 6            | Sulfuric Acid               | Isokinetic Sampling, Barium -- Titrimetric Method <sup>(6)</sup>                                                                   |
| 7            | Total Suspended Particulate | Isokinetic Sampling, Gravimetric Method <sup>(7)</sup>                                                                             |

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ที่ ๑๗๑๘/๑๖๐๐๕๘



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพมหานคร ๑๐๕๐๐

๒๕ พฤศจิกายน ๒๕๖๕

เรื่อง ขอยกเลิกการขอตั้งห้องปฏิบัติการวิเคราะห์

สืบเนื่องจากบริษัท บริษัท เอนแอล แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

ดำเนินการขอตั้งห้องปฏิบัติการวิเคราะห์วิเคราะห์กลุ่ม (ประเทศไทย) จำกัด เลขที่ ๒๒๐/๒๐๖๕

ลงวันที่ ๒๖ พฤษภาคม ๒๕๖๕

ตามที่บริษัท บริษัท เอนแอล แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอตั้งห้องปฏิบัติการ  
วิเคราะห์วิเคราะห์กลุ่ม (ประเทศไทย) จำกัด เลขที่ ๒๒๐/๒๐๖๕ นั้น บริษัท เอนแอล แลบอราทอรี  
กรุ๊ป (ประเทศไทย) จำกัด ขอตั้งห้องปฏิบัติการวิเคราะห์วิเคราะห์กลุ่ม (ประเทศไทย) จำกัด เลขที่ ๒๒๐/๒๐๖๕

กรมโรงงานอุตสาหกรรม ได้พิจารณาและดำเนินการตามขั้นตอนแล้ว จึงมีคำสั่งให้ปฏิบัติ

การวิเคราะห์วิเคราะห์กลุ่ม (ประเทศไทย) จำกัด

ดำเนินการวิเคราะห์วิเคราะห์กลุ่ม (ประเทศไทย) จำกัด

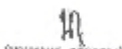
ดำเนินการวิเคราะห์วิเคราะห์กลุ่ม (ประเทศไทย) จำกัด

ดำเนินการวิเคราะห์วิเคราะห์กลุ่ม (ประเทศไทย) จำกัด

ดำเนินการวิเคราะห์วิเคราะห์กลุ่ม (ประเทศไทย) จำกัด

ดำเนินการวิเคราะห์วิเคราะห์กลุ่ม (ประเทศไทย) จำกัด

ขอแสดงความนับถือ

  
(นายพรชัย สอนิมงคล)  
รองอธิบดี (ผู้บังคับการ)  
กองบริหารโรงงานอุตสาหกรรม

ศูนย์วิจัยและพัฒนาการป้องกันและจัดการภัยพิบัติ  
โทร. ๐๒-๖๖๖๖-๖๖๖๖ ต่อ ๕๕๕๕๕๕  
ไปรษณีย์อิเล็กทรอนิกส์ ewp@ddw.mail.go.th



กระทรวงอุตสาหกรรม กรมโรงงานอุตสาหกรรม ถนนพระรามที่ ๖ แขวงทุ่งพญาไท กรุงเทพมหานคร ๑๐๕๐๐



ที่ อก ๐๓๑๐(๓)/ ๕๒๔๖



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐  
๒๐ พฤษภาคม ๒๕๖๕

เรื่อง ขอยกเลิกการขอตั้งห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอนแอล แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๑๐ เมษายน ๒๕๖๕

ตามคำขอที่อ้างถึง บริษัท เอนแอล แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอตั้งห้องปฏิบัติการ  
วิเคราะห์วิเคราะห์กลุ่ม (ประเทศไทย) จำกัด เลขที่ ๒๒๐/๒๐๖๕ นั้น บริษัท เอนแอล แลบอราทอรี  
กรุ๊ป (ประเทศไทย) จำกัด ขอตั้งห้องปฏิบัติการวิเคราะห์วิเคราะห์กลุ่ม (ประเทศไทย) จำกัด เลขที่ ๒๒๐/๒๐๖๕

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ได้ยกเลิกเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน  
จำนวน ๑ ราย ได้แก่ นายปารเมศ สัตยาคุณ ทะเบียนเลขที่ ๖-๒๐๓๓-๖๐๐๕๑

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายประสม ดำรงพร)

ผู้อำนวยการกองวิจัยและพัฒนาโรงงาน

ปฏิบัติการตามแผนฉบับกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและพัฒนาการป้องกันและจัดการภัยพิบัติ

โทร. ๐๒๓๓๓ ๖๐๕๕ ต่อ ๕๐๐๑๖

ไปรษณีย์อิเล็กทรอนิกส์ ewp@ddw.mail.go.th



"อุตสาหกรรมก้าวหน้า ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ที่ อก ๐๓๑๐(๓)/ ๕๕๐๕



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๗ พฤษภาคม ๒๕๖๘

เรื่อง เปลี่ยนแปลงชื่อ-สกุลบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอเพิ่มเขียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๑๕ พฤษภาคม ๒๕๖๘

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ  
วิเคราะห์เอกชน เลขทะเบียน ๖-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอลำลูกเกด  
จังหวัดระยอง ขอเปลี่ยนแปลงชื่อ-สกุลบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้เปลี่ยนแปลงชื่อ-สกุลบุคลากร จำนวน ๑ ราย  
จากนายธนสิทธิ์ วงศ์ไชย เป็น นายอมลวิทย์ วงศ์ไชย

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประสม ดำรงสุข)

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน  
ปฏิบัติการตามหนังสือกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ einw@diw.mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ที่ อก ๐๓๑๐(๓)/ ๕๗๖๔



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๐๒ ธันวาคม ๒๕๖๘

เรื่อง เปลี่ยนแปลงสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอเพิ่มเขียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๓๑ ตุลาคม ๒๕๖๘

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ  
วิเคราะห์เอกชน เลขทะเบียน ๖-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอลำลูกเกด  
จังหวัดระยอง ขอเปลี่ยนแปลงสารมลพิษที่วิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด  
เพิ่มขอขยายชนิดสารมลพิษที่วิเคราะห์ในน้ำเสีย และน้ำใต้ดิน ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้ส่งอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
ในวันที่ ๒๘ มิถุนายน ๒๕๖๙

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางสาวปัทมวรรณ คุณประเสริฐ)

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน  
ปฏิบัติการตามหนังสือกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ einw@diw.mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๓๒๓

ที่ อก ๐๓๑๐(๓)/ ๕๗๖๔ ลงวันที่ ๐๒ ธันวาคม ๒๕๖๘

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๓ รายการ

น้ำเสีย จำนวน 13 รายการ

| ลำดับที่ | สารมลพิษ            | วิธีวิเคราะห์                                                |
|----------|---------------------|--------------------------------------------------------------|
| 1        | Arsenic             | Digestion, Inductively Coupled Plasma Method                 |
| 2        | Barium              | Digestion, Inductively Coupled Plasma Method                 |
| 3        | Cadmium             | Digestion, Inductively Coupled Plasma Method                 |
| 4        | Chromium            | Digestion, Inductively Coupled Plasma Method                 |
| 5        | Copper              | Digestion, Inductively Coupled Plasma Method                 |
| 6        | Hexavalent Chromium | Colorimetric Method                                          |
| 7        | Lead                | Digestion, Inductively Coupled Plasma Method                 |
| 8        | Manganese           | Digestion, Inductively Coupled Plasma Method                 |
| 9        | Mercury             | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method |
| 10       | Nickel              | Digestion, Inductively Coupled Plasma Method                 |
| 11       | Selenium            | Digestion, Inductively Coupled Plasma Method                 |
| 12       | Trivalent Chromium  | Calculation                                                  |
| 13       | Zinc                | Digestion, Inductively Coupled Plasma Method                 |

น้ำใต้ดิน จำนวน 20 รายการ

| ลำดับที่ | สารมลพิษ       | วิธีวิเคราะห์                                |
|----------|----------------|----------------------------------------------|
| 1        | Aluminum       | Digestion, Inductively Coupled Plasma Method |
| 2        | Antimony       | Digestion, Inductively Coupled Plasma Method |
| 3        | Arsenic        | Digestion, Inductively Coupled Plasma Method |
| 4        | Barium         | Digestion, Inductively Coupled Plasma Method |
| 5        | Beryllium      | Digestion, Inductively Coupled Plasma Method |
| 6        | Cadmium        | Digestion, Inductively Coupled Plasma Method |
| 7        | Chromium       | Digestion, Inductively Coupled Plasma Method |
| 8        | Chromium (III) | Calculation                                  |
| 9        | Chromium (VI)  | Colorimetric Method                          |
| 10       | Copper         | Digestion, Inductively Coupled Plasma Method |

๒๐

| ลำดับที่ | สารมลพิษ   | วิธีวิเคราะห์                                               |
|----------|------------|-------------------------------------------------------------|
| 11       | Iron       | Digestion, Inductively Coupled Plasma Method                |
| 12       | Lead       | Digestion, Inductively Coupled Plasma Method                |
| 13       | Manganese  | Digestion, Inductively Coupled Plasma Method                |
| 14       | Mercury    | Digestion Cold-Vapor Atomic Absorption Spectrometric Method |
| 15       | Molybdenum | Digestion, Inductively Coupled Plasma Method                |
| 16       | Nickel     | Digestion, Inductively Coupled Plasma Method                |
| 17       | Selenium   | Digestion, Inductively Coupled Plasma Method                |
| 18       | Silver     | Digestion, Inductively Coupled Plasma Method                |
| 19       | Vanadium   | Digestion, Inductively Coupled Plasma Method                |
| 20       | Zinc       | Digestion, Inductively Coupled Plasma Method                |

เอกสารอ้างอิง

APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 24th ed. Washington, DC: APHA, 2023.



๐๖ มีนาคม ๒๕๖๕

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๖ กุมภาพันธ์ ๒๕๖๔ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ  
วิเคราะห์เอกชน เลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู่ อำเภอปลวกแดง  
จังหวัดระยอง ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้นกรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน  
จำนวน ๗ ราย ได้แก่

|                           |                            |
|---------------------------|----------------------------|
| ๑) นายธนวิษ คงปลีก        | ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๖๓ |
| ๒) นายธนาธิป อธิวุฒตา     | ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๖๔ |
| ๓) นายเฉลิมชัย บุญชูบ     | ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๖๕ |
| ๔) นางสาวจิตรา งามเสงี่ยม | ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๖๖ |
| ๕) นางสาวลลิตา คำสมัย     | ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๖๗ |
| ๖) นางสาวปัทมา ชูตินันท์  | ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๖๘ |
| ๗) นายปฏิญญา ปานทองทา     | ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๖๙ |

อนึ่ง หนังสือฉบับนี้จะส่งอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
ในวันที่ ๒๘ มิถุนายน ๒๕๖๕

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายศิระ จันทร์เจ็ด)

นักวิทยาศาสตร์เชี่ยวชาญ วิชาการการแทน  
ผู้อำนวยการวิจัยและเตือนภัยมลพิษโรงงาน  
ปฏิบัติการแทนอธิบดีกรมโรงงานอุตสาหกรรมกองวิจัยและเตือนภัยมลพิษโรงงาน  
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก  
โทร. ๐ ๓๓๑๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒  
ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th

"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"

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บริษัท เอแอลเอส แลборาทอรี กรุ๊ป (ประเทศไทย) จำกัด

104 ซอยพัฒนาการ 40 ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร 10250

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