

## ภาคผนวก ค

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ใบรับรองผลการตรวจวิเคราะห์

# ภาคผนวก ค-1

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คุณภาพอากาศในบรรยากาศ





## Analysis / Test Report



TESTING  
No.0009

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2493819  
Date Received : Dec 24, 2024  
Date Reported : Jan 02, 2025  
Report Number: 3083090-1

Page 1 of 1

Sample Description Air Quality  
Location สวนอุตสาหกรรมโรจนะ ระยะที่ 1-4 (GPS 47P 676951, 1583181)  
Date Analysis Commenced Dec 25, 2024  
Condition of Sample Drawn into one glass filter paper (8x10 Inch) placed in plastic bag, one quartz filter paper (8x10 Inch) placed in plastic bag

Sample Number	Sampled Date	Total Suspended Particulate (mg/m3)	Particulate Matter (PM-10) (mg/m3)	Barometric Pressure (mm Hg) *	Atmospheric Temperature (°C) *
2493819-22	Dec 16 - Dec 17, 2024	0.080	0.046	760*	32*
2493819-23	Dec 17 - Dec 18, 2024	0.093	0.056	760*	32*
2493819-24	Dec 18 - Dec 19, 2024	0.103	0.048	760*	33*
2493819-25	Dec 19 - Dec 20, 2024	0.094	0.056	760*	33*
2493819-26	Dec 20 - Dec 21, 2024	0.108	0.069	760*	33*
2493819-27	Dec 21 - Dec 22, 2024	0.092	0.052	760*	33*
2493819-28	Dec 22 - Dec 23, 2024	0.095	0.054	760*	32*
Guideline		0.33	0.12	-	-

### Reference Method

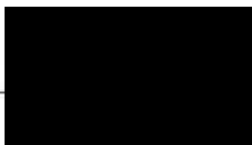
Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B  
Particulate Matter (PM-10) : US EPA 40 CFR Part 50 Appendix J

Guideline : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004  
Sampled By : Thanong Wiriyasahakij

### Remark :

- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.
- Result (s) and Analyte (s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.

Approved by



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.

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## Analysis / Test Report



TESTING  
No.0009

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2493819  
Date Received : Dec 24, 2024  
Date Reported : Jan 02, 2025  
Report Number: 3206399-1

Page 1 of 1

Sample Description Air Quality  
Location วัดหนองสำน (GPS 47P 683755, 1584181)  
Date Analysis Commenced Dec 25, 2024  
Condition of Sample Drawn into one glass filter paper (8x10 Inch) placed in plastic bag, one quartz filter paper (8x10 Inch) placed in plastic bag

Sample Number	Sampled Date	Total Suspended Particulate (mg/m3)	Particulate Matter (PM-10) (mg/m3)	Barometric Pressure (mm Hg) *	Atmospheric Temperature (°C) *
2493819-1	Dec 16 - Dec 17, 2024	0.077	0.040	760*	29*
2493819-2	Dec 17 - Dec 18, 2024	0.092	0.053	760*	30*
2493819-3	Dec 18 - Dec 19, 2024	0.080	0.045	760*	30*
2493819-4	Dec 19 - Dec 20, 2024	0.088	0.049	760*	30*
2493819-5	Dec 20 - Dec 21, 2024	0.103	0.060	760*	29*
2493819-6	Dec 21 - Dec 22, 2024	0.087	0.043	760*	30*
2493819-7	Dec 22 - Dec 23, 2024	0.085	0.044	760*	29*
Guideline		0.33	0.12	-	-

### Reference Method

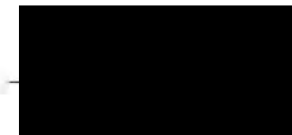
Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B  
Particulate Matter (PM-10) : US EPA 40 CFR Part 50 Appendix J

Guideline : Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004  
Sampled By : Thanong Wiriyasahakij

### Remark :

- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.
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## Analysis / Test Report



TESTING  
No.0009

**Client :** Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT

**Lot ID: 2493819**  
Date Received : Dec 24, 2024  
Date Reported : Jan 02, 2025  
Report Number: 3206403-1

Page 1 of 1

<b>Sample Description</b>		Air Quality			
<b>Location</b>		โรงเรียนวัดหนองนา (GPS 47P 684438, 1587210)			
<b>Date Analysis Commenced</b>		Dec 25, 2024			
<b>Condition of Sample</b>		Drawn into one glass filter paper (8x10 inch) placed in plastic bag, one quartz filter paper (8x10 inch) placed in plastic bag			
Sample Number	Sampled Date	Total Suspended Particulate (mg/m3)	Particulate Matter (PM-10) (mg/m3)	Barometric Pressure (mm Hg) *	Atmospheric Temperature (°C) *
2493819-8	Dec 16 - Dec 17, 2024	0.155	0.059	760*	32*
2493819-9	Dec 17 - Dec 18, 2024	0.089	0.052	760*	32*
2493819-10	Dec 18 - Dec 19, 2024	0.096	0.046	760*	32*
2493819-11	Dec 19 - Dec 20, 2024	0.092	0.048	760*	32*
2493819-12	Dec 20 - Dec 21, 2024	0.091	0.055	760*	32*
2493819-13	Dec 21 - Dec 22, 2024	0.083	0.044	760*	32*
2493819-14	Dec 22 - Dec 23, 2024	0.098	0.052	760*	32*
<b>Guideline</b>		0.33	0.12	-	-

### Reference Method

Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B  
Particulate Matter (PM-10) : US EPA 40 CFR Part 50 Appendix J

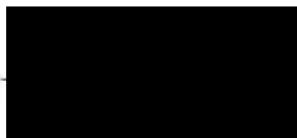
**Guideline :** Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

**Sampled By :** Thanong Wiriyasahakij

### Remark :

- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.
- Result (s) and Analyte (s) marked \* Is/are not included In scope of Accreditation ISO/IEC 17025.

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## Analysis / Test Report



TESTING  
No.0009

**Client :** Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT

**Lot ID: 2493819**  
Date Received : Dec 24, 2024  
Date Reported : Jan 02, 2025  
Report Number: 3206404-1

Page 1 of 1

<b>Sample Description</b>		Air Quality			
<b>Location</b>		โรงเรียนวัดดอนพุดนา (GPS 47P 687981, 1587129)			
<b>Date Analysis Commenced</b>		Dec 25, 2024			
<b>Condition of Sample</b>		Drawn into one glass filter paper (8x10 inch) placed in plastic bag, one quartz filter paper (8x10 inch) placed in plastic bag			
Sample Number	Sampled Date	Total Suspended Particulate (mg/m3)	Particulate Matter (PM-10) (mg/m3)	Barometric Pressure (mm Hg) *	Atmospheric Temperature (°C) *
2493819-15	Dec 16 - Dec 17, 2024	0.092	0.056	760*	30*
2493819-16	Dec 17 - Dec 18, 2024	0.080	0.049	760*	30*
2493819-17	Dec 18 - Dec 19, 2024	0.086	0.053	760*	31*
2493819-18	Dec 19 - Dec 20, 2024	0.068	0.054	760*	31*
2493819-19	Dec 20 - Dec 21, 2024	0.096	0.069	760*	31*
2493819-20	Dec 21 - Dec 22, 2024	0.079	0.051	760*	31*
2493819-21	Dec 22 - Dec 23, 2024	0.084	0.049	760*	30*
<b>Guideline</b>		0.33	0.12	-	-

### Reference Method

Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B  
Particulate Matter (PM-10) : US EPA 40 CFR Part 50 Appendix J

**Guideline :** Notification of the National Environmental Board. No.24, 2004 (B.E.2547) dated September 22, 2004

**Sampled By :** Thanong Wiriyasahakij

### Remark :

- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.
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## Analysis / Test Report

**Client :** Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyuthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT

**Lot ID: 2493815**  
**Date Received :** Dec 24, 2024  
**Date Reported :** Dec 30, 2024  
**Report Number:** 3083084-1

Page 1 of 1

**Sample Description** Air Quality  
**Location** วัดหนองน้ำส้ม (GPS 47P 683755, 1584181)  
**Parameter** Sulfur Dioxide (ppm)  
**Measurement Date** Dec 16, 2024 - Dec 23, 2024  
**Measurement by** Thanong Wiriyasahakij

Time	2493815-1	2493815-2	2493815-3	2493815-4	2493815-5	2493815-6	2493815-7
	Dec 16, 2024	Dec 17, 2024	Dec 18, 2024	Dec 19, 2024	Dec 20, 2024	Dec 21, 2024	Dec 22, 2024
08:00 AM - 09:00 AM	0.0027	0.0050	0.0042	0.0041	0.0032	0.0064	0.0030
09:00 AM - 10:00 AM	0.0026	0.0033	0.0034	0.0025	0.0032	0.0054	0.0025
10:00 AM - 11:00 AM	0.0022	0.0064	0.0046	0.0020	0.0029	0.0041	0.0028
11:00 AM - 12:00 PM	0.0022	0.0049	0.0045	0.0034	0.0023	0.0032	0.0029
12:00 PM - 01:00 PM	0.0022	0.0036	0.0042	0.0036	0.0027	0.0035	0.0027
01:00 PM - 02:00 PM	0.0018	0.0027	0.0031	0.0037	0.0032	0.0033	0.0030
02:00 PM - 03:00 PM	0.0035	0.0027	0.0026	0.0033	0.0030	0.0027	0.0029
03:00 PM - 04:00 PM	0.0033	0.0024	0.0025	0.0039	0.0027	0.0027	0.0034
04:00 PM - 05:00 PM	0.0036	0.0023	0.0026	0.0038	0.0022	0.0025	0.0034
05:00 PM - 06:00 PM	0.0037	0.0022	0.0030	0.0028	0.0020	0.0019	0.0033
06:00 PM - 07:00 PM	0.0032	0.0017	0.0037	0.0027	0.0022	0.0023	0.0020
07:00 PM - 08:00 PM	0.0017	0.0019	0.0032	0.0021	0.0022	0.0025	0.0018
08:00 PM - 09:00 PM	0.0018	0.0022	0.0025	0.0020	0.0021	0.0024	0.0018
09:00 PM - 10:00 PM	0.0017	0.0022	0.0027	0.0020	0.0021	0.0023	0.0019
10:00 PM - 11:00 PM	0.0014	0.0033	0.0025	0.0025	0.0020	0.0026	0.0034
11:00 PM - 12:00 AM	0.0015	0.0026	0.0028	0.0025	0.0020	0.0021	0.0021
12:00 AM - 01:00 AM	0.0015	0.0024	0.0058	0.0028	0.0022	0.0018	0.0022
01:00 AM - 02:00 AM	0.0021	0.0024	0.0058	0.0029	0.0028	0.0024	0.0023
02:00 AM - 03:00 AM	0.0019	0.0026	0.0059	0.0027	0.0023	0.0041	0.0029
03:00 AM - 04:00 AM	0.0018	0.0025	0.0054	0.0027	0.0020	0.0039	0.0034
04:00 AM - 05:00 AM	0.0019	0.0025	0.0054	0.0028	0.0018	0.0031	0.0031
05:00 AM - 06:00 AM	0.0019	0.0027	0.0050	0.0028	0.0018	0.0024	0.0032
06:00 AM - 07:00 AM	0.0021	0.0026	0.0047	0.0033	0.0019	0.0026	0.0036
07:00 AM - 08:00 AM	0.0059	0.0039	0.0039	0.0032	0.0049	0.0027	0.0037
Average	0.0024	0.0030	0.0039	0.0029	0.0025	0.0030	0.0028
1hr - Maximum	0.0059	0.0064	0.0059	0.0041	0.0049	0.0064	0.0037
Standard 1hr - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Standard 24 hrs - Average	0.12	0.12	0.12	0.12	0.12	0.12	0.12

**Standard :** Notification of the National Environment Board No.10, 1995 (B.E.2538), No. 21, 2001 (B.E.2544) and No.24, 2004 (B.E.2547).  
**Reference Method :** US EPA Method Part 53 and 58

Approved by

Scientist (3)

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## Analysis / Test Report

**Client :** Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyuthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT

**Lot ID: 2493815**  
**Date Received :** Dec 24, 2024  
**Date Reported :** Dec 30, 2024  
**Report Number:** 3205737-1

Page 1 of 1

**Sample Description** Air Quality  
**Location** โรงเรียนวัดบางพิ (GPS 47P 684438, 1587210)  
**Parameter** Sulfur Dioxide (ppm)  
**Measurement Date** Dec 16, 2024 - Dec 23, 2024  
**Measurement by** Thanong Wiriyasahakij

Time	2493815-8	2493815-9	2493815-10	2493815-11	2493815-12	2493815-13	2493815-14
	Dec 16, 2024	Dec 17, 2024	Dec 18, 2024	Dec 19, 2024	Dec 20, 2024	Dec 21, 2024	Dec 22, 2024
10:00 AM - 11:00 AM	0.0029	0.0035	0.0036	0.0033	0.0035	0.0035	0.0038
11:00 AM - 12:00 PM	0.0030	0.0033	0.0035	0.0034	0.0036	0.0036	0.0037
12:00 PM - 01:00 PM	0.0029	0.0034	0.0037	0.0036	0.0037	0.0037	0.0036
01:00 PM - 02:00 PM	0.0030	0.0035	0.0035	0.0037	0.0037	0.0038	0.0037
02:00 PM - 03:00 PM	0.0030	0.0035	0.0036	0.0036	0.0036	0.0036	0.0037
03:00 PM - 04:00 PM	0.0029	0.0035	0.0037	0.0036	0.0036	0.0036	0.0038
04:00 PM - 05:00 PM	0.0032	0.0038	0.0038	0.0038	0.0039	0.0038	0.0039
05:00 PM - 06:00 PM	0.0033	0.0038	0.0040	0.0040	0.0040	0.0041	0.0040
06:00 PM - 07:00 PM	0.0033	0.0038	0.0039	0.0040	0.0040	0.0041	0.0040
07:00 PM - 08:00 PM	0.0033	0.0038	0.0039	0.0039	0.0039	0.0040	0.0037
08:00 PM - 09:00 PM	0.0033	0.0037	0.0039	0.0038	0.0039	0.0039	0.0037
09:00 PM - 10:00 PM	0.0032	0.0036	0.0038	0.0038	0.0038	0.0038	0.0037
10:00 PM - 11:00 PM	0.0033	0.0036	0.0038	0.0038	0.0038	0.0037	0.0038
11:00 PM - 12:00 AM	0.0035	0.0037	0.0037	0.0038	0.0039	0.0038	0.0037
12:00 AM - 01:00 AM	0.0033	0.0037	0.0037	0.0038	0.0039	0.0039	0.0038
01:00 AM - 02:00 AM	0.0034	0.0037	0.0036	0.0038	0.0039	0.0039	0.0038
02:00 AM - 03:00 AM	0.0035	0.0037	0.0038	0.0039	0.0039	0.0040	0.0040
03:00 AM - 04:00 AM	0.0037	0.0037	0.0037	0.0039	0.0039	0.0039	0.0041
04:00 AM - 05:00 AM	0.0036	0.0036	0.0037	0.0039	0.0039	0.0038	0.0040
05:00 AM - 06:00 AM	0.0035	0.0037	0.0036	0.0039	0.0038	0.0039	0.0040
06:00 AM - 07:00 AM	0.0035	0.0037	0.0037	0.0039	0.0038	0.0040	0.0039
07:00 AM - 08:00 AM	0.0034	0.0036	0.0036	0.0038	0.0039	0.0039	0.0040
08:00 AM - 09:00 AM	0.0035	0.0035	0.0037	0.0038	0.0038	0.0038	0.0039
09:00 AM - 10:00 AM	0.0033	0.0036	0.0035	0.0036	0.0038	0.0038	0.0040
Average	0.0033	0.0036	0.0037	0.0038	0.0038	0.0038	0.0038
1hr - Maximum	0.0037	0.0038	0.0040	0.0040	0.0040	0.0041	0.0041
Standard 1hr - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Standard 24 hrs - Average	0.12	0.12	0.12	0.12	0.12	0.12	0.12

**Standard :** Notification of the National Environment Board No.10, 1995 (B.E.2538), No. 21, 2001 (B.E.2544) and No.24, 2004 (B.E.2547).  
**Reference Method :** US EPA Method Part 53 and 58

Approved by

Scientist (3)

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## Analysis / Test Report

**Client :** Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT

**Lot ID: 2493815**  
**Date Received :** Dec 24, 2024  
**Date Reported :** Dec 30, 2024  
**Report Number:** 3205738-1

Page 1 of 1

Sample Description	Air Quality						
Location	โรงเรียนวัดดอนหุดง (GPS 47P 687981, 1587129)						
Parameter	Sulfur Dioxide (ppm)						
Measurement Date	Dec 16, 2024 - Dec 23, 2024						
Measurement by	Thanong Wiriyasahakij						
Time	2493815-15 Dec 16, 2024	2493815-16 Dec 17, 2024	2493815-17 Dec 18, 2024	2493815-18 Dec 19, 2024	2493815-19 Dec 20, 2024	2493815-20 Dec 21, 2024	2493815-21 Dec 22, 2024
09:00 AM - 10:00 AM	0.0029	0.0028	0.0029	0.0020	0.0024	0.0024	0.0024
10:00 AM - 11:00 AM	0.0026	0.0030	0.0028	0.0022	0.0022	0.0026	0.0025
11:00 AM - 12:00 PM	0.0025	0.0027	0.0029	0.0021	0.0022	0.0026	0.0024
12:00 PM - 01:00 PM	0.0024	0.0028	0.0028	0.0021	0.0020	0.0026	0.0025
01:00 PM - 02:00 PM	0.0024	0.0026	0.0028	0.0020	0.0022	0.0025	0.0024
02:00 PM - 03:00 PM	0.0023	0.0025	0.0027	0.0023	0.0022	0.0026	0.0026
03:00 PM - 04:00 PM	0.0022	0.0025	0.0028	0.0023	0.0021	0.0025	0.0026
04:00 PM - 05:00 PM	0.0021	0.0025	0.0027	0.0020	0.0021	0.0025	0.0025
05:00 PM - 06:00 PM	0.0023	0.0025	0.0027	0.0019	0.0020	0.0022	0.0025
06:00 PM - 07:00 PM	0.0023	0.0025	0.0027	0.0020	0.0021	0.0025	0.0027
07:00 PM - 08:00 PM	0.0021	0.0025	0.0029	0.0020	0.0022	0.0024	0.0024
08:00 PM - 09:00 PM	0.0022	0.0026	0.0028	0.0022	0.0022	0.0022	0.0024
09:00 PM - 10:00 PM	0.0023	0.0026	0.0029	0.0023	0.0021	0.0023	0.0027
10:00 PM - 11:00 PM	0.0022	0.0027	0.0028	0.0024	0.0021	0.0023	0.0027
11:00 PM - 12:00 AM	0.0022	0.0027	0.0028	0.0023	0.0021	0.0024	0.0027
12:00 AM - 01:00 AM	0.0025	0.0024	0.0028	0.0022	0.0022	0.0024	0.0027
01:00 AM - 02:00 AM	0.0031	0.0026	0.0029	0.0023	0.0021	0.0025	0.0028
02:00 AM - 03:00 AM	0.0029	0.0025	0.0028	0.0022	0.0020	0.0024	0.0029
03:00 AM - 04:00 AM	0.0028	0.0024	0.0028	0.0023	0.0020	0.0023	0.0029
04:00 AM - 05:00 AM	0.0029	0.0025	0.0022	0.0023	0.0021	0.0024	0.0030
05:00 AM - 06:00 AM	0.0034	0.0025	0.0022	0.0023	0.0021	0.0022	0.0030
06:00 AM - 07:00 AM	0.0033	0.0026	0.0022	0.0024	0.0020	0.0022	0.0031
07:00 AM - 08:00 AM	0.0032	0.0026	0.0022	0.0024	0.0023	0.0023	0.0032
08:00 AM - 09:00 AM	0.0029	0.0028	0.0022	0.0024	0.0024	0.0025	0.0033
Average	0.0026	0.0026	0.0027	0.0022	0.0021	0.0024	0.0027
1hr - Maximum	0.0034	0.0030	0.0029	0.0024	0.0024	0.0026	0.0033
Standard 1hr - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Standard 24 hrs - Average	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Standard	: Notification of the National Environment Board No.10, 1995 (B.E.2538), No. 21, 2001 (B.E.2544) and No.24, 2004 (B.E.2547).						
Reference Method	: US EPA Method Part 53 and 58						

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.

Approved by

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11730-21/ EMAIL

S:\Report\Air SOxNOx.rpt (10:54AM)



## Analysis / Test Report

**Client :** Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT

**Lot ID: 2493815**  
**Date Received :** Dec 24, 2024  
**Date Reported :** Dec 30, 2024  
**Report Number:** 3205740-1

Page 1 of 1

Sample Description	Air Quality						
Location	สวนอุตสาหกรรมโรจนะ ระยะที่ 1-4 (GPS 47P 676951, 1583181)						
Parameter	Sulfur Dioxide (ppm)						
Measurement Date	Dec 16, 2024 - Dec 23, 2024						
Measurement by	Thanong Wiriyasahakij						
Time	2493815-22 Dec 16, 2024	2493815-23 Dec 17, 2024	2493815-24 Dec 18, 2024	2493815-25 Dec 19, 2024	2493815-26 Dec 20, 2024	2493815-27 Dec 21, 2024	2493815-28 Dec 22, 2024
11:00 AM - 12:00 PM	0.0029	0.0028	0.0026	0.0028	0.0027	0.0025	0.0026
12:00 PM - 01:00 PM	0.0028	0.0025	0.0027	0.0026	0.0027	0.0027	0.0025
01:00 PM - 02:00 PM	0.0029	0.0025	0.0027	0.0026	0.0023	0.0023	0.0026
02:00 PM - 03:00 PM	0.0031	0.0028	0.0020	0.0026	0.0022	0.0026	0.0025
03:00 PM - 04:00 PM	0.0030	0.0028	0.0020	0.0026	0.0026	0.0026	0.0025
04:00 PM - 05:00 PM	0.0030	0.0028	0.0029	0.0026	0.0026	0.0026	0.0024
05:00 PM - 06:00 PM	0.0028	0.0026	0.0028	0.0027	0.0027	0.0028	0.0025
06:00 PM - 07:00 PM	0.0032	0.0025	0.0026	0.0028	0.0027	0.0027	0.0024
07:00 PM - 08:00 PM	0.0031	0.0027	0.0024	0.0027	0.0027	0.0026	0.0024
08:00 PM - 09:00 PM	0.0028	0.0028	0.0026	0.0025	0.0028	0.0026	0.0024
09:00 PM - 10:00 PM	0.0028	0.0025	0.0027	0.0026	0.0031	0.0026	0.0024
10:00 PM - 11:00 PM	0.0027	0.0030	0.0025	0.0023	0.0028	0.0025	0.0025
11:00 PM - 12:00 AM	0.0029	0.0028	0.0027	0.0026	0.0028	0.0026	0.0025
12:00 AM - 01:00 AM	0.0026	0.0029	0.0027	0.0027	0.0027	0.0026	0.0026
01:00 AM - 02:00 AM	0.0031	0.0030	0.0028	0.0027	0.0028	0.0026	0.0026
02:00 AM - 03:00 AM	0.0027	0.0030	0.0026	0.0026	0.0029	0.0026	0.0026
03:00 AM - 04:00 AM	0.0028	0.0028	0.0025	0.0026	0.0028	0.0026	0.0025
04:00 AM - 05:00 AM	0.0029	0.0029	0.0025	0.0028	0.0027	0.0024	0.0024
05:00 AM - 06:00 AM	0.0029	0.0030	0.0027	0.0027	0.0029	0.0024	0.0024
06:00 AM - 07:00 AM	0.0029	0.0028	0.0027	0.0026	0.0028	0.0026	0.0026
07:00 AM - 08:00 AM	0.0029	0.0029	0.0025	0.0026	0.0027	0.0026	0.0017
08:00 AM - 09:00 AM	0.0030	0.0028	0.0026	0.0026	0.0027	0.0025	0.0020
09:00 AM - 10:00 AM	0.0027	0.0028	0.0023	0.0025	0.0026	0.0025	0.0025
10:00 AM - 11:00 AM	0.0027	0.0027	0.0026	0.0025	0.0025	0.0025	0.0026
Average	0.0029	0.0028	0.0026	0.0026	0.0027	0.0026	0.0024
1hr - Maximum	0.0032	0.0030	0.0029	0.0028	0.0031	0.0028	0.0026
Standard 1hr - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Standard 24 hrs - Average	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Standard	: Notification of the National Environment Board No.10, 1995 (B.E.2538), No. 21, 2001 (B.E.2544) and No.24, 2004 (B.E.2547).						
Reference Method	: US EPA Method Part 53 and 58						

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.

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Orawan Rakkyong  
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S:\Report\Air SOxNOx.rpt (10:54AM)



## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhsiansyuthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2493812  
Date Received : Dec 24, 2024  
Date Reported : Dec 30, 2024  
Report Number: 3083080-1

Page 1 of 1

Sample Description Air Quality  
Location วัดหนองน้ำสน (GPS 47P 683755, 1584181)  
Parameter Nitrogen dioxide (ppm)  
Measurement Date Dec 16, 2024 - Dec 23, 2024  
Measurement by Thanong Wiriyasahakij

Time	2493812-1	2493812-2	2493812-3	2493812-4	2493812-5	2493812-6	2493812-7
	Dec 16, 2024	Dec 17, 2024	Dec 18, 2024	Dec 19, 2024	Dec 20, 2024	Dec 21, 2024	Dec 22, 2024
08:00 AM - 09:00 AM	0.0107	0.0130	0.0128	0.0091	0.0110	0.0284	0.0171
09:00 AM - 10:00 AM	0.0105	0.0079	0.0084	0.0058	0.0091	0.0235	0.0194
10:00 AM - 11:00 AM	0.0038	0.0139	0.0130	0.0044	0.0067	0.0180	0.0073
11:00 AM - 12:00 PM	0.0121	0.0151	0.0107	0.0071	0.0076	0.0123	0.0067
12:00 PM - 01:00 PM	0.0088	0.0128	0.0088	0.0075	0.0080	0.0088	0.0057
01:00 PM - 02:00 PM	0.0071	0.0087	0.0062	0.0079	0.0079	0.0081	0.0061
02:00 PM - 03:00 PM	0.0063	0.0091	0.0049	0.0074	0.0071	0.0067	0.0061
03:00 PM - 04:00 PM	0.0066	0.0091	0.0046	0.0100	0.0091	0.0093	0.0088
04:00 PM - 05:00 PM	0.0072	0.0292	0.0056	0.0117	0.0088	0.0081	0.0108
05:00 PM - 06:00 PM	0.0094	0.0132	0.0099	0.0143	0.0108	0.0094	0.0077
06:00 PM - 07:00 PM	0.0117	0.0172	0.0124	0.0146	0.0122	0.0207	0.0050
07:00 PM - 08:00 PM	0.0143	0.0139	0.0136	0.0287	0.0148	0.0150	0.0068
08:00 PM - 09:00 PM	0.0089	0.0136	0.0129	0.0162	0.0177	0.0144	0.0082
09:00 PM - 10:00 PM	0.0104	0.0135	0.0161	0.0142	0.0182	0.0158	0.0177
10:00 PM - 11:00 PM	0.0121	0.0167	0.0159	0.0151	0.0167	0.0069	0.0154
11:00 PM - 12:00 AM	0.0131	0.0143	0.0134	0.0096	0.0176	0.0089	0.0086
12:00 AM - 01:00 AM	0.0062	0.0129	0.0178	0.0087	0.0172	0.0067	0.0083
01:00 AM - 02:00 AM	0.0070	0.0114	0.0203	0.0094	0.0207	0.0062	0.0115
02:00 AM - 03:00 AM	0.0061	0.0115	0.0197	0.0096	0.0225	0.0059	0.0147
03:00 AM - 04:00 AM	0.0053	0.0107	0.0184	0.0107	0.0187	0.0194	0.0157
04:00 AM - 05:00 AM	0.0060	0.0109	0.0192	0.0087	0.0158	0.0142	0.0156
05:00 AM - 06:00 AM	0.0136	0.0123	0.0125	0.0081	0.0147	0.0144	0.0151
06:00 AM - 07:00 AM	0.0151	0.0115	0.0115	0.0105	0.0194	0.0131	0.0144
07:00 AM - 08:00 AM	0.0162	0.0153	0.0086	0.0123	0.0298	0.0131	0.0141
Average	0.0095	0.0132	0.0124	0.0109	0.0143	0.0128	0.0111
1hr - Maximum	0.0162	0.0292	0.0203	0.0287	0.0298	0.0284	0.0194
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

Standard : Notification of the National Environment Board No. 33, 2009 (B.E. 2552).  
Reference Method : US EPA Method Part 50 App. F (Chemiluminescence)

Approved by



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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhsiansyuthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2493812  
Date Received : Dec 24, 2024  
Date Reported : Dec 30, 2024  
Report Number: 3205741-1

Page 1 of 1

Sample Description Air Quality  
Location โรงเจินหมากง (GPS 47P 684438, 1587210)  
Parameter Nitrogen dioxide (ppm)  
Measurement Date Dec 16, 2024 - Dec 23, 2024  
Measurement by Thanong Wiriyasahakij

Time	2493812-8	2493812-9	2493812-10	2493812-11	2493812-12	2493812-13	2493812-14
	Dec 16, 2024	Dec 17, 2024	Dec 18, 2024	Dec 19, 2024	Dec 20, 2024	Dec 21, 2024	Dec 22, 2024
10:00 AM - 11:00 AM	0.0092	0.0138	0.0166	0.0100	0.0107	0.0176	0.0128
11:00 AM - 12:00 PM	0.0098	0.0120	0.0145	0.0121	0.0113	0.0144	0.0113
12:00 PM - 01:00 PM	0.0078	0.0090	0.0131	0.0130	0.0108	0.0150	0.0121
01:00 PM - 02:00 PM	0.0069	0.0074	0.0107	0.0120	0.0117	0.0139	0.0126
02:00 PM - 03:00 PM	0.0063	0.0067	0.0092	0.0110	0.0111	0.0111	0.0131
03:00 PM - 04:00 PM	0.0062	0.0068	0.0091	0.0115	0.0116	0.0108	0.0144
04:00 PM - 05:00 PM	0.0067	0.0080	0.0211	0.0120	0.0099	0.0121	0.0141
05:00 PM - 06:00 PM	0.0082	0.0084	0.0164	0.0131	0.0111	0.0135	0.0145
06:00 PM - 07:00 PM	0.0084	0.0102	0.0132	0.0180	0.0123	0.0156	0.0130
07:00 PM - 08:00 PM	0.0096	0.0113	0.0162	0.0155	0.0152	0.0162	0.0119
08:00 PM - 09:00 PM	0.0099	0.0121	0.0191	0.0149	0.0160	0.0147	0.0124
09:00 PM - 10:00 PM	0.0153	0.0127	0.0180	0.0147	0.0161	0.0163	0.0133
10:00 PM - 11:00 PM	0.0095	0.0132	0.0164	0.0123	0.0179	0.0191	0.0186
11:00 PM - 12:00 AM	0.0089	0.0139	0.0128	0.0113	0.0198	0.0175	0.0139
12:00 AM - 01:00 AM	0.0112	0.0137	0.0162	0.0125	0.0191	0.0149	0.0136
01:00 AM - 02:00 AM	0.0122	0.0128	0.0168	0.0127	0.0199	0.0154	0.0128
02:00 AM - 03:00 AM	0.0099	0.0130	0.0171	0.0112	0.0206	0.0169	0.0148
03:00 AM - 04:00 AM	0.0117	0.0117	0.0172	0.0113	0.0187	0.0155	0.0165
04:00 AM - 05:00 AM	0.0123	0.0114	0.0168	0.0105	0.0159	0.0146	0.0169
05:00 AM - 06:00 AM	0.0125	0.0109	0.0141	0.0107	0.0142	0.0139	0.0152
06:00 AM - 07:00 AM	0.0128	0.0101	0.0144	0.0121	0.0168	0.0142	0.0160
07:00 AM - 08:00 AM	0.0136	0.0132	0.0135	0.0124	0.0210	0.0131	0.0165
08:00 AM - 09:00 AM	0.0124	0.0133	0.0136	0.0124	0.0240	0.0120	0.0165
09:00 AM - 10:00 AM	0.0091	0.0131	0.0109	0.0119	0.0213	0.0113	0.0158
Average	0.0100	0.0112	0.0149	0.0125	0.0157	0.0146	0.0143
1hr - Maximum	0.0153	0.0139	0.0211	0.0180	0.0240	0.0191	0.0186
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

Standard : Notification of the National Environment Board No. 33, 2009 (B.E. 2552).  
Reference Method : US EPA Method Part 50 App. F (Chemiluminescence)

Approved by



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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhsaiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493812

Date Received : Dec 24, 2024

Date Reported : Dec 30, 2024

Report Number: 3205742-1

Page 1 of 1

Sample Description Air Quality

Location โรงเรียนวัดดอนพุดา (GPS 47P 687981, 1587129)

Parameter Nitrogen dioxide (ppm)

Measurement Date Dec 16, 2024 - Dec 23, 2024

Measurement by Thanong Wiriyasahakij

Time	2493812-15 Dec 16, 2024	2493812-16 Dec 17, 2024	2493812-17 Dec 18, 2024	2493812-18 Dec 19, 2024	2493812-19 Dec 20, 2024	2493812-20 Dec 21, 2024	2493812-21 Dec 22, 2024
09:00 AM - 10:00 AM	0.0105	0.0071	0.0068	0.0098	0.0064	0.0195	0.0044
10:00 AM - 11:00 AM	0.0061	0.0081	0.0088	0.0124	0.0033	0.0224	0.0041
11:00 AM - 12:00 PM	0.0110	0.0104	0.0077	0.0164	0.0026	0.0219	0.0042
12:00 PM - 01:00 PM	0.0097	0.0085	0.0067	0.0181	0.0027	0.0145	0.0051
01:00 PM - 02:00 PM	0.0078	0.0133	0.0065	0.0134	0.0054	0.0155	0.0044
02:00 PM - 03:00 PM	0.0057	0.0105	0.0053	0.0161	0.0051	0.0108	0.0038
03:00 PM - 04:00 PM	0.0050	0.0109	0.0034	0.0102	0.0055	0.0162	0.0057
04:00 PM - 05:00 PM	0.0070	0.0128	0.0036	0.0088	0.0045	0.0229	0.0063
05:00 PM - 06:00 PM	0.0156	0.0169	0.0051	0.0069	0.0044	0.0195	0.0055
06:00 PM - 07:00 PM	0.0237	0.0185	0.0072	0.0078	0.0102	0.0066	0.0040
07:00 PM - 08:00 PM	0.0090	0.0167	0.0084	0.0095	0.0104	0.0138	0.0045
08:00 PM - 09:00 PM	0.0082	0.0030	0.0079	0.0101	0.0122	0.0118	0.0055
09:00 PM - 10:00 PM	0.0056	0.0024	0.0083	0.0116	0.0114	0.0118	0.0067
10:00 PM - 11:00 PM	0.0042	0.0101	0.0051	0.0091	0.0118	0.0126	0.0102
11:00 PM - 12:00 AM	0.0033	0.0092	0.0035	0.0064	0.0069	0.0107	0.0110
12:00 AM - 01:00 AM	0.0034	0.0093	0.0043	0.0060	0.0084	0.0080	0.0057
01:00 AM - 02:00 AM	0.0044	0.0098	0.0058	0.0066	0.0073	0.0128	0.0061
02:00 AM - 03:00 AM	0.0049	0.0097	0.0057	0.0069	0.0050	0.0102	0.0138
03:00 AM - 04:00 AM	0.0053	0.0081	0.0068	0.0066	0.0039	0.0115	0.0122
04:00 AM - 05:00 AM	0.0067	0.0061	0.0064	0.0066	0.0036	0.0095	0.0089
05:00 AM - 06:00 AM	0.0235	0.0092	0.0102	0.0061	0.0041	0.0064	0.0094
06:00 AM - 07:00 AM	0.0146	0.0077	0.0142	0.0082	0.0066	0.0074	0.0110
07:00 AM - 08:00 AM	0.0134	0.0115	0.0123	0.0092	0.0162	0.0072	0.0109
08:00 AM - 09:00 AM	0.0117	0.0131	0.0129	0.0095	0.0229	0.0061	0.0114
Average	0.0092	0.0101	0.0072	0.0097	0.0075	0.0130	0.0071
1hr - Maximum	0.0237	0.0185	0.0142	0.0181	0.0229	0.0229	0.0122
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

Standard : Notification of the National Environment Board No. 33, 2009 (B.E. 2552).

Reference Method : US EPA Method Part 50 App. F (Chemiluminescence)

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.

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11/30/21/ EML

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhsaiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493812

Date Received : Dec 24, 2024

Date Reported : Dec 30, 2024

Report Number: 3205743-1

Page 1 of 1

Sample Description Air Quality

Location สวนอุตสาหกรรมโรจนะ ระยะที่ 1-4 (GPS 47P 676951, 1583181)

Parameter Nitrogen dioxide (ppm)

Measurement Date Dec 16, 2024 - Dec 23, 2024

Measurement by Thanong Wiriyasahakij

Time	2493812-22 Dec 16, 2024	2493812-23 Dec 17, 2024	2493812-24 Dec 18, 2024	2493812-25 Dec 19, 2024	2493812-26 Dec 20, 2024	2493812-27 Dec 21, 2024	2493812-28 Dec 22, 2024
11:00 AM - 12:00 PM	0.0183	0.0186	0.0214	0.0180	0.0220	0.0263	0.0176
12:00 PM - 01:00 PM	0.0171	0.0145	0.0205	0.0158	0.0216	0.0240	0.0188
01:00 PM - 02:00 PM	0.0136	0.0159	0.0243	0.0160	0.0214	0.0223	0.0178
02:00 PM - 03:00 PM	0.0106	0.0183	0.0280	0.0168	0.0209	0.0240	0.0169
03:00 PM - 04:00 PM	0.0125	0.0236	0.0270	0.0147	0.0251	0.0243	0.0170
04:00 PM - 05:00 PM	0.0131	0.0223	0.0254	0.0159	0.0353	0.0273	0.0204
05:00 PM - 06:00 PM	0.0156	0.0256	0.0297	0.0207	0.0315	0.0340	0.0198
06:00 PM - 07:00 PM	0.0200	0.0273	0.0295	0.0245	0.0312	0.0269	0.0192
07:00 PM - 08:00 PM	0.0237	0.0343	0.0267	0.0246	0.0392	0.0302	0.0193
08:00 PM - 09:00 PM	0.0234	0.0347	0.0264	0.0266	0.0332	0.0258	0.0207
09:00 PM - 10:00 PM	0.0225	0.0243	0.0293	0.0209	0.0158	0.0262	0.0203
10:00 PM - 11:00 PM	0.0186	0.0232	0.0212	0.0161	0.0168	0.0205	0.0179
11:00 PM - 12:00 AM	0.0187	0.0223	0.0163	0.0190	0.0317	0.0185	0.0181
12:00 AM - 01:00 AM	0.0191	0.0212	0.0212	0.0234	0.0274	0.0214	0.0183
01:00 AM - 02:00 AM	0.0177	0.0203	0.0223	0.0214	0.0281	0.0203	0.0175
02:00 AM - 03:00 AM	0.0168	0.0240	0.0222	0.0166	0.0262	0.0187	0.0183
03:00 AM - 04:00 AM	0.0174	0.0242	0.0220	0.0155	0.0238	0.0183	0.0222
04:00 AM - 05:00 AM	0.0176	0.0199	0.0196	0.0152	0.0226	0.0228	0.0222
05:00 AM - 06:00 AM	0.0181	0.0187	0.0185	0.0159	0.0251	0.0219	0.0242
06:00 AM - 07:00 AM	0.0206	0.0202	0.0226	0.0203	0.0275	0.0190	0.0268
07:00 AM - 08:00 AM	0.0254	0.0238	0.0213	0.0249	0.0302	0.0174	0.0211
08:00 AM - 09:00 AM	0.0216	0.0227	0.0219	0.0209	0.0279	0.0160	0.0227
09:00 AM - 10:00 AM	0.0198	0.0233	0.0165	0.0207	0.0263	0.0166	0.0222
10:00 AM - 11:00 AM	0.0216	0.0218	0.0154	0.0199	0.0276	0.0188	0.0188
Average	0.0185	0.0227	0.0229	0.0193	0.0266	0.0226	0.0199
1hr - Maximum	0.0254	0.0347	0.0297	0.0266	0.0392	0.0340	0.0268
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

Standard : Notification of the National Environment Board No. 33, 2009 (B.E. 2552).

Reference Method : US EPA Method Part 50 App. F (Chemiluminescence)

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.

Approved by



Scientist (3)

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11/30/21/ EML

S:\Reports\Air SOxNOx.rpt (10:48AM)



## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyayuthaya Thailand 13210

Lot ID: 2493817  
Date Received :Dec 24, 2024  
Date Reported :Dec 27, 2024  
Report Number :3202586-1

P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Page 1 of 1

Sample Number 2493817-1 to 7  
Parameter Temperature  
Location หนองน้ำส้ม (GPS 47P 0683755, 1584181)  
Sampling Date Dec 16 - Dec 23, 2024  
Sampling by Thanong Wiriyasahakij

Time	Temperature (°C)						
	Dec 16 - Dec 17, 2024	Dec 17 - Dec 18, 2024	Dec 18 - Dec 19, 2024	Dec 19 - Dec 20, 2024	Dec 20 - Dec 21, 2024	Dec 21 - Dec 22, 2024	Dec 22 - Dec 23, 2024
08:00 AM - 09:00 AM	24.1	24.4	25.4	24.8	23.9	23.9	22.7
09:00 AM - 10:00 AM	24.6	25.9	26.7	26.8	25.9	26.5	24.0
10:00 AM - 11:00 AM	25.1	27.9	27.7	28.1	27.3	28.3	25.5
11:00 AM - 12:00 PM	27.1	28.4	28.9	29.2	27.5	28.9	26.2
12:00 PM - 01:00 PM	28.2	29.0	29.7	29.7	28.2	30.0	27.2
01:00 PM - 02:00 PM	29.5	29.9	30.5	30.4	28.9	30.0	27.6
02:00 PM - 03:00 PM	29.7	29.5	30.9	30.0	28.7	29.8	27.5
03:00 PM - 04:00 PM	28.9	29.4	30.6	29.3	28.7	29.7	26.8
04:00 PM - 05:00 PM	27.5	28.4	29.4	28.2	27.8	28.1	26.0
05:00 PM - 06:00 PM	27.1	27.3	27.7	27.0	25.6	26.1	24.4
06:00 PM - 07:00 PM	26.1	26.5	26.0	26.5	23.9	25.0	23.4
07:00 PM - 08:00 PM	25.9	25.9	25.6	25.6	23.4	25.1	22.9
08:00 PM - 09:00 PM	26.0	24.9	25.5	24.8	22.8	23.8	23.2
09:00 PM - 10:00 PM	25.6	23.9	24.8	24.0	22.0	23.3	22.0
10:00 PM - 11:00 PM	24.8	23.9	24.4	23.7	21.8	22.8	22.1
11:00 PM - 12:00 AM	24.3	23.9	24.2	23.3	21.2	21.8	21.4
12:00 AM - 01:00 AM	23.8	22.9	23.5	22.3	21.8	21.5	21.2
01:00 AM - 02:00 AM	23.4	22.7	23.4	21.5	21.0	21.2	20.7
02:00 AM - 03:00 AM	22.8	22.3	23.1	21.1	20.1	21.4	20.1
03:00 AM - 04:00 AM	22.4	22.3	22.4	20.9	19.5	21.1	19.6
04:00 AM - 05:00 AM	21.8	22.4	22.0	20.6	18.9	21.0	19.4
05:00 AM - 06:00 AM	21.5	22.0	21.7	20.4	18.5	20.7	19.5
06:00 AM - 07:00 AM	21.8	22.7	22.3	20.7	19.9	20.3	19.9
07:00 AM - 08:00 AM	22.8	23.7	23.3	22.1	21.5	21.5	21.0
Average - 24 hr	25.2	25.4	25.8	25.0	23.7	24.7	23.1
Max - 1 hr	29.7	29.9	30.9	30.4	28.9	30.0	27.6
Min - 1 hr	21.5	22.0	21.7	20.4	18.5	20.3	19.4

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Approved by

Sarayuth Jitranont  
Assistant General Manager

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyayuthaya Thailand 13210

Lot ID: 2493817  
Date Received :Dec 24, 2024  
Date Reported :Dec 27, 2024  
Report Number :3202587-1

P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Page 1 of 1

Sample Number 2493817-8 to 14  
Parameter Temperature  
Location โรงเรียนวัดบางศรี (GPS 47P 0684438, 1587210)  
Sampling Date Dec 16 - Dec 23, 2024  
Sampling by Thanong Wiriyasahakij

Time	Temperature (°C)						
	Dec 16 - Dec 17, 2024	Dec 17 - Dec 18, 2024	Dec 18 - Dec 19, 2024	Dec 19 - Dec 20, 2024	Dec 20 - Dec 21, 2024	Dec 21 - Dec 22, 2024	Dec 22 - Dec 23, 2024
10:00 AM - 11:00 AM	27.1	29.7	30.9	31.2	30.4	32.6	28.6
11:00 AM - 12:00 PM	31.0	31.1	32.6	32.1	31.4	32.6	30.0
12:00 PM - 01:00 PM	31.1	32.8	33.8	33.1	31.2	33.8	30.4
01:00 PM - 02:00 PM	31.8	33.7	34.0	33.6	30.9	33.3	31.1
02:00 PM - 03:00 PM	31.6	33.8	34.4	33.2	31.5	33.9	30.1
03:00 PM - 04:00 PM	30.5	31.1	32.0	31.0	29.8	31.0	28.2
04:00 PM - 05:00 PM	28.7	28.9	29.5	28.7	28.2	28.6	26.5
05:00 PM - 06:00 PM	26.6	26.2	27.2	26.7	25.7	25.6	24.4
06:00 PM - 07:00 PM	26.1	25.3	26.2	25.0	24.6	24.4	23.2
07:00 PM - 08:00 PM	25.6	24.6	26.0	24.2	23.5	23.9	22.3
08:00 PM - 09:00 PM	25.5	24.3	25.1	23.7	22.2	22.7	22.0
09:00 PM - 10:00 PM	25.3	23.7	24.4	23.2	21.6	22.0	21.6
10:00 PM - 11:00 PM	24.4	23.1	24.0	22.4	21.1	22.0	21.2
11:00 PM - 12:00 AM	23.9	22.4	23.7	22.1	20.6	21.7	20.7
12:00 AM - 01:00 AM	23.3	21.8	23.2	21.4	20.1	21.5	20.6
01:00 AM - 02:00 AM	23.1	21.5	22.8	21.0	19.6	21.4	20.1
02:00 AM - 03:00 AM	22.4	21.7	22.6	20.7	19.3	20.6	19.8
03:00 AM - 04:00 AM	22.0	21.7	22.2	20.4	18.9	20.3	19.6
04:00 AM - 05:00 AM	21.6	21.6	21.8	20.3	18.8	20.5	19.4
05:00 AM - 06:00 AM	21.1	21.5	21.5	20.3	18.7	20.3	19.3
06:00 AM - 07:00 AM	22.1	22.8	22.7	20.9	20.4	20.6	20.0
07:00 AM - 08:00 AM	24.8	25.6	25.6	24.5	24.5	22.8	22.3
08:00 AM - 09:00 AM	27.0	27.7	28.1	26.7	27.8	25.3	24.6
09:00 AM - 10:00 AM	28.4	29.4	29.8	28.1	30.0	27.0	24.9
Average - 24 hr	26.0	26.1	26.8	25.6	24.6	25.4	23.8
Max - 1 hr	31.8	33.8	34.4	33.6	31.5	33.9	31.1
Min - 1 hr	21.1	21.5	21.5	20.3	18.7	20.3	19.3

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Approved by

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonslayutthaya Thailand 13210

Lot ID: 2493817  
Date Received :Dec 24, 2024  
Date Reported :Dec 27, 2024  
Report Number :3202589-1

P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Page 1 of 1

Sample Number 2493817-15 to 21  
Parameter Temperature  
Location โรงเรือนคัดผลไม้ (GPS 47P 0687981, 1587129)  
Sampling Date Dec 16 - Dec 23, 2024  
Sampling by Thanong Wiriyasahakij

Time	Temperature (°C)						
	Dec 16 - Dec 17, 2024	Dec 17 - Dec 18, 2024	Dec 18 - Dec 19, 2024	Dec 19 - Dec 20, 2024	Dec 20 - Dec 21, 2024	Dec 21 - Dec 22, 2024	Dec 22 - Dec 23, 2024
09:00 AM - 10:00 AM	26.2	27.9	29.2	29.8	28.8	28.8	26.4
10:00 AM - 11:00 AM	27.2	29.0	30.5	30.8	30.3	31.4	28.1
11:00 AM - 12:00 PM	30.0	30.8	31.7	32.0	31.1	32.1	29.4
12:00 PM - 01:00 PM	30.6	31.6	32.5	32.5	30.8	32.5	29.5
01:00 PM - 02:00 PM	31.0	32.5	33.1	32.9	30.5	32.3	30.3
02:00 PM - 03:00 PM	30.9	32.7	33.2	32.6	30.8	32.2	29.3
03:00 PM - 04:00 PM	30.4	31.2	32.1	31.1	29.4	30.1	27.9
04:00 PM - 05:00 PM	27.9	27.6	29.3	28.4	27.5	27.7	26.5
05:00 PM - 06:00 PM	26.0	25.6	26.2	26.2	24.8	24.5	24.5
06:00 PM - 07:00 PM	26.1	24.6	25.6	23.2	23.5	23.7	23.1
07:00 PM - 08:00 PM	25.3	24.2	25.7	22.9	22.6	22.3	22.0
08:00 PM - 09:00 PM	24.9	23.1	24.2	22.6	21.2	21.2	21.1
09:00 PM - 10:00 PM	24.9	22.3	23.9	22.9	20.5	20.9	20.4
10:00 PM - 11:00 PM	24.0	22.0	23.4	22.4	19.9	21.5	20.5
11:00 PM - 12:00 AM	23.4	21.6	23.3	22.1	19.2	20.7	20.1
12:00 AM - 01:00 AM	22.8	20.9	22.7	21.2	18.8	20.6	19.9
01:00 AM - 02:00 AM	22.7	21.1	22.3	20.6	19.3	20.7	19.8
02:00 AM - 03:00 AM	21.8	21.0	22.3	20.1	18.4	20.1	19.0
03:00 AM - 04:00 AM	21.4	21.5	22.1	20.1	18.7	19.6	19.0
04:00 AM - 05:00 AM	21.1	21.5	21.7	19.8	18.3	19.8	19.0
05:00 AM - 06:00 AM	20.7	21.2	21.5	19.6	17.7	19.8	19.0
06:00 AM - 07:00 AM	22.4	23.1	23.2	20.9	20.1	20.5	19.5
07:00 AM - 08:00 AM	24.9	25.9	25.3	24.3	23.2	22.7	22.1
08:00 AM - 09:00 AM	27.0	27.7	27.3	26.6	27.5	24.8	25.0
Average - 24 hr	25.6	25.4	26.3	25.2	23.9	24.6	23.4
Max - 1 hr	31.0	32.7	33.2	32.9	31.1	32.5	30.3
Min - 1 hr	20.7	20.9	21.5	19.6	17.7	19.6	19.0

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Assistant General Manager

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonslayutthaya Thailand 13210

Lot ID: 2493817  
Date Received :Dec 24, 2024  
Date Reported :Dec 27, 2024  
Report Number :3083087-1

P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Page 1 of 1

Sample Number 2493817-22 to 28  
Parameter Temperature  
Location สวนอุตสาหกรรมโรจนะ ระยะที่ 1-4 (GPS 47P 0676951, 1583181)  
Sampling Date Dec 16 - Dec 23, 2024  
Sampling by Thanong Wiriyasahakij

Time	Temperature (°C)						
	Dec 16 - Dec 17, 2024	Dec 17 - Dec 18, 2024	Dec 18 - Dec 19, 2024	Dec 19 - Dec 20, 2024	Dec 20 - Dec 21, 2024	Dec 21 - Dec 22, 2024	Dec 22 - Dec 23, 2024
11:00 AM - 12:00 PM	27.5	28.2	28.8	29.0	27.8	29.0	26.1
12:00 PM - 01:00 PM	28.2	29.2	29.8	29.5	28.2	29.7	27.1
01:00 PM - 02:00 PM	29.5	29.7	30.6	30.1	28.6	29.9	27.6
02:00 PM - 03:00 PM	29.4	29.7	30.5	30.4	28.9	29.5	27.7
03:00 PM - 04:00 PM	29.2	29.2	30.4	29.9	28.8	28.9	27.3
04:00 PM - 05:00 PM	28.8	28.7	30.3	29.5	28.3	28.4	26.7
05:00 PM - 06:00 PM	27.6	27.6	28.9	28.1	27.1	27.5	25.5
06:00 PM - 07:00 PM	27.1	27.0	27.5	26.8	26.2	26.2	24.3
07:00 PM - 08:00 PM	26.5	26.2	27.3	26.4	24.8	25.0	23.8
08:00 PM - 09:00 PM	26.0	25.9	26.0	25.4	23.5	24.8	23.2
09:00 PM - 10:00 PM	25.7	24.8	26.1	24.3	22.7	23.9	22.4
10:00 PM - 11:00 PM	25.4	24.3	25.3	24.3	22.2	23.4	22.1
11:00 PM - 12:00 AM	24.6	24.0	25.1	24.0	21.7	22.8	21.6
12:00 AM - 01:00 AM	24.3	23.3	24.5	23.1	22.7	22.2	20.7
01:00 AM - 02:00 AM	23.9	23.1	23.9	21.8	21.5	22.0	20.6
02:00 AM - 03:00 AM	23.2	23.1	23.3	21.4	21.4	21.8	20.0
03:00 AM - 04:00 AM	22.4	22.6	23.1	21.1	20.6	21.1	19.9
04:00 AM - 05:00 AM	22.0	22.0	22.6	20.9	19.9	21.1	19.8
05:00 AM - 06:00 AM	21.5	21.6	22.2	20.9	19.8	20.7	19.8
06:00 AM - 07:00 AM	21.4	22.3	22.0	20.6	19.0	20.7	19.6
07:00 AM - 08:00 AM	22.7	23.5	23.3	21.7	21.2	21.5	20.6
08:00 AM - 09:00 AM	24.8	25.5	24.9	23.7	23.9	22.8	22.6
09:00 AM - 10:00 AM	26.2	26.8	27.0	25.4	26.2	23.8	23.7
10:00 AM - 11:00 AM	26.5	27.8	28.1	26.7	27.8	25.4	25.0
Average - 24 hr	25.6	25.7	26.3	25.2	24.3	24.7	23.2
Max - 1 hr	29.5	29.7	30.6	30.4	28.9	29.9	27.7
Min - 1 hr	21.4	21.6	22.0	20.6	19.0	20.7	19.6

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Assistant General Manager

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhlonslayuthaya Thailand 13210

Lot ID: 2493823  
Date Received :Dec 24, 2024  
Date Reported :Jan 02, 2025  
Report Number :3083093-1

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Page 1 of 2

Sample Number 2493823-1 to 7  
Parameter Wind Speed / Wind Direction  
Location รังนกนางแอ่น (GPS 47P 0683755, 1584181)  
Sampling Date Dec 16 - Dec 23, 2024  
Sampling by Thanong Wiriyasahakij

Time	Dec 16 - Dec 17, 2024			Dec 17 - Dec 18, 2024			Dec 18 - Dec 19, 2024			Dec 19 - Dec 20, 2024			Dec 20 - Dec 21, 2024			Dec 21 - Dec 22, 2024			Dec 22 - Dec 23, 2024		
	WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)	
08:00 AM - 09:00 AM	3.2	46.0	NE	3.1	17.0	NNE	1.4	30.0	NNE	4.1	59.0	ENE	1.5	305.0	NW	1.3	57.0	ENE	2.6	287.0	VNWW
09:00 AM - 10:00 AM	2.8	62.0	ENE	1.5	30.0	NNE	3.7	44.0	NE	2.9	56.0	NE	2.0	14.0	NNE	1.2	52.0	NE	3.3	45.0	NE
10:00 AM - 11:00 AM	5.1	32.0	NNE	1.7	357.0	N	5.3	36.0	NE	3.5	359.0	N	1.4	351.0	N	0.4	2.0	N	1.4	346.0	NNW
11:00 AM - 12:00 PM	3.8	344.0	NNW	2.9	358.0	N	2.4	38.0	NE	2.3	30.0	NNE	3.0	52.0	NE	2.4	318.0	NW	1.4	91.0	E
12:00 PM - 01:00 PM	6.3	27.0	NNE	2.0	18.0	NNE	3.0	44.0	NE	3.3	52.0	NE	2.6	63.0	ENE	1.4	74.0	ENE	2.6	335.0	NNW
01:00 PM - 02:00 PM	3.3	40.0	NE	1.0	5.0	N	2.1	35.0	NE	3.1	286.0	VNWW	2.1	346.0	NNW	1.4	61.0	ENE	2.1	88.0	E
02:00 PM - 03:00 PM	2.6	14.0	NNE	2.2	47.0	NE	1.1	314.0	NW	1.4	62.0	ENE	1.6	42.0	NE	2.0	306.0	NW	3.9	358.0	N
03:00 PM - 04:00 PM	0.5	26.0	NNE	0.9	306.0	NW	0.9	286.0	VNWW	2.5	0.0	N	2.0	359.0	N	1.6	307.0	NW	3.8	33.0	NNE
04:00 PM - 05:00 PM	1.8	44.0	NE	3.2	309.0	NW	2.9	46.0	NE	2.0	37.0	NE	1.4	29.0	NNE	0.3	243.0	WSW	2.4	42.0	NE
05:00 PM - 06:00 PM	1.4	4.0	N	2.1	291.0	VNWW	1.4	50.0	NE	1.4	61.0	ENE	1.3	75.0	ENE	1.9	318.0	NW	1.8	76.0	ENE
06:00 PM - 07:00 PM	1.2	13.0	NNE	1.6	331.0	NNW	1.2	41.0	NE	0.7	24.0	NNE	0.0	-	-	0.8	41.0	NE	2.0	33.0	NNE
07:00 PM - 08:00 PM	1.5	82.0	E	1.7	354.0	N	1.3	65.0	ENE	0.6	0.0	N	0.1	-	-	0.5	35.0	NE	1.3	54.0	NE
08:00 PM - 09:00 PM	0.4	352.0	N	2.0	354.0	N	0.7	50.0	NE	1.5	359.0	N	0.0	-	-	0.5	50.0	NE	0.6	27.0	NNE
09:00 PM - 10:00 PM	2.5	16.0	NNE	0.2	-	-	1.0	29.0	NNE	2.1	28.0	NNE	0.0	-	-	1.9	350.0	N	0.8	339.0	NNW
10:00 PM - 11:00 PM	1.9	355.0	N	0.7	298.0	VNWW	1.4	72.0	ENE	0.7	317.0	NW	0.0	-	-	1.4	354.0	N	1.8	359.0	N
11:00 PM - 12:00 AM	2.5	58.0	ENE	1.1	359.0	N	2.1	44.0	NE	2.0	359.0	N	0.6	18.0	NNE	1.3	52.0	NE	1.7	32.0	NNE
12:00 AM - 01:00 AM	1.5	63.0	ENE	0.0	-	-	1.9	31.0	NNE	0.7	333.0	NNW	1.5	359.0	N	1.1	58.0	ENE	2.1	359.0	N
01:00 AM - 02:00 AM	3.3	17.0	NNE	0.8	342.0	NNW	0.9	29.0	NNE	1.3	359.0	N	0.8	350.0	N	1.3	357.0	N	1.3	341.0	NNW
02:00 AM - 03:00 AM	1.1	44.0	NE	0.0	-	-	1.5	58.0	ENE	1.6	331.0	NNW	0.5	351.0	N	2.3	70.0	ENE	2.0	26.0	NNE
03:00 AM - 04:00 AM	1.2	52.0	NE	2.6	0.0	N	2.0	60.0	ENE	1.6	330.0	NNW	0.0	-	-	2.4	19.0	NNE	1.2	95.0	E
04:00 AM - 05:00 AM	3.3	359.0	N	2.9	16.0	NNE	1.7	53.0	NE	1.9	5.0	N	1.4	46.0	NE	1.9	34.0	NE	1.5	355.0	N
05:00 AM - 06:00 AM	2.5	355.0	N	2.8	359.0	N	1.7	44.0	NE	1.1	16.0	NNE	0.0	-	-	4.3	0.0	N	1.4	33.0	NNE
06:00 AM - 07:00 AM	3.2	348.0	NNW	2.4	40.0	NE	1.6	24.0	NNE	3.0	341.0	NNW	0.9	11.0	N	2.5	42.0	NE	2.9	5.0	N
07:00 AM - 08:00 AM	4.1	338.0	NNW	4.2	37.0	NE	3.6	76.0	ENE	2.8	11.0	N	1.2	92.0	E	2.6	352.0	N	2.1	340.0	NNW

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Sarayuth Jitranont  
Assistant General Manager

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhlonslayuthaya Thailand 13210

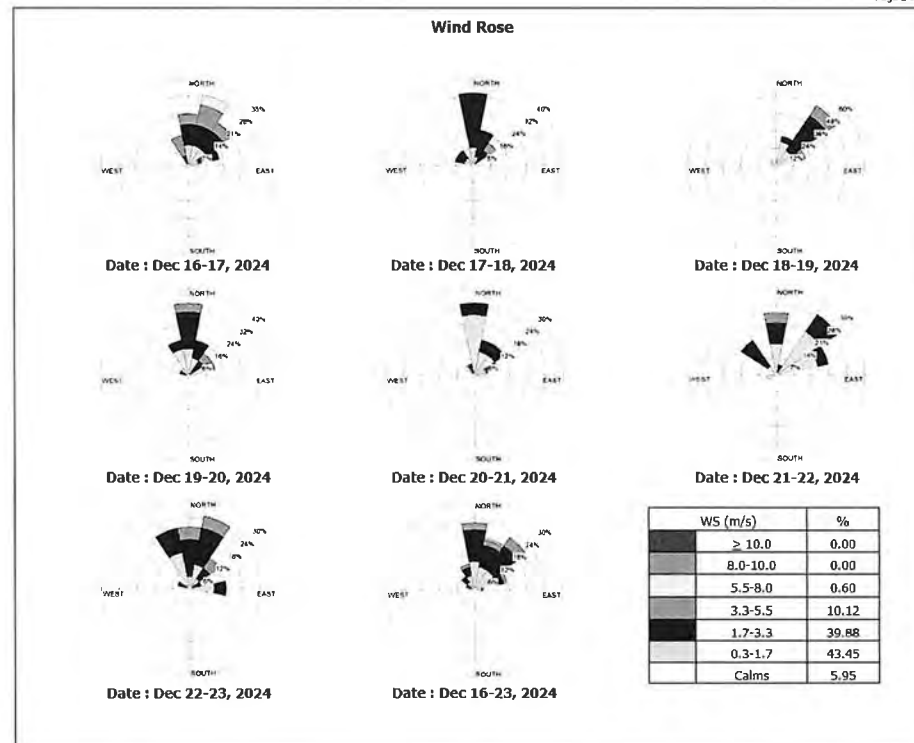
Lot ID: 2493823  
Date Received :Dec 24, 2024  
Date Reported :Jan 02, 2025  
Report Number :3083093-1

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Page 2 of 2



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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyuthaya Thailand 13210

Lot ID: 2493823  
Date Received :Dec 24, 2024  
Date Reported :Jan 02, 2025  
Report Number :3083093-1

P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Page 1 of 2

Sample Number 2493823-8 to 14  
Parameter Wind Speed / Wind Direction  
Location โรงเรือนผักนางพื (GPS 47P 0684438, 1587210)  
Sampling Date Dec 16 - Dec 23, 2024  
Sampling by Thanong Wiriyasahakij

Time	Dec 16 - Dec 17, 2024		Dec 17 - Dec 18, 2024		Dec 18 - Dec 19, 2024		Dec 19 - Dec 20, 2024		Dec 20 - Dec 21, 2024		Dec 21 - Dec 22, 2024		Dec 22 - Dec 23, 2024	
	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)
10:00 AM - 11:00 AM	2.6	30.0	NNE	3.8	46.0	NE	4.6	22.0	NNE	3.1	56.0	NE	0.9	59.0
11:00 AM - 12:00 PM	5.7	25.0	NNE	2.4	40.0	NE	1.5	0.0	N	3.1	40.0	NE	2.9	14.0
12:00 PM - 01:00 PM	3.0	10.0	N	1.7	35.0	NE	2.4	55.0	NE	1.9	37.0	NE	3.8	320.0
01:00 PM - 02:00 PM	1.4	13.0	NNE	1.4	67.0	ENE	1.6	348.0	NNW	1.7	53.0	NE	2.2	346.0
02:00 PM - 03:00 PM	1.3	18.0	NNE	0.7	359.0	N	1.7	29.0	NNE	2.5	10.0	N	1.1	28.0
03:00 PM - 04:00 PM	3.0	44.0	NE	0.9	322.0	NW	1.7	31.0	NNE	1.1	19.0	NNE	2.2	345.0
04:00 PM - 05:00 PM	0.9	30.0	NNE	0.7	315.0	NW	1.3	20.0	NNE	1.3	60.0	ENE	0.5	0.0
05:00 PM - 06:00 PM	0.7	26.0	NNE	0.6	319.0	NW	1.4	27.0	NNE	0.6	29.0	NNE	0.9	13.0
06:00 PM - 07:00 PM	0.5	33.0	NNE	1.3	326.0	NW	0.7	58.0	ENE	0.9	53.0	NE	0.2	-
07:00 PM - 08:00 PM	0.9	30.0	NNE	0.4	359.0	N	0.2	-	-	0.8	0.0	N	0.2	-
08:00 PM - 09:00 PM	1.9	359.0	N	0.4	18.0	NNE	0.3	63.0	ENE	0.7	12.0	NNE	0.0	-
09:00 PM - 10:00 PM	0.7	28.0	NNE	0.6	9.0	N	1.2	14.0	NNE	1.8	0.0	N	0.0	-
10:00 PM - 11:00 PM	1.1	74.0	ENE	0.5	11.0	N	1.2	36.0	NE	1.9	326.0	NW	0.0	-
11:00 PM - 12:00 AM	1.5	36.0	NE	0.0	-	-	1.2	28.0	NNE	1.0	347.0	NNW	0.0	-
12:00 AM - 01:00 AM	1.2	7.0	N	0.0	-	-	2.0	58.0	ENE	1.6	13.0	NNE	0.1	-
01:00 AM - 02:00 AM	0.5	359.0	N	0.7	352.0	N	1.6	6.0	N	0.7	43.0	NE	0.5	12.0
02:00 AM - 03:00 AM	1.1	32.0	NNE	1.9	0.0	N	3.1	2.0	N	1.6	354.0	N	0.0	-
03:00 AM - 04:00 AM	3.1	11.0	N	2.1	4.0	N	2.1	34.0	NE	0.9	359.0	N	1.0	15.0
04:00 AM - 05:00 AM	1.8	30.0	NNE	0.8	20.0	NNE	1.3	41.0	NE	2.0	23.0	NNE	0.6	15.0
05:00 AM - 06:00 AM	1.8	37.0	NE	2.1	30.0	NNE	2.5	54.0	NE	1.5	12.0	NNE	0.0	-
06:00 AM - 07:00 AM	2.9	0.0	N	3.4	36.0	NE	1.2	22.0	NNE	1.2	4.0	N	1.2	56.0
07:00 AM - 08:00 AM	4.7	43.0	NE	2.2	50.0	NE	2.2	29.0	NNE	2.5	33.0	NNE	0.5	343.0
08:00 AM - 09:00 AM	3.0	55.0	NE	1.9	13.0	NNE	5.7	41.0	NE	2.2	92.0	E	3.8	36.0
09:00 AM - 10:00 AM	4.0	18.0	NNE	4.9	352.0	N	4.7	15.0	NNE	4.0	344.0	NNW	1.2	0.0

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Assistant General Manager

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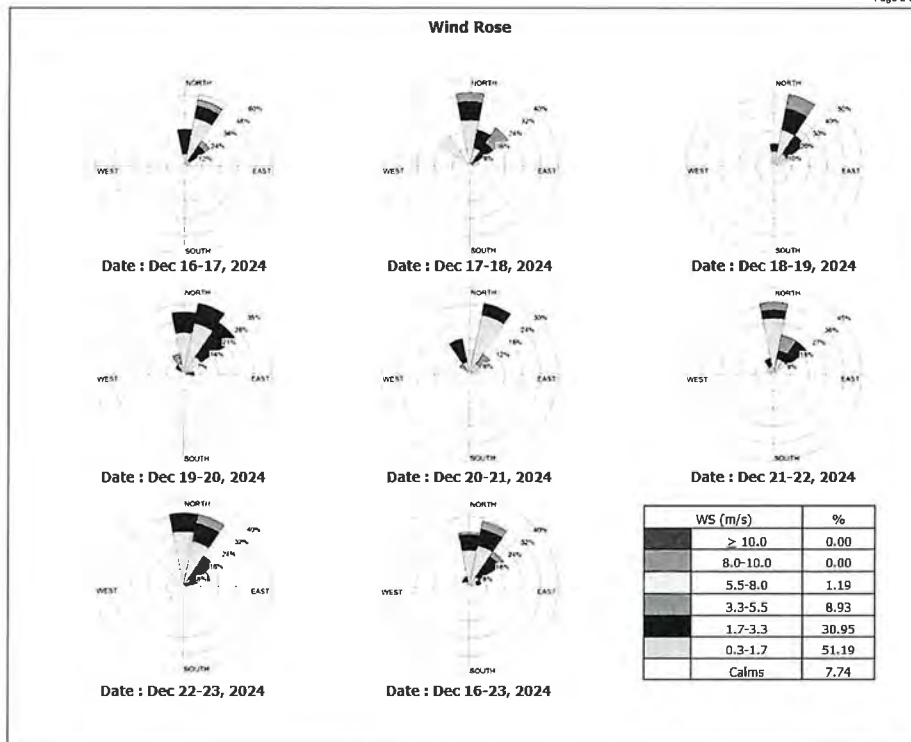
## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyuthaya Thailand 13210

Lot ID: 2493823  
Date Received :Dec 24, 2024  
Date Reported :Jan 02, 2025  
Report Number :3083093-1

P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

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Lot ID: 2493823  
Date Received :Dec 24, 2024  
Date Reported :Jan 02, 2025  
Report Number :3083093-1

P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Page 1 of 2

Sample Number : 2493823-15 to 21  
Parameter : Wind Speed / Wind Direction  
Location : โรงเรียนวัดคลองพุทธา (GPS 47P 0687981, 1587129)  
Sampling Date : Dec 16 - Dec 23, 2024  
Sampling by : Thanong Wiriyasahakij

Time	Dec 16 - Dec 17, 2024			Dec 17 - Dec 18, 2024			Dec 18 - Dec 19, 2024			Dec 19 - Dec 20, 2024			Dec 20 - Dec 21, 2024			Dec 21 - Dec 22, 2024			Dec 22 - Dec 23, 2024		
	WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)	
09:00 AM - 10:00 AM	0.8	35.0	NE	3.6	7.0	N	3.1	65.0	ENE	2.1	26.0	NNE	0.3	55.0	NE	2.0	14.0	NNE	2.6	23.0	NNE
10:00 AM - 11:00 AM	1.7	359.0	N	3.1	44.0	NE	4.1	51.0	NE	3.3	359.0	N	1.9	38.0	NE	0.6	355.0	N	0.9	50.0	NE
11:00 AM - 12:00 PM	3.1	28.0	NNE	2.0	5.0	N	6.0	5.0	N	0.5	46.0	NE	1.3	48.0	NE	1.1	9.0	N	2.2	103.0	ESE
12:00 PM - 01:00 PM	2.1	13.0	NNE	3.0	15.0	NNE	1.5	46.0	NE	1.9	19.0	NNE	2.9	4.0	N	1.4	343.0	NNW	2.9	30.0	NNE
01:00 PM - 02:00 PM	4.9	353.0	N	1.6	359.0	N	1.8	14.0	NNE	1.3	14.0	NNE	1.0	101.0	E	0.7	0.0	N	1.2	117.0	ESE
02:00 PM - 03:00 PM	3.0	17.0	NNE	2.0	20.0	NNE	2.2	30.0	NNE	4.0	6.0	N	0.9	6.0	N	0.3	53.0	NE	1.5	17.0	NNE
03:00 PM - 04:00 PM	0.6	152.0	SSE	0.3	341.0	NNW	3.1	348.0	NNW	2.3	31.0	NNE	1.4	2.0	N	0.5	296.0	WNW	1.2	62.0	ENE
04:00 PM - 05:00 PM	1.2	1.0	N	1.5	323.0	NW	1.5	63.0	ENE	1.4	19.0	NNE	0.3	4.0	N	0.3	332.0	NNW	2.0	348.0	NNW
05:00 PM - 06:00 PM	0.4	38.0	NE	0.3	325.0	NW	0.0	-	-	0.2	-	-	0.9	28.0	NNE	0.3	40.0	NE	0.8	84.0	E
06:00 PM - 07:00 PM	0.1	-	-	0.2	-	-	0.2	-	-	0.4	37.0	NE	0.6	91.0	E	0.3	23.0	NNE	0.1	-	-
07:00 PM - 08:00 PM	0.3	33.0	NNE	0.1	-	-	0.9	80.0	E	1.1	7.0	N	0.0	-	-	0.1	-	-	0.7	24.0	NNE
08:00 PM - 09:00 PM	1.2	38.0	NE	0.0	-	-	0.0	-	-	1.0	7.0	N	0.0	-	-	0.0	-	-	0.5	26.0	NNE
09:00 PM - 10:00 PM	1.5	54.0	NE	0.0	-	-	0.1	-	-	2.0	20.0	NNE	0.0	-	-	0.0	-	-	0.8	4.0	N
10:00 PM - 11:00 PM	1.1	3.0	N	0.0	-	-	1.2	62.0	ENE	0.1	-	-	0.2	-	-	0.9	359.0	N	1.6	359.0	N
11:00 PM - 12:00 AM	0.4	107.0	ESE	0.8	359.0	N	0.0	-	-	0.6	359.0	N	0.0	-	-	0.3	82.0	E	0.8	8.0	N
12:00 AM - 01:00 AM	0.5	4.0	N	0.0	-	-	0.3	28.0	NNE	0.9	59.0	ENE	0.0	-	-	0.3	103.0	ESE	0.5	11.0	N
01:00 AM - 02:00 AM	1.8	82.0	E	0.0	-	-	1.0	27.0	NNE	1.1	18.0	NNE	0.5	2.0	N	0.6	80.0	E	1.0	42.0	NE
02:00 AM - 03:00 AM	0.7	18.0	NNE	0.9	28.0	NNE	0.8	1.0	N	1.7	29.0	NNE	0.7	7.0	N	0.4	21.0	NNE	0.2	-	-
03:00 AM - 04:00 AM	1.8	12.0	NNE	1.4	11.0	N	0.8	63.0	ENE	1.9	8.0	N	1.0	16.0	NNE	1.0	21.0	NNE	1.6	13.0	NNE
04:00 AM - 05:00 AM	1.7	21.0	NNE	2.2	3.0	N	1.0	55.0	NE	1.8	0.0	N	0.0	-	-	1.2	41.0	NE	3.3	352.0	N
05:00 AM - 06:00 AM	2.0	51.0	NE	3.4	21.0	NNE	0.6	359.0	N	1.0	30.0	NNE	0.0	-	-	0.6	23.0	NNE	5.3	359.0	N
06:00 AM - 07:00 AM	2.3	353.0	N	0.6	69.0	ENE	2.8	4.0	N	1.8	37.0	NE	0.0	-	-	3.1	48.0	NE	3.6	11.0	N
07:00 AM - 08:00 AM	3.9	72.0	ENE	1.7	113.0	ESE	1.5	87.0	E	3.1	51.0	NE	0.5	39.0	NE	2.5	349.0	N	3.0	348.0	NNW
08:00 AM - 09:00 AM	2.4	359.0	N	0.9	49.0	NE	1.0	8.0	N	1.8	86.0	E	1.8	42.0	NE	1.1	85.0	E	2.1	11.0	N

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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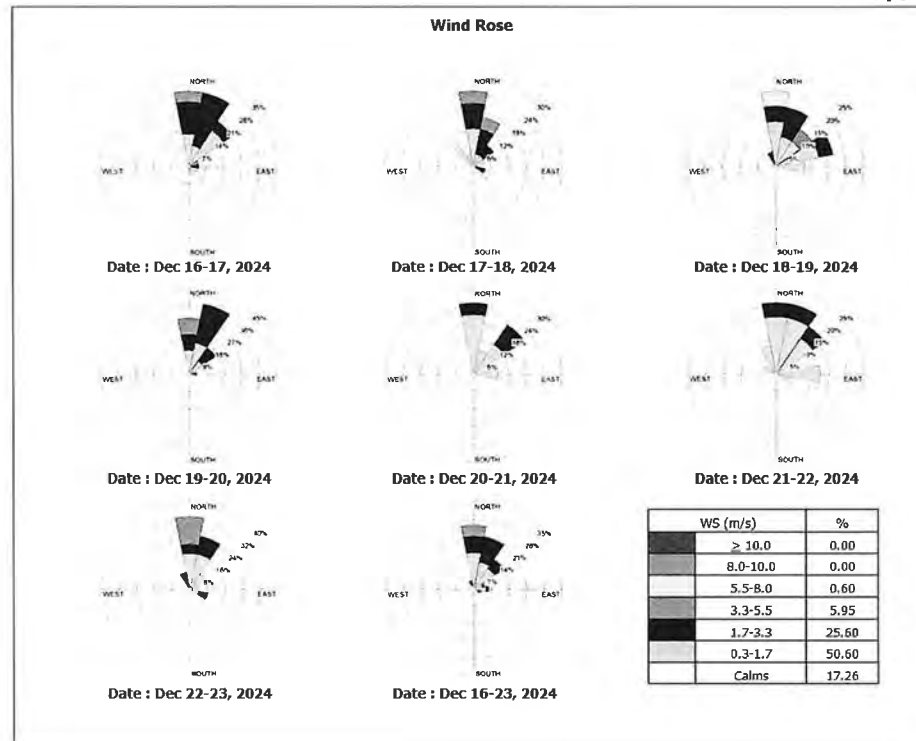
## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210

Lot ID: 2493823  
Date Received :Dec 24, 2024  
Date Reported :Jan 02, 2025  
Report Number :3083093-1

P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

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999 Moo 1, Ban Chang, Uthai, Prakhonslayuththaya Thailand 13210

Lot ID: 2493823  
Date Received :Dec 24, 2024  
Date Reported :Jan 02, 2025  
Report Number :3083093-1

P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Page 1 of 2

Sample Number 2493823-22 to 28  
Parameter Wind Speed / Wind Direction  
Location ตำบลสาทรพนมไพร ระยะที่ 1-4 (GPS 47P 0676951, 1583181)  
Sampling Date Dec 16 - Dec 23, 2024  
Sampling by Thanong Wriyasahaki

Time	Dec 16 - Dec 17, 2024			Dec 17 - Dec 18, 2024			Dec 18 - Dec 19, 2024			Dec 19 - Dec 20, 2024			Dec 20 - Dec 21, 2024			Dec 21 - Dec 22, 2024			Dec 22 - Dec 23, 2024		
	WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)	
11:00 AM - 12:00 PM	3.6	112.0	ESE	2.8	39.0	NE	1.8	85.0	E	1.8	262.0	W	1.6	77.0	ENE	0.9	298.0	WNW	2.2	129.0	SE
12:00 PM - 01:00 PM	1.6	114.0	ESE	1.6	112.0	ESE	1.5	91.0	E	1.2	120.0	ESE	1.8	86.0	E	0.4	70.0	ENE	2.3	96.0	E
01:00 PM - 02:00 PM	1.2	124.0	SE	1.8	194.0	SSW	1.8	99.0	E	0.5	65.0	ENE	2.3	131.0	SE	0.6	342.0	NNW	1.7	112.0	ESE
02:00 PM - 03:00 PM	1.8	118.0	ESE	1.3	271.0	W	2.1	138.0	SE	3.5	85.0	E	0.8	188.0	S	2.1	110.0	ESE	2.1	83.0	E
03:00 PM - 04:00 PM	2.0	110.0	ESE	1.6	323.0	NW	1.1	298.0	WNW	1.6	140.0	SE	0.4	84.0	E	1.5	352.0	N	2.4	139.0	SE
04:00 PM - 05:00 PM	2.5	129.0	SE	1.2	10.0	N	1.2	141.0	SE	0.7	108.0	ESE	1.1	112.0	ESE	2.1	333.0	NNW	2.2	119.0	ESE
05:00 PM - 06:00 PM	0.8	94.0	E	2.6	359.0	N	0.9	119.0	ESE	1.8	86.0	E	0.4	90.0	E	0.0	-	-	1.2	133.0	SE
06:00 PM - 07:00 PM	0.6	93.0	E	2.7	359.0	N	1.1	122.0	ESE	0.9	114.0	ESE	0.6	138.0	SE	1.2	118.0	ESE	0.7	98.0	E
07:00 PM - 08:00 PM	1.5	152.0	SSE	0.0	-	-	1.6	125.0	SE	0.5	93.0	E	0.4	98.0	E	1.4	129.0	SE	1.5	104.0	ESE
08:00 PM - 09:00 PM	0.9	85.0	E	0.5	120.0	ESE	0.0	-	-	0.8	129.0	SE	0.0	-	-	0.3	114.0	ESE	1.8	80.0	E
09:00 PM - 10:00 PM	1.2	130.0	SE	0.7	82.0	E	1.9	123.0	ESE	0.9	148.0	SSE	0.0	-	-	1.2	130.0	SE	0.9	125.0	SE
10:00 PM - 11:00 PM	1.6	90.0	E	0.9	359.0	N	0.8	98.0	E	1.3	121.0	ESE	0.0	-	-	0.7	90.0	E	0.8	93.0	E
11:00 PM - 12:00 AM	1.3	123.0	ESE	0.8	118.0	ESE	1.6	98.0	E	1.1	92.0	E	0.0	-	-	1.8	115.0	ESE	0.6	74.0	ENE
12:00 AM - 01:00 AM	0.4	78.0	ENE	0.0	-	-	1.0	110.0	ESE	0.6	174.0	S	0.3	103.0	ESE	1.2	95.0	E	0.9	101.0	E
01:00 AM - 02:00 AM	4.5	139.0	SE	0.3	121.0	ESE	2.2	86.0	E	0.3	118.0	ESE	0.0	-	-	0.8	123.0	ESE	1.4	126.0	SE
02:00 AM - 03:00 AM	1.4	133.0	SE	0.5	339.0	NNW	2.6	98.0	E	1.7	91.0	E	0.9	150.0	SSE	1.2	108.0	ESE	0.8	106.0	ESE
03:00 AM - 04:00 AM	0.7	118.0	ESE	0.8	95.0	E	1.9	93.0	E	1.0	141.0	SE	0.8	65.0	ENE	1.0	83.0	E	1.1	149.0	SSE
04:00 AM - 05:00 AM	1.5	125.0	SE	0.9	66.0	ENE	2.4	125.0	SE	0.8	119.0	ESE	0.0	-	-	0.5	83.0	E	1.5	142.0	SE
05:00 AM - 06:00 AM	1.1	112.0	ESE	1.6	329.0	NNW	2.6	78.0	ENE	2.4	138.0	SE	0.5	120.0	ESE	1.2	94.0	E	1.9	129.0	SE
06:00 AM - 07:00 AM	2.0	101.0	E	1.2	104.0	ESE	3.6	100.0	E	1.1	163.0	SSE	0.0	-	-	2.5	127.0	SE	1.8	216.0	SW
07:00 AM - 08:00 AM	1.2	103.0	ESE	2.2	98.0	E	4.8	124.0	SE	2.8	161.0	SSE	0.6	118.0	ESE	2.6	133.0	SE	1.6	93.0	E
08:00 AM - 09:00 AM	4.3	120.0	ESE	3.9	142.0	SE	2.2	74.0	ENE	0.9	130.0	SE	1.7	116.0	ESE	4.2	119.0	ESE	1.5	95.0	E
09:00 AM - 10:00 AM	1.7	98.0	E	2.5	117.0	ESE	3.9	131.0	SE	3.7	103.0	ESE	1.1	179.0	S	2.0	106.0	ESE	4.2	104.0	ESE
10:00 AM - 11:00 AM	1.8	82.0	E	2.9	138.0	SE	1.2	101.0	E	1.4	115.0	ESE	1.5	109.0	ESE	0.8	93.0	E	3.0	149.0	SSE

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Assistant General Manager

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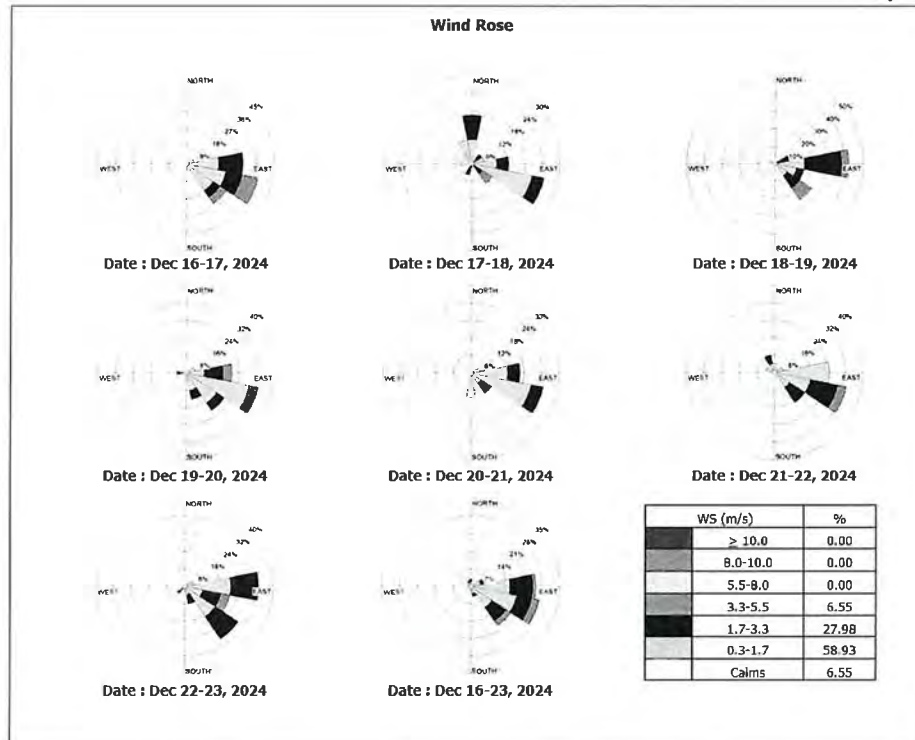
## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonslayuththaya Thailand 13210

Lot ID: 2493823  
Date Received :Dec 24, 2024  
Date Reported :Jan 02, 2025  
Report Number :3083093-1

P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Page 2 of 2



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Assistant General Manager

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## ภาคผนวก ค-2

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การตรวจสอบความถูกต้องของระบบติดตามตรวจสอบคุณภาพอากาศจาก  
ปล่องระบายอากาศแบบต่อเนื่อง ประจำปี พ.ศ. 2567  
(CEMs RATA Audit)



## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonslayuthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418546  
Date Received : Feb 29, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913272-1

Page 1 of 4

Sample Number 2418546-1  
Sampled Date Feb 28, 2024  
Sample Description Emission from Stationary Source  
Location HRS 11  
Parameter NOx

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual O2		Corrected Value at 7% O2		Difference
		Start	Stop	CEMs (ppm)	RM (ppm)	CEMs (ppm)	RM (ppm)	
1	28 Feb 24	10:20	10:40	25.59	23.98	47.36	44.41	-2.95
2	28 Feb 24	10:41	11:01	25.65	23.69	47.26	43.80	-3.46
3	28 Feb 24	11:02	11:22	25.55	23.63	47.09	43.55	-3.54
4*	28 Feb 24	11:23	11:43	25.77	23.79	47.51	43.85	-3.66
5	28 Feb 24	11:44	12:04	26.01	24.09	47.97	44.42	-3.55
6	28 Feb 24	12:05	12:25	25.79	23.96	47.54	44.15	-3.38
7	28 Feb 24	12:26	12:46	26.16	24.28	48.15	44.73	-3.42
8	28 Feb 24	12:47	13:07	26.28	24.43	48.42	44.99	-3.44
9	28 Feb 24	13:08	13:28	26.49	24.58	48.80	45.22	-3.58
10*	28 Feb 24	13:29	13:49	26.65	24.74	49.14	45.55	-3.60
11	28 Feb 24	13:50	14:10	26.31	24.78	49.22	46.23	-2.99
12*	28 Feb 24	14:11	14:31	23.81	22.12	51.60	47.49	-4.11
Average						47.98	44.61	-3.37
Confidence Coefficient (CC)								0.18
Relative Accuracy (Compared with RM) (%)								7.95
Relative Accuracy Criteria <sup>1/</sup> (Compared with RM)								≤ 20%

Reference Method : US EPA Method 7E

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of NOx is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 2 (PS-2)

RA Result is within Criteria

Technical Management



ทะเบียนเลขที่ 2-204-ก-6113

Approved by



Assistant General Manager

ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonslayuthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418546  
Date Received : Feb 29, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913272-1

Page 2 of 4

Sample Number 2418546-1  
Sampled Date Feb 28, 2024  
Sample Description Emission from Stationary Source  
Location HRS 11  
Parameter SO2

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual O2		Corrected Value at 7% O2		Difference
		Start	Stop	CEMs (ppm)	RM (ppm)	CEMs (ppm)	RM (ppm)	
1	28 Feb 24	10:20	10:40	0.00	0.20	0.00	0.36	0.36
2	28 Feb 24	10:41	11:01	0.02	0.20	0.03	0.37	0.34
3	28 Feb 24	11:02	11:22	0.02	0.21	0.04	0.39	0.35
4	28 Feb 24	11:23	11:43	0.01	0.23	0.03	0.43	0.40
5	28 Feb 24	11:44	12:04	0.05	0.24	0.10	0.44	0.34
6*	28 Feb 24	12:05	12:25	0.00	0.32	0.00	0.59	0.59
7	28 Feb 24	12:26	12:46	0.00	0.23	0.00	0.43	0.43
8	28 Feb 24	12:47	13:07	0.00	0.25	0.00	0.47	0.47
9*	28 Feb 24	13:08	13:28	0.00	0.27	0.00	0.51	0.51
10	28 Feb 24	13:29	13:49	0.01	0.19	0.02	0.34	0.33
11	28 Feb 24	13:50	14:10	0.01	0.20	0.02	0.38	0.36
12*	28 Feb 24	14:11	14:31	0.00	0.22	0.00	0.48	0.47
Average						0.03	0.40	0.37
Confidence Coefficient (CC)								0.04
Relative Accuracy (Compared with Emission Standard : 10 ppm) (%)								4.11
Relative Accuracy Criteria <sup>1/</sup> (Compared with Emission Standard : 10 ppm)								≤ 10%

Reference Method : US EPA Method 6C

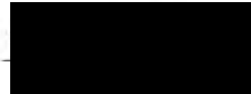
Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of SO2 is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 2 (PS-2) compared with

Emission Standard 10 ppm at 7%O2

RA Result is within Criteria

Technical Management



ทะเบียนเลขที่ 2-204-ก-6113

Approved by



Assistant General Manager

ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhsayuthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418546  
Date Received : Feb 29, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913272-1

Page 3 of 4

Sample Number 2418546-1  
Sampled Date Feb 28, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 11  
Parameter CO

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual O2		Corrected Value at 7% O2		Difference
		Start	Stop	CEMs (ppm)	RM (ppm)	CEMs (ppm)	RM (ppm)	
1	28 Feb 24	10:20	10:40	0.00	0.56	0.00	1.05	1.05
2*	28 Feb 24	10:41	11:01	0.00	0.64	0.00	1.18	1.18
3	28 Feb 24	11:02	11:22	0.00	0.59	0.00	1.09	1.09
4	28 Feb 24	11:23	11:43	0.00	0.62	0.00	1.15	1.15
5	28 Feb 24	11:44	12:04	0.00	0.57	0.00	1.04	1.04
6	28 Feb 24	12:05	12:25	0.00	0.62	0.00	1.15	1.15
7	28 Feb 24	12:26	12:46	0.00	0.57	0.00	1.06	1.06
8	28 Feb 24	12:47	13:07	0.00	0.58	0.00	1.06	1.06
9	28 Feb 24	13:08	13:28	0.00	0.58	0.00	1.08	1.08
10	28 Feb 24	13:29	13:49	0.00	0.59	0.00	1.09	1.09
11*	28 Feb 24	13:50	14:10	0.04	0.79	0.08	1.48	1.40
12*	28 Feb 24	14:11	14:31	5.75	7.32	12.47	15.71	3.25
Average						0.00	1.08	1.08
Confidence Coefficient (CC)								0.03
Relative Accuracy (Compared with Emission Standard : 690 ppm) (%)								0.16
Relative Accuracy Criteria <sup>1/</sup> (Compared with Emission Standard :690 ppm)								≤ 5%

Reference Method : US EPA Method 10

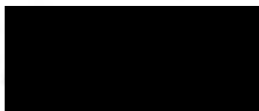
Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of CO is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 4 (PS-4) compared with

Emission Standard 690 ppm at 7%O2

RA Result is within Criteria

Technical Management



ทะเบียนเลขที่ 2-204-ก-6113

Approved by



ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

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P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418546  
Date Received : Feb 29, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913272-1

Page 4 of 4

Sample Number 2418546-1  
Sampled Date Feb 28, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 11  
Parameter O2

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual		Difference
		Start	Stop	CEMs (%)	RM (%)	
1	28 Feb 24	10:20	10:40	13.39	13.39	0.01
2*	28 Feb 24	10:41	11:01	13.36	13.38	0.03
3	28 Feb 24	11:02	11:22	13.36	13.36	0.00
4	28 Feb 24	11:23	11:43	13.36	13.36	0.00
5	28 Feb 24	11:44	12:04	13.36	13.36	0.00
6	28 Feb 24	12:05	12:25	13.36	13.36	0.00
7	28 Feb 24	12:26	12:46	13.35	13.36	0.01
8	28 Feb 24	12:47	13:07	13.36	13.35	-0.01
9	28 Feb 24	13:08	13:28	13.35	13.34	-0.01
10	28 Feb 24	13:29	13:49	13.36	13.35	-0.01
11*	28 Feb 24	13:50	14:10	13.47	13.45	-0.02
12*	28 Feb 24	14:11	14:31	14.49	14.43	-0.06
Average				13.36	13.36	0.00
Confidence Coefficient (CC)						-
Relative Accuracy (Compared in Actual) (%)						0.00
Relative Accuracy Criteria (%)						≤ 1%

Reference Method : US EPA Method 3A

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of O2 is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 3 (PS-3)

RA Result is within Criteria

Sampled By : Worawich Tongpoom

Technical Management



ทะเบียนเลขที่ 2-204-ก-6113

Approved by



ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonslayuthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418556  
Date Received : Feb 29, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2924834-1

Page 1 of 2

Sample Number 2418556-1  
Sampled Date Feb 28, 2024  
Sample Description Emission from Stationary Source  
Location HRS11  
Parameter Flowrate

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Flowrate Data		Difference
		Start	Stop	CEMs (Nm <sup>3</sup> /Hr)	RM (Nm <sup>3</sup> /Hr)	
1*	28 Feb 24	10:40	10:54	1,703,294	2,076,847	373,553
2	28 Feb 24	11:35	11:49	1,718,466	1,984,092	265,626
3*	28 Feb 24	11:50	12:04	1,719,341	1,985,997	266,656
4	28 Feb 24	12:05	12:19	1,723,372	1,973,186	249,814
5*	28 Feb 24	12:20	12:34	1,721,620	2,005,392	283,772
6	28 Feb 24	12:35	12:49	1,739,197	1,994,572	255,375
7	28 Feb 24	12:50	13:04	1,734,135	1,999,150	265,015
8	28 Feb 24	13:05	13:19	1,733,586	1,974,808	241,222
9	28 Feb 24	13:20	13:34	1,723,769	1,983,512	259,743
10	28 Feb 24	13:35	13:49	1,722,393	1,983,775	261,382
11	28 Feb 24	13:50	14:04	1,720,091	1,861,670	141,579
12	28 Feb 24	14:05	14:19	1,383,826	1,455,231	71,405
Average				1,688,760	1,912,222	223,462
Confidence Coefficient (CC)						53,055
Relative Accuracy <sup>1/</sup> (Compared with RM) (%)						14.46
Relative Accuracy Criteria (Compared with RM)						≤ 20 %

Reference Method : US EPA Method 2

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of Flowrate is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 6 (PS-6)

RA Result is within Criteria

Technical Management



ทะเบียนเลขที่ 2-204-ก-6113

Approved by



Sarayuth Jitranont  
Assistant General Manager

ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonslayuthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418556  
Date Received : Feb 29, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2924834-1

Page 2 of 2

Sample Number 2418556-1  
Sampled Date Feb 28, 2024  
Sample Description Emission from Stationary Source  
Location HRS11  
Parameter Stack Temperature

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Temperature Data		Difference
		Start	Stop	CEMs (°C)	RM (°C)	
1	28 Feb 24	10:40	10:54	90.6	88.5	-2.1
2	28 Feb 24	11:35	11:49	90.0	86.1	-3.9
3	28 Feb 24	11:50	12:04	90.5	86.0	-4.5
4	28 Feb 24	12:05	12:19	90.5	86.1	-4.4
5*	28 Feb 24	12:20	12:34	90.6	85.2	-5.4
6	28 Feb 24	12:35	12:49	90.1	85.0	-5.1
7	28 Feb 24	12:50	13:04	89.8	84.9	-4.9
8	28 Feb 24	13:05	13:19	90.2	84.9	-5.3
9	28 Feb 24	13:20	13:34	90.2	85.0	-5.2
10*	28 Feb 24	13:35	13:49	90.3	84.9	-5.4
11*	28 Feb 24	13:50	14:04	90.4	83.8	-6.7
12	28 Feb 24	14:05	14:19	87.4	82.1	-5.4
Average				89.9	85.4	-4.5
Confidence Coefficient (CC)						0.8
Relative Accuracy <sup>1/</sup> (Compared with RM) (%)						6.2
Relative Accuracy Criteria (Compared with RM)						≤ 20 %

Reference Method : US EPA Method 2

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of Stack Temperature is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 6 (PS-6)

RA Result is within Criteria

Sampled By : Ussaree Namburee

Technical Management



ทะเบียนเลขที่ 2-204-ก-6113

Approved by



ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonslyutthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418547  
Date Received : Mar 08, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913271-1

Page 1 of 4

Sample Number 2418547-1  
Sample Date Mar 08, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 12  
Parameter NOx

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual O2		Corrected Value at 7% O2		Difference
		Start	Stop	CEMs (ppm)	RM (ppm)	CEMs (ppm)	RM (ppm)	
1	08 Mar 24	10:35	10:55	20.12	19.25	37.49	34.88	-2.61
2	08 Mar 24	10:56	11:16	20.23	19.14	37.70	34.87	-2.82
3	08 Mar 24	11:17	11:37	20.32	19.16	37.91	35.01	-2.90
4	08 Mar 24	11:38	11:58	20.37	19.18	37.97	35.06	-2.91
5	08 Mar 24	11:59	12:19	20.95	19.71	39.13	36.11	-3.02
6	08 Mar 24	12:20	12:40	20.63	19.48	38.56	35.64	-2.92
7	08 Mar 24	12:41	13:01	21.24	19.99	39.71	36.64	-3.07
8*	08 Mar 24	13:02	13:22	21.56	20.22	40.35	37.04	-3.32
9	08 Mar 24	13:23	13:43	21.79	20.51	40.82	37.70	-3.13
10	08 Mar 24	13:44	14:04	22.14	20.82	41.51	38.32	-3.19
11*	08 Mar 24	14:05	14:25	22.65	21.31	42.55	39.28	-3.27
12*	08 Mar 24	14:26	14:46	22.78	21.40	42.82	39.48	-3.34
Average						38.98	36.02	-2.95
Confidence Coefficient (CC)								0.13
Relative Accuracy (Compared with RM) (%)								8.57
Relative Accuracy Criteria <sup>1/</sup> (Compared with RM)								≤ 20%

Reference Method : US EPA Method 7E

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of NOx is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 2 (PS-2)

RA Result is within Criteria

Technical Management

ทะเบียนเลขที่ 2-204-ก-6113

Approved by

Assistant General Manager

ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonslyutthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418547  
Date Received : Mar 08, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913271-1

Page 2 of 4

Sample Number 2418547-1  
Sample Date Mar 08, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 12  
Parameter SO2

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual O2		Corrected Value at 7% O2		Difference
		Start	Stop	CEMs (ppm)	RM (ppm)	CEMs (ppm)	RM (ppm)	
1	08 Mar 24	10:35	10:55	0.00	0.21	0.00	0.38	0.38
2	08 Mar 24	10:56	11:16	0.00	0.15	0.00	0.27	0.27
3	08 Mar 24	11:17	11:37	0.00	0.12	0.00	0.22	0.22
4	08 Mar 24	11:38	11:58	0.00	0.20	0.00	0.36	0.36
5	08 Mar 24	11:59	12:19	0.00	0.16	0.00	0.30	0.30
6	08 Mar 24	12:20	12:40	0.00	0.21	0.00	0.38	0.38
7*	08 Mar 24	12:41	13:01	0.00	0.26	0.00	0.48	0.48
8*	08 Mar 24	13:02	13:22	0.00	0.30	0.00	0.54	0.54
9*	08 Mar 24	13:23	13:43	0.00	0.27	0.00	0.49	0.49
10	08 Mar 24	13:44	14:04	0.00	0.22	0.00	0.40	0.40
11	08 Mar 24	14:05	14:25	0.00	0.22	0.00	0.41	0.41
12	08 Mar 24	14:26	14:46	0.00	0.20	0.00	0.37	0.37
Average						0.00	0.34	0.34
Confidence Coefficient (CC)								0.05
Relative Accuracy (Compared with Emission Standard : 10 ppm) (%)								3.92
Relative Accuracy Criteria <sup>1/</sup> (Compared with Emission Standard : 10 ppm)								≤ 10%

Reference Method : US EPA Method 6C

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of SO2 is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 2 (PS-2) compared with

Emission Standard 10 ppm at 7%O2

RA Result is within Criteria

Technical Management

ทะเบียนเลขที่ 2-204-ก-6113

Approved by

Assistant General Manager

ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakonslayuthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418547  
Date Received : Mar 08, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913271-1

Page 3 of 4

Sample Number 2418547-1  
Sampled Date Mar 08, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 12  
Parameter CO

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual O2		Corrected Value at 7% O2		Difference
		Start	Stop	CEMs (ppm)	RM (ppm)	CEMs (ppm)	RM (ppm)	
1	08 Mar 24	10:35	10:55	0.00	0.32	0.00	0.59	0.59
2	08 Mar 24	10:56	11:16	0.00	0.26	0.00	0.48	0.48
3	08 Mar 24	11:17	11:37	0.00	0.24	0.00	0.44	0.44
4	08 Mar 24	11:38	11:58	0.00	0.31	0.00	0.57	0.57
5	08 Mar 24	11:59	12:19	0.00	0.28	0.00	0.51	0.51
6	08 Mar 24	12:20	12:40	0.00	0.40	0.00	0.74	0.74
7*	08 Mar 24	12:41	13:01	0.00	0.56	0.00	1.03	1.03
8	08 Mar 24	13:02	13:22	0.00	0.41	0.00	0.75	0.75
9	08 Mar 24	13:23	13:43	0.00	0.41	0.00	0.75	0.75
10*	08 Mar 24	13:44	14:04	0.00	0.48	0.00	0.88	0.88
11*	08 Mar 24	14:05	14:25	0.00	0.44	0.00	0.80	0.80
12	08 Mar 24	14:26	14:46	0.00	0.37	0.00	0.68	0.68
Average						0.00	0.61	0.61
Confidence Coefficient (CC)								0.12
Relative Accuracy (Compared with Emission Standard : 690 ppm) (%)								0.11
Relative Accuracy Criteria <sup>1/</sup> (Compared with Emission Standard :690 ppm)								≤ 5%

Reference Method : US EPA Method 10

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of CO is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 4 (PS-4) compared with Emission Standard 690 ppm at 7%O2

RA Result is within Criteria

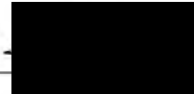
Technical Management



Manager

ทะเบียนเลขที่ 2-204-ก-6113

Approved by



Assistant General Manager

ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

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P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418547  
Date Received : Mar 08, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913271-1

Page 4 of 4

Sample Number 2418547-1  
Sampled Date Mar 08, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 12  
Parameter O2

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual		Difference
		Start	Stop	CEMs (%)	RM (%)	
1*	08 Mar 24	10:35	10:55	13.44	13.23	-0.21
2*	08 Mar 24	10:56	11:16	13.44	13.27	-0.17
3	08 Mar 24	11:17	11:37	13.45	13.29	-0.16
4	08 Mar 24	11:38	11:58	13.44	13.30	-0.15
5	08 Mar 24	11:59	12:19	13.46	13.31	-0.15
6	08 Mar 24	12:20	12:40	13.46	13.30	-0.16
7	08 Mar 24	12:41	13:01	13.47	13.32	-0.15
8*	08 Mar 24	13:02	13:22	13.47	13.31	-0.16
9	08 Mar 24	13:23	13:43	13.48	13.34	-0.15
10	08 Mar 24	13:44	14:04	13.49	13.35	-0.14
11	08 Mar 24	14:05	14:25	13.50	13.36	-0.14
12	08 Mar 24	14:26	14:46	13.51	13.37	-0.14
Average				13.47	13.33	-0.15
Confidence Coefficient (CC)						-
Relative Accuracy (Compared in Actual) (%)						0.15
Relative Accuracy Criteria (%)						≤ 1%

Reference Method : US EPA Method 3A

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of O2 is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 3 (PS-3)

RA Result is within Criteria

Sampled By : Worawich Tongpoom

Technical Management



Wichan Choonharat

Manager

ทะเบียนเลขที่ 2-204-ก-6113

Approved by



Sarayuth Jitranont  
Assistant General Manager

ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418557  
Date Received : Mar 11, 2024  
Date Reported : Mar 18, 2024  
Report Number : 2933428-1

Page 1 of 2

Sample Number 2418557-1  
Sampled Date Mar 08, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 12  
Parameter Flowrate

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Flowrate Data		Difference
		Start	Stop	CEMs (Nm3/Hr)	RM (Nm3/Hr)	
1	08 Mar 24	11:25	11:39	1,738,777	1,843,222	104,445
2	08 Mar 24	11:40	11:54	1,744,459	1,838,830	94,371
3	08 Mar 24	11:55	12:09	1,754,373	1,812,155	57,782
4*	08 Mar 24	12:10	12:24	1,741,966	1,847,675	105,709
5	08 Mar 24	12:25	12:39	1,737,656	1,818,438	80,782
6	08 Mar 24	12:40	12:54	1,751,449	1,822,553	71,104
7*	08 Mar 24	12:55	13:09	1,739,162	1,845,594	106,432
8	08 Mar 24	13:10	13:24	1,755,921	1,840,648	84,727
9*	08 Mar 24	13:25	13:39	1,761,515	1,877,833	116,318
10	08 Mar 24	13:40	13:54	1,747,011	1,842,044	95,033
11	08 Mar 24	13:55	14:09	1,772,311	1,828,483	56,172
12	08 Mar 24	14:10	14:24	1,760,079	1,842,309	82,230
Average				1,751,337	1,832,076	80,739
Confidence Coefficient (CC)						12,728
Relative Accuracy <sup>1/</sup> (Compared with RM) (%)						5.10
Relative Accuracy Criteria (Compared with RM)						≤ 20 %

Reference Method : US EPA Method 2

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of Flowrate is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 6 (PS-6)

RA Result is within Criteria

Technical Management

ทะเบียนเลขที่ 2-204-ก-6113

Approved by

Signature  
Assistant General Manager  
ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418557  
Date Received : Mar 11, 2024  
Date Reported : Mar 18, 2024  
Report Number : 2933428-1

Page 2 of 2

Sample Number 2418557-1  
Sampled Date Mar 08, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 12  
Parameter Stack Temperature

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Temperature Data		Difference
		Start	Stop	CEMs (°C)	RM (°C)	
1	08 Mar 24	11:25	11:39	90.8	92.0	1.2
2	08 Mar 24	11:40	11:54	91.1	90.5	-0.6
3	08 Mar 24	11:55	12:09	90.9	89.0	-1.9
4	08 Mar 24	12:10	12:24	90.9	87.5	-3.4
5	08 Mar 24	12:25	12:39	90.9	87.0	-3.9
6*	08 Mar 24	12:40	12:54	90.7	86.5	-4.2
7	08 Mar 24	12:55	13:09	90.7	86.5	-4.2
8*	08 Mar 24	13:10	13:24	90.8	86.5	-4.3
9*	08 Mar 24	13:25	13:39	91.0	86.0	-5.0
10	08 Mar 24	13:40	13:54	90.6	86.5	-4.1
11	08 Mar 24	13:55	14:09	90.7	86.5	-4.2
12	08 Mar 24	14:10	14:24	90.6	86.5	-4.1
Average				90.8	88.0	-2.8
Confidence Coefficient (CC)						1.5
Relative Accuracy <sup>1/</sup> (Compared with RM) (%)						4.9
Relative Accuracy Criteria (Compared with RM)						≤ 20 %

Reference Method : US EPA Method 2

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of Stack Temperature is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 6 (PS-6)

RA Result is within Criteria

Sampled By : Khanetson Khamphet

Technical Management

ทะเบียนเลขที่ 2-204-ก-6113

Approved by

Signature  
Assistant General Manager  
ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418548  
Date Received : Feb 20, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913269-1

Page 1 of 4

Sample Number 2418548-1  
Sampled Date Feb 19, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 21  
Parameter NOx

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual O2		Corrected Value at 7% O2		Difference
		Start	Stop	CEMs (ppm)	RM (ppm)	CEMs (ppm)	RM (ppm)	
1*	19 Feb 24	10:40	11:00	24.36	22.88	46.22	42.09	-4.13
2	19 Feb 24	11:01	11:21	24.26	22.90	46.11	42.29	-3.83
3	19 Feb 24	11:22	11:42	22.24	21.12	44.02	40.21	-3.81
4	19 Feb 24	11:43	12:03	20.31	19.14	41.49	37.77	-3.73
5*	19 Feb 24	12:04	12:24	21.86	20.37	46.47	42.14	-4.34
6*	19 Feb 24	12:25	12:45	21.60	20.28	46.05	41.72	-4.33
7	19 Feb 24	12:46	13:06	21.52	20.44	44.96	41.65	-3.31
8	19 Feb 24	13:07	13:27	23.67	22.34	45.46	41.99	-3.47
9	19 Feb 24	13:28	13:48	21.43	20.17	45.28	41.32	-3.96
10	19 Feb 24	13:49	14:09	22.32	21.11	47.34	43.39	-3.95
11	19 Feb 24	14:10	14:30	22.73	21.15	45.52	41.51	-4.01
12	19 Feb 24	14:31	14:51	22.99	22.01	44.94	42.08	-2.86
Average						45.01	41.36	-3.66
Confidence Coefficient (CC)								0.29
Relative Accuracy (Compared with RM) (%)								9.55
Relative Accuracy Criteria <sup>1/</sup> (Compared with RM)								≤ 20%

Reference Method : US EPA Method 7E

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of NOx is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 2 (PS-2)

RA Result is within Criteria

Technical Management



Manager

ทะเบียนเลขที่ 2-204-ก-6113

Approved by



Assistant General Manager

ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418548  
Date Received : Feb 20, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913269-1

Page 2 of 4

Sample Number 2418548-1  
Sampled Date Feb 19, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 21  
Parameter SO2

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual O2		Corrected Value at 7% O2		Difference
		Start	Stop	CEMs (ppm)	RM (ppm)	CEMs (ppm)	RM (ppm)	
1	19 Feb 24	10:40	11:00	0.12	0.21	0.23	0.38	0.15
2	19 Feb 24	11:01	11:21	0.07	0.27	0.14	0.50	0.36
3	19 Feb 24	11:22	11:42	0.14	0.46	0.28	0.88	0.60
4	19 Feb 24	11:43	12:03	0.14	0.41	0.29	0.81	0.52
5	19 Feb 24	12:04	12:24	0.08	0.32	0.17	0.66	0.48
6	19 Feb 24	12:25	12:45	0.08	0.42	0.17	0.87	0.70
7*	19 Feb 24	12:46	13:06	0.04	0.53	0.09	1.08	0.99
8	19 Feb 24	13:07	13:27	0.02	0.35	0.04	0.66	0.62
9*	19 Feb 24	13:28	13:48	0.04	0.40	0.09	0.82	0.73
10*	19 Feb 24	13:49	14:09	0.03	0.49	0.07	1.01	0.94
11	19 Feb 24	14:10	14:30	0.02	0.28	0.05	0.55	0.50
12	19 Feb 24	14:31	14:51	0.02	0.33	0.04	0.62	0.59
Average						0.16	0.66	0.50
Confidence Coefficient (CC)								0.13
Relative Accuracy (Compared with Emission Standard : 10 ppm) (%)								6.28
Relative Accuracy Criteria <sup>1/</sup> (Compared with Emission Standard : 10 ppm)								≤ 10%

Reference Method : US EPA Method 6C

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of SO2 is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 2 (PS-2) compared with

Emission Standard 10 ppm at 7%O2

RA Result is within Criteria

Technical Management



ทะเบียนเลขที่ 2-204-ก-6113

Approved by



Assistant General Manager

ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyuthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418548  
Date Received : Feb 20, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913269-1

Page 3 of 4

Sample Number 2418548-1  
Sampled Date Feb 19, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 21  
Parameter CO

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual O2		Corrected Value at 7% O2		Difference
		Start	Stop	CEMs (ppm)	RM (ppm)	CEMs (ppm)	RM (ppm)	
1	19 Feb 24	10:40	11:00	1.18	0.07	2.24	0.13	-2.10
2*	19 Feb 24	11:01	11:21	1.48	0.09	2.80	0.17	-2.64
3	19 Feb 24	11:22	11:42	2.50	1.96	4.95	3.73	-1.22
4	19 Feb 24	11:43	12:03	4.64	5.28	9.49	10.41	0.92
5*	19 Feb 24	12:04	12:24	4.49	6.06	9.54	12.54	3.00
6	19 Feb 24	12:25	12:45	4.17	5.25	8.90	10.80	1.90
7*	19 Feb 24	12:46	13:06	3.45	4.83	7.21	9.84	2.63
8	19 Feb 24	13:07	13:27	0.09	0.61	0.18	1.15	0.97
9	19 Feb 24	13:28	13:48	4.20	5.05	8.87	10.35	1.47
10	19 Feb 24	13:49	14:09	2.89	3.84	6.13	7.89	1.76
11	19 Feb 24	14:10	14:30	1.95	2.64	3.90	5.19	1.28
12	19 Feb 24	14:31	14:51	0.64	0.96	1.24	1.83	0.59
Average						5.10	5.72	0.62
Confidence Coefficient (CC)								1.06
Relative Accuracy (Compared with Emission Standard : 690 ppm) (%)								0.24
Relative Accuracy Criteria <sup>1/</sup> (Compared with Emission Standard :690 ppm)								≤ 5%

Reference Method : US EPA Method 10

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of CO is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 4 (PS-4) compared with

Emission Standard 690 ppm at 7%O2

RA Result is within Criteria

Technical Management

Manager

ทะเบียนเลขที่ 2-204-ก-6113

Approved by

Assistant General Manager

ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyuthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418548  
Date Received : Feb 20, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913269-1

Page 4 of 4

Sample Number 2418548-1  
Sampled Date Feb 19, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 21  
Parameter O2

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual		Difference
		Start	Stop	CEMs (%)	RM (%)	
1	19 Feb 24	10:40	11:00	13.57	13.35	-0.23
2	19 Feb 24	11:01	11:21	13.59	13.37	-0.22
3*	19 Feb 24	11:22	11:42	13.88	13.60	-0.28
4*	19 Feb 24	11:43	12:03	14.10	13.85	-0.24
5	19 Feb 24	12:04	12:24	14.36	14.18	-0.18
6*	19 Feb 24	12:25	12:45	14.38	14.14	-0.24
7	19 Feb 24	12:46	13:06	14.25	14.08	-0.17
8	19 Feb 24	13:07	13:27	13.66	13.50	-0.16
9	19 Feb 24	13:28	13:48	14.32	14.12	-0.20
10	19 Feb 24	13:49	14:09	14.35	14.14	-0.21
11	19 Feb 24	14:10	14:30	13.96	13.82	-0.14
12	19 Feb 24	14:31	14:51	13.79	13.63	-0.16
Average				13.98	13.80	-0.19
Confidence Coefficient (CC)						-
Relative Accuracy (Compared in Actual) (%)						0.19
Relative Accuracy Criteria (%)						≤ 1%

Reference Method : US EPA Method 3A

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of O2 is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 3 (PS-3)

RA Result is within Criteria

Sampled By : Anuvat Mounpaib

Technical Management

Manager

ทะเบียนเลขที่ 2-204-ก-6113

Approved by

Assistant General Manager

ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418558  
Date Received : Apr 25, 2024  
Date Reported : May 16, 2024  
Report Number : 2975859-1

Page 1 of 2

Sample Number 2418558-1  
Sampled Date Apr 25, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 21  
Parameter Flowrate

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Flowrate Data		Difference
		Start	Stop	CEMs (Nm3/Hr)	RM (Nm3/Hr)	
1*	25 Apr 24	10:45	10:59	1,675,579	1,408,445	-267,134
2*	25 Apr 24	11:30	11:44	1,675,477	1,404,205	-271,272
3	25 Apr 24	12:15	12:29	1,477,451	1,445,693	-31,758
4	25 Apr 24	13:00	13:14	1,730,811	1,515,088	-215,723
5	25 Apr 24	13:45	13:59	1,502,777	1,540,488	37,711
6	25 Apr 24	14:30	14:44	1,749,985	1,537,465	-212,520
7	25 Apr 24	14:46	15:00	1,743,740	1,543,003	-200,737
8	25 Apr 24	15:02	15:16	1,752,503	1,575,355	-177,148
9	25 Apr 24	15:18	15:32	1,750,480	1,535,947	-214,533
10	25 Apr 24	15:34	15:48	1,746,033	1,524,227	-221,806
11*	25 Apr 24	15:50	16:04	1,744,170	1,511,324	-232,846
12	25 Apr 24	16:06	16:20	1,736,210	1,523,849	-212,361
Average				1,687,777	1,526,791	-160,986
Confidence Coefficient (CC)						73,366
Relative Accuracy <sup>1/</sup> (Compared with RM) (%)						15.35
Relative Accuracy Criteria (Compared with RM)						≤ 20 %

Reference Method : US EPA Method 2

Remark: \* Sample with \* Is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of Flowrate is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 6 (PS-6)

RA Result is within Criteria

Technical Management

Manager

โทรศัพท์ 0-204-8-6113

Approved by

Sarayuth Jitranont  
Assistant General Manager

โทรศัพท์ 0-204-8-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418558  
Date Received : Apr 25, 2024  
Date Reported : May 16, 2024  
Report Number : 2975859-1

Page 2 of 2

Sample Number 2418558-1  
Sampled Date Apr 25, 2024  
Sample Description Emission from Stationary Source  
Location HRSG 21  
Parameter Stack Temperature

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Temperature Data		Difference
		Start	Stop	CEMs (°C)	RM (°C)	
1*	25 Apr 24	10:45	10:59	90.5	85.6	-4.9
2*	25 Apr 24	11:30	11:44	90.6	85.5	-5.1
3*	25 Apr 24	12:15	12:29	90.5	86.8	-3.7
4	25 Apr 24	13:00	13:14	91.5	88.0	-3.5
5	25 Apr 24	13:45	13:59	86.7	88.2	1.5
6	25 Apr 24	14:30	14:44	90.1	87.1	-3.0
7	25 Apr 24	14:46	15:00	90.0	86.8	-3.2
8	25 Apr 24	15:02	15:16	89.9	88.0	-1.9
9	25 Apr 24	15:18	15:32	90.0	87.5	-2.5
10	25 Apr 24	15:34	15:48	89.8	88.4	-1.4
11	25 Apr 24	15:50	16:04	89.8	87.1	-2.7
12	25 Apr 24	16:06	16:20	89.5	88.0	-1.5
Average				89.7	87.7	-2.0
Confidence Coefficient (CC)						1.2
Relative Accuracy <sup>1/</sup> (Compared with RM) (%)						3.6
Relative Accuracy Criteria (Compared with RM)						≤ 20 %

Reference Method : US EPA Method 2

Remark: \* Sample with \* Is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of Stack Temperature is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 6 (PS-6)

RA Result is within Criteria

Sampled By : Anuvat Mounpair

Technical Management

Manager

โทรศัพท์ 0-204-8-6113

Approved by

Assistant General Manager

โทรศัพท์ 0-204-8-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhsaiyuthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418549  
Date Received : Feb 20, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913268-1

Page 1 of 4

Sample Number : 2418549-1  
Sampled Date : Feb 19, 2024  
Sample Description : Emission from Stationary Source  
Location : HRSG 22  
Parameter : NOx

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual O2		Corrected Value at 7% O2		Difference
		Start	Stop	CEMs (ppm)	RM (ppm)	CEMs (ppm)	RM (ppm)	
1*	19 Feb 24	10:20	10:40	24.97	21.32	46.46	38.52	-7.94
2	19 Feb 24	10:41	11:01	24.92	22.84	46.43	41.26	-5.16
3	19 Feb 24	11:02	11:22	25.13	23.31	47.03	42.34	-4.69
4	19 Feb 24	11:23	11:43	24.91	23.20	48.90	43.76	-5.14
5	19 Feb 24	11:44	12:04	25.14	23.83	51.19	46.70	-4.49
6*	19 Feb 24	12:05	12:25	23.28	21.34	49.74	43.97	-5.77
7*	19 Feb 24	12:26	12:46	23.64	21.86	50.15	44.70	-5.45
8	19 Feb 24	12:47	13:07	24.85	23.21	51.53	46.76	-4.77
9	19 Feb 24	13:08	13:28	25.84	25.33	49.17	46.66	-2.50
10	19 Feb 24	13:29	13:49	24.55	23.30	51.84	47.35	-4.50
11	19 Feb 24	13:50	14:10	24.65	23.82	51.99	48.47	-3.51
12	19 Feb 24	14:11	14:31	26.53	25.85	52.39	50.01	-2.39
Average						50.05	45.92	-4.13
Confidence Coefficient (CC)								0.82
Relative Accuracy (Compared with RM) (%)								10.78
Relative Accuracy Criteria <sup>1/</sup> (Compared with RM)								≤ 20%

Reference Method : US EPA Method 7E

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of NOx is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 2 (PS-2)

RA Result is within Criteria

Technical Management



Manager  
ทะเบียนเลขที่ 2-204-ก-6113

Approved by



Assistant General Manager  
ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

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P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418549  
Date Received : Feb 20, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913268-1

Page 2 of 4

Sample Number : 2418549-1  
Sampled Date : Feb 19, 2024  
Sample Description : Emission from Stationary Source  
Location : HRSG 22  
Parameter : SO2

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual O2		Corrected Value at 7% O2		Difference
		Start	Stop	CEMs (ppm)	RM (ppm)	CEMs (ppm)	RM (ppm)	
1	19 Feb 24	10:20	10:40	0.01	0.15	0.02	0.28	0.26
2	19 Feb 24	10:41	11:01	0.01	0.17	0.02	0.30	0.28
3	19 Feb 24	11:02	11:22	0.01	0.22	0.02	0.39	0.38
4	19 Feb 24	11:23	11:43	0.01	0.26	0.01	0.50	0.49
5	19 Feb 24	11:44	12:04	0.01	0.34	0.01	0.66	0.64
6	19 Feb 24	12:05	12:25	0.01	0.29	0.03	0.59	0.56
7	19 Feb 24	12:26	12:46	0.01	0.34	0.03	0.69	0.66
8*	19 Feb 24	12:47	13:07	0.02	0.41	0.03	0.83	0.79
9	19 Feb 24	13:08	13:28	0.00	0.39	0.00	0.72	0.72
10	19 Feb 24	13:29	13:49	0.01	0.37	0.02	0.76	0.73
11*	19 Feb 24	13:50	14:10	0.01	0.42	0.03	0.86	0.83
12*	19 Feb 24	14:11	14:31	0.00	0.41	0.00	0.80	0.79
Average						0.02	0.54	0.52
Confidence Coefficient (CC)								0.14
Relative Accuracy (Compared with Emission Standard : 10 ppm) (%)								6.65
Relative Accuracy Criteria <sup>1/</sup> (Compared with Emission Standard : 10 ppm)								≤ 10%

Reference Method : US EPA Method 6C

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of SO2 is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 2 (PS-2) compared with

Emission Standard 10 ppm at 7%O2

RA Result is within Criteria

Technical Management



Wichan Choonharat  
Manager  
ทะเบียนเลขที่ 2-204-ก-6113

Approved by



Assistant General Manager  
ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonslayuthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418549  
Date Received : Feb 20, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913268-1

Page 3 of 4

Sample Number 2418549-1  
Sampled Date Feb 19, 2024  
Sample Description Emission from Stationary Source  
Location HRS22  
Parameter CO

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual O2		Corrected Value at 7% O2		Difference
		Start	Stop	CEMs (ppm)	RM (ppm)	CEMs (ppm)	RM (ppm)	
1*	19 Feb 24	10:20	10:40	4.76	0.06	8.85	0.12	-8.73
2	19 Feb 24	10:41	11:01	3.13	0.04	5.84	0.06	-5.77
3	19 Feb 24	11:02	11:22	0.32	0.05	0.59	0.10	-0.50
4	19 Feb 24	11:23	11:43	7.01	4.08	13.76	7.69	-6.07
5*	19 Feb 24	11:44	12:04	13.21	9.03	26.89	17.70	-9.19
6	19 Feb 24	12:05	12:25	26.02	22.84	55.62	47.05	-8.57
7	19 Feb 24	12:26	12:46	22.92	19.68	48.62	40.24	-8.38
8	19 Feb 24	12:47	13:07	16.49	15.30	34.20	30.81	-3.39
9	19 Feb 24	13:08	13:28	1.74	1.08	3.30	1.99	-1.31
10*	19 Feb 24	13:29	13:49	18.48	14.78	39.02	30.04	-8.99
11	19 Feb 24	13:50	14:10	16.95	13.67	35.75	27.81	-7.93
12	19 Feb 24	14:11	14:31	6.54	6.78	12.92	13.12	0.20
Average						23.40	18.76	-4.63
Confidence Coefficient (CC)								2.67
Relative Accuracy (Compared with Emission Standard : 690 ppm) (%)								1.06
Relative Accuracy Criteria <sup>1/</sup> (Compared with Emission Standard :690 ppm)								≤ 5%

Reference Method : US EPA Method 10

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of CO is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 4 (PS-4) compared with

Emission Standard 690 ppm at 7%O2

RA Result is within Criteria

Technical Management



Wichan Choonmarat  
Manager  
ทะเบียนเลขที่ 2-204-ก-6113

Approved by



Sarayuth Jitranont  
Assistant General Manager  
ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonslayuthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418549  
Date Received : Feb 20, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913268-1

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Sample Number 2418549-1  
Sampled Date Feb 19, 2024  
Sample Description Emission from Stationary Source  
Location HRS22  
Parameter O2

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Raw Data at Actual		Difference
		Start	Stop	CEMs (%)	RM (%)	
1	19 Feb 24	10:20	10:40	13.43	13.21	-0.22
2	19 Feb 24	10:41	11:01	13.44	13.21	-0.23
3	19 Feb 24	11:02	11:22	13.47	13.25	-0.23
4*	19 Feb 24	11:23	11:43	13.82	13.53	-0.29
5*	19 Feb 24	11:44	12:04	14.07	13.81	-0.27
6	19 Feb 24	12:05	12:25	14.40	14.15	-0.24
7	19 Feb 24	12:26	12:46	14.35	14.10	-0.25
8	19 Feb 24	12:47	13:07	14.20	14.00	-0.20
9	19 Feb 24	13:08	13:28	13.60	13.35	-0.24
10*	19 Feb 24	13:29	13:49	14.32	14.06	-0.26
11	19 Feb 24	13:50	14:10	14.31	14.07	-0.24
12	19 Feb 24	14:11	14:31	13.86	13.72	-0.15
Average				13.89	13.67	-0.22
Confidence Coefficient (CC)						-
Relative Accuracy (Compared in Actual) (%)						0.22
Relative Accuracy Criteria (%)						≤ 1%

Reference Method : US EPA Method 3A

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of O2 is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 3 (PS-3)

RA Result is within Criteria

Sampled By : Anuvat Mounpair

Technical Management



Anuvat Mounpair  
Manager  
ทะเบียนเลขที่ 2-204-ก-6113

Approved by



Sarayuth Jitranont  
Assistant General Manager  
ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonslayuthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418559  
Date Received : Feb 20, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913282-2

Page 1 of 2

Sample Number : 2418559-1  
Sampled Date : Feb 19, 2024  
Sample Description : Emission from Stationary Source  
Location : HRSG 22  
Parameter : Flowrate

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Flowrate Data		Difference
		Start	Stop	CEMs (Nm3/Hr)	RM (Nm3/Hr)	
1	19 Feb 24	10:20	10:34	1,730,809	1,906,805	175,996
2	19 Feb 24	11:31	11:45	1,512,288	1,810,811	298,523
3	19 Feb 24	11:46	12:00	1,475,626	1,622,852	147,226
4*	19 Feb 24	12:01	12:15	1,231,522	1,673,882	442,360
5	19 Feb 24	12:16	12:30	1,155,826	1,445,340	289,514
6	19 Feb 24	12:31	12:45	1,187,705	1,490,380	302,675
7*	19 Feb 24	12:46	13:00	1,174,988	1,482,636	307,648
8	19 Feb 24	13:01	13:15	1,497,175	1,628,035	130,860
9	19 Feb 24	13:16	13:30	1,638,939	1,923,166	284,227
10*	19 Feb 24	13:31	13:45	1,223,071	1,742,480	519,409
11	19 Feb 24	13:46	14:00	1,173,156	1,443,769	270,613
12	19 Feb 24	14:01	14:15	1,172,779	1,456,363	283,584
Average				1,393,811	1,636,391	242,580
Confidence Coefficient (CC)						53,774
Relative Accuracy <sup>1/</sup> (Compared with RM) (%)						18.11
Relative Accuracy Criteria (Compared with RM)						≤ 20 %

Reference Method : US EPA Method 2

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of Flowrate is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 6 (PS-6)

RA Result is within Criteria

Technical Management

Manager

ทะเบียนเลขที่ 2-204-ก-6113

Approved by

Sarayuth Jitranont  
Assistant General Manager

ทะเบียนเลขที่ 2-204-ก-4702

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonslayuthaya Thailand 13210  
P/O : 4102004243  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 2418559  
Date Received : Feb 20, 2024  
Date Reported : Mar 12, 2024  
Report Number : 2913282-2

Page 2 of 2

Sample Number : 2418559-1  
Sampled Date : Feb 19, 2024  
Sample Description : Emission from Stationary Source  
Location : HRSG 22  
Parameter : Stack Temperature

### Relative Accuracy Test Audit Report

Run No.	Date	Time		Temperature Data		Difference
		Start	Stop	CEMs (°C)	RM (°C)	
1	19 Feb 24	10:20	10:34	89.4	88.8	-0.6
2	19 Feb 24	11:31	11:45	87.4	86.3	-1.0
3	19 Feb 24	11:46	12:00	86.3	83.8	-2.4
4	19 Feb 24	12:01	12:15	85.8	87.9	2.1
5	19 Feb 24	12:16	12:30	85.4	87.8	2.4
6	19 Feb 24	12:31	12:45	85.8	88.8	3.0
7*	19 Feb 24	12:46	13:00	85.5	88.8	3.4
8	19 Feb 24	13:01	13:15	90.0	92.1	2.1
9*	19 Feb 24	13:16	13:30	91.4	97.0	5.6
10*	19 Feb 24	13:31	13:45	82.8	90.5	7.7
11	19 Feb 24	13:46	14:00	83.4	82.8	-0.7
12	19 Feb 24	14:01	14:15	84.9	85.8	0.9
Average				86.5	87.1	0.7
Confidence Coefficient (CC)						1.5
Relative Accuracy <sup>1/</sup> (Compared with RM) (%)						2.4
Relative Accuracy Criteria (Compared with RM)						≤ 20 %

Reference Method : US EPA Method 2

Remark: \* Sample with \* is a rejected data

<sup>1/</sup> Relative Accuracy Criteria of Stack Temperature is refer to 40 CFR Part 60 Appendix B : Performance Specification Test 6 (PS-6)

RA Result is within Criteria

Sampled By : Apsit Singha

Technical Management

Manager

ทะเบียนเลขที่ 2-204-ก-6113

Approved by

Sarayuth Jitranont  
Assistant General Manager

ทะเบียนเลขที่ 2-204-ก-4702

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# ภาคผนวก ค-3

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ระดับเสียงทั่วไป





## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhsaiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205527-1

Page 1 of 1

Sample Number 2493826-1

Parameter Noise (Leq 24 hrs.)

Location บริเวณริมรั้วโครงการทางด่านทิศใต้ (GPS 47P 682744, 1584543)

Measurement Date Dec 18 - Dec 19, 2024

Measurement by Thanong Wiriyasahakij

Sound Level meter Serial No. 597156

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
02:00 PM - 03:00 PM	45.8	69.0	41.1
03:00 PM - 04:00 PM	44.9	67.5	40.4
04:00 PM - 05:00 PM	45.3	76.4	41.0
05:00 PM - 06:00 PM	46.0	64.1	42.8
06:00 PM - 07:00 PM	48.2	61.5	46.1
07:00 PM - 08:00 PM	48.8	59.9	45.5
08:00 PM - 09:00 PM	45.8	56.1	44.7
09:00 PM - 10:00 PM	45.2	51.5	44.0
10:00 PM - 11:00 PM	45.8	58.6	44.7
11:00 PM - 12:00 AM	45.7	61.7	44.4
12:00 AM - 01:00 AM	45.2	51.7	44.1
01:00 AM - 02:00 AM	44.8	55.0	43.6
02:00 AM - 03:00 AM	44.2	57.3	43.1
03:00 AM - 04:00 AM	44.9	54.9	42.9
04:00 AM - 05:00 AM	47.8	62.1	44.2
05:00 AM - 06:00 AM	47.7	63.9	44.7
06:00 AM - 07:00 AM	47.7	65.4	45.1
07:00 AM - 08:00 AM	50.2	77.4	45.1
08:00 AM - 09:00 AM	49.1	69.0	44.2
09:00 AM - 10:00 AM	48.3	65.5	43.6
10:00 AM - 11:00 AM	47.7	61.8	42.9
11:00 AM - 12:00 PM	48.8	66.8	43.6
12:00 PM - 01:00 PM	48.8	66.3	42.5
01:00 PM - 02:00 PM	48.2	67.1	43.3

Leq Average 24 hrs. (dB(A))

47.2

Lmax (dB(A))

77.4

L90 (dB(A))

43.6

Ldn (dB(A))

52.8

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

Technical Management

Sa

Scientist (4)

Approved by

Section Head

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhsaiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205528-1

Page 1 of 1

Sample Number 2493826-2

Parameter Noise (Leq 24 hrs.)

Location บริเวณริมรั้วโครงการทางด่านทิศใต้ (GPS 47P 682744, 1584543)

Measurement Date Dec 19 - Dec 20, 2024

Measurement by Thanong Wiriyasahakij

Sound Level meter Serial No. 597156

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
02:00 PM - 03:00 PM	48.3	72.4	43.0
03:00 PM - 04:00 PM	47.6	74.5	42.6
04:00 PM - 05:00 PM	44.9	69.9	41.7
05:00 PM - 06:00 PM	46.1	75.0	43.2
06:00 PM - 07:00 PM	46.8	61.3	45.1
07:00 PM - 08:00 PM	45.7	56.2	44.5
08:00 PM - 09:00 PM	45.9	60.0	44.2
09:00 PM - 10:00 PM	45.1	59.0	43.8
10:00 PM - 11:00 PM	45.8	60.8	44.3
11:00 PM - 12:00 AM	45.4	59.5	43.9
12:00 AM - 01:00 AM	46.1	57.4	44.3
01:00 AM - 02:00 AM	46.5	61.0	45.0
02:00 AM - 03:00 AM	45.6	56.8	43.8
03:00 AM - 04:00 AM	45.1	56.2	43.9
04:00 AM - 05:00 AM	45.5	58.6	44.0
05:00 AM - 06:00 AM	45.4	56.0	44.0
06:00 AM - 07:00 AM	47.9	65.8	45.5
07:00 AM - 08:00 AM	49.2	63.9	46.4
08:00 AM - 09:00 AM	47.9	66.2	44.6
09:00 AM - 10:00 AM	50.3	63.6	44.1
10:00 AM - 11:00 AM	50.1	64.2	43.9
11:00 AM - 12:00 PM	45.5	62.6	40.0
12:00 PM - 01:00 PM	44.6	60.9	39.5
01:00 PM - 02:00 PM	48.4	67.9	41.6

Leq Average 24 hrs. (dB(A))

47.0

Lmax (dB(A))

75.0

L90 (dB(A))

43.9

Ldn (dB(A))

52.7

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

Technical Management

Sa

Scientist (4)

Approved by

Section Head

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhonsiyuthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205529-1

Page 1 of 1

Sample Number 2493826-3  
Parameter Noise (Leq 24 hrs.)  
Location บริเวณริมรั้วโครงการทางด่านที่ศสได้ (GPS 47P 682744, 1584543)  
Measurement Date Dec 20 - Dec 21, 2024  
Measurement by Thanong Wiriyasahakij  
Sound Level meter Serial No. 597156

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
02:00 PM - 03:00 PM	48.4	69.8	43.2
03:00 PM - 04:00 PM	44.2	73.5	40.4
04:00 PM - 05:00 PM	43.3	73.2	40.3
05:00 PM - 06:00 PM	44.7	65.5	42.2
06:00 PM - 07:00 PM	45.9	62.7	43.8
07:00 PM - 08:00 PM	45.0	55.2	44.1
08:00 PM - 09:00 PM	44.6	54.5	43.4
09:00 PM - 10:00 PM	44.9	57.3	43.6
10:00 PM - 11:00 PM	45.1	52.6	43.6
11:00 PM - 12:00 AM	44.7	73.4	42.0
12:00 AM - 01:00 AM	44.5	58.7	42.8
01:00 AM - 02:00 AM	43.7	52.5	42.4
02:00 AM - 03:00 AM	43.5	52.4	42.5
03:00 AM - 04:00 AM	44.8	52.9	43.7
04:00 AM - 05:00 AM	45.1	63.2	44.0
05:00 AM - 06:00 AM	46.5	58.4	45.0
06:00 AM - 07:00 AM	46.7	76.9	44.2
07:00 AM - 08:00 AM	46.0	68.3	43.7
08:00 AM - 09:00 AM	44.0	60.8	41.2
09:00 AM - 10:00 AM	46.6	64.2	41.0
10:00 AM - 11:00 AM	46.7	67.6	40.4
11:00 AM - 12:00 PM	48.0	65.5	40.3
12:00 PM - 01:00 PM	41.6	53.4	36.9
01:00 PM - 02:00 PM	45.7	61.8	39.8

Leq Average 24 hrs. (dB(A))

45.4

Lmax (dB(A))

76.9

L90 (dB(A))

42.5

Ldn (dB(A))

51.6

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

Technical Management

Signature

Scientist (4)

Approved by

Section Head

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhonsiyuthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205530-1

Page 1 of 1

Sample Number 2493826-4  
Parameter Noise (Leq 24 hrs.)  
Location บริเวณริมรั้วโครงการทางด่านที่ศสได้ (GPS 47P 682744, 1584543)  
Measurement Date Dec 21 - Dec 22, 2024  
Measurement by Thanong Wiriyasahakij  
Sound Level meter Serial No. 597156

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
02:00 PM - 03:00 PM	46.0	62.6	40.7
03:00 PM - 04:00 PM	46.3	61.1	43.6
04:00 PM - 05:00 PM	46.2	68.2	43.3
05:00 PM - 06:00 PM	47.4	77.1	43.6
06:00 PM - 07:00 PM	47.7	61.9	46.1
07:00 PM - 08:00 PM	47.2	62.5	45.4
08:00 PM - 09:00 PM	45.8	57.1	44.7
09:00 PM - 10:00 PM	47.1	63.0	44.8
10:00 PM - 11:00 PM	45.9	53.7	45.0
11:00 PM - 12:00 AM	45.4	53.8	44.3
12:00 AM - 01:00 AM	44.9	55.2	43.9
01:00 AM - 02:00 AM	44.9	53.4	43.8
02:00 AM - 03:00 AM	45.0	54.8	43.4
03:00 AM - 04:00 AM	44.7	53.3	43.2
04:00 AM - 05:00 AM	45.7	54.5	44.1
05:00 AM - 06:00 AM	47.1	63.1	44.5
06:00 AM - 07:00 AM	48.4	64.3	45.4
07:00 AM - 08:00 AM	48.9	63.7	45.8
08:00 AM - 09:00 AM	49.0	67.8	45.1
09:00 AM - 10:00 AM	49.6	67.4	44.2
10:00 AM - 11:00 AM	49.1	65.5	43.9
11:00 AM - 12:00 PM	47.9	66.9	42.2
12:00 PM - 01:00 PM	47.9	64.5	41.5
01:00 PM - 02:00 PM	48.6	65.4	43.5

Leq Average 24 hrs. (dB(A))

47.2

Lmax (dB(A))

77.1

L90 (dB(A))

43.9

Ldn (dB(A))

52.7

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

Technical Management

Signature

Scientist (4)

Approved by

Section Head

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205531-1

Page 1 of 1

Sample Number 2493826-5  
Parameter Noise (Leq 24 hrs.)  
Location บริเวณริมรั้วโครงการทางด้านทิศใต้ (GPS 47P 682744, 1584543)  
Measurement Date Dec 22 - Dec 23, 2024  
Measurement by Thanong Wiriyasahakij  
Sound Level meter Serial No. 597156

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
02:00 PM - 03:00 PM	47.8	64.6	42.4
03:00 PM - 04:00 PM	48.0	71.1	43.2
04:00 PM - 05:00 PM	47.0	64.4	43.1
05:00 PM - 06:00 PM	46.4	73.0	43.2
06:00 PM - 07:00 PM	46.2	59.0	44.7
07:00 PM - 08:00 PM	46.4	57.6	45.2
08:00 PM - 09:00 PM	44.4	53.2	43.1
09:00 PM - 10:00 PM	44.9	59.3	43.6
10:00 PM - 11:00 PM	45.9	63.9	44.5
11:00 PM - 12:00 AM	46.3	57.0	45.1
12:00 AM - 01:00 AM	45.4	56.2	44.1
01:00 AM - 02:00 AM	45.2	64.9	43.6
02:00 AM - 03:00 AM	44.4	58.3	42.8
03:00 AM - 04:00 AM	44.1	59.0	42.8
04:00 AM - 05:00 AM	45.4	61.0	43.3
05:00 AM - 06:00 AM	47.5	68.5	44.7
06:00 AM - 07:00 AM	50.1	69.5	46.1
07:00 AM - 08:00 AM	53.6	69.7	48.4
08:00 AM - 09:00 AM	50.8	67.0	45.3
09:00 AM - 10:00 AM	51.2	69.5	45.1
10:00 AM - 11:00 AM	50.4	70.6	43.8
11:00 AM - 12:00 PM	47.9	65.2	42.7
12:00 PM - 01:00 PM	47.9	62.5	41.8
01:00 PM - 02:00 PM	45.2	62.2	41.7

Leq Average 24 hrs. (dB(A)) 48.0  
Lmax (dB(A)) 73.0  
L90 (dB(A)) 43.6  
Ldn (dB(A)) 53.2  
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

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Approved by

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205532-1

Page 1 of 1

Sample Number 2493826-6  
Parameter Noise (Leq 24 hrs.)  
Location หนองน้ำส้ม (GPS 47P 683730, 1584131)  
Measurement Date Dec 18 - Dec 19, 2024  
Measurement by Thanong Wiriyasahakij  
Sound Level meter Serial No. 296514

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	52.2	77.7	47.5
10:00 AM - 11:00 AM	54.6	85.2	49.8
11:00 AM - 12:00 PM	51.1	73.4	45.4
12:00 PM - 01:00 PM	47.6	71.0	43.6
01:00 PM - 02:00 PM	47.7	69.8	43.5
02:00 PM - 03:00 PM	48.9	66.8	43.9
03:00 PM - 04:00 PM	51.9	71.7	46.3
04:00 PM - 05:00 PM	50.9	78.0	45.5
05:00 PM - 06:00 PM	52.5	73.9	44.3
06:00 PM - 07:00 PM	48.9	69.1	47.4
07:00 PM - 08:00 PM	48.2	60.9	47.3
08:00 PM - 09:00 PM	47.8	59.7	46.9
09:00 PM - 10:00 PM	47.6	58.1	46.7
10:00 PM - 11:00 PM	47.6	65.0	46.2
11:00 PM - 12:00 AM	46.9	55.4	46.0
12:00 AM - 01:00 AM	46.4	51.2	45.4
01:00 AM - 02:00 AM	45.8	52.6	44.9
02:00 AM - 03:00 AM	45.9	70.2	44.8
03:00 AM - 04:00 AM	45.9	56.8	45.1
04:00 AM - 05:00 AM	46.5	63.4	44.2
05:00 AM - 06:00 AM	47.9	67.8	44.1
06:00 AM - 07:00 AM	51.6	68.5	46.9
07:00 AM - 08:00 AM	52.2	77.7	47.5
08:00 AM - 09:00 AM	51.7	68.7	48.0

Leq Average 24 hrs. (dB(A)) 49.9  
Lmax (dB(A)) 85.2  
L90 (dB(A)) 45.5  
Ldn (dB(A)) 54.6  
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205533-1

Page 1 of 1

Sample Number 2493826-7  
Parameter Noise (Leq 24 hrs.)  
Location รั้วหนองน้ำส้ม (GPS 47P 683730, 1584131)  
Measurement Date Dec 19 - Dec 20, 2024  
Measurement by Thanong Wiriyasahakij  
Sound Level meter Serial No. 296514

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	53.0	76.5	48.5
10:00 AM - 11:00 AM	49.6	68.1	45.7
11:00 AM - 12:00 PM	48.3	67.9	45.2
12:00 PM - 01:00 PM	48.0	66.9	44.6
01:00 PM - 02:00 PM	48.4	65.5	45.2
02:00 PM - 03:00 PM	49.2	62.9	47.0
03:00 PM - 04:00 PM	49.2	64.9	45.8
04:00 PM - 05:00 PM	48.1	69.6	44.8
05:00 PM - 06:00 PM	48.7	72.4	45.8
06:00 PM - 07:00 PM	48.8	68.4	47.3
07:00 PM - 08:00 PM	48.0	61.8	46.6
08:00 PM - 09:00 PM	47.0	63.3	45.9
09:00 PM - 10:00 PM	47.6	61.5	46.3
10:00 PM - 11:00 PM	46.9	59.8	46.0
11:00 PM - 12:00 AM	47.1	60.1	45.9
12:00 AM - 01:00 AM	47.1	63.7	45.9
01:00 AM - 02:00 AM	45.7	55.8	44.9
02:00 AM - 03:00 AM	45.2	58.3	44.2
03:00 AM - 04:00 AM	45.3	58.9	43.4
04:00 AM - 05:00 AM	45.1	64.2	42.9
05:00 AM - 06:00 AM	52.3	77.4	43.3
06:00 AM - 07:00 AM	50.4	71.2	46.5
07:00 AM - 08:00 AM	49.9	64.5	46.7
08:00 AM - 09:00 AM	49.1	64.7	46.2

Leq Average 24 hrs. (dB(A))

48.7

Lmax (dB(A))

77.4

L90 (dB(A))

45.8

Ldn (dB(A))

54.6

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป

2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

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Approved by

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205534-1

Page 1 of 1

Sample Number 2493826-8  
Parameter Noise (Leq 24 hrs.)  
Location รั้วหนองน้ำส้ม (GPS 47P 683730, 1584131)  
Measurement Date Dec 20 - Dec 21, 2024  
Measurement by Thanong Wiriyasahakij  
Sound Level meter Serial No. 296514

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	48.9	66.9	45.7
10:00 AM - 11:00 AM	48.0	67.9	44.1
11:00 AM - 12:00 PM	46.5	69.0	42.7
12:00 PM - 01:00 PM	47.3	71.8	43.1
01:00 PM - 02:00 PM	47.2	63.8	44.2
02:00 PM - 03:00 PM	48.6	65.4	44.7
03:00 PM - 04:00 PM	48.1	64.7	44.0
04:00 PM - 05:00 PM	48.4	70.8	44.3
05:00 PM - 06:00 PM	49.3	76.3	42.7
06:00 PM - 07:00 PM	47.3	74.2	44.5
07:00 PM - 08:00 PM	45.7	74.4	43.7
08:00 PM - 09:00 PM	44.7	65.8	43.0
09:00 PM - 10:00 PM	43.7	64.7	42.7
10:00 PM - 11:00 PM	44.4	61.7	42.7
11:00 PM - 12:00 AM	43.9	68.2	41.9
12:00 AM - 01:00 AM	43.0	53.4	41.6
01:00 AM - 02:00 AM	44.4	57.8	43.6
02:00 AM - 03:00 AM	44.5	50.8	43.8
03:00 AM - 04:00 AM	45.4	61.3	43.8
04:00 AM - 05:00 AM	46.9	67.0	44.0
05:00 AM - 06:00 AM	46.7	67.5	43.6
06:00 AM - 07:00 AM	51.2	70.7	45.5
07:00 AM - 08:00 AM	50.3	72.1	45.9
08:00 AM - 09:00 AM	51.3	68.5	45.6

Leq Average 24 hrs. (dB(A))

47.5

Lmax (dB(A))

76.3

L90 (dB(A))

43.8

Ldn (dB(A))

53.1

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป

2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205535-1

Page 1 of 1

Sample Number 2493826-9  
Parameter Noise (Leq 24 hrs.)  
Location วัดหนองน้ำส้ม (GPS 47P 683730, 1584131)  
Measurement Date Dec 21 - Dec 22, 2024  
Measurement by Thanong Wiriyasahakij  
Sound Level meter Serial No. 296514

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	50.5	67.3	44.8
10:00 AM - 11:00 AM	48.7	72.6	44.0
11:00 AM - 12:00 PM	46.4	65.6	42.3
12:00 PM - 01:00 PM	45.4	67.0	40.9
01:00 PM - 02:00 PM	45.4	62.7	41.4
02:00 PM - 03:00 PM	47.6	62.5	43.6
03:00 PM - 04:00 PM	47.3	68.5	43.2
04:00 PM - 05:00 PM	48.3	69.4	43.3
05:00 PM - 06:00 PM	50.0	74.8	43.4
06:00 PM - 07:00 PM	46.8	64.9	43.8
07:00 PM - 08:00 PM	48.4	74.4	46.0
08:00 PM - 09:00 PM	47.1	62.2	45.6
09:00 PM - 10:00 PM	48.3	65.4	45.9
10:00 PM - 11:00 PM	47.6	60.6	46.5
11:00 PM - 12:00 AM	46.8	57.1	45.8
12:00 AM - 01:00 AM	46.0	58.9	45.0
01:00 AM - 02:00 AM	45.5	58.9	44.5
02:00 AM - 03:00 AM	45.3	60.3	44.1
03:00 AM - 04:00 AM	44.7	56.9	43.8
04:00 AM - 05:00 AM	44.9	60.2	43.6
05:00 AM - 06:00 AM	44.8	57.7	43.6
06:00 AM - 07:00 AM	47.8	75.0	43.9
07:00 AM - 08:00 AM	50.7	70.7	46.5
08:00 AM - 09:00 AM	51.1	71.4	47.6

Leq Average 24 hrs. (dB(A)) 47.7  
Lmax (dB(A)) 75.0  
L90 (dB(A)) 43.9  
Ldn (dB(A)) 52.9  
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

Technical Management

Approved by

Scientist (4)

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205536-1

Page 1 of 1

Sample Number 2493826-10  
Parameter Noise (Leq 24 hrs.)  
Location วัดหนองน้ำส้ม (GPS 47P 683730, 1584131)  
Measurement Date Dec 22 - Dec 23, 2024  
Measurement by Thanong Wiriyasahakij  
Sound Level meter Serial No. 296514

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	53.5	70.8	47.8
10:00 AM - 11:00 AM	53.4	69.9	47.1
11:00 AM - 12:00 PM	52.9	68.8	46.0
12:00 PM - 01:00 PM	47.8	67.6	44.1
01:00 PM - 02:00 PM	52.9	77.6	44.9
02:00 PM - 03:00 PM	54.4	86.0	45.9
03:00 PM - 04:00 PM	53.5	70.4	45.3
04:00 PM - 05:00 PM	53.6	70.7	46.4
05:00 PM - 06:00 PM	50.3	66.1	45.6
06:00 PM - 07:00 PM	47.2	70.5	44.6
07:00 PM - 08:00 PM	47.8	73.4	46.4
08:00 PM - 09:00 PM	47.2	70.4	46.1
09:00 PM - 10:00 PM	46.4	55.4	45.5
10:00 PM - 11:00 PM	48.2	56.8	46.9
11:00 PM - 12:00 AM	48.4	60.0	47.1
12:00 AM - 01:00 AM	48.3	60.0	46.9
01:00 AM - 02:00 AM	48.1	56.9	47.0
02:00 AM - 03:00 AM	48.3	66.7	47.1
03:00 AM - 04:00 AM	47.7	65.1	46.7
04:00 AM - 05:00 AM	47.0	67.7	45.8
05:00 AM - 06:00 AM	47.1	65.5	45.8
06:00 AM - 07:00 AM	50.5	72.3	45.2
07:00 AM - 08:00 AM	54.1	87.5	47.8
08:00 AM - 09:00 AM	56.3	71.7	49.4

Leq Average 24 hrs. (dB(A)) 51.3  
Lmax (dB(A)) 87.5  
L90 (dB(A)) 46.1  
Ldn (dB(A)) 55.6  
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205537-1

Page 1 of 1

Sample Number 2493826-11  
Parameter Noise (Leq 24 hrs.)  
Location โรงเรือนโรงงาน (GPS 47P 684386, 1587182)  
Measurement Date Dec 18 - Dec 19, 2024  
Measurement by Thanong Wiriyasahakij  
Sound Level meter Serial No. 597155

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	54.1	76.7	45.5
12:00 PM - 01:00 PM	53.0	77.4	45.9
01:00 PM - 02:00 PM	53.7	73.0	44.5
02:00 PM - 03:00 PM	52.9	73.8	44.6
03:00 PM - 04:00 PM	56.2	87.2	45.5
04:00 PM - 05:00 PM	56.8	85.0	47.6
05:00 PM - 06:00 PM	54.1	80.4	44.9
06:00 PM - 07:00 PM	57.3	62.0	42.3
07:00 PM - 08:00 PM	54.5	80.3	44.8
08:00 PM - 09:00 PM	51.6	78.4	45.6
09:00 PM - 10:00 PM	54.8	74.5	45.5
10:00 PM - 11:00 PM	45.5	68.7	41.2
11:00 PM - 12:00 AM	46.8	82.8	41.1
12:00 AM - 01:00 AM	59.4	74.0	58.9
01:00 AM - 02:00 AM	59.2	66.4	58.7
02:00 AM - 03:00 AM	57.3	62.0	42.3
03:00 AM - 04:00 AM	45.1	72.2	41.4
04:00 AM - 05:00 AM	48.0	74.4	41.2
05:00 AM - 06:00 AM	62.5	99.6	43.0
06:00 AM - 07:00 AM	56.7	80.1	49.2
07:00 AM - 08:00 AM	60.5	94.2	50.6
08:00 AM - 09:00 AM	58.0	79.2	50.4
09:00 AM - 10:00 AM	57.0	80.1	50.5
10:00 AM - 11:00 AM	56.2	83.0	48.4

Leq Average 24 hrs. (dB(A))

56.5

Lmax (dB(A))

99.6

L90 (dB(A))

45.5

Ldn (dB(A))

63.4

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

Technical Management

Approved by

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S:\Reports\_Air Noise rpt (10:10AM)



## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205538-1

Page 1 of 1

Sample Number 2493826-12  
Parameter Noise (Leq 24 hrs.)  
Location โรงเรือนโรงงาน (GPS 47P 684386, 1587182)  
Measurement Date Dec 19 - Dec 20, 2024  
Measurement by Thanong Wiriyasahakij  
Sound Level meter Serial No. 597155

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	54.0	72.1	47.6
12:00 PM - 01:00 PM	53.0	77.6	46.5
01:00 PM - 02:00 PM	51.2	73.2	45.5
02:00 PM - 03:00 PM	54.0	80.4	46.3
03:00 PM - 04:00 PM	55.6	80.9	45.3
04:00 PM - 05:00 PM	56.4	85.3	47.2
05:00 PM - 06:00 PM	54.2	78.5	45.0
06:00 PM - 07:00 PM	56.8	85.9	45.1
07:00 PM - 08:00 PM	51.2	78.3	44.8
08:00 PM - 09:00 PM	50.2	71.7	44.0
09:00 PM - 10:00 PM	48.0	75.4	42.8
10:00 PM - 11:00 PM	44.8	65.9	42.1
11:00 PM - 12:00 AM	45.2	76.4	41.7
12:00 AM - 01:00 AM	59.7	86.9	41.8
01:00 AM - 02:00 AM	44.2	64.4	41.7
02:00 AM - 03:00 AM	42.7	66.9	40.0
03:00 AM - 04:00 AM	43.1	64.9	40.3
04:00 AM - 05:00 AM	52.7	82.2	41.1
05:00 AM - 06:00 AM	54.6	79.3	43.0
06:00 AM - 07:00 AM	61.6	91.5	50.7
07:00 AM - 08:00 AM	58.4	76.6	49.0
08:00 AM - 09:00 AM	59.2	84.4	48.1
09:00 AM - 10:00 AM	58.3	81.4	47.9
10:00 AM - 11:00 AM	61.0	95.0	47.6

Leq Average 24 hrs. (dB(A))

55.8

Lmax (dB(A))

95.0

L90 (dB(A))

45.0

Ldn (dB(A))

61.8

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205539-1

Page 1 of 1

Sample Number 2493826-13  
Parameter Noise (Leq 24 hrs.)  
Location โรงเรือนวัดนางสี (GPS 47P 684386, 1587182)  
Measurement Date Dec 20 - Dec 21, 2024  
Measurement by Thanong Wiriyasahakij  
Sound Level meter Serial No. 597155

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	54.2	74.4	45.2
12:00 PM - 01:00 PM	55.5	83.3	45.6
01:00 PM - 02:00 PM	57.8	89.6	45.5
02:00 PM - 03:00 PM	55.8	72.8	45.0
03:00 PM - 04:00 PM	57.6	83.0	46.0
04:00 PM - 05:00 PM	56.6	81.0	49.7
05:00 PM - 06:00 PM	58.1	86.7	47.6
06:00 PM - 07:00 PM	54.9	83.6	45.1
07:00 PM - 08:00 PM	54.3	82.8	45.9
08:00 PM - 09:00 PM	55.7	84.2	44.3
09:00 PM - 10:00 PM	50.2	82.1	43.1
10:00 PM - 11:00 PM	47.1	67.2	42.3
11:00 PM - 12:00 AM	45.5	68.7	41.2
12:00 AM - 01:00 AM	46.8	82.8	41.1
01:00 AM - 02:00 AM	55.8	87.7	40.6
02:00 AM - 03:00 AM	45.2	72.6	43.2
03:00 AM - 04:00 AM	47.7	83.2	40.8
04:00 AM - 05:00 AM	49.2	77.6	40.8
05:00 AM - 06:00 AM	61.6	96.5	47.1
06:00 AM - 07:00 AM	58.5	78.6	48.4
07:00 AM - 08:00 AM	58.3	84.2	48.2
08:00 AM - 09:00 AM	59.2	87.4	49.4
09:00 AM - 10:00 AM	56.5	79.6	46.7
10:00 AM - 11:00 AM	56.3	69.4	46.5

Leq Average 24 hrs. (dB(A)) 56.0  
Lmax (dB(A)) 96.5  
L90 (dB(A)) 45.2  
Ldn (dB(A)) 61.7  
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205540-1

Page 1 of 1

Sample Number 2493826-14  
Parameter Noise (Leq 24 hrs.)  
Location โรงเรือนวัดนางสี (GPS 47P 684386, 1587182)  
Measurement Date Dec 21 - Dec 22, 2024  
Measurement by Thanong Wiriyasahakij  
Sound Level meter Serial No. 597155

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	55.3	74.2	44.1
12:00 PM - 01:00 PM	54.7	71.7	43.0
01:00 PM - 02:00 PM	58.3	83.3	46.1
02:00 PM - 03:00 PM	53.6	75.7	43.6
03:00 PM - 04:00 PM	52.0	74.2	43.2
04:00 PM - 05:00 PM	55.3	79.3	44.4
05:00 PM - 06:00 PM	56.7	83.4	45.5
06:00 PM - 07:00 PM	51.2	73.4	44.3
07:00 PM - 08:00 PM	51.5	73.1	44.3
08:00 PM - 09:00 PM	55.5	78.8	44.5
09:00 PM - 10:00 PM	49.8	79.2	44.5
10:00 PM - 11:00 PM	58.6	92.5	43.7
11:00 PM - 12:00 AM	52.8	80.9	42.9
12:00 AM - 01:00 AM	45.6	67.0	42.3
01:00 AM - 02:00 AM	50.1	68.8	43.0
02:00 AM - 03:00 AM	53.4	84.3	49.9
03:00 AM - 04:00 AM	50.6	72.5	49.0
04:00 AM - 05:00 AM	48.3	83.5	41.1
05:00 AM - 06:00 AM	47.2	75.4	42.3
06:00 AM - 07:00 AM	56.0	80.1	47.3
07:00 AM - 08:00 AM	57.1	79.4	48.6
08:00 AM - 09:00 AM	56.8	81.5	48.5
09:00 AM - 10:00 AM	57.6	79.5	47.7
10:00 AM - 11:00 AM	55.9	79.3	47.7

Leq Average 24 hrs. (dB(A)) 54.7  
Lmax (dB(A)) 92.5  
L90 (dB(A)) 44.3  
Ldn (dB(A)) 60.0  
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhonsiyulthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 2493826

Date Received : Dec 24, 2024

Date Reported : Jan 02, 2025

Report Number: 3205541-1

Page 1 of 1

Sample Number 2493826-15  
Parameter Noise (Leq 24 hrs.)  
Location โรงเรียนโตนาง (GPS 47P 684386, 1587182)  
Measurement Date Dec 22 - Dec 23, 2024  
Measurement by Thanong Wiriyasahakij  
Sound Level meter Serial No. 597155

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	56.4	79.4	47.1
12:00 PM - 01:00 PM	55.8	75.7	47.2
01:00 PM - 02:00 PM	54.7	80.3	45.0
02:00 PM - 03:00 PM	55.6	73.4	46.0
03:00 PM - 04:00 PM	54.9	76.4	45.3
04:00 PM - 05:00 PM	54.0	70.6	48.2
05:00 PM - 06:00 PM	55.6	75.4	46.1
06:00 PM - 07:00 PM	55.1	85.3	44.6
07:00 PM - 08:00 PM	57.6	82.6	44.6
08:00 PM - 09:00 PM	53.4	80.0	44.3
09:00 PM - 10:00 PM	57.4	85.7	42.8
10:00 PM - 11:00 PM	55.7	77.4	42.9
11:00 PM - 12:00 AM	46.8	69.0	42.4
12:00 AM - 01:00 AM	49.9	81.9	48.1
01:00 AM - 02:00 AM	50.4	83.3	41.1
02:00 AM - 03:00 AM	52.3	83.7	40.9
03:00 AM - 04:00 AM	42.8	62.7	40.2
04:00 AM - 05:00 AM	47.1	80.2	40.7
05:00 AM - 06:00 AM	58.6	92.5	43.7
06:00 AM - 07:00 AM	67.5	85.7	46.3
07:00 AM - 08:00 AM	62.1	84.8	50.2
08:00 AM - 09:00 AM	58.6	82.3	50.3
09:00 AM - 10:00 AM	55.0	83.7	48.7
10:00 AM - 11:00 AM	56.4	82.4	48.8
Leq Average 24 hrs. (dB(A))	57.8		
Lmax (dB(A))		92.5	
L90 (dB(A))			45.0
Ldn (dB(A))	65.2		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป  
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการ  
โรงงาน พ.ศ. 2548

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Approved by

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# ภาคผนวก ค-4

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ระดับเสียงภายในสถานประกอบการ





## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197061-1

Page 1 of 1

Sample Number 24139063-1  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Cooling Tower Block 1  
Measurement Date Dec 11, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	57.6	70.6	57.2
10:00 AM - 11:00 AM	57.5	69.2	57.2
11:00 AM - 12:00 PM	57.3	63.9	57.0
12:00 PM - 01:00 PM	57.5	67.7	57.0
01:00 PM - 02:00 PM	57.4	64.1	57.0
02:00 PM - 03:00 PM	57.5	66.3	57.2
03:00 PM - 04:00 PM	57.3	64.5	57.1
04:00 PM - 05:00 PM	58.9	66.6	57.4

Leq Average 8 hrs. (dB(A)) 57.7

Lmax (dB(A)) 70.6

Standard (dB(A)) 90

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

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Approved by

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197062-1

Page 1 of 1

Sample Number 24139063-2  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Cooling Tower Block 1  
Measurement Date Dec 12, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	57.7	66.5	57.4
10:00 AM - 11:00 AM	57.5	62.8	57.4
11:00 AM - 12:00 PM	57.7	69.9	57.3
12:00 PM - 01:00 PM	57.6	69.6	57.2
01:00 PM - 02:00 PM	57.3	61.7	57.1
02:00 PM - 03:00 PM	57.8	66.1	57.4
03:00 PM - 04:00 PM	62.8	68.8	57.7
04:00 PM - 05:00 PM	61.2	66.3	58.0

Leq Average 8 hrs. (dB(A)) 59.2

Lmax (dB(A)) 69.9

Standard (dB(A)) 90

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197063-1

Page 1 of 1

Sample Number 24139063-3  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Cooling Tower Block 1  
Measurement Date Dec 13, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	58.3	65.5	58.0
10:00 AM - 11:00 AM	58.1	65.8	57.8
11:00 AM - 12:00 PM	58.3	65.7	57.9
12:00 PM - 01:00 PM	58.2	64.9	57.7
01:00 PM - 02:00 PM	57.8	64.3	57.7
02:00 PM - 03:00 PM	58.2	66.7	57.8
03:00 PM - 04:00 PM	58.2	72.6	57.9
04:00 PM - 05:00 PM	58.3	63.3	58.1

Leq Average 8 hrs. (dB(A))

58.2

Lmax (dB(A))

72.6

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๕๖

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197070-1

Page 1 of 1

Sample Number 24139063-10  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Boiler Feed Pump Block 1  
Measurement Date Dec 11, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	52.4	71.1	51.6
10:00 AM - 11:00 AM	52.3	66.7	51.4
11:00 AM - 12:00 PM	51.5	54.5	51.1
12:00 PM - 01:00 PM	51.5	63.9	50.9
01:00 PM - 02:00 PM	51.2	56.8	50.8
02:00 PM - 03:00 PM	51.3	55.4	50.8
03:00 PM - 04:00 PM	52.0	61.7	51.2
04:00 PM - 05:00 PM	63.8	73.0	52.1

Leq Average 8 hrs. (dB(A))

56.3

Lmax (dB(A))

73.0

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๕๖

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S:\Reports\Air Noise.rpt (10:04AM)



## Analysis / Test Report

**Client :** Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiayutthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT

**Lot ID: 24139063**  
Date Received : Dec 13, 2024  
Date Reported : Dec 19, 2024  
Report Number: 3197071-1

Page 1 of 1

**Sample Number** 24139063-11  
**Parameter** Noise (Leq 8 hrs.)  
**Location** บริเวณ Boiler Feed Pump Block 1  
**Measurement Date** Dec 12, 2024  
**Measurement by** Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	54.2	71.3	51.8
10:00 AM - 11:00 AM	52.8	61.6	51.9
11:00 AM - 12:00 PM	53.8	73.5	51.6
12:00 PM - 01:00 PM	52.2	66.1	51.4
01:00 PM - 02:00 PM	57.4	78.5	51.8
02:00 PM - 03:00 PM	58.2	76.4	51.8
03:00 PM - 04:00 PM	55.5	74.1	51.8
04:00 PM - 05:00 PM	56.7	77.0	52.0

Leq Average 8 hrs. (dB(A)) 55.6  
Lmax (dB(A)) 78.5  
Standard (dB(A)) 90  
Reference Method : Based on ISO1996-1 and 1996-2  
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

**Client :** Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiayutthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT

**Lot ID: 24139063**  
Date Received : Dec 13, 2024  
Date Reported : Dec 19, 2024  
Report Number: 3197072-1

Page 1 of 1

**Sample Number** 24139063-12  
**Parameter** Noise (Leq 8 hrs.)  
**Location** บริเวณ Boiler Feed Pump Block 1  
**Measurement Date** Dec 13, 2024  
**Measurement by** Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	53.4	63.6	52.2
10:00 AM - 11:00 AM	55.2	82.1	52.1
11:00 AM - 12:00 PM	54.7	68.7	52.8
12:00 PM - 01:00 PM	53.3	65.7	52.3
01:00 PM - 02:00 PM	52.6	56.0	52.3
02:00 PM - 03:00 PM	55.4	63.6	52.5
03:00 PM - 04:00 PM	55.8	75.2	53.5
04:00 PM - 05:00 PM	55.3	62.7	54.8

Leq Average 8 hrs. (dB(A)) 54.6  
Lmax (dB(A)) 82.1  
Standard (dB(A)) 90  
Reference Method : Based on ISO1996-1 and 1996-2  
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 24139063  
Date Received : Dec 13, 2024  
Date Reported : Dec 19, 2024  
Report Number: 3197079-1

Page 1 of 1

Sample Number 24139063-19  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Gas Turbine Accessories System Block 1  
Measurement Date Dec 11, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	80.6	81.0	80.5
10:00 AM - 11:00 AM	80.4	81.0	80.3
11:00 AM - 12:00 PM	80.3	80.8	80.2
12:00 PM - 01:00 PM	80.2	80.6	80.1
01:00 PM - 02:00 PM	80.0	80.5	79.9
02:00 PM - 03:00 PM	79.9	80.2	79.8
03:00 PM - 04:00 PM	79.8	80.3	79.7
04:00 PM - 05:00 PM	79.9	80.3	79.8

Leq Average 8 hrs. (dB(A))

80.1

Lmax (dB(A))

81.0

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 24139063  
Date Received : Dec 13, 2024  
Date Reported : Dec 19, 2024  
Report Number: 3197080-1

Page 1 of 1

Sample Number 24139063-20  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Gas Turbine Accessories System Block 1  
Measurement Date Dec 12, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	80.4	80.8	80.3
10:00 AM - 11:00 AM	80.3	82.6	80.1
11:00 AM - 12:00 PM	80.2	80.5	80.2
12:00 PM - 01:00 PM	80.2	83.8	80.1
01:00 PM - 02:00 PM	80.2	80.6	80.1
02:00 PM - 03:00 PM	80.2	80.6	80.1
03:00 PM - 04:00 PM	80.2	85.0	80.1
04:00 PM - 05:00 PM	80.2	80.6	80.1

Leq Average 8 hrs. (dB(A))

80.2

Lmax (dB(A))

85.0

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

**Client :** Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT

**Lot ID: 24139063**  
Date Received : Dec 13, 2024  
Date Reported : Dec 19, 2024  
Report Number: 3197081-1

Page 1 of 1

**Sample Number** 24139063-21  
**Parameter** Noise (Leq 8 hrs.)  
**Location** บริเวณ Gas Turbine Accessories System Block 1  
**Measurement Date** Dec 13, 2024  
**Measurement by** Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	80.7	81.1	80.6
10:00 AM - 11:00 AM	80.6	82.7	80.5
11:00 AM - 12:00 PM	80.4	80.9	80.3
12:00 PM - 01:00 PM	80.4	80.9	80.3
01:00 PM - 02:00 PM	80.4	80.8	80.3
02:00 PM - 03:00 PM	80.3	80.8	80.2
03:00 PM - 04:00 PM	80.2	80.7	80.1
04:00 PM - 05:00 PM	80.2	80.6	80.1

Leq Average 8 hrs. (dB(A)) 80.4  
Lmax (dB(A)) 82.7  
Standard (dB(A)) 90  
Reference Method : Based on ISO1996-1 and 1996-2  
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

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999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT

**Lot ID: 24139063**  
Date Received : Dec 13, 2024  
Date Reported : Dec 19, 2024  
Report Number: 3197088-1

Page 1 of 1

**Sample Number** 24139063-28  
**Parameter** Noise (Leq 8 hrs.)  
**Location** บริเวณ Steam Turbine Generator Block 1  
**Measurement Date** Dec 11, 2024  
**Measurement by** Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	79.0	80.3	78.9
10:00 AM - 11:00 AM	78.9	80.2	78.8
11:00 AM - 12:00 PM	78.8	80.2	78.6
12:00 PM - 01:00 PM	78.6	79.9	78.5
01:00 PM - 02:00 PM	78.4	80.1	78.3
02:00 PM - 03:00 PM	78.4	79.9	78.3
03:00 PM - 04:00 PM	78.3	80.0	78.2
04:00 PM - 05:00 PM	78.4	80.3	78.3

Leq Average 8 hrs. (dB(A)) 78.6  
Lmax (dB(A)) 80.3  
Standard (dB(A)) 90  
Reference Method : Based on ISO1996-1 and 1996-2  
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197089-1

Page 1 of 1

Sample Number 24139063-29  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Steam Turbine Generator Block 1  
Measurement Date Dec 12, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	78.9	81.1	78.7
10:00 AM - 11:00 AM	78.9	82.9	78.8
11:00 AM - 12:00 PM	78.8	80.2	78.7
12:00 PM - 01:00 PM	78.8	80.2	78.7
01:00 PM - 02:00 PM	78.7	80.2	78.6
02:00 PM - 03:00 PM	78.7	82.6	78.6
03:00 PM - 04:00 PM	78.6	80.0	78.5
04:00 PM - 05:00 PM	78.6	80.2	78.5

Leq Average 8 hrs. (dB(A))

78.8

Lmax (dB(A))

82.9

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197090-1

Page 1 of 1

Sample Number 24139063-30  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Steam Turbine Generator Block 1  
Measurement Date Dec 13, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	79.3	80.6	79.1
10:00 AM - 11:00 AM	79.2	80.4	79.1
11:00 AM - 12:00 PM	79.2	80.5	79.0
12:00 PM - 01:00 PM	79.1	80.7	79.0
01:00 PM - 02:00 PM	79.1	80.5	79.0
02:00 PM - 03:00 PM	79.1	80.5	78.9
03:00 PM - 04:00 PM	79.0	80.4	78.9
04:00 PM - 05:00 PM	79.0	80.3	78.8

Leq Average 8 hrs. (dB(A))

79.1

Lmax (dB(A))

80.7

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197097-1

Page 1 of 1

Sample Number 24139063-37  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Steam Turbine Lube Oil Skid Block 1  
Measurement Date Dec 11, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	80.4	82.2	79.5
10:00 AM - 11:00 AM	80.0	81.5	79.2
11:00 AM - 12:00 PM	79.8	81.3	79.1
12:00 PM - 01:00 PM	79.4	80.7	79.1
01:00 PM - 02:00 PM	79.3	80.1	79.2
02:00 PM - 03:00 PM	79.3	80.0	79.0
03:00 PM - 04:00 PM	78.4	79.5	78.0
04:00 PM - 05:00 PM	78.6	80.2	78.1

Leq Average 8 hrs. (dB(A))

79.4

Lmax (dB(A))

82.2

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197098-1

Page 1 of 1

Sample Number 24139063-38  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Steam Turbine Lube Oil Skid Block 1  
Measurement Date Dec 12, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	80.2	81.7	79.9
10:00 AM - 11:00 AM	80.2	86.2	79.9
11:00 AM - 12:00 PM	79.2	81.1	78.9
12:00 PM - 01:00 PM	79.5	81.6	79.1
01:00 PM - 02:00 PM	79.7	81.5	79.4
02:00 PM - 03:00 PM	80.0	81.5	79.7
03:00 PM - 04:00 PM	80.1	81.4	79.8
04:00 PM - 05:00 PM	80.2	81.9	79.9

Leq Average 8 hrs. (dB(A))

79.9

Lmax (dB(A))

86.2

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhsaiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197099-1

Page 1 of 1

Sample Number 24139063-39  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Steam Turbine Lube Oil Skid Block 1  
Measurement Date Dec 13, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	80.3	81.7	80.0
10:00 AM - 11:00 AM	80.4	81.7	80.1
11:00 AM - 12:00 PM	80.4	81.7	80.1
12:00 PM - 01:00 PM	80.4	81.8	80.1
01:00 PM - 02:00 PM	80.5	81.8	80.2
02:00 PM - 03:00 PM	80.5	82.4	80.1
03:00 PM - 04:00 PM	80.4	81.8	80.1
04:00 PM - 05:00 PM	80.2	81.7	79.9

Leq Average 8 hrs. (dB(A))

80.4

Lmax (dB(A))

82.4

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย

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Scientist (3)

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S:\Reports\Air Noise.rpt (10:19AM)



## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhsaiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197106-1

Page 1 of 1

Sample Number 24139063-46  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Air Compressor Block 1  
Measurement Date Dec 11, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	81.2	102.2	77.5
10:00 AM - 11:00 AM	80.8	102.1	77.5
11:00 AM - 12:00 PM	79.7	102.1	77.2
12:00 PM - 01:00 PM	79.7	102.2	77.0
01:00 PM - 02:00 PM	79.2	102.5	76.8
02:00 PM - 03:00 PM	79.1	103.0	76.7
03:00 PM - 04:00 PM	79.1	103.2	76.6
04:00 PM - 05:00 PM	79.1	103.0	76.7

Leq Average 8 hrs. (dB(A))

79.8

Lmax (dB(A))

103.2

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 24139063  
Date Received : Dec 13, 2024  
Date Reported : Dec 19, 2024  
Report Number: 3197107-1

Page 1 of 1

Sample Number 24139063-47  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Air Compressor Block 1  
Measurement Date Dec 12, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	81.3	102.0	77.6
10:00 AM - 11:00 AM	81.0	102.3	77.4
11:00 AM - 12:00 PM	81.5	100.8	79.9
12:00 PM - 01:00 PM	81.0	97.4	77.5
01:00 PM - 02:00 PM	80.4	97.6	77.3
02:00 PM - 03:00 PM	80.4	97.2	77.3
03:00 PM - 04:00 PM	80.2	97.1	77.2
04:00 PM - 05:00 PM	80.1	96.9	77.1

Leq Average 8 hrs. (dB(A)) 80.8  
Lmax (dB(A)) 102.3  
Standard (dB(A)) 90  
Reference Method : Based on ISO1996-1 and 1996-2  
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

Lot ID: 24139063  
Date Received : Dec 13, 2024  
Date Reported : Dec 19, 2024  
Report Number: 3197108-1

Page 1 of 1

Sample Number 24139063-48  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Air Compressor Block 1  
Measurement Date Dec 13, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	81.2	97.1	78.4
10:00 AM - 11:00 AM	81.5	97.3	77.7
11:00 AM - 12:00 PM	81.7	96.8	77.8
12:00 PM - 01:00 PM	81.6	98.3	77.5
01:00 PM - 02:00 PM	81.6	97.8	77.5
02:00 PM - 03:00 PM	81.4	97.5	77.5
03:00 PM - 04:00 PM	81.2	97.5	77.4
04:00 PM - 05:00 PM	81.3	97.2	77.4

Leq Average 8 hrs. (dB(A)) 81.4  
Lmax (dB(A)) 98.3  
Standard (dB(A)) 90  
Reference Method : Based on ISO1996-1 and 1996-2  
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhsaiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197115-1

Page 1 of 1

Sample Number 24139063-55  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Cooling Tower Block 2  
Measurement Date Dec 11, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	49.7	58.3	48.7
10:00 AM - 11:00 AM	50.1	60.3	48.6
11:00 AM - 12:00 PM	49.3	61.0	48.1
12:00 PM - 01:00 PM	48.5	52.0	48.0
01:00 PM - 02:00 PM	48.8	64.8	47.9
02:00 PM - 03:00 PM	48.7	55.0	48.0
03:00 PM - 04:00 PM	50.6	68.4	47.9
04:00 PM - 05:00 PM	49.9	59.8	48.2

Leq Average 8 hrs. (dB(A))

49.5

Lmax (dB(A))

68.4

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhsaiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197116-1

Page 1 of 1

Sample Number 24139063-56  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Cooling Tower Block 2  
Measurement Date Dec 12, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	52.0	64.6	49.8
10:00 AM - 11:00 AM	52.4	76.4	49.2
11:00 AM - 12:00 PM	52.9	75.1	48.4
12:00 PM - 01:00 PM	49.2	53.0	48.5
01:00 PM - 02:00 PM	49.7	57.5	48.3
02:00 PM - 03:00 PM	50.1	74.4	48.4
03:00 PM - 04:00 PM	48.5	54.4	48.0
04:00 PM - 05:00 PM	48.8	55.3	48.2

Leq Average 8 hrs. (dB(A))

50.8

Lmax (dB(A))

76.4

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

**Client :** Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT

**Lot ID: 24139063**  
Date Received : Dec 13, 2024  
Date Reported : Dec 19, 2024  
Report Number: 3197117-1

Page 1 of 1

**Sample Number** 24139063-57  
**Parameter** Noise (Leq 8 hrs.)  
**Location** บริเวณ Cooling Tower Block 2  
**Measurement Date** Dec 13, 2024  
**Measurement by** Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	50.5	58.6	49.4
10:00 AM - 11:00 AM	52.2	63.9	49.8
11:00 AM - 12:00 PM	51.6	62.6	49.4
12:00 PM - 01:00 PM	50.8	64.6	49.1
01:00 PM - 02:00 PM	50.5	60.0	49.0
02:00 PM - 03:00 PM	49.4	55.8	49.0
03:00 PM - 04:00 PM	49.3	55.1	48.8
04:00 PM - 05:00 PM	50.5	64.5	49.0

Leq Average 8 hrs. (dB(A)) 50.7  
Lmax (dB(A)) 64.6  
Standard (dB(A)) 90  
Reference Method : Based on ISO1996-1 and 1996-2  
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

**Client :** Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT

**Lot ID: 24139063**  
Date Received : Dec 13, 2024  
Date Reported : Dec 19, 2024  
Report Number: 3197124-1

Page 1 of 1

**Sample Number** 24139063-64  
**Parameter** Noise (Leq 8 hrs.)  
**Location** บริเวณ Boiler Feed Pump Block 2  
**Measurement Date** Dec 11, 2024  
**Measurement by** Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	52.7	63.2	52.1
10:00 AM - 11:00 AM	52.7	57.1	52.3
11:00 AM - 12:00 PM	52.7	61.0	52.1
12:00 PM - 01:00 PM	52.6	66.4	52.0
01:00 PM - 02:00 PM	56.9	78.6	51.7
02:00 PM - 03:00 PM	52.2	64.1	51.6
03:00 PM - 04:00 PM	54.8	77.2	51.7
04:00 PM - 05:00 PM	52.7	61.9	51.8

Leq Average 8 hrs. (dB(A)) 53.7  
Lmax (dB(A)) 78.6  
Standard (dB(A)) 90  
Reference Method : Based on ISO1996-1 and 1996-2  
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197125-1

Page 1 of 1

Sample Number 24139063-65  
Parameter Noise (Leq 8 hrs.)  
Location บังเกอร์ Boiler Feed Pump Block 2  
Measurement Date Dec 12, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	54.1	75.9	52.7
10:00 AM - 11:00 AM	57.4	80.5	52.3
11:00 AM - 12:00 PM	56.0	78.8	52.1
12:00 PM - 01:00 PM	52.4	55.6	52.0
01:00 PM - 02:00 PM	58.8	81.3	52.1
02:00 PM - 03:00 PM	54.9	79.1	52.2
03:00 PM - 04:00 PM	52.4	61.8	52.0
04:00 PM - 05:00 PM	52.5	67.1	52.1

Leq Average 8 hrs. (dB(A))

55.4

Lmax (dB(A))

81.3

Standard (dB(A))

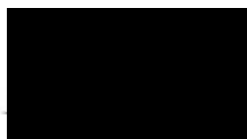
90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการวัดความถี่เสียง  
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Scientist (3)

Approved by



Section Head

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197126-1

Page 1 of 1

Sample Number 24139063-66  
Parameter Noise (Leq 8 hrs.)  
Location บังเกอร์ Boiler Feed Pump Block 2  
Measurement Date Dec 13, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	53.0	59.5	52.5
10:00 AM - 11:00 AM	59.3	78.2	52.4
11:00 AM - 12:00 PM	53.9	67.3	52.5
12:00 PM - 01:00 PM	54.6	73.2	52.5
01:00 PM - 02:00 PM	54.4	69.6	52.3
02:00 PM - 03:00 PM	54.9	72.6	52.2
03:00 PM - 04:00 PM	59.8	90.2	52.3
04:00 PM - 05:00 PM	56.0	71.1	52.5

Leq Average 8 hrs. (dB(A))

56.4

Lmax (dB(A))

90.2

Standard (dB(A))

90

140

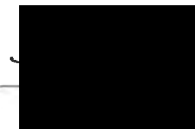
Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการวัดความถี่เสียง  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197133-1

Page 1 of 1

Sample Number 24139063-73  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Gas Turbine Accessories System Block 2  
Measurement Date Dec 11, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	82.7	83.9	82.4
10:00 AM - 11:00 AM	82.5	83.2	82.3
11:00 AM - 12:00 PM	82.4	83.2	82.2
12:00 PM - 01:00 PM	82.3	83.0	82.1
01:00 PM - 02:00 PM	82.2	82.9	82.1
02:00 PM - 03:00 PM	82.2	82.9	82.0
03:00 PM - 04:00 PM	82.1	82.7	81.9
04:00 PM - 05:00 PM	82.0	82.8	81.8

Leq Average 8 hrs. (dB(A))

82.3

Lmax (dB(A))

83.9

Standard (dB(A))

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197134-1

Page 1 of 1

Sample Number 24139063-74  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Gas Turbine Accessories System Block 2  
Measurement Date Dec 12, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	82.6	92.1	82.4
10:00 AM - 11:00 AM	82.9	90.8	82.5
11:00 AM - 12:00 PM	82.9	91.6	82.6
12:00 PM - 01:00 PM	82.9	83.9	82.7
01:00 PM - 02:00 PM	82.6	83.4	82.3
02:00 PM - 03:00 PM	82.4	91.1	82.2
03:00 PM - 04:00 PM	82.2	82.9	82.1
04:00 PM - 05:00 PM	82.2	82.9	82.0

Leq Average 8 hrs. (dB(A))

82.6

Lmax (dB(A))

92.1

Standard (dB(A))

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197135-1

Page 1 of 1

Sample Number 24139063-75  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Gas Turbine Accessories System Block 2  
Measurement Date Dec 13, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	82.1	82.9	81.9
10:00 AM - 11:00 AM	82.2	82.9	82.0
11:00 AM - 12:00 PM	82.3	82.8	82.1
12:00 PM - 01:00 PM	82.2	82.9	82.1
01:00 PM - 02:00 PM	82.1	82.8	82.0
02:00 PM - 03:00 PM	82.1	82.8	82.0
03:00 PM - 04:00 PM	82.0	82.6	81.8
04:00 PM - 05:00 PM	82.0	82.5	81.8

Leq Average 8 hrs. (dB(A))

82.1

Lmax (dB(A))

82.9

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197142-1

Page 1 of 1

Sample Number 24139063-82  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Steam Turbine Generator Block 2  
Measurement Date Dec 11, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	77.3	77.9	77.1
10:00 AM - 11:00 AM	77.2	77.8	77.1
11:00 AM - 12:00 PM	77.0	77.6	76.9
12:00 PM - 01:00 PM	76.9	77.6	76.8
01:00 PM - 02:00 PM	76.8	77.6	76.7
02:00 PM - 03:00 PM	76.8	77.4	76.7
03:00 PM - 04:00 PM	76.8	77.3	76.7
04:00 PM - 05:00 PM	76.8	77.6	76.7

Leq Average 8 hrs. (dB(A))

77.0

Lmax (dB(A))

77.9

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

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999 Moo 1, Ban Chang, Uthai, Pranakonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197143-1

Page 1 of 1

Sample Number 24139063-83  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Steam Turbine Generator Block 2  
Measurement Date Dec 12, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	77.4	89.0	77.2
10:00 AM - 11:00 AM	77.2	77.8	77.1
11:00 AM - 12:00 PM	77.1	77.7	77.0
12:00 PM - 01:00 PM	77.2	88.6	77.0
01:00 PM - 02:00 PM	77.0	77.8	76.9
02:00 PM - 03:00 PM	77.0	77.8	76.9
03:00 PM - 04:00 PM	77.0	77.6	76.9
04:00 PM - 05:00 PM	77.1	77.7	77.0

Leq Average 8 hrs. (dB(A))

77.1

Lmax (dB(A))

89.0

Standard (dB(A))

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139063

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197144-1

Page 1 of 1

Sample Number 24139063-84  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Steam Turbine Generator Block 2  
Measurement Date Dec 13, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	77.6	78.1	77.5
10:00 AM - 11:00 AM	77.6	78.7	77.5
11:00 AM - 12:00 PM	77.6	78.7	77.5
12:00 PM - 01:00 PM	77.5	78.3	77.4
01:00 PM - 02:00 PM	77.5	78.3	77.4
02:00 PM - 03:00 PM	77.5	78.2	77.4
03:00 PM - 04:00 PM	77.5	78.2	77.4
04:00 PM - 05:00 PM	77.4	78.0	77.3

Leq Average 8 hrs. (dB(A))

77.5

Lmax (dB(A))

78.7

Standard (dB(A))

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139069

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197176-1

Page 1 of 1

Sample Number 24139069-1  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Steam Turbine Lube Oil Skid Block 2  
Measurement Date Dec 11, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	77.8	78.4	77.5
10:00 AM - 11:00 AM	78.1	78.8	77.8
11:00 AM - 12:00 PM	78.1	78.8	77.9
12:00 PM - 01:00 PM	77.9	78.6	77.6
01:00 PM - 02:00 PM	77.7	78.4	77.5
02:00 PM - 03:00 PM	78.0	79.7	77.6
03:00 PM - 04:00 PM	79.6	80.8	78.9
04:00 PM - 05:00 PM	80.5	82.4	79.8

Leq Average 8 hrs. (dB(A))

78.6

Lmax (dB(A))

82.4

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prankhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139069

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197177-1

Page 1 of 1

Sample Number 24139069-2  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Steam Turbine Lube Oil Skid Block 2  
Measurement Date Dec 12, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	84.2	94.3	83.3
10:00 AM - 11:00 AM	83.9	85.4	83.0
11:00 AM - 12:00 PM	84.6	85.7	83.9
12:00 PM - 01:00 PM	85.0	94.6	84.5
01:00 PM - 02:00 PM	84.5	85.7	83.3
02:00 PM - 03:00 PM	82.8	85.1	82.2
03:00 PM - 04:00 PM	82.5	83.0	82.3
04:00 PM - 05:00 PM	82.8	83.4	82.7

Leq Average 8 hrs. (dB(A))

83.9

Lmax (dB(A))

94.6

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139069

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197178-1

Page 1 of 1

Sample Number 24139069-3  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Steam Turbine Lube Oil Skid Block 2  
Measurement Date Dec 13, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	83.3	83.8	83.2
10:00 AM - 11:00 AM	83.4	83.9	83.3
11:00 AM - 12:00 PM	83.4	83.9	83.2
12:00 PM - 01:00 PM	83.4	83.9	83.3
01:00 PM - 02:00 PM	83.4	83.9	83.2
02:00 PM - 03:00 PM	83.4	83.9	83.3
03:00 PM - 04:00 PM	83.4	84.0	83.3
04:00 PM - 05:00 PM	83.4	83.9	83.3

Leq Average 8 hrs. (dB(A))

83.4

Lmax (dB(A))

84.0

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139069

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197185-1

Page 1 of 1

Sample Number 24139069-10  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Air Compressor Block 2  
Measurement Date Dec 11, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	82.5	88.5	80.6
10:00 AM - 11:00 AM	80.9	88.6	79.9
11:00 AM - 12:00 PM	79.6	88.6	73.9
12:00 PM - 01:00 PM	76.4	88.5	72.6
01:00 PM - 02:00 PM	74.8	88.5	72.0
02:00 PM - 03:00 PM	74.1	88.5	72.1
03:00 PM - 04:00 PM	74.4	88.6	72.7
04:00 PM - 05:00 PM	74.0	89.0	71.8

Leq Average 8 hrs. (dB(A))

78.3

Lmax (dB(A))

89.0

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonslayutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139069

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197186-1

Page 1 of 1

Sample Number 24139069-11  
Parameter Noise (Leq 8 hrs.)  
Location บังเกอร์ Air Compressor Block 2  
Measurement Date Dec 12, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	81.1	91.7	79.1
10:00 AM - 11:00 AM	79.5	88.6	74.9
11:00 AM - 12:00 PM	77.8	88.5	74.2
12:00 PM - 01:00 PM	77.4	90.7	73.5
01:00 PM - 02:00 PM	74.8	88.4	71.8
02:00 PM - 03:00 PM	73.5	88.5	71.7
03:00 PM - 04:00 PM	73.8	88.4	71.9
04:00 PM - 05:00 PM	74.1	88.4	71.9

Leq Average 8 hrs. (dB(A))

77.4

Lmax (dB(A))

91.7

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139069

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197187-1

Page 1 of 1

Sample Number 24139069-12  
Parameter Noise (Leq 8 hrs.)  
Location บังเกอร์ Air Compressor Block 2  
Measurement Date Dec 13, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	82.6	88.6	82.1
10:00 AM - 11:00 AM	81.3	89.0	78.5
11:00 AM - 12:00 PM	82.3	88.9	79.6
12:00 PM - 01:00 PM	82.6	88.6	81.9
01:00 PM - 02:00 PM	82.6	88.7	81.7
02:00 PM - 03:00 PM	82.5	88.6	81.8
03:00 PM - 04:00 PM	82.6	88.6	81.7
04:00 PM - 05:00 PM	81.8	88.6	80.6

Leq Average 8 hrs. (dB(A))

82.3

Lmax (dB(A))

89.0

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139069

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197194-1

Page 1 of 1

Sample Number 24139069-19  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Gas Compressor (ด้านหัว)  
Measurement Date Dec 11, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	66.0	72.1	65.8
10:00 AM - 11:00 AM	66.1	70.4	65.9
11:00 AM - 12:00 PM	66.2	70.9	66.0
12:00 PM - 01:00 PM	66.2	71.3	65.8
01:00 PM - 02:00 PM	65.9	66.9	65.7
02:00 PM - 03:00 PM	65.8	69.5	65.6
03:00 PM - 04:00 PM	65.8	70.3	65.6
04:00 PM - 05:00 PM	66.4	71.2	66.0

Leq Average 8 hrs. (dB(A)) 66.1  
Lmax (dB(A)) 72.1  
Standard (dB(A)) 90  
Reference Method : Based on ISO1996-1 and 1996-2  
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๕๖

Technical Management

Approved by

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139069

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197195-1

Page 1 of 1

Sample Number 24139069-20  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Gas Compressor (ด้านหัว)  
Measurement Date Dec 12, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	66.1	70.6	65.7
10:00 AM - 11:00 AM	66.0	68.5	65.8
11:00 AM - 12:00 PM	66.0	73.8	65.8
12:00 PM - 01:00 PM	66.1	70.6	65.9
01:00 PM - 02:00 PM	66.1	68.7	65.9
02:00 PM - 03:00 PM	66.0	68.3	65.8
03:00 PM - 04:00 PM	66.4	71.7	66.0
04:00 PM - 05:00 PM	66.0	66.9	65.8

Leq Average 8 hrs. (dB(A)) 66.1  
Lmax (dB(A)) 73.8  
Standard (dB(A)) 90  
Reference Method : Based on ISO1996-1 and 1996-2  
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.

999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210

P/O : 4102004523

Project Name : Monitoring EIA

Project Location : GUT

Lot ID: 24139069

Date Received : Dec 13, 2024

Date Reported : Dec 19, 2024

Report Number: 3197196-1

Page 1 of 1

Sample Number 24139069-21  
Parameter Noise (Leq 8 hrs.)  
Location บริเวณ Gas Compressor (ด้านหัว)  
Measurement Date Dec 13, 2024  
Measurement by Phongsiri Somkaew

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	66.1	68.4	65.8
10:00 AM - 11:00 AM	66.0	72.9	65.7
11:00 AM - 12:00 PM	65.8	68.1	65.6
12:00 PM - 01:00 PM	65.8	70.4	65.6
01:00 PM - 02:00 PM	65.9	70.6	65.5
02:00 PM - 03:00 PM	65.7	67.3	65.5
03:00 PM - 04:00 PM	67.1	74.1	65.6
04:00 PM - 05:00 PM	65.9	71.8	65.7

Leq Average 8 hrs. (dB(A))

66.1

Lmax (dB(A))

74.1

Standard (dB(A))

90

140

Reference Method : Based on ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการวัดความถี่เสียง  
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# ภาคผนวก ค-5

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คุณภาพน้ำผิวดิน



## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhsongyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT



TESTING  
No.0009

Lot ID: 2466401  
Date Received : Jul 08, 2024  
Date Reported : Jul 12, 2024  
Report Number : 3021258-1

Page 1 of 2

Sample Number 2466401-1  
Sampled Date Jul 08, 2024 9:05 AM  
Sample Description Wastewater  
Location บ่อพักน้ำหล่อเย็น  
Date Analysis Commenced Jul 09, 2024  
Condition of Sample Contained In one amber glass bottle and two 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>							
Copper	mg/L	0.0003	0.0005	0.003	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.02	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
<b>Water Testing</b>							
Oil & Grease *	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Bangkok
pH at 25 degree C *		-	-	7.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (F)	Bangkok
Temperature *	Degree C	-	-	31.5	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Bangkok
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	1152	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	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 : Altipon Yaso ทะเบียนเลขที่ 7-204-จ-0059

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

Technical Management



ทะเบียนเลขที่ 7-204-จ-0007

Approved by



ทะเบียนเลขที่ 7-204-จ-0004

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhsongyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT



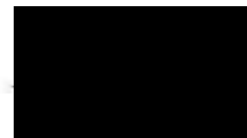
TESTING  
No.0009

Lot ID: 2466401  
Date Received : Jul 08, 2024  
Date Reported : Jul 12, 2024  
Report Number : 3021258-1

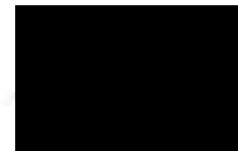
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT



TESTING  
No.0009  
Lot ID: **2466404**  
Date Received : Jul 08, 2024  
Date Reported : Jul 12, 2024  
Report Number : 3021260-1

Page 1 of 2

Sample Number 2466404-1  
Sampled Date Jul 08, 2024 9:15 AM  
Sample Description Wastewater  
Location โรงไฟฟ้า  
Date Analysis Commenced Jul 09, 2024  
Condition of Sample Contained in one amber glass bottle and two 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>							
Copper	mg/L	0.0003	0.0005	0.02	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.09	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
<b>Water Testing</b>							
Oil & Grease *	mg/L	-	3	4	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Bangkok
pH at 25 degree C *		-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (F)	Bangkok
Temperature *	Degree C	-	-	33.3	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Bangkok
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	384	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Bangkok

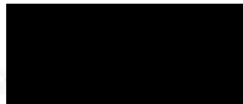
Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).

Sampling By : Altipon Yaso ทะเบียนเลขที่ ๖-204-๖-0059

### Remark :

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

Technical Management



Manager  
ทะเบียนเลขที่ ๖-204-๖-0007

Approved by



ทะเบียนเลขที่ ๖-204-๖-0004

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

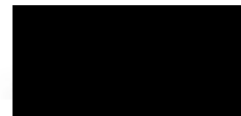


TESTING  
No.0009  
Lot ID: **2466404**  
Date Received : Jul 08, 2024  
Date Reported : Jul 12, 2024  
Report Number : 3021260-1

Page 2 of 2

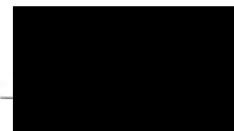
- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management



Manager  
ทะเบียนเลขที่ ๖-204-๖-0007

Approved by



ทะเบียนเลขที่ ๖-204-๖-0004

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring IEA  
Project Location : GUT



TESTING  
No.0009

Lot ID: 2479824  
Date Received : Aug 05, 2024  
Date Reported : Aug 09, 2024  
Report Number : 3053276-1

Page 1 of 2

Sample Number 2479824-1  
Sampled Date Aug 05, 2024 9:45 AM  
Sample Description Wastewater  
Location บ่อพักน้ำคลองเฒ่า  
Date Analysis Commenced Aug 06, 2024  
Condition of Sample Contained in one amber glass bottle and two 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>							
Copper	mg/L	0.0003	0.0005	0.005	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.05	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
<b>Water Testing</b>							
Oil & Grease *	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Bangkok
pH at 25 degree C *		-	-	7.2	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (F)	Bangkok
Temperature *	Degree C	-	-	30.1	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Bangkok
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	952	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	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 : Altipon Yaso ทะเบียนเลขที่ ๖-204-๖-0059

Remark :

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

Technical Management



Manager  
ทะเบียนเลขที่ ๖-204-๖-0007

Approved by



Assistant General Manager  
ทะเบียนเลขที่ ๖-204-๖-0004

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring IEA  
Project Location : GUT



TESTING  
No.0009

Lot ID: 2479824  
Date Received : Aug 05, 2024  
Date Reported : Aug 09, 2024  
Report Number : 3053276-1

Page 2 of 2

- Analyte(s) marked \* is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025

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Manager  
ทะเบียนเลขที่ ๖-204-๖-0007

Approved by



Kanokkom Anek  
Assistant General Manager  
ทะเบียนเลขที่ ๖-204-๖-0004

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT



TESTING  
No.0009  
Lot ID: 2479825  
Date Received : Aug 05, 2024  
Date Reported : Aug 09, 2024  
Report Number : 3053277-1

Page 1 of 2

Sample Number 2479825-1  
Sampled Date Aug 05, 2024 9:55 AM  
Sample Description Wastewater  
Location โรงพักน้ำทิ้ง  
Date Analysis Commenced Aug 06, 2024  
Condition of Sample Contained in one amber glass bottle and two 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>							
Copper	mg/L	0.0003	0.0005	0.01	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.04	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
<b>Water Testing</b>							
Oil & Grease *	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Bangkok
pH at 25 degree C *		-	-	7.9	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (F)	Bangkok
Temperature *	Degree C	-	-	32.0	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Bangkok
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	344	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	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 : Altipon Yaso ทะเบียนเลขที่ 7-204-ก-0059

### Remark :

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

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ทะเบียนเลขที่ 7-204-ก-0007

Approved by



Assistant General Manager  
ทะเบียนเลขที่ 7-204-ก-0004

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

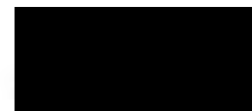


TESTING  
No.0009  
Lot ID: 2479825  
Date Received : Aug 05, 2024  
Date Reported : Aug 09, 2024  
Report Number : 3053277-1

Page 2 of 2

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Technical Management



Manager  
ทะเบียนเลขที่ 7-204-ก-0007

Approved by



Assistant General Manager  
ทะเบียนเลขที่ 7-204-ก-0004

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prankhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT



TESTING  
No.0009

Lot ID: 24101325  
Date Received : Sep 09, 2024  
Date Reported : Sep 13, 2024  
Report Number : 3098578-1

Page 1 of 2

Sample Number 24101325-1  
Sampled Date Sep 09, 2024 10:00 AM  
Sample Description Wastewater  
Location ปลายน้ำคลอง  
Date Analysis Commenced Sep 10, 2024  
Condition of Sample Contained in two plastic bottles and one amber glass bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Metals Testing</b>							
Copper	mg/L	0.0003	0.0005	0.004	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.03	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
<b>Water Testing</b>							
Oil & Grease *	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Bangkok
pH at 25 degree C *		-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Residual Free Chlorine *	mg/L	-	0.1	0.2	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (F)	Bangkok
Temperature *	Degree C	-	-	31.9	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Bangkok
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	892	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	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 : Altipon Yaso ๖๖๖๖๖๖๖๖ ๖-๒๐๔-๖-๐๐59

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

Technical Management

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prankhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT



TESTING  
No.0009

Lot ID: 24101325  
Date Received : Sep 09, 2024  
Date Reported : Sep 13, 2024  
Report Number : 3098578-1

Page 2 of 2

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TESTING  
No.0009

**Lot ID: 24101326**  
Date Received : Sep 09, 2024  
Date Reported : Sep 13, 2024  
Report Number : 3098579-1

Page 1 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
<b>Metals Testing</b>							
Copper	mg/L	0.0003	0.0005	0.04	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.09	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
<b>Water Testing</b>							
Oil & Grease *	mg/L	-	3	5	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Bangkok
pH at 25 degree C *		-	-	7.9	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (F)	Bangkok
Temperature *	Degree C	-	-	34.2	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Bangkok
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	416	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Bangkok

**Sampling By :** Aittipon Yaso โทร ๐๒-๒๐๔-๓-๐๐๕๙

### Technical Management

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TESTING  
No. 0009

**Lot ID: 24101326**  
Date Received : Sep 09, 2024  
Date Reported : Sep 13, 2024  
Report Number : 3098579-1

Page 2 of 2

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prankhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT



TESTING  
No.0009  
Lot ID: 24109165  
Date Received : Oct 07, 2024  
Date Reported : Oct 11, 2024  
Report Number : 3117566-1

Page 1 of 2

Sample Number 24109165-1  
Sampled Date Oct 07, 2024 9:10 AM  
Sample Description Wastewater  
Location ฝายพิกุลน้อย  
Date Analysis Commenced Oct 08, 2024  
Condition of Sample Contained In one amber glass bottle and two 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>							
Copper	mg/L	0.0003	0.0005	0.0009	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.01	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
<b>Water Testing</b>							
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	Bangkok
pH at 25 degree C		-	-	7.4	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Bangkok
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Bangkok
Temperature *	Degree C	-	-	30.6	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Bangkok
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	752	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	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 :** Altipon Yaso ๖๖๖๖๖๖๖๖ ๖-204-๙-0059

Remark :

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Technical Management



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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prankhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT

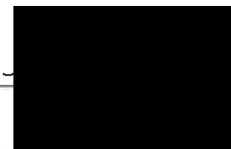


TESTING  
No.0009  
Lot ID: 24109165  
Date Received : Oct 07, 2024  
Date Reported : Oct 11, 2024  
Report Number : 3117566-1

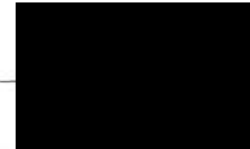
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## Analysis / Test Report

**Client :** Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT



**TESTING**  
**No.0009**  
**Lot ID: 24109166**  
**Date Received :** Oct 07, 2024  
**Date Reported :** Oct 11, 2024  
**Report Number :** 3117572-1

Page 1 of 2

**Sample Number** 24109166-1  
**Sampled Date** Oct 07, 2024 9:20 AM  
**Sample Description** Wastewater  
**Location** ภาณุพันธ์  
**Date Analysis Commenced** Oct 08, 2024  
**Condition of Sample** Contained in one amber glass bottle and two 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>							
Copper	mg/L	0.0003	0.0005	0.02	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B, 3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.07	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B, 3030 F	Bangkok
<b>Water Testing</b>							
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	Bangkok
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)	Bangkok
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Bangkok
Temperature *	Degree C	-	-	32.6	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Bangkok
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	328	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	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 :** Aitipon Yaso ๖๖๖๖๖๖๖๖ ๖-204-๖-0059

**Remark :**

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

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## Analysis / Test Report

**Client :** Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
**P/O :** 4102004523  
**Project Name :** Monitoring EIA  
**Project Location :** GUT



**TESTING**  
**No.0009**  
**Lot ID: 24109166**  
**Date Received :** Oct 07, 2024  
**Date Reported :** Oct 11, 2024  
**Report Number :** 3117572-1

Page 2 of 2

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location: GUT



TESTING  
No.0009  
Lot ID: 24120763  
Date Received : Nov 11, 2024  
Date Reported : Nov 15, 2024  
Report Number : 3143687-1

Page 1 of 2

Sample Number 24120763-1  
Sampled Date Nov 11, 2024 9:05 AM  
Sample Description Wastewater  
Location บ่กลั่นน้ำหล่อเย็น  
Date Analysis Commenced Nov 12, 2024  
Condition of Sample Contained in one amber glass bottle and two 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>							
Copper	mg/L	0.0003	0.0005	0.0010	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.007	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
<b>Water Testing</b>							
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	Bangkok
pH at 25 degree C		-	-	7.6	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Bangkok
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Bangkok
Temperature *	Degree C	-	-	28.4	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Bangkok
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	912	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	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 :** Aitipon Yaso ทะเบียนเลขที่ ๖-204-๓-0059

Remark :  
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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location: GUT



TESTING  
No.0009  
Lot ID: 24120763  
Date Received : Nov 11, 2024  
Date Reported : Nov 15, 2024  
Report Number : 3143687-1

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyuthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT



TESTING  
No.0009  
Lot ID: 24120771  
Date Received : Nov 11, 2024  
Date Reported : Nov 15, 2024  
Report Number : 3143689-1

Page 1 of 2

Sample Number 24120771-1  
Sampled Date Nov 11, 2024 9:15 AM  
Sample Description Wastewater  
Location บ่อพักน้ำทิ้ง  
Date Analysis Commenced Nov 12, 2024  
Condition of Sample Contained in one amber glass bottle and two 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>							
Copper	mg/L	0.0003	0.0005	0.04	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B, 3030 F	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
<b>Water Testing</b>							
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	Bangkok
pH at 25 degree C		-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Bangkok
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Bangkok
Temperature *	Degree C	-	-	32.7	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Bangkok
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	372	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	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 : Aittipon Yaso โทร:09-00000000 +204-q-0059

### Remark :

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

Technical Management

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyuthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT



TESTING  
No.0009  
Lot ID: 24120771  
Date Received : Nov 11, 2024  
Date Reported : Nov 15, 2024  
Report Number : 3143689-1

Page 2 of 2

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- \* The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prankhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT



TESTING  
No.0009  
Lot ID: 24132201  
Date Received : Dec 09, 2024  
Date Reported : Dec 13, 2024  
Report Number : 3172230-1

Page 1 of 2

Sample Number 24132201-1  
Sampled Date Dec 09, 2024 9:40 AM  
Sample Description Wastewater  
Location ปลายทางท่อเป็น  
Date Analysis Commenced Dec 10, 2024  
Condition of Sample Contained in one amber glass bottle and two 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>							
Copper	mg/L	0.0003	0.0005	0.02	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.10	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
<b>Water Testing</b>							
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	Bangkok
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)	Bangkok
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Bangkok
Temperature *	Degree C	-	-	31.8	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Bangkok
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	356	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	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 : Thitiwan Alimurai ๓๓๓๓๓๓๓๓ ๓-204-๓-0148

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

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Prankhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT



TESTING  
No.0009  
Lot ID: 24132201  
Date Received : Dec 09, 2024  
Date Reported : Dec 13, 2024  
Report Number : 3172230-1

Page 2 of 2

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT



TESTING  
No.0009  
Lot ID: 24132202  
Date Received : Dec 09, 2024  
Date Reported : Dec 13, 2024  
Report Number : 3172231-1

Page 1 of 2

Sample Number 24132202-1  
Sampled Date Dec 09, 2024 9:25 AM  
Sample Description Wastewater  
Location โรงฟักน้ำทิ้ง  
Date Analysis Commenced Dec 10, 2024  
Condition of Sample Contained in one amber glass bottle and two 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>							
Copper	mg/L	0.0003	0.0005	0.002	≤2.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
Zinc	mg/L	0.003	0.005	0.04	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 3125 B,3030 F	Bangkok
<b>Water Testing</b>							
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	Bangkok
pH at 25 degree C		-	-	7.4	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500 - H (B)	Bangkok
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 4500-Cl (F)	Bangkok
Temperature *	Degree C	-	-	25.9	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2550 B	Bangkok
Total Dissolved solids Dried at 180 degree C	mg/L	-	5	1228	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 24th ed., 2023, part 2540 C	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 :** Thitwan Almural ทรัพย์สินทางปัญญา 7-204-3-0148

**Remark :**

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

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## Analysis / Test Report

Client : Gulf JP UT Co., Ltd.  
999 Moo 1, Ban Chang, Uthai, Pranakhonsiyutthaya Thailand 13210  
P/O : 4102004523  
Project Name : Monitoring EIA  
Project Location : GUT



TESTING  
No.0009  
Lot ID: 24132202  
Date Received : Dec 09, 2024  
Date Reported : Dec 13, 2024  
Report Number : 3172231-1

Page 2 of 2

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## ภาคผนวก ง

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Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Ambient	Particulate Matter (PM-10)	High Volume	BH-150378	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	BH-150385	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	BH-150396	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	BH-150388	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	BH-150401	3-Jun-24	3-Jun-25	12
Ambient	Total Suspended Particulate	High Volume	BH-150366	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	BH-150369	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	BH-151856	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	BH-150366	-	-	On site Calibration
Ambient	Total Suspended Particulate	Detail Balance	BH-150400	3-Jun-24	3-Jun-25	12
Ambient	Ammonia Dioxide	TO Analyzer	BH-151892	3-Jun-24	3-Jun-25	6
Ambient	Nitrogen Dioxide	TO Analyzer	BH-151846	2-Jun-24	2-Jun-25	6
Ambient	Nitrogen Dioxide	TO Analyzer	BH-151848	3-Jun-24	3-Jun-25	6
Ambient	Nitrogen Dioxide	TO Analyzer	BH-151858	3-Jun-24	3-Jun-25	6
Ambient	Sulfur Dioxide	TO Analyzer	BH-151691	3-Jun-24	3-Jun-25	6
Ambient	Sulfur Dioxide	TO Analyzer	BH-151404	5-Jun-24	5-Jun-25	6
Ambient	Sulfur Dioxide	TO Analyzer	BH-151848	3-Jun-24	3-Jun-25	6
Ambient	Sulfur Dioxide	TO Analyzer	BH-151067	5-Jun-24	5-Jun-25	6
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	BH-151370	27-Nov-24	27-May-26	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	BH-151369	26-Nov-24	26-May-26	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	BH-151374	29-Nov-24	29-May-26	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	BH-151372	28-Nov-24	28-May-26	18
Ambient	Temperature	Temperature Sensor	BH-151369	26-Nov-24	27-May-26	18
Ambient	Temperature	Temperature Sensor	BH-151369	26-Nov-24	26-May-26	18
Ambient	Temperature	Temperature Sensor	BH-151374	29-Nov-24	29-May-26	18
Ambient	Temperature	Temperature Sensor	BH-151373	29-Nov-24	29-May-26	18
Noise	Leq 24 Hr	Sound Calibrator	BH-150632	2-Jun-24	28-Jun-25	12
Noise	Leq 24 Hr	Sound Level Meter	BH-150691	22-Feb-25	21-Feb-26	12
Noise	Leq 24 Hr	Sound Level Meter	BH-150692	19-Sep-24	19-Sep-25	12
Noise	Leq 24 Hr	Sound Level Meter	BH-150698	12-Feb-26	12-Feb-26	12
Noise	Leq 8 Hrs	Sound Calibrator	BH-150632	22-Oct-24	22-Oct-25	12
Noise	Leq 8 Hrs	Sound Level Meter	BH-150634	21-Oct-24	21-Oct-25	12
Noise	Leq 8 Hrs	Sound Level Meter	BH-150606	26-Jan-24	26-Jan-25	12
Noise	Leq 8 Hrs	Sound Level Meter	BH-150699	29-Jan-26	29-Jan-25	12
Noise	Leq 8 Hrs	Sound Level Meter	BH-150699	30-Aug-24	30-Aug-25	12
Noise	Leq 8 Hrs	Sound Level Meter	BH-150101	29-May-24	29-May-25	12
Noise	Leq 8 Hrs	Sound Level Meter	BH-150111	5-Jan-24	4-Jan-25	12
Noise	Leq 8 Hrs	Sound Level Meter	BH-150129	21-Feb-24	20-Feb-25	12
Noise	Leq 8 Hrs	Sound Level Meter	BH-150926	12-Nov-24	12-Nov-25	12
Noise	Leq 8 Hrs	Sound Level Meter	BH-150626	9-Apr-24	8-Apr-25	12
Noise	Leq 8 Hrs	Sound Level Meter	SRT-150622	3-Jul-24	3-Jul-25	12
Noise	Leq 8 Hrs	Sound Level Meter	BH-150927	5-Jan-24	4-Jan-25	12
Noise	Leq 8 Hrs	Sound Level Meter	SRT-150620	8-Jul-24	8-Jul-25	12
Noise	Leq 8 Hrs	Sound Level Meter	NHG-150023	8-Jul-24	8-Jul-25	12
Water Lab	pH at 25 °C	pH meter	BH-150432	11-Oct-24	11-Oct-25	12
Water Lab	Residual Free Chlorine	Digital Meter	BH-150669	12-Nov-24	12-Nov-25	12
Water Lab	Oil & Grease	Equation Toploading Balance	BH-150662	2-Apr-24	2-Apr-25	12
Water Lab	Oil & Grease	Equation	BH-150435	4-Jun-24	4-Jun-25	18
Water Lab	Total Dissolved Solids, 180°C	Equation Toploading Balance	BH-150003	2-Aug-24	2-Apr-25	12
Water Lab	Total Dissolved Solids, 180°C	Oven	BH-150273	14-May-24	14-Nov-25	18
Water Lab	Temperature	pH meter	D-1150644	20-Sep-24	20-Sep-25	12
Water Lab	Copper	CP MS	BH-150685	-	-	12
Water Lab	Copper	ICP-MS	BH-151058	22-Sep-23	22-Mar-25	18
Water Lab	Copper	ICP-MS, (Cooling Room)	BH-150687	9-Sep-23	9-Jun-25	18

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Sample Name	Parameter	Equipment Name	ID No	Calibrated Date	Next Cal	Freq Calibrate (Months)
Water Lab	Zinc	CP MAS	IR-EL0043	20Oct14	3 Apr 26	18
Water Lab	Zinc	Heater Block	IR-EL0054	22-Sep-23	22-Mar-25	18
Water Lab	Zinc	Chamber (Cooking Room)	IR-EN0189	6-Dec-23	6-Jun-25	18

3

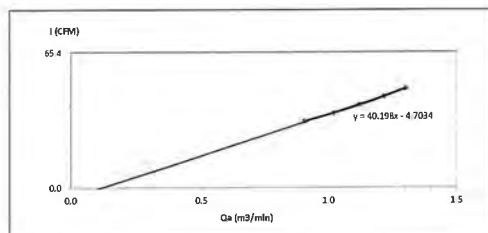
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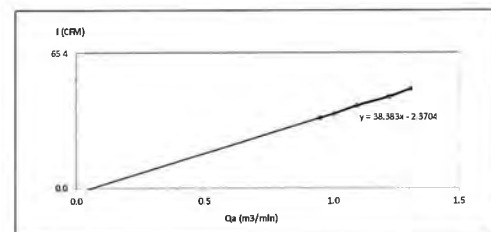
Project Site:	Gulf HT Co., Ltd.	Barometric Pressure (mm Hg):	760.4
Calibrate Location:	สุวรรณภูมิ	Temperature (°C):	29.1
Calibrate Date:	16-Dec-24	High Volume ID:	BKK FS9374
CalibrationSheet No:	C-61224-BKK FS9374	High Volume Model:	TE-5009X
Calibrator ID:	BKK FS6025	High Volume S/N:	5195
Calibrator Model:	TE-5028A	Calibrator Slope:	1.04893
Calibrator S/N:	2585	Calibrator Intercept:	-0.01266

Test No.	Delta H <sub>2</sub> O (inches)	Qa (m <sup>3</sup> /min)	I: Chart (CFS)	Linear Regression	
1	2.2	0.904	32	Slope:	40.1976
2	2.8	1.018	36	Intercept:	-4.7034
3	3.4	1.121	40	Correlation Coefficient:	0.9985
4	4.0	1.215	44		
5	4.6	1.302	48		



Project Site :	Gulf IP UT Co., Ltd.	Barometric Pressure (mm Hg) :	760.4
Calibrate Location :	โสตถุบำรุง	Temperature (°C) :	31.6
Calibrate Date :	16-Dec-24	High Volume ID :	BKK-F50389
CalibrationSheet No.:	C-61224-BKK-F50389	High Volume Model :	TE-5609X
Calibrator ID:	BKK-F5625	High Volume S/N :	5329
Calibrator Model :	TE-502BA	Calibrator Slope :	1.04003
Calibrator S/N :	7505	Calibrator Intercept :	-0.01206

Test No.	Delta H <sub>2</sub> O (inch)	Q <sub>a</sub> (m <sup>3</sup> /min)	I : Chart (CFM)	Linear Regression	
1	2.4	0.949	34	Slope :	38.3629
2	2.7	1.004	36	Intercept :	-2.3704
3	3.2	1.092	40	Correlation Coefficient :	0.9962
4	4.0	1.220	44		
5	4.6	1.307	48		

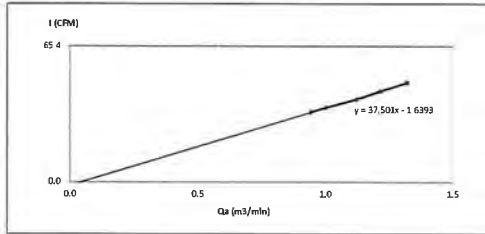




### High Volume Air Sampler Calibration Worksheet

Project Site : Gulf IPT Co., Ltd. Barometric Pressure (mm Hg) : 760.4  
Calibrate Location : สุราษฎร์ธานี Temperature (°C) : 30.1  
Calibrate Date : 16-Dec-24 High Volume ID : BKK-PS0386  
Calibration Sheet No. : C-161224-BKK-PS0386 High Volume Model : TE-5009X  
Calibrator ID : BKK-PS0625 High Volume S/N : 4790  
Calibrator Model : TE-5028A Calibrator Slope : 1.04803  
Calibrator S/N : 2585 Calibrator Intercept : -0.01206

Test No.	Delta H <sub>2</sub> O (inch)	Qa (m³/min)	I : Chart (CFM)	Linear Regression
1	2.4	0.945	34	Slope: 37.5010 Intercept: -1.6393 Correlation Coefficient: 0.9988
2	2.7	1.002	36	
3	3.4	1.123	40	
4	4.0	1.217	44	
5	4.7	1.319	48	



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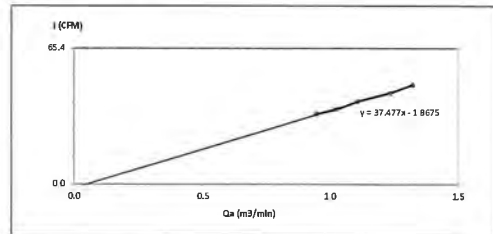
FORM NO.: F-06-074 REVISION NO.:2 ISSUE DATE: 20/11/23



### High Volume Air Sampler Calibration Worksheet

Project Site : Gulf IPT Co., Ltd. Barometric Pressure (mm Hg) : 760.4  
Calibrate Location : สุราษฎร์ธานี Temperature (°C) : 32  
Calibrate Date : 16-Dec-24 High Volume ID : BKK-PS1060  
Calibration Sheet No. : C-161224-BKK-PS1060 High Volume Model : TE-5009X  
Calibrator ID : BKK-PS0625 High Volume S/N : 5503  
Calibrator Model : TE-5028A Calibrator Slope : 1.04803  
Calibrator S/N : 2585 Calibrator Intercept : -0.01206

Test No.	Delta H <sub>2</sub> O (inch)	Qa (m³/min)	I : Chart (CFM)	Linear Regression
1	2.4	0.948	34	Slope: 37.4767 Intercept: -1.8675 Correlation Coefficient: 0.9973
2	2.8	1.023	36	
3	3.3	1.110	40	
4	4.1	1.236	44	
5	4.7	1.322	48	



Cal

FORM NO.: F-06-074 REVISION NO.:2 ISSUE DATE: 20/11/23



PLAY SOLUTION TECHNOLOGY COMPANY LIMITED  
179/75 Newong Pracha Pattana Road, Sikin, Donmuang, Bangkok 10210  
Tel: +66 2 011 0505, Fax: +66 2 012 7700  
www.playstec.com



## CERTIFICATE OF CALIBRATION

Certificate No. : PST-0126-24

W/O No. : WO-0051-24

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD. Page no. 1 of 3  
Address : 304 Phatthanabul 40, Phatthanabul Road, Chongeng Phatthanabul,  
City / Province : Khet Suon Lumb, Bangkok  
Zip/Postal : 10256

Device : Electronic Balance Capacity : 120 / 220 g  
Manufacturer : OHAUS Readability : 0.00001 / 0.0001 g  
Model : EX225D/AD ID No : BKK-ENC403  
Serial No : C309774648  
Condition : Normal

Environment Conditions : Environment Lab  
Location of Calibration : Environment Lab  
Ambient Temperature : 20.1 (°C) ± 3 °C  
Relative Humidity : 70.3 (%RH) ± 15 %RH  
Barometric Pressure : 1011.1 (mba) ± 10 hPa  
Comment :

Date of Receipt : June 3, 2024  
Date of Calibration : June 3, 2024  
Issue Date : June 5, 2024  
Calibrated by : Mr. Kittichai Pattanachum  
Calibrator :

The reported measurement result relates only to the measurement and applies only at the time of measurement.  
This Certificate is issued in accordance with the conditions of accreditation granted by Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognize national standards and to the unit of measurement referred at the corresponding national standard laboratory. This certificate may not be reproduced either in full or except with the prior written approval prior written approval of the calibration center, Play Solution Technology Co., Ltd.



PLAY SOLUTION TECHNOLOGY COMPANY LIMITED  
179/75 Newong Pracha Pattana Road, Sikin, Donmuang, Bangkok 10210  
Tel: +66 2 011 0505, Fax: +66 2 012 7700  
www.playstec.com



## CERTIFICATE OF CALIBRATION

Certificate No. : PST-0126-24

W/O No. : WO-0051-24

Result of Calibration : Without Adjustment Page no. 2 of 3

### 1. Repeatability

Weighting Range	g	Nominal Value	g	Standard Deviation	g
Max. capacity	220	50	200	0.000012	0.000048

### 2. Linearity, Departure of indication from nominal value

Weighting Range	Nominal Value	Standard Value	Indication	Error of Indication	Expanded Uncertainty	Factor k
g	g	g	g	g	g	
0.01	0.01000	0.01000	0.01000	-0.000001	0.000005	2.87
0.1	0.10001	0.10001	0.10001	0.000004	0.000002	2.87
0.5	0.50000	0.50001	0.50002	0.000012	0.000006	2.87
1	1.00001	1.00002	1.00003	0.000013	0.000006	2.87
5	5.00002	5.00003	5.00004	0.000009	0.000006	2.82
20	20.00009	20.00009	20.00010	-0.000001	0.000006	2.28
50	50.00001	50.00001	50.00002	-0.000002	0.000006	2.00
100	100.00002	100.00002	100.00003	0.000004	0.000006	2.00
110	110.00002	110.00002	110.00003	0.000004	0.000006	2.00
200	200.00003	200.00003	200.00004	0.000004	0.000006	2.00





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## CERTIFICATE OF CALIBRATION

Certificate No.: PST-0126-24

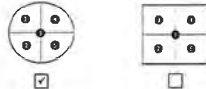
W/O No.: WO-0051-24

Result of Calibration

Page no 3 of 3

### 3. Eccentricity

Test: load at least 1/3 of the maximum capacity, typically placed between 1/2 and 1/3 of the distance from the centre of the load receptor to the edge.



Weighting Rules:

Test Load

Position	Indication	g
1	100.00004	
2	100.00005	
3	100.00009	
4	100.00004	
5	100.00003	
Max. Deviation	0.00003	

### Standard method

The calibration was performed by using calibration laboratory's in house calibrator method CP M 001 based on "UKAS LAS 14 Calibration of weighing machines" (edition 6) October 2019.

### Reference standards instrument

Instrument	QIM Class	S/N	Certificate No.	Due Date
Standard Weight Set	E2	4030021952	22-128725	November 15, 2024
Standard Weight Set				
Standard Weight Set				
Standard Weight Set				

### Measurement Uncertainty

The given measurement uncertainty is the standard of the measurement multiplied by an extension factor  $k$  which corresponds to a confidence level of about 95% for a normal distribution. The standard uncertainty was calculated according to UKAS M3003.

### Traceability:

The measurement is traceable to national standard, which realize the physical unit of measurement (SI) through the reference calibration laboratory of Asia Medical and Agricultural Laboratory and Research Center Co., Ltd.

END OF REPORT

F-039

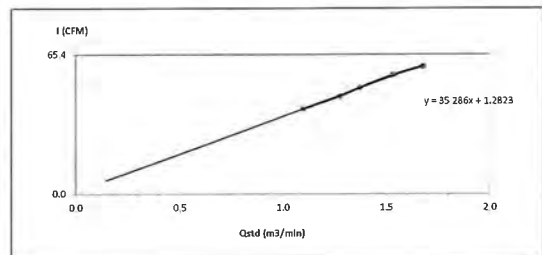
REV 03 30/08/66



## High Volume Air Sampler Calibration Worksheet

Project Site:	Gulf IP UT Co., Ltd.	Barometric Pressure (mm Hg):	760.4
Calibrate Location:	โรงเรียนวัดบางพลีใหญ่	Temperature (°C):	29.1
Calibrate Date:	16-Dec-24	High Volume ID:	BKK_FS0364
Calibration Sheet No.:	C-161224-BKK_FS0364	High Volume Model:	TE-5009X
Calibrator ID:	BKK_FS0625	High Volume S/N:	4154
Calibrator Model:	TE-5028A	Calibrator Slope:	1.67329
Calibrator S/N:	2585	Calibrator Intercept:	-0.01925

Test No.	Delta H <sub>2</sub> O (inch)	Q <sub>air</sub> (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	3.3	1.0978	40	Slope: 35.2863
2	4.5	1.2767	46	Intercept: 1.2823
3	5.2	1.3731	50	Correlation Coefficient: 0.9963
4	6.5	1.5329	56	
5	7.8	1.6774	60	



Calibrated by

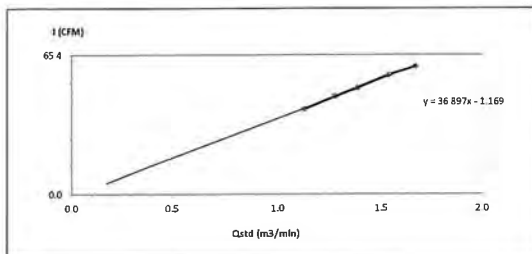
FORM NO.: F 06-073 REVISION NO.:2 ISSUE DATE: 20/11/23



## High Volume Air Sampler Calibration Worksheet

Project Site:	Gulf IP UT Co., Ltd.	Barometric Pressure (mm Hg):	760.4
Calibrate Location:	โรงเรียนวัดบางพลีใหญ่	Temperature (°C):	31.6
Calibrate Date:	16-Dec-24	High Volume ID:	BKK_FS0369
Calibration Sheet No.:	C-161224-BKK_FS0369	High Volume Model:	TE-5009X
Calibrator ID:	BKK_FS0625	High Volume S/N:	4166
Calibrator Model:	TE-5028A	Calibrator Slope:	1.67329
Calibrator S/N:	2585	Calibrator Intercept:	-0.01925

Test No.	Delta H <sub>2</sub> O (inch)	Q <sub>air</sub> (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	3.5	1.1254	40	Slope: 36.8973
2	4.5	1.2795	46	Intercept: -1.1690
3	5.3	1.3804	50	Correlation Coefficient: 0.9988
4	6.6	1.5382	56	
5	7.8	1.6706	60	



Calibrated by

(Mr

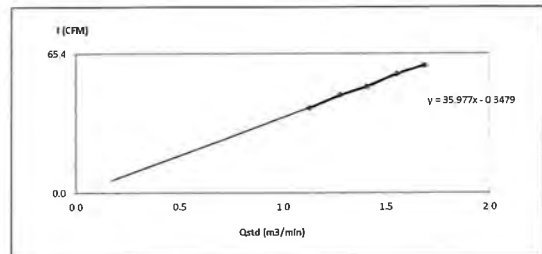
FORM NO.: F 06-073 REVISION NO.:2 ISSUE DATE: 20/11/23



## High Volume Air Sampler Calibration Worksheet

Project Site:	Gulf IP UT Co., Ltd.	Barometric Pressure (mm Hg):	760.4
Calibrate Location:	โรงเรียนวัดบางพลีใหญ่	Temperature (°C):	30.1
Calibrate Date:	16-Dec-24	High Volume ID:	BKK_FS1056
Calibration Sheet No.:	C-161224-BKK_FS1056	High Volume Model:	TE-5009X
Calibrator ID:	BKK_FS0625	High Volume S/N:	5499
Calibrator Model:	TE-5028A	Calibrator Slope:	1.67329
Calibrator S/N:	2585	Calibrator Intercept:	-0.01925

Test No.	Delta H <sub>2</sub> O (inch)	Q <sub>air</sub> (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	3.5	1.1281	40	Slope: 35.9772
2	4.5	1.2766	46	Intercept: -0.3479
3	5.5	1.4093	50	Correlation Coefficient: 0.9987
4	6.7	1.5535	56	
5	7.9	1.6852	60	



Calibrated by

(Mr R

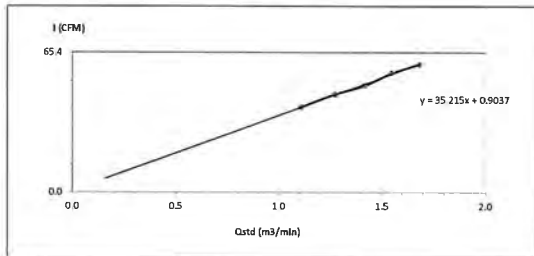
FORM NO.: F 06-073 REVISION NO.:2 ISSUE DATE: 20/11/23



### High Volume Air Sampler Calibration Worksheet

Project Site: Gulf P UT Co. Ltd. Barometric Pressure (mm Hg): 760.4  
Calibrate Location: สถานประกอบการ โรงงาน 1-4 Temperature (°C): 32  
Calibrate Date: 16-Dec-24 High Volume ID: BKK\_FS0366  
Calibration Sheet No.: C-161224-BKK\_FS0366 High Volume Model: TE-5009X  
Calibrator ID: BKK\_FS0625 High Volume S/N: 4156  
Calibrator Model: TE-5028A Calibrator Slope: 1.67329  
Calibrator S/N: 2585 Calibrator Intercept: -0.01925

Test No.	Delta H <sub>2</sub> O (Inch)	Q <sub>std</sub> (m <sup>3</sup> /min)	I: Chart (CFM)	Linear Regression
1	3.4	1.1088	40	Slope: 35.2150 Intercept: 0.9037 Correlation Coefficient: 0.9979
2	4.5	1.2727	46	
3	5.6	1.4175	50	
4	6.7	1.5487	56	
5	7.9	1.6800	60	



Calibrated by

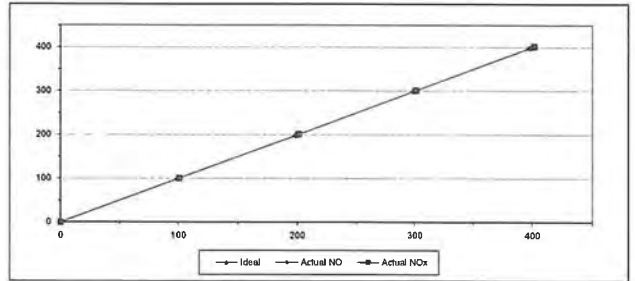
FORM NO: F 06-073 REVISION NO:2 ISSUE DATE: 20/11/23



### MULTIPOINT CALIBRATION REPORT

Calibration Date: 3-Jul-24 Equipment Name: NOx Analyzer  
Manufacturer: HORIBA Model: APNA-370  
Serial No.: XL7WRBSJ Equipment ID: BKK\_FS1082  
Calibrator Manufacturer: Teledyne API Model: 700  
Serial No.: 847  
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	99.70	-0.30	-0.30	101.00	1.00	1.00
2	200.00	198.10	-1.90	-0.95	201.20	1.20	0.60
3	300.00	299.20	-0.80	-0.27	301.40	1.40	0.47
4	400.00	398.20	-1.80	-0.45	402.10	2.10	0.53
AVERAGE (%)				-0.37			0.54



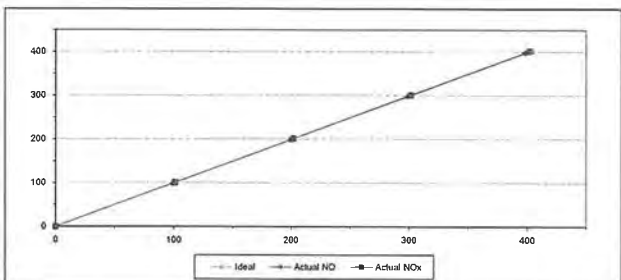
FORM NO: F 06-056 REVISION NO: - ISSUE DATE: 02/04/12



### MULTIPOINT CALIBRATION REPORT

Calibration Date: 2-Jul-24 Equipment Name: NOx Analyzer  
Manufacturer: Teledyne API Model: N200  
Serial No.: 80 Equipment ID: BKK\_FS1406  
Calibrator Manufacturer: Teledyne API Model: 700  
Serial No.: 847  
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	99.30	-0.70	-0.70	101.00	1.00	1.00
2	200.00	199.50	-0.50	-0.25	201.70	1.70	0.85
3	300.00	298.80	-1.20	-0.40	301.50	1.50	0.50
4	400.00	398.50	-1.50	-0.38	402.30	2.30	0.58
AVERAGE (%)				-0.33			0.60



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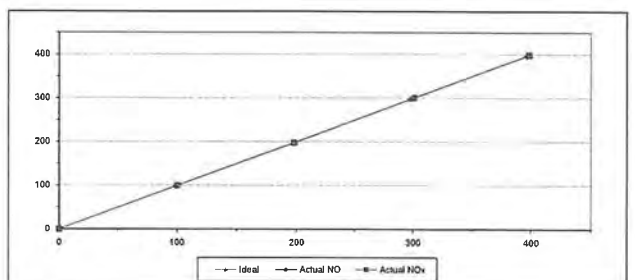
ALS Laboratory Group  
FORM NO: F 06-056 REVISION NO: - ISSUE DATE: 02/04/12



### MULTIPOINT CALIBRATION REPORT

Calibration Date: 3-Jul-24 Equipment Name: NOx Analyzer  
Manufacturer: HORIBA Model: APNA-370  
Serial No.: PX13CWA0 Equipment ID: BKK\_FS1088  
Calibrator Manufacturer: Teledyne API Model: 700  
Serial No.: 847  
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	99.10	-0.90	-0.90	100.30	0.30	0.30
2	200.00	198.30	-1.70	-0.85	198.10	-1.90	-0.95
3	300.00	298.40	-1.60	-0.53	301.30	1.30	0.43
4	400.00	396.80	-3.20	-0.80	398.70	-1.30	-0.33
AVERAGE (%)				-0.60			-0.09



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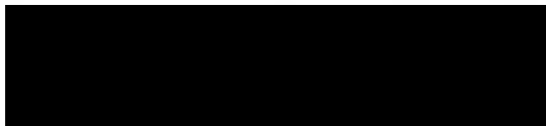
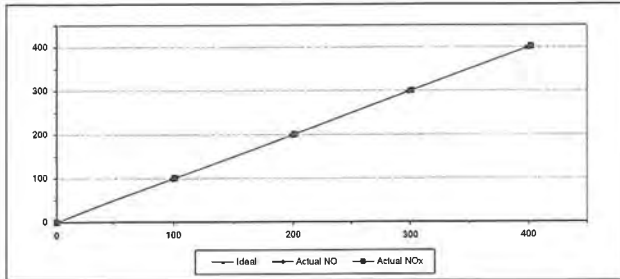
ALS Laboratory Group  
FORM NO: F 06-056 REVISION NO: - ISSUE DATE: 02/04/12



### MULTIPOINT CALIBRATION REPORT

Calibration Date 3-Jul-24 Equipment Name NOx Analyzer  
Manufacturer Teledyne API Model T200  
Serial No. 6305 Equipment ID BKK\_FS1098  
Calibrator Manufacturer Teledyne 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	99.40	-0.60	-0.60	101.20	1.20	1.20
2	200.00	198.50	-1.50	-0.75	201.40	1.40	0.70
3	300.00	298.50	-1.50	-0.50	301.10	1.10	0.37
4	400.00	398.50	-1.50	-0.38	402.00	2.00	0.50
AVERAGE (%)				-0.42			0.57



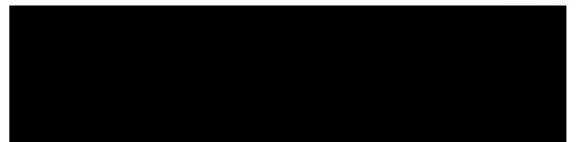
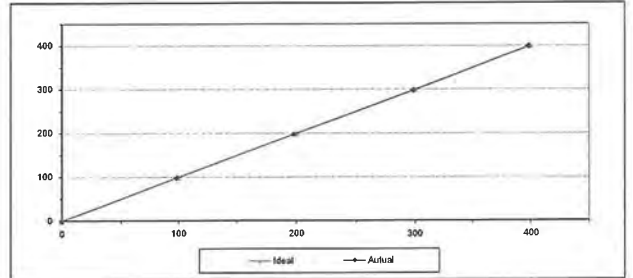
ALS Laboratory Group  
FORM NO : F 06-056 REVISION NO : - ISSUE DATE: 02/04/12



### MULTIPOINT CALIBRATION REPORT

Calibration Date 5-Jul-24 Equipment Name SO2 Analyzer  
Manufacturer HORIBA Model APSA-370  
Serial No. 6BVW6P1K Equipment ID BKK\_FS1091  
Calibrator Manufacturer Teledyne API Model 700  
Serial No. 947  
Std. Gas Concentration (PPM) 58.3 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	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 (%)				-0.64



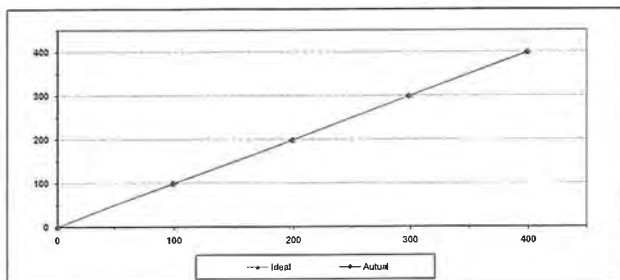
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FORM NO : F 06-056 REVISION NO : - ISSUE DATE: 02/04/12



### MULTIPOINT CALIBRATION REPORT

Calibration Date 5-Jul-24 Equipment Name SO2 Analyzer  
Manufacturer Teledyne API Model N100  
Serial No. 88 Equipment ID BKK\_FS1408  
Calibrator Manufacturer Teledyne API Model 700  
Serial No. 947  
Std. Gas Concentration (PPM) 56.3 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	98.90	-1.10	-1.10
2	200.00	198.50	-1.50	-0.75
3	300.00	298.50	-1.50	-0.50
4	400.00	399.20	-0.80	-0.20
AVERAGE (%)				-0.49



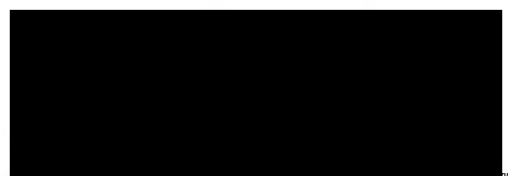
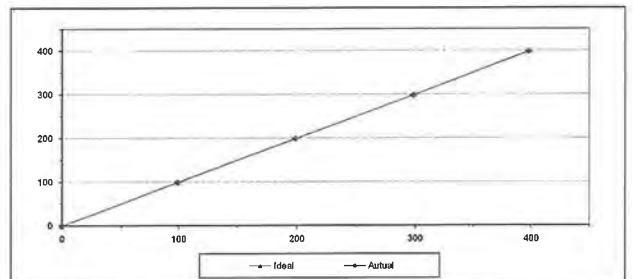
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FORM NO : F 06-056 REVISION NO : - ISSUE DATE: 02/04/12



### MULTIPOINT CALIBRATION REPORT

Calibration Date 5-Jul-24 Equipment Name SO2 Analyzer  
Manufacturer HORIBA Model APSA-370  
Serial No. XHV1SS8F Equipment ID BKK\_FS1087  
Calibrator Manufacturer Teledyne API Model 700  
Serial No. 947  
Std. Gas Concentration (PPM) 58.3 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	99.10	-0.90	-0.90
2	200.00	198.80	-1.20	-0.60
3	300.00	298.00	-2.00	-0.67
4	400.00	398.30	-1.70	-0.42
AVERAGE (%)				-0.50



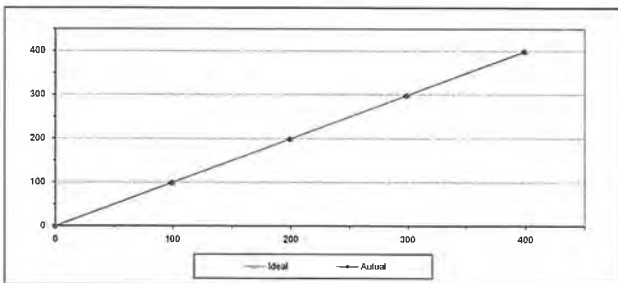
ALS Laboratory Group  
FORM NO : F 06-056 REVISION NO : - ISSUE DATE: 02/04/12



# MULTIPOINT CALIBRATION REPORT

Calibration Date	5-Jul-24	Equipment Name	SO2 Analyzer
Manufacturer	Teledyne API	Model	T100
Serial No.	5345	Equipment ID	BKK_FS1097
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	58.3	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	99.60	-1.40	-1.40
2	200.00	198.80	-1.20	-0.60
3	300.00	298.40	-1.60	-0.53
4	400.00	398.70	-1.30	-0.33
AVERAGE (%)				-0.55



ALS Laboratory Group  
FORM NO.: F-056 REVISION NO.: ISSUE DATE: 02/04/12



JIRANATEE ASSOCIATES CO., LTD.

1 Jiranteer Associates Co. Ltd  
6/14 25, 0735 36  
P.O. Box 1, 111 82 Bangkok 1, Bangkok  
Tel: 02-000-1111 (10 lines)  
Tel: 02-000-1111  
Mobile: 09-000-1111  
E-mail: jiranteer@jiranteer.com  
Web site: www.jiranteer.com

Accredited calibration laboratory  
ISO/IEC 17025:2017  
NSC-TIS-1715 17025  
CALIBRATION 0367  
Air speed measurement laboratory  
Calibration services department



NSC-TIS-1715 17025  
CALIBRATION 0367

Certificate Number  
CWS 063 67

## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Cup anemometer  
MANUFACTURER : Nowalyn  
MODEL/TYPE : Sensor: WS 037  
Data logger: 110-WS-2501 D  
SERIAL NUMBER : Sensor: WS0 AS965  
Data logger: AS965  
ID NUMBER : BKK FS1097  
CONDITION AS RECEIVED : Used item  
CUSTOMER : ALS Laboratory group (Thailand) Co., Ltd  
104 Phatthanakan Rd, Khwaeng Suan Luang,  
Khet Suan Luang, Bangkok 10250 Thailand

RECEIVED DATE : 27 Nov 2024  
MEASUREMENT DATE : 27 Nov 2024  
ISSUE DATE : 27 Nov 2024

ENVIRONMENTAL CONDITIONS:  
Ambient condition in the laboratory are as follow:  
Temperature : 23.0 ± 3.0 °C  
Relative Humidity : 55.0 ± 15.0 %RH  
Atmospheric Pressure : 1010.2 ± 10 hPa

PLACE OF CALIBRATION : Effel type wind tunnel of Jiranteer Associates Co., Ltd

CALIBRATION CONDITIONS : Wind tunnel cross section area : 900 cm<sup>2</sup>  
Wind direction (azimuthal angle) : 100 cm<sup>2</sup>  
Diameter of measuring pipe : 10 mm  
Blockage ratio of test object : 0.111 [-]

Preconditioning : 24 hours at ambient conditions  
Measurement Condition : The average values during measurement are (24.2) °C, (42.2) %RH and (1012.5) hPa

TABULATION OF RESULTS:  
The table on next page give the measured values

Calibrated by:  
Jiranteer Associates Co. Ltd  
104 Phatthanakan Rd, Khwaeng Suan Luang,  
Khet Suan Luang, Bangkok 10250 Thailand

Remarks:  
1. The wind tunnel cross section area of the wind tunnel  
2. The average values during measurement are (24.2) °C, (42.2) %RH and (1012.5) hPa  
3. The average values during measurement are (24.2) °C, (42.2) %RH and (1012.5) hPa

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 wind velocity transducer (type: WS0 AS965) and pitot tube with pressure differential pressure meter (type: WS0 AS965) in accordance with the requirements of ISO 9126 and ISO 9127. The test was performed in accordance with the requirements of ISO 9126 and ISO 9127. The test was performed in accordance with the requirements of ISO 9126 and ISO 9127.

Traceability:  
This certificate provides a traceability of the measurement to the international system of units (SI) through the NIST (National Institute of Standards and Technology) Calibration Service (NIST CS).

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 (Guide to the Expression of Uncertainty in Measurement).

REVIEW BY :  
APPROVED BY :  
ISSUE DATE : 27/05/26

Page 2 of 2 Pages

### MEASUREMENT RESULTS<sup>1</sup>

The Cup anemometer, WS0 AS965, was calibrated for 10 m/s for 5 minutes prior to calibration for its performance. 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 10 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 50 mm away from wind tunnel nozzle and installed 10 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 30 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> (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	U <sub>meas</sub> (m/s)	Error (m/s)	U <sub>ref</sub> (m/s)
1.013	24.56	24.20	0.0	-0.1	0.31
1.197	24.10	24.20	2.0	-0.7	0.31
1.350	24.61	24.20	2.9	-0.1	0.31
1.480	24.48	24.20	4.0	-0.2	0.31
1.595	23.64	24.20	4.9	0.0	0.31
1.695	23.95	24.20	5.9	-0.1	0.31
1.782	23.70	24.20	7.0	0.0	0.31
1.848	23.72	24.20	8.0	0.0	0.31
1.898	23.70	24.20	9.0	0.0	0.31
1.936	23.60	24.20	10.1	0.1	0.31
1.960	23.70	24.20	11.1	0.0	0.31
1.973	23.60	24.20	12.0	0.0	0.42
1.979	23.70	24.20	12.9	0.0	0.35
1.982	23.70	24.20	14.0	0.0	0.31
1.983	23.66	24.20	15.0	0.0	0.39
1.984	23.60	24.20	16.0	0.0	0.49

Remarks:  
<sup>1</sup> Calibration was only carried for the tested circumstances and environmental conditions which were calibration test plan

<sup>2</sup> Velocity of standard

<sup>3</sup> Velocity of this wind Calibration

PHOTO OF CALIBRATION SET UP



Copyright © 2012 of the Cup anemometer calibration. The wind tunnel of Jiranteer Associates Co., Ltd. The Cup anemometer shown may differ from the calibration results. In the picture of the set up and test results.



JIRANATEE ASSOCIATES CO., LTD.

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E-mail: jiranteer@jiranteer.com  
Web site: www.jiranteer.com

Accredited calibration laboratory  
ISO/IEC 17025:2017  
NSC-TIS-1715 17025  
CALIBRATION 0367  
Wind direction measurement laboratory  
Calibration services department



NSC-TIS-1715 17025  
CALIBRATION 0367

Certificate Number  
CWS 063 67

## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Wind Direction Sensor  
MANUFACTURER : Nowalyn  
MODEL/TYPE : Sensor: WS 037  
Data logger: 110-WS-2501 D  
SERIAL NUMBER : Sensor: WS0 AS965  
Data logger: AS965  
ID NUMBER : BKK FS1097  
CONDITION AS RECEIVED : Used item  
CUSTOMER : ALS Laboratory group (Thailand) Co., Ltd  
104 Phatthanakan Rd, Khwaeng Suan Luang,  
Khet Suan Luang, Bangkok 10250 Thailand

RECEIVED DATE : 22 Nov 2024  
MEASUREMENT DATE : 27 Nov 2024  
ISSUE DATE : 27 Nov 2024

ENVIRONMENTAL CONDITIONS:  
Ambient condition in the laboratory are as follow:  
Temperature : 23.0 ± 3.0 °C  
Relative Humidity : 55.0 ± 15.0 %RH  
Atmospheric Pressure : 1010.2 ± 10 hPa

PLACE OF CALIBRATION : Effel type wind tunnel of Jiranteer Associates Co., Ltd

CALIBRATION CONDITION : Wind tunnel cross section area : 900 cm<sup>2</sup>  
Wind direction (azimuthal angle) : 125 cm<sup>2</sup>  
Diameter of measuring pipe : 10 mm  
Blockage ratio of test object : 0.143 [-]

Preconditioning : 24 hours at ambient conditions  
Measurement Condition : The average values during measurement are (24.2) °C, (42.2) %RH and (1012.5) hPa

TABULATION OF RESULTS:  
The table on next page give the measured values

Calibrated by:  
Jiranteer Associates Co. Ltd  
104 Phatthanakan Rd, Khwaeng Suan Luang,  
Khet Suan Luang, Bangkok 10250 Thailand

Remarks:  
1. The wind tunnel cross section area of the wind tunnel  
2. The average values during measurement are (24.2) °C, (42.2) %RH and (1012.5) hPa  
3. The average values during measurement are (24.2) °C, (42.2) %RH and (1012.5) hPa

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 wind velocity transducer (type: WS0 AS965) and pitot tube with pressure differential pressure meter (type: WS0 AS965) in accordance with the requirements of ISO 9126 and ISO 9127. The test was performed in accordance with the requirements of ISO 9126 and ISO 9127. The test was performed in accordance with the requirements of ISO 9126 and ISO 9127.

Traceability:  
This certificate provides a traceability of the measurement to the international system of units (SI) through the NIST (National Institute of Standards and Technology) Calibration Service (NIST CS).

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 (Guide to the Expression of Uncertainty in Measurement).

# 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 adjustment has been made. The flow speed of wind tunnel (usually 5 m/s) is kept constant while the sensor is rotated around in vertical axis. The results of calibration and expanded measurement uncertainty are reported in the table below.

Air speed m/s	D <sub>150</sub> Degree (°)	D <sub>150</sub> Degree (°)	Error Degree (°)	U (k=2) Degree (°)
5.02	45.000	41	-4	0.80
	90.000	87	-3	0.80
	135.000	133	-2	0.80
	180.000	181	1	0.80
	225.000	227	2	0.80
	270.000	273	3	0.80
	315.000	318	3	0.80
	360.000	359	-1	0.80

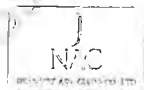
## Remarks:

<sup>1</sup> Calibration results only count for the tested circumstances and measurement conditions during which calibration took place.

<sup>2</sup> Direction of standard

<sup>3</sup> Direction of Unit Under Calibration

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



## CERTIFICATE OF CALIBRATION

Certificate No. : CDT-203-67

Page 1 of 2 Pages

MEASUREMENT ITEM : Data Logger with Temperature sensor  
MANUFACTURER : Novolyne  
MODEL/TYPE : 110-WS-25D1-D  
SERIAL NUMBER : AS965  
ID NUMBER : 08K-F51370  
CONDITION AS-RECEIVED : Used item  
CUSTOMER : ALS Laboratory group (Thailand) Co., Ltd  
104 Phatthanakan 40, Phatthanakan Rd.,  
Klongkum Suburb, Bangkok 10250 Thailand.

RECEIVED DATE : 21 Nov 2024  
MEASUREMENT DATE : 27 Nov 2024  
ISSUE DATE : 27 Nov 2024

## ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:  
Temperature : 23.0 ± 3.0 °C  
Relative Humidity : 55.0 ± 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.

Calibration procedure:  
The temperature calibration was carried out by using a standard rotary encoder with flow speed digital temperature sensor and standard temperature probe. The temperature state was based on ITS-90.

Traceability:  
The calibration system is traceable to the International System of Units (SI) through National Institute of Metrology (Thailand (NIMT)) Certificate number: 11-04-7-24, Certificate number: 11-01-1-24.

Reference Used During Calibration:  
1. Standard Temperature Probe  
Model: STS-100-A520, Serial No.: 187662-05,  
Diameter: 1.6 mm, 2023  
2. Digital Temperature Indicator  
Model: DTN-1000-A-RK1, Serial No.: 171402-0078, Due date: 21 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.

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Continuation of Certificate of Calibration Number CDT-203-67

Page 2 of 2 Pages

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

## Function:

Table 3: This equipment was connected with temperature sensor Model: HMP60 5/N, U3641226  
Dimension: Diameter 12 mm, Length 80 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.066	19.8	0.3	0.095
80	25.053	24.8	0.3	0.095
80	30.045	29.8	-0.2	0.095
80	35.029	34.5	-0.5	0.095
80	40.016	39.5	-0.5	0.095

UUC: Unit Under Calibration

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



## CERTIFICATE OF CALIBRATION

Certificate No. : CRT 055 67

Page 1 of 2 Pages

MEASUREMENT ITEM : Relative humidity with data logger  
MANUFACTURER : Novolyne  
MODEL/TYPE : Data Logger 110-WS-25D1-D  
Sensor: HMP60  
SERIAL NUMBER : Data Logger: AS965  
Sensor: U3641226  
ID NUMBER : 08K-F51370  
CONDITION AS-RECEIVED : New item  
CUSTOMER : ALS Laboratory group (Thailand) Co., Ltd  
104 Phatthanakan 40, Phatthanakan Rd., Klongkum Suburb,  
Bangkok 10250 Thailand

RECEIVED DATE : 21 Nov 2024  
MEASUREMENT DATE : 27 Nov 2024  
ISSUE DATE : 27 Nov 2024

## ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:  
Temperature : 23.0 ± 3.0 °C  
Relative Humidity : 55.0 ± 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.

Calibration procedure:  
The relative humidity and Air Temperature measurement was done by the standard equipment as ISO/IEC 17025 and by the comparison method with Standard, Certified Reference humidity generator chamber.

Traceability:  
The measurement is traceable to the International System of Units (SI) through National Institute of Metrology (Thailand (NIMT)) Certificate number: 11-04-7-24 and through 3 meter Approval Co., Ltd. Calibration certificate CDT 001-24.

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.

Calibrated by:

1. Jirananee Associates Co., Ltd.  
2. Jirananee Associates Co., Ltd.  
3. Jirananee Associates Co., Ltd.



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JIRANATEE ASSOCIATES CO., LTD.

Continuation of Certificate of Calibration Number: CRT-055-07

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 the table below.  
Calibration Range: 70-100 to 85-111

Air Temperature (°C)	Standard Reading (%RH)	UUC Reading (%RH)	Error (%RH)	Uncertainty (%RH)
29.22	10.70	10.7	-1.0	0.78
29.72	50.87	50.5	-2.0	1.0
29.80	81.61	80.5	-2.9	1.1

UUC\* Unit Under Calibration

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



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E-mail: jirantee@jirantee.com  
Website: www.jirantee.com

Accredited calibration laboratory  
ISO/IEC 17025:2017  
NSC-TIS-17025  
CALIBRATION 0367

Pressure measurement laboratory  
Calibration services department



## CERTIFICATE OF CALIBRATION

Certificate No.: CFB-031-07

Page 1 of 2 Pages

#### MEASUREMENT ITEM

Digital barometer

#### MANUFACTURER

Rowley

#### MODEL/TYPE

Sensor: 110 WS 2.0P

Data logger: 110 WS 2.0L D

#### SERIAL NUMBER

Sensor: BP AS965

Data logger: AS965

#### ID NUMBER

UUC: 151340

#### CONDITION AS RECEIVED

Used item

#### CUSTOMER

ALS laboratory group (Thailand) Co., Ltd.  
105 Phatthakan 40 Phatthakan Rd,  
Klongkum Suburb, Klongkum Suburb,  
Bangkok 10250 Thailand

#### RECEIVED DATE

22 Nov 2024

#### MEASUREMENT DATE

22 Nov 2024

#### ISSUE DATE

27 Nov 2024

#### Calibration procedure:

The digital barometer was calibrated against  
Digital pressure calibration, 110 WS 2.0P  
was used as a calibration standard.

#### 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 0001 21

#### 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. Reference Standard Instrument:

Instrument: Model: Serial No.: Certificate No.: Due Date:

Absolute Pressure Transducer: CPT2500: 2101288: MP 0001 21: 27 Dec 2024

##### 2. The UUC\* was installed in vertical orientation, and the reference standard instrument and center of UUC\* was used as the reference level.

##### 3. Calibration conditions:

4. Conditions:

5. The certificate is valid only for the items calibrated on this date and place of calibration.

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ISO/IEC 17025:2017  
NSC-TIS-TIS 17025  
CALIBRATION 0367  
Pressure measurement laboratory  
Calibration services department



## CERTIFICATE OF CALIBRATION

Certificate No. : CRT-054-67

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.

SI Unit	Unit	Error	Uncertainty (k=2)
(mbar)	(mbar)	(mbar)	(mbar)
950.00	950.00	1.4	0.3
960.00	960.00	1.0	0.3
970.00	970.00	0.6	0.3
980.00	980.00	0.3	0.4
990.00	990.00	0.2	0.3
1000.00	1000.00	0.2	0.4

Note: "Unit" Unit Under Calibration

: To convert the result in report unit to Pa should be multiply by 100

\*End of certificate\*



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Website: www.jiranatee.com

Accredited calibration laboratory  
ISO/IEC 17025:2017  
NSC-TIS-TIS 17025  
CALIBRATION 0367

Relative humidity and Air Temperature measurement laboratory  
Calibration services department

## CERTIFICATE OF CALIBRATION

Certificate No. : CRT-054-67

Page 1 of 2 Pages

MEASUREMENT ITEM : Relative humidity with data logger  
MANUFACTURER : Nivalyne  
MODEL/TYPE : Data Logger: 110 WS-250L D  
Sensor: RH900  
SERIAL NUMBER : Data Logger: A5964  
Sensor: U3911251  
ID NUMBER : BAK\_F51369  
CONDITION AS RECEIVED : New Item  
CUSTOMER : AIS Laboratory Group (Thailand) Co., Ltd.  
104 Phatthanasak 40, Phatthanasak Rd, Khwaeng Suan Luang,  
Khet Suan Luang, Bangkok 10250 Thailand

RECEIVED DATE : 23 Nov 2024  
MEASUREMENT DATE : 26 Nov 2024  
ISSUE DATE : 26 Nov 2024

### ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow  
Temperature : 23.0 ± 3.0 °C  
Relative Humidity : 55.0 ± 15.0 %RH

NOTE: 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

Calibration procedure  
The Relative humidity and Air Temperature  
measured are done by a Nivalyne RH900  
sensor with data logger 110 WS-250L D  
using the Nivalyne RH900 sensor and data  
logger 110 WS-250L D and Nivalyne  
Data Logger A5964 and Nivalyne  
Sensor U3911251.

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  
evaluation of measurement data - based on the  
expression of uncertainty in measurement.

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 - based on the  
expression of uncertainty in measurement.

Calibrated by:

- 1. Jiranatee Associates Co., Ltd.
- 2. Jiranatee Associates Co., Ltd.
- 3. Jiranatee Associates Co., Ltd.

THIS CERTIFICATE OF CALIBRATION MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED  
IN WRITING FROM THE LABORATORY



JIRANATEE ASSOCIATES CO., LTD.

Continuation of Certificate of Calibration Number: CRT-054-67

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 : 20%RH to 80%RH

Air Temperature (°C)	Standard Reading (%RH)	Unit Reading (%RH)	Error (%RH)	Uncertainty (%RH)
29.81	59.41	59.41	0.0	0.7
29.82	59.41	59.41	0.0	0.7
29.83	59.42	59.42	0.0	0.7

Note: "Unit" Unit Under Calibration

\*End of Certificate of Calibration\*



JIRANATEE ASSOCIATES CO., LTD.

13/18 Bldg. 101  
P.O. Box 1211, 111/111, 111/111, Bangkok  
Tel: 02-000-0000  
Fax: 02-000-0000  
E-mail: jiranatee@jiranatee.com  
Website: www.jiranatee.com

Accredited calibration laboratory  
ISO/IEC 17025:2017  
NSC-TIS-TIS 17025  
CALIBRATION 0367

Wind direction measurement laboratory  
Calibration services department



Certificate Number

CWD 062-67

## CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Wind Direction Sensor  
MANUFACTURER : Nivalyne  
MODEL/TYPE : Sensor WS 020  
Data logger: 110 WS-250L D  
Sensor: WS0 A5564  
SERIAL NUMBER : Data logger: A5964  
Sensor: WS0 A5564  
ID NUMBER : BAK\_F51369  
CONDITION AS RECEIVED : Used Item  
CUSTOMER : AIS Laboratory Group (Thailand) Co., Ltd.  
104 Phatthanasak 40, Phatthanasak Rd, Khwaeng Suan Luang,  
Khet Suan Luang, Bangkok 10250 Thailand

RECEIVED DATE : 22 Nov 2024  
MEASUREMENT DATE : 26 Nov 2024  
ISSUE DATE : 26 Nov 2024

### ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow  
Temperature : 23.0 ± 3.0 °C  
Relative Humidity : 55.0 ± 15.0 %RH  
Atmospheric Pressure : 1010.0 ± 10 hPa

### PLACE OF CALIBRATION

: Effel type wind tunnel of Jiranatee Associates Co., Ltd.

### CALIBRATION CONDITION

: Wind tunnel cross-section area<sup>a</sup> : 900 cm<sup>2</sup>  
Wind direction from all area<sup>a</sup> : 120 cm<sup>2</sup>  
Diameter of mounting pipe<sup>a</sup> : 1.143 mm  
Blockage ratio of test object<sup>a</sup> : 0.143 [-]

### Preconditioning

: 24 hours at ambient condition  
The average values during measurement are 23.9 °C, 49.2 %RH and 1008.8 hPa.

### TABULATION OF RESULTS:

The table on next page give the measured values

Calibrated by:

- 1. Jiranatee Associates Co., Ltd.
- 2. Jiranatee Associates Co., Ltd.
- 3. Jiranatee Associates Co., Ltd.

### Remarks:

- <sup>a</sup> The cross-section area of the wind tunnel
- <sup>a</sup> The cross-section area of the test object including mounting pipe
- <sup>a</sup> Diameter of mounting pipe
- <sup>a</sup> Blockage ratio

Calibration procedure  
The wind direction sensor was calibrated using  
Nivalyne Wind Encoder, Sensor WS 020  
and data logger 110 WS-250L D using the  
Nivalyne Wind Encoder, Sensor WS 020  
and data logger 110 WS-250L D and Nivalyne  
Data Logger A5964 and Nivalyne Sensor  
WS0 A5564.

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  
evaluation of measurement data - based on the  
expression of uncertainty in measurement.

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 - based on the  
expression of uncertainty in measurement.

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<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 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.

Air speed m/s	D <sup>1</sup> <sub>me</sub> Degree (°)	D <sup>1</sup> <sub>act</sub> Degree (°)	Error Degree (°)	U <sub>95</sub> (k=2) Degree (°)
	0.000	0	0	0.000
	45.000	47	-3	45.000
	90.000	87	-3	90.000
	135.000	133	-2	135.000
	180.000	181	1	180.000
	225.000	227	2	225.000
	270.000	273	3	270.000
	315.000	318	3	315.000

#### Remark:

<sup>1</sup> Calibration results only valid for the listed instruments and environmental conditions during which calibration was done.

<sup>2</sup> Direction of standard

Direction of Unit Under Calibration

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



JIRANATEE ASSOCIATES CO., LTD.

Jiranatee Associates Co., Ltd.  
48/31 J.S. Road, 88  
Pacharavee 27/1, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

Accredited calibration laboratory  
ISO/IEC 17025:2017  
NSC-TISI-TIS 17025  
CALIBRATION 0367

Temperature measurement laboratory  
Calibration services department



## CERTIFICATE OF CALIBRATION

Certificate No. : CDT-205-67

**MEASUREMENT ITEM** : Data Logger with Temperature sensor  
**MANUFACTURER** : Novapine  
**MODEL/TYPE** : 110-WS-25DL-D  
**SERIAL NUMBER** : AS974  
**ID NUMBER** : BKK\_FS1374  
**CONDITION AS RECEIVED** : Used item  
**CUSTOMER** : ALS laboratory group (Thailand) Co., Ltd.  
304 Phatthanakan 40, Phatthanakan Rd.,  
Khuang Suan Luang, Khet Suan Luang,  
Bangkok 10250 Thailand

**RECEIVED DATE** : 21 Nov 2024  
**MEASUREMENT DATE** : 29 Nov 2024  
**ISSUE DATE** : 29 Nov 2024

**ENVIRONMENTAL CONDITIONS:**  
Ambient condition in the laboratory are as follows:  
**Temperature** : 23.0 ± 3.0 °C  
**Relative Humidity** : 55.0 ± 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



Calibrated by:  
[Signature]  
[Name]  
[Title]

**Calibration procedure:**  
The temperature calibration was carried out by the fixed calibration method in accordance with the ISO 17025:2017 standard. The temperature sensor was calibrated against the standard temperature probe. The temperature probe was calibrated against the standard temperature probe.

**Traceability:**  
The measurement results are traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST) Calibration Services. The temperature probe was calibrated against the standard temperature probe.

**Reference Used During Calibration:**  
1. Standard Temperature Probe Model: S15-100-A500, Serial No.: 102111-015, Due date: 26 Mar 2025  
2. Digital Temperature Indicator Model: D11-1000-A-MC-1, Serial No.: 111407, Due date: 21 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 a measurement.

THIS CERTIFICATE MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION FOR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY



JIRANATEE ASSOCIATES CO., LTD.

Continuation of Certificate of Calibration Number CDT-205-67

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

**Calibration Range:** 20 °C to 40 °C

#### Function:

Table 3: This equipment was connected with temperature sensor Model: DS2005/RE-V1500211. Dimension: Diameter 12 mm, Length 80 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.067	19.8	-0.3	0.039
80	25.033	24.8	-0.3	0.039
80	30.045	29.8	-0.2	0.039
80	35.022	34.7	-0.3	0.039
80	40.016	39.7	-0.3	0.039

UUC\*: Unit Under Calibration

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



JIRANATEE ASSOCIATES CO., LTD.

Jiranatee Associates Co., Ltd.  
48/31 J.S. Road, 88  
Pacharavee 27/1, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837







Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C to 40 °C

**Function:**

Table 3: This equipment was connected with temperature sensor Model: HMP603/N, V1920209, Dimension: Diameter 12 mm, Length 80 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.066	19.8	-0.3	0.093
80	25.053	24.6	-0.5	0.093
80	30.036	29.7	-0.3	0.093
80	35.028	34.7	-0.3	0.093
80	40.016	39.5	-0.5	0.093

UUC\*: Unit Under Calibration

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



## CERTIFICATE OF CALIBRATION

Certificate No.: CPL 037-67

Page 1 of 2 Pages

**MEASUREMENT ITEM**

Digital barometer

**MANUFACTURER**

Novalyne

**MODEL/TYPE**

Sensor: 110 WS 25DL D

**SERIAL NUMBER**

Data Logger: 110 WS 25DL D

**ID NUMBER**

Sensor: BC 25970

**CONDITION AS RECEIVED**

Data Logger: A5970

**CUSTOMER**

Novalyne  
A/S Laboratory group (Thailand) Co., Ltd  
104 Phatthanakan Rd, Phatthanakan Rd,  
Khlong Sam Luang, Khlong Sam Luang,  
Bangkok 10250 Thailand

RECEIVED DATE: 22 Nov 2024  
MEASUREMENT DATE: 28 Nov 2024  
ISSUE DATE: 28 Nov 2024

**Calibration procedure:**

The Digital barometer was calibrated against Digital pressure calibration (1013.25 hPa) was used as a reference pressure.

**Traceability:**

The measurement results are traceable to the international system of units (SI) through the NIST National Metrology Institute of Thailand via Certificate number: MP-0039 74

**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. Reference Standard Instrument**

Instrument: Model: Serial No: Certificate No: Due Date

Absolute Pressure Transducer: CUS2703: 2107228: LAB-0009-J2: 27 Dec 2024

1. Calibration effort for calibration sequence E

2. The UUC was installed in vertical orientation and reference standard instrument and center of GUM was used as the reference level

3. Calibration conditions

4. Conditions

Pressure transmitting medium: ☒ Normal ☐ Alternative

Pressure transmitting medium:  $p_0$  (20°C, 1 bar)

$H_{rel}$ : 19.42 m

$H_{rel}$ : 75.15 m

$H_{rel}$ : 73.13 m

$H_{rel}$ : 10.00-10.10 m

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

**Calibrated by:**

Mr. Somchai Chaisri

11/25/2024 10:00 AM

THIS CERTIFICATE REPORT MAY NOT BE REPRODUCED EXCEPT IN FULL UNLESS PERMISSION OR REPRODUCTION HAS BEEN OBTAINED IN WRITING FROM THE LABORATORY



## CERTIFICATE OF CALIBRATION

Certificate No.: CPL 037-67

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	UUC*	Error	Uncertainty (k=2)
(mbar)	(mbar)	(mbar)	(mbar)
950.01	951.6	1.6	0.37
960.99	971.0	1.0	0.37
970.99	990.4	0.4	0.37
1010.00	1009.8	0.2	0.37
1030.05	1039.4	0.4	0.37
1050.04	1048.7	-0.3	0.37

Note: UUC\* Unit Under Calibration

To convert the result in report unit in Pa should be multiply by 100

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



## CERTIFICATE OF CALIBRATION

Certificate No.: CRT-056-67

Page 1 of 2 Pages

**MEASUREMENT ITEM**

Relative humidity with data logger

**MANUFACTURER**

Novalyne

**MODEL/TYPE**

Data Logger: 110 WS 25DL D

**SERIAL NUMBER**

Sensor: HMP603

**ID NUMBER**

Data Logger: A5970

**CONDITION AS RECEIVED**

Sensor: V1920209

**CUSTOMER**

Novalyne  
A/S Laboratory group (Thailand) Co., Ltd  
104 Phatthanakan Rd, Phatthanakan Rd,  
Khlong Sam Luang, Khlong Sam Luang,  
Bangkok 10250 Thailand

RECEIVED DATE: 21 Nov 2024

MEASUREMENT DATE: 28 Nov 2024

ISSUE DATE: 28 Nov 2024

**ENVIRONMENTAL CONDITIONS:**

Ambient condition in the laboratory are as follow:

Temperature: 23.0 ± 0.2 °C

Relative Humidity: 55.0 ± 1.0 %RH

**Calibration procedure:**

The Relative humidity and Air Temperature were calibrated against the standard uncertainty indicated 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.

**Traceability:**

The measurement results are traceable to the international system of units (SI) through the NIST National Metrology Institute of Thailand via Certificate number: MP-0039 74

**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.

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. Somchai Chaisri  
11/25/2024 10:00 AM

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Certificate Number

CWS-064-67

Page 7 of 7 Pages

MEASUREMENT RESULTS<sup>1</sup>

The Cup anemometer, Unit Under Calibration (UUC) was exercised at 30 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 meter which was installed 50 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 flow pipe 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 method of 3 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

UUC (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	$V_{ref}$ (m/s)	Error (m/s)	$U$ (95%) (m/s)
1.009	23.76	23.70	0.9	0.1	0.31
2.022	23.60	23.70	2.0	-0.2	0.31
3.031	23.60	23.70	2.9	0.1	0.31
4.201	23.62	23.70	4.0	-0.2	0.31
4.96	23.50	23.70	4.9	0.0	0.31
5.95	23.72	23.70	5.9	0.0	0.31
7.01	23.52	23.70	7.0	0.0	0.31
7.97	23.50	23.70	7.9	0.1	0.31
8.97	23.42	23.70	8.9	-0.2	0.31
9.96	23.40	23.70	9.9	0.0	0.31
11.10	23.40	23.70	11.0	0.1	0.31
12.02	23.30	23.70	12.1	0.1	0.31
12.93	23.38	23.70	13.0	0.0	0.31
13.92	23.30	23.70	14.0	0.1	0.31
14.98	23.30	23.70	15.1	0.1	0.31
15.96	23.30	23.70	16.0	0.1	0.31

## Remark:

<sup>1</sup> Calibration results only count for the tested circumstances and environmental condition during which calibration took place.<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 flow direction is shown may differ from the calibrated one. Error: no proportion of the set up not true to scale due to imaging geometry.

SITHIPORN ASSOCIATES CO., LTD.  
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Tel : +66 2433 8331 Email : calibration@sithiporn.comSITHIPORN  
ASSOCIATES

Cert. No. : ACC24010

Pages : 1 of 3

## Calibration Certificate

Equipment : SOUND CALIBRATOR  
Manufacturer : RION  
Model : NC-74  
Serial No. : 34178119  
ID No. : BKK\_FS0632

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,  
KHWAENG PHATTHANAKAN, KHE7 SUAN LUANG,  
HANGKOK, 10250 THAILAND.

Location :  
Ambient Temperature : ( 23.0 ± 3 ) °C  
Pressure : ( 101.3 ± 3 ) kPa  
Relative Humidity : ( 50.0 ± 20 ) %

Received Date : 19 JANUARY 2024  
Calibration Date : 26 JANUARY 2024  
Date of Issue : 29 JANUARY 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by :

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

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associatesCert. No. : ACC24010  
Job No. : VC67AC0059  
Pages : 2 of 3

Calibration Procedure : CP-AC-03

## Calibration Method :

This equipment was calibrated by follow on IEC-60942-2003 Standard.

The sound pressure level, frequency and total distortion of the sound calibrator was measured using the reference microphone.

## Condition of this result of calibration :

## 1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33511B	MY52302742	EF-0010-23	07-FEB-24
Digital Multimeter	33461A	MY53220104	EEL BP 30/0266	13-FEB-24
Digital Multimeter	33461A	MY53220076	EEL BP 30/0267	13-FEB-24
Digital Multimeter	33461A	MY60024273	FLL BP 31/0266	08-FEB-24
Programmable Attenuator	MA1-1070	62100114	EF-0011-23	14-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KA1	34560495	AA-3002-23	14-FEB-24
Audio Analyzer	AVR-3360A	V744B6069	EF-0012-23	10-FEB-24

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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associatesCert. No. : ACC24010  
Job No. : VC67AC0059  
Pages : 3 of 3

## Result of calibration :

## 1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Acceptance limit (dB)
94	93.94	-0.06	0.14	0.40

## 2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Acceptance limit (%)
1000	1001.1	0.1	0.1	1.0

## 3. Total distortion

Measured value (%)	Uncertainty (%)	Acceptance limit (%)
1.48	0.10	3.0

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

End of Calibration Certificate



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0231

MTC No. EEL BP. 170/0167

## CALIBRATION CERTIFICATE

Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.  
 Address : 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250  
 Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre  
 Soi 13, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

Instrument Calibrated :  
 Description : Sound Level Meter  
 Manufacturer : Rion  
 Model : NL-42  
 Serial No : 00296514 (ID: BKK\_FS0971)  
 Microphone : Type UC-52 No 179116  
 Preamplifier : Type NH-24 No 87523

Standards used :

Ambient Environment  
 Temperature : (23 ± 3) °C  
 Relative Humidity : (50 ± 15) %  
 Ambient Pressure : (101,325 ± 1.5) kPa



1. Band Pass Filter Wavelec 752A S/N 90010494.
2. Condenser Microphone Brüel&Kjær 4180 S/N 2889871.
3. Decade Attenuator Ando AL-205 S/N 00464602.
4. Function/Arbitrary Waveform Generator Agilent 33220A S/N MY44042668.
5. Digital Function Synthesizer NF Electronic Instruments DF-193A S/N 122037.
6. Digital Multimeter Fluke 8520A S/N 4985007.
7. Pistonphone Rion NC-72 S/N 00402446.
8. Measuring Amplifier Brüel&Kjær 2636 S/N 1537484.

Date of Receipt : 24 Jan. 2024

Date of Calibration : 22-28 Feb. 2024

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This certificate is valid only for the items described in the scope of calibration.  
 Adherence to the calibration conditions and procedures is required for full and accurate calibration performance. Calibration is performed under the supervision of TISTR.

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

## Calibration Procedure :

This instrument was calibrated by using calibration procedures no CP-102-02 and CP-102-03, which were based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2013). These calibration procedures were related to the electrical and acoustic signal tests. The electrical signal test was carried out with the direct measurement method. The acoustic signal test was performed in an anechoic room with the comparison measurement method.

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

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

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

Date of Calibration : 22-28 Feb. 2024

3/9

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## 1. Absolute Sensitivity

Reference Acoustic Signal (dB)	Measured value (dB)	Deviation	Acceptance limit	Uncertainty	Maximum-permitted uncertainty
	Before adjust	After adjust	Class 2 (±dB)	(±dB)	of measurement (±dB)
113.96	114.4	113.9	-0.1	1.0	0.30

Note: The external calibration adjustment was firstly performed. The internal calibration adjustment was then completed at the display of 123.7 dB.

## 2. Self-generated noise

## 2.1. Normal test

Measured value (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
19.7	0.10	N/A

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

Frequency Weighting	Measured value (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
A-Weight	11.2	0.10	N/A
C-Weight	16.6	0.10	N/A
Flat	22.0	0.10	N/A

Date of Calibration : 22-28 Feb. 2024

3/9

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## 3. Acoustical signal test of frequency weightings

Frequency (Hz)	Deviation from frequency response (dB)			Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
	A-weight	C-weight	Flat			
125	0.5	0.6	0.7	1.5	0.45	0.6
1 000	-0.6	-0.6	-0.7	1.0	0.45	0.6
8 000	-1.4	-1.4	-1.3	5.0	0.45	0.7

## 4. Electrical signal test of frequency weightings

Frequency (Hz)	Deviation from frequency response (dB)			Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
	A-weight	C-weight	Flat			
63	-0.1	0.0	0.0	2.0	0.20	0.6
125	-0.1	0.0	0.0	1.5	0.20	0.6
250	-0.1	0.0	0.0	1.5	0.20	0.6
500	0.0	0.0	0.0	1.5	0.20	0.6
1 000	0.0	0.0	0.0	1.0	0.20	0.6
2 000	0.0	0.1	0.0	2.0	0.20	0.6
4 000	0.0	0.0	0.0	3.0	0.20	0.6
8 000	0.1	0.1	0.0	5.0	0.20	0.7

Date of Calibration : 22-28 Feb. 2024

3/9

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#### 5. Long-term stability

Time	Measured Value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Begin	94.0	0.0	0.3	0.10	0.1
End	94.0				

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

##### 6.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
A-weight	94.0	0.0	0.2	0.20	0.2
C-weight	94.0	0.0	0.2	0.20	0.2
Flat	94.1	0.1	0.2	0.20	0.2

##### 6.2 Time weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Fast	94.0	0.0	0.1	0.20	0.2
Slow	94.0	0.0	0.1	0.20	0.2
1eq	94.0	0.0	0.1	0.20	0.2

Date of Calibration : 22-28 Feb. 2024

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The results relate only to the items tested and are not to be generalized.

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

Anticipated value (dB)	Measured Value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
137	137.1	0.1	1.1	0.30	0.3
136	136.1	0.1	1.1	0.30	0.3
135	135.1	0.1	1.1	0.30	0.3
133	133.1	0.1	1.1	0.30	0.3
132	132.1	0.1	1.1	0.30	0.3
131	131.1	0.1	1.1	0.30	0.3
130	130.1	0.1	1.1	0.30	0.3
129	129.0	0.0	1.1	0.30	0.3
124	124.0	0.0	1.1	0.30	0.3
119	119.1	0.1	1.1	0.30	0.3
114	114.1	0.1	1.1	0.30	0.3
109	109.0	0.0	1.1	0.30	0.3
104	104.1	0.1	1.1	0.30	0.3
99	99.0	0.0	1.1	0.30	0.3
94	94.0	0.0	1.1	0.30	0.3
89	89.0	0.0	1.1	0.30	0.3
84	84.1	0.1	1.1	0.30	0.3
79	79.1	0.1	1.1	0.30	0.3
74	74.0	0.0	1.1	0.30	0.3
69	69.0	0.0	1.1	0.30	0.3
64	64.0	0.0	1.1	0.30	0.3
59	59.0	0.0	1.1	0.30	0.3

Date of Calibration : 22-28 Feb. 2024

6/9

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#### 7. Level linearity on the reference level range (cont.)

Anticipated value (dB)	Measured Value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
54	54.0	0.0	1.1	0.30	0.3
49	49.0	0.0	1.1	0.30	0.3
44	44.0	0.0	1.1	0.30	0.3
39	39.0	0.0	1.1	0.30	0.3
34	34.0	0.0	1.1	0.30	0.3
29	28.9	-0.1	1.1	0.30	0.3
28	28.0	0.0	1.1	0.30	0.3
27	27.0	0.0	1.1	0.30	0.3
26	26.0	0.0	1.1	0.30	0.3
25	25.0	0.0	1.1	0.30	0.3

#### 8. Level linearity including the level range control

At reference sound level on the reference level range

Range	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
30-130	94.0	94.0	0.0	1.1	0.30	0.3

Date of Calibration : 22-28 Feb. 2024

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#### 8. Level linearity including the level range control

At reference level at 5 dB greater than the under-range on a level range

Range	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
30-130	25	25.0	0.0	1.1	0.30	0.3

#### 9. Tone burst response

Time Weighting	Duration, Tb (ms)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Fast	200	126.0	0.0	±1.0	0.20	0.3
	2	108.9	-0.1	-1.0; +2.5	0.20	0.3
	0.25	100.0	0.0	+1.5; -5.0	0.20	0.3
Slow	200	119.5	-0.1	±1.0	0.20	0.3
	2	100.0	0.0	+1.0; -5.0	0.20	0.3

Date of Calibration : 22-28 Feb. 2024

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E-mail: kump@tistr.go.th

FM/BLMTC 002 Rev.4



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0231

MTC No. ELL, BP, 170 0167

#### 10. Peak C sound level

Number of cycles in test signal	Anticipated value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Complete cycle	125.4	125.5	0.1	3.0	0.20	0.35
Positive half cycle	124.4	124.1	-0.3	2.0	0.20	0.35
Negative half cycle	124.4	124.1	-0.3	2.0	0.20	0.35

#### 11. Overload indication

Measured value (dB)		Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Positive one-half cycle	Negative one-half cycle				
135.4	135.4	0.0	1.5	0.55	0.25

#### 12. High-level stability

Time	Measured value (dB)	Deviated value (dB)	Acceptance limit class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
Begin	129.0	0.0	0.3	0.10	0.1
End	129.0				

Calibrated by   
(Mr. Pannasit Phasingsri)

Approved by:   
(Mr. Pannasit Phasingsri)  
Electrical and Electronic Standards Laboratory  
Industrial Metrology and Testing Service Centre  
Ref : 2011267012400346008

Date of Calibration : 22-28 Feb. 2024

Date of Issue : 29 Feb. 2024

End of Certificate

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The results obtained are the result of the test performed by the laboratory. The laboratory is not responsible for the results obtained by the user. The user is responsible for the results obtained by the user. The user is responsible for the results obtained by the user.

## SITHIPORN ASSOCIATES CO., LTD. CALIBRATION LABORATORY

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Cert. No. : ACL24284  
Pages : 1 of 8

## Calibration Certificate

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24  
Serial No. : 00597155 / 180398 / XN168  
ID No. : BKK-FS0993

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,  
KHUWAENG PHATTHANAKAN, KHET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

Location :  
Ambient Temperature : ( 23.0 ± 3 ) °C  
Pressure : ( 101.3 ± 3 ) kPa  
Relative Humidity : ( 50.0 ± 20 ) %

Received Date : 04 SEPTEMBER 2024  
Calibration Date : 19 SEPTEMBER 2024  
Date of Issue : 20 SEPTEMBER 2024

Calibrated by : Nathakorn Pisutpaisan

Approved by :   
( Thanakul Petchurai )

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

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Cert. No. : ACL24284  
Job No. : VC67AC0149  
Pages : 2 of 8

Calibration Procedure : CP-AC-01

#### Calibration Method :

(This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.  
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

#### Condition of this result of calibration :

##### 1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Cert. No. : ACL24284  
Job No. : VC67AC0149  
Pages : 3 of 8

#### Summary of Measurement Result :

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long-term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

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Job No. : VC67AC0149  
Page : 4 of 8

**Result of calibration :**

**1. Absolute sensitivity**

Reference Acoustic Signal ( dB )	Measured Value ( dB )	Deviation ( dB )	Acceptance Limit ( dB )
93.9 (93-94)	93.9	0.0	±0.3

**2. Self-generated noise**

**2.1 Normal test**

Measured Value ( dB )
15.1

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

Frequency Weighting	Weighting ( dB )
A - weight	10.8
C - weight	17.2
Flat	23.3

**3. Acoustical signal tests of frequency weightings**

Meter free-field acoustic response at a level of 84 dB

Frequency ( Hz )	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.0	0.0	± 1.5
1000	-0.1	-0.1	-0.1	± 1.0
8000	-0.9	-0.9	-0.8	± 5.0

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**4. Electrical signal tests of frequency weightings**

Weighting network response with relative to 1 kHz

Frequency ( Hz )	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

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

**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

**5.2 Time weighting at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

**6. Long-term stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.3

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Pages : 6 of 8

**7. Level linearity on the reference level range**

Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.9	-0.1	± 1.1

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**8. Level linearity including the level range control**

Range	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
130	30.0	29.9	-0.1	±1.1

**9. Tone burst response**

Time Weighting	Tone burst duration, 1b ( ms )	Cycle	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	0.25	1	108.0	108.0	0.0	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

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**10. Peak C sound level**

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value, I.epeak ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.0	0.0	±3.0
One	136.4	136.4	0.0	±3.0

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.1	0.1	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

**11. Overload indication**

Measured value ( dB )		Deviated Value ( dB )	Acceptance Limits ( dB )
Positive one-half cycle	Negative one-half cycle	0.0	±1.5
89.6	89.6		

**12. High level stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor  $k \approx 2$   
or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate

*T. Retin*

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Cert. No. : ACL24344  
Pages : 1 of 8

**Calibration Certificate**

**Equipment :** SOUND LEVEL METER  
**Manufacturer :** RION  
**Model :** NL-42 / Microphone UC-52 / Preamplifier NH-24  
**Serial No.:** 00597156 / 170403 / 72904  
**ID No.:** BKK\_F80994

**Condition As Found :** GOOD

**Customer :** ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,  
KHWAENG PHATTHANAKAN, KHET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

**Location :** -  
**Ambient Temperature :** ( 23.0 ± 3 ) °C  
**Pressure :** ( 101.3 ± 3 ) kPa  
**Relative Humidity :** ( 50.0 ± 20 ) %

**Received Date :** 01 NOVEMBER 2024  
**Calibration Date :** 12 NOVEMBER 2024  
**Date of Issue :** 13 NOVEMBER 2024

**Calibrated by :** Nathakorn Pisutpaisan

**Approved by :**

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other than in full, except with the prior written approval of the head of Calibration Laboratory.

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**CALIBRATION LABORATORY**

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Cert. No. : ACL24344  
Job No. : VC68AC0027  
Pages : 2 of 8

**Calibration Procedure :** CP-AC-01

**Calibration Method :**

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference  
Standard Instruments.  
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

**Condition of this result of calibration :**

**1. Reference Standard Instruments :**

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	LI-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EELBP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EELBP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EELBP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	FF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

*T. Retin*

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Cert. No. : ACL24344  
Job No. : VC68AC0027  
Pages : 3 of 8

**Summary of Measurement Result :**

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

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Page : 4 of 8

**Result of calibration :**

**1. Absolute sensitivity**

Reference Acoustic Signal ( dB )	Measured Value ( dB )	Deviation ( dB )	Acceptance Limit ( dB )
93.9 (93.94)	93.9	0.0	±0.3

**2. Self-generated noise**

**2.1 Normal test**

Measured Value ( dB )
13.8

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

Frequency Weighting	Weighting ( dB )
A - weight	9.9
C - weight	16.0
Flat	21.9

**3. Acoustical signal tests of frequency weightings**

Meter (free-field acoustic response at a level of 84 dB)

Frequency ( Hz )	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.7	0.7	0.8	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	-1.8	-1.8	-1.7	± 5.0

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**4. Electrical signal tests of frequency weightings**

Weighting network response with relative to 1 kHz.

Frequency ( Hz )	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	-0.1	±2.0
125	-0.1	0.0	0.0	±1.5
250	0.0	0.0	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

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

**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

**5.2 Time weighting at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

**6. Long - term stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.3

*T. Petch*

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Job No. : VC68AC0027  
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**7. Level linearity on the reference level range**

Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.0	0.0	± 1.1
26.0	26.0	0.0	± 1.1
25.0	25.0	0.0	± 1.1

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Job No. : VC68AC0027  
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**8. Level linearity including the level range control**

Range	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
130	29.0	29.0	0.0	±1.1

**9. Tone burst response**

Time Weighting	Tone burst duration, Tb ( ms )	Cycle	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

*T. Petch*



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Job No. : VC68AC0027  
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**10. Peak C sound level**

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value, L <sub>peak</sub> ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

**11. Overload indication**

Measured value ( dB )		Deviated Value ( dB )	Acceptance Limits ( dB )
Positive one-half cycle	Negative one-half cycle		
89.5	89.5	0.0	±1.5

**12. High level stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	137.0	137.0	0.0	±0.3

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

End of Calibration Certificate

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Cert. No. : ACC24056  
Pages : 1 of 3

**Calibration Certificate**

Equipment : SOUND CALIBRATOR  
Manufacturer : RION  
Model : NC-74  
Serial No. : 34425566  
ID No. : BKK\_FS0617

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTANAKAN 40, PHATTANAKAN ROAD,  
KHWAENG PHATTANAKAN, KHET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

Location :  
Ambient Temperature : ( 23.0 ± 3 ) °C  
Pressure : ( 101.3 ± 3 ) kPa  
Relative Humidity : ( 50.0 ± 20 ) %  
Received Date : 04 OCTOBER 2024  
Calibration Date : 22 OCTOBER 2024  
Date of Issue : 24 OCTOBER 2024

REVIEW BY :  
APPROVED BY :  
NEXT CAL DATE : 22/10/25

Calibrated by : Nathakorn Pisutpaism

Approved by :

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other than in full, except with the prior written approval of the head of Calibration Laboratory

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**CALIBRATION LABORATORY**

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Cert. No. : ACC24056  
Job No. : VC67AC0170  
Pages : 2 of 3

Calibration Procedure : CP-AC-03

**Calibration Method :**

This equipment was calibrated by follow on JEC-60942-2003 Standard.

The sound pressure level, frequency and total distortion of the sound calibrator was measured using the reference  
microphone.

**Condition of this result of calibration :**

**1. Reference Standard Instruments :**

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP 20/0267	15-FEB-25
Digital Multimeter	33461A	MY60024273	EEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25
Audio Analyzer	AVR-3360A	V744B6069	EF-0009-24	09-FEB-25

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Cert. No. : ACC24056  
Job No. : VC67AC0170  
Pages : 3 of 3

**Result of calibration :**

**1. Sound pressure level**

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Acceptance limit (dB)
94	94.14	0.14	0.14	0.40

**2. Frequency**

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Acceptance limit (%)
1000	1001.9	0.2	0.1	1.0

**3. Total distortion**

Measured value ( % )	Uncertainty ( % )	Acceptance limit ( % )
1.12	0.10	3.0

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

End of Calibration Certificate

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Cert. No. : ACL24330  
Pages : 1 of 8

**Calibration Certificate**

**Equipment :** SOUND LEVEL METER  
**Manufacturer :** RION  
**Model :** NL-42 / Microphone UC-52 / Preamplifier NH-24  
**Serial No.:** 01122547 / 143452 / 22584  
**ID No.:** BKK\_FS0034

**Condition As Found :** GOOD

**Customer :** ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,  
KHWAENG PHATTHANAKAN, KHET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

**Location :** -  
**Ambient Temperature :** ( 23.0 ± 3 ) °C  
**Pressure :** ( 101.3 ± 3 ) kPa  
**Relative Humidity :** ( 50.0 ± 20 ) %

**Received Date :** 04 OCTOBER 2024  
**Calibration Date :** 21-22 OCTOBER 2024  
**Date of Issue :** 24 OCTOBER 2024

**Calibrated by :** Nathakorn Pisutpaisan

**Approved by :**

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Cert. No. : ACL24330  
Job No. : VC68AC0005  
Pages : 2 of 8

**Calibration Procedure :** CP-AC-01

**Calibration Method :**

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).

The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

**Condition of this result of calibration :**

**1. Reference Standard Instruments :**

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	FF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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**Summary of Measurement Result :**

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long-term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

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Job No. : VC68AC0005  
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**Result of calibration :**

**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	93.9	0.0	±0.3

**2. Self-generated noise**

**2.1 Normal test**

Measured Value (dB)
17.3

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

Frequency Weighting	Weighting (dB)
A-weighting	10.8
C-weighting	17.3
Flat	23.4

**3. Acoustical signal tests of frequency weightings**

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.7	0.8	0.8	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-2.3	-2.2	-2.2	± 5.0

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Job No. : VC68AC0005  
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**4. Electrical signal tests of frequency weightings**

Weighting network response with relative to 1 kHz.

Frequency ( Hz )	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

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

**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

**5.2 Time weighting at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

**6. Long - term stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.3

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Cert. No. : ACL24339  
Job No. : VC68AC0005  
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**7. Level linearity on the reference level range**

Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	29.9	-0.1	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.8	-0.2	± 1.1

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Job No. : VC68AC0005  
Pages : 7 of 8

**8. Level linearity including the level range control**

Range	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
130	29.0	28.9	-0.1	±1.1

**9. Tone burst response**

Time Weighting	Tone burst duration, Tb ( ms )	Cycle	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
SH	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

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Job No. : VC68AC0005  
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**10. Peak C sound level**

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value, Lepeak ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	130.0	130.0	0.0	±3.0
One	135.4	133.3	-0.1	±3.0

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.1	0.1	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

**11. Overload indication**

Measured value ( dB )		Deviated Value ( dB )	Acceptance Limits ( dB )
Positive one-half cycle	Negative one-half cycle		
89.5	89.5	0.0	±1.5

**12. High level stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	137.0	137.0	0.0	±0.3

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

End of Calibration Certificate

*T. Petch*

Certificate of Calibration

Customer  
Name: ALS Laboratory Group Thailand Co., Ltd.  
Address: 104 Soi Puthairakan 40, Puthairakan Road, Sam Luang, Bangkok 10250  
Certificate No: 24-SI-M-019  
Request No: Req-2023-2672

Units Under Calibration Details

Measurement Item: Sound Level Meter  
Manufacturer: RION  
Model: NL-42  
Serial Number: 00659239  
ID: RIK TS0096  
Resolution: 0.1 dB  
Microphone Class: 2  
Microphone Model: LC-52  
Microphone S/N: 157780  
Preamplifier Model: NH-24  
Preamplifier S/N: 48095  
Instrument Status: Used

Calibration Environment and Details

Temperature: 23 °C ± 2 °C  
Humidity: 50 ± 8% RH  
Barometric Pressure: 1013 hPa ± 10 hPa  
Received Date: 20 December 2023  
Calibration Date: 29 January 2024  
Calibration Procedure: In house method CP-SLM 01 based on IEC 61672-3:2013 Electroacoustics - Sound level meters - Part 3: Periodic tests  
Location of Calibration: Lab Acoustic

Reference Standard

Instrument	Brand	Model	SN	Due calibration	Traceability
Standard Microphone	GRAS	40AN	189273	21 August 2024	GRAS
Mid-frequency Calibrator	Qness	Qness cal	11-A000234	26 July 2024	ISI
Audio Generator	Storck	S-400H	131	9 October 2024	WK Electric

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

Calibrated By:   
Mr. Nopadon Tungsant  
Service Calibration Engineer  
Approved By:   
Mr. Pait Mallavong  
Calibration Engineer Supervisor  
Issue Date: 29 January 2024

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

(PM 701-SI-M-019) Rev.02 Issue date: 11/23

Certificate No: 24-SI-M-019  
Request No: Req-2023-2672

1. Indication at the calibration check frequency

U/C Setting	Nominal Level	Before Adjust		After Adjust		UNCERTAINTY (± dB)	Acceptance Limit (± dB)
		U/C	ERR	U/C	ERR		
FAST / A / 30-130	(dB)	(dB)	(dB)	(dB)	(dB)		
Calibrator Setting							
1000 Hz 114 dB	113.78	113.2	-0.58	113.8	0.02	0.20	0.30

Note: Absolute sensitivity was established by the use of Sound Calibrator Brand SVAN11 K, Model SV 33A, SN: 58070

2. Self-generated noise, Microphone installed

U/C Setting	Measured	UNCERTAINTY
FAST / 30-130	(dB)	(± dB)
U/C Weighting		
A	18.1	0.10

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

U/C Setting	Measured	UNCERTAINTY
FAST / 30-130	(dB)	(± dB)
U/C Weighting		
A	12.9	0.10
C	17.2	0.10
Z	21.4	0.10

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

U/C Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY (± dB)	Acceptance Limit (± dB)
	A	C	Z		
FAST / 30-130	(dB)	(dB)	(dB)		
STD Setting					
125 Hz	0.4	0.6	0.6	0.60	1.5
1000 Hz	0.0	0.0	0.0	0.60	1.0
4000 Hz	0.8	0.8	0.5	0.60	3.0
8000 Hz	-1.1	-1.2	-1.2	0.70	5.0

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

(PM 701-SI-M-019) Rev.02 Issue date: 11/23

Certificate No: 24-SI-M-019  
Request No: Req-2023-2672

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

U/C Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY (± dB)	Acceptance Limit (± dB)
	A	C	Z		
FAST / 30-130	(dB)	(dB)	(dB)		
STD Setting					
63 Hz	-0.2	-0.1	-0.1	0.20	2.0
125 Hz	-0.1	0.0	0.0		1.5
250 Hz	-0.1	0.0	0.0		1.5
500 Hz	0.0	0.0	0.0		1.5
1000 Hz	0.0	0.0	0.0	0.20	1.0
2000 Hz	0.0	0.0	0.0		2.0
4000 Hz	0.0	0.0	0.0		3.0
8000 Hz	0.0	0.1	0.0		5.0
16000 Hz	-1.4	-1.4	0.0		-5.0 ~ 15.0

6. Frequency and time weightings at 1 kHz

U/C Setting	STD	Measured		UNCERTAINTY (± dB)	Acceptance Limit (± dB)
		REF	ERR		
FAST / 30-130					
U/C Weighting	(dB)	(dB)	(dB)		
A	114.00	114.0	0.0	0.20	0.20
C	113.00	114.0	0.0		0.20
Z	114.00	114.0	0.0		0.20

U/C Setting	STD	Measured		UNCERTAINTY (± dB)	Acceptance Limit (± dB)
		REF	ERR		
30-130 / A					
U/C Time Response	(dB)	(dB)	(dB)		
Fast	114.00	114.0	0.0	0.10	0.10
Slow	114.00	114.0	0.0	0.20	0.10
Leq	114.00	114.0	0.0		0.10

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

(PM 701-SI-M-019) Rev.02 Issue date: 11/23

Certificate No: 24-SI-M-019  
Request No: Req-2023-2672

7. Long Term Stability

U/C Setting	Measured	UNCERTAINTY	Acceptance Limit
FAST / A / 30-130	U/C	(± dB)	(± dB)
STD Setting	(dB)		
Initial	114.0		
Final	114.0		
Deviation	0.0	0.10	0.30

8. Level linearity on the reference level range

U/C Setting	Anticipated REF	Deviation		UNCERTAINTY (± dB)	Acceptance Limit (± dB)
		U/C	ERR		
FAST / A / 30-130	(dB)	(dB)	(dB)		
STD dB					
138.00	138	138.0	0.0		1.5
132.00	132	132.0	0.0		1.5
124.00	124	124.0	0.0		1.5
124.00	124	124.0	0.0		1.5
118.00	118	118.0	0.0		1.5
114.00	114	114.0	0.0		1.5
109.00	109	109.0	0.0		1.5
104.00	104	104.0	0.1		1.5
99.00	99	99.0	0.0		1.5
94.00	94	94.0	0.0		1.5
89.00	89	89.0	0.1		1.5
84.00	84	84.0	0.1		1.5
79.00	79	79.0	0.0		1.5
74.00	74	74.0	0.1		1.5
69.00	69	69.0	0.1		1.5
64.00	64	64.0	0.0		1.5
59.00	59	59.0	0.1		1.5
54.00	54	54.0	0.0		1.5
49.00	49	49.0	0.1		1.5
44.00	44	44.0	0.1		1.5
39.00	39	39.0	0.1		1.5
34.00	34	34.0	0.1		1.5
29.00	29	29.0	0.1		0.5
24.00	24	24.0	0.1		1.5

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

(PM 701-SI-M-019) Rev.02 Issue date: 11/23

Certificate No : 24-SI-M-019

Request No : Req-2023-2672

9. Level linearity including the level range control

UUC Setting	STD	Measured	UNCERTAINTY	Acceptance
FAST / A	REF	UUC	ERR	Limit
UUC Range	(dB)	(dB)	(dB)	(± dB)
30-130	29.40	29.5	0.1	1.1
	114	114.0	0.0	1.1

10. Tone burst response

UUC Setting	STD	Anticipated	Measured	UNCERTAINTY	Acceptance
A / 30-130	Touchstart	Ref	UUC	ERR	Limit
UUC Time Response	(ms)	(dB)	(dB)	(dB)	(± dB)
Fast	200	126.0	126.0	0.0	1.0
	2	109.0	109.0	0.0	-1.0, -2.5
	0.25	100.0	99.9	-0.1	-1.5, -5.0
Slow	200	118.5	118.6	0.0	1.0
	2	100.0	100.0	0.0	-1.0, -5.0
	0.25	91.0	90.9	-0.1	-1.0
SEL	200	120.0	120.0	0.0	1.0
	2	100.0	100.0	0.0	-1.0, -2.5
	0.25	91.0	90.9	-0.1	-1.5, -5.0

11. Peak C Sound level

UUC Setting	Anticipated	Measured	UNCERTAINTY	Acceptance
FAST / C / 55-144	REF	UUC	ERR	Limit
STD Setting	(dB)	(dB)	(dB)	(± dB)
Complete cycle	136.4	136.4	0.0	3.0
Positive half cycle	135.4	135.1	-0.30	2.0
Negative half cycle	135.4	135.1	-0.30	2.0

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TM 706-51-M-019 Rev 02 Issue date 11/21

Certificate No : 24-SI-M-019

Request No : Req-2023-2672

12. Overload indication

UUC Setting	Measured	UNCERTAINTY	Acceptance
FAST / A / 30-130	UUC	(± dB)	Limit
STD Setting	(dB)	(± dB)	(± dB)
Positive one-half cycle	139.4		
Negative one-half cycle	139.4		
Distorted	0.0	0.20	1.5

13. High Level Stability

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

Note:

Function	Maximum-permitted Uncertainty of measurement
1. Indication at the calibration check frequency	Not applicable
2. Self-generated noise, Microphone installed	Not applicable
3. Self-generated noise, Microphone replaced by the electrical input signal device	Not applicable
4. Acoustic signal test of frequency weightings at 10 Hz to 4 kHz	0.60 dB
5. Acoustic signal test of frequency weightings at 54 kHz to 10 kHz	0.70 dB
6. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz	0.20 dB
7. Frequency and time weightings at 1 kHz	0.20 dB
8. Long Term Stability	0.10 dB
9. Level linearity on the reference level range	0.30 dB
10. Level linearity including the level range control	0.30 dB
11. Tone burst response	0.30 dB
12. Peak C's and level	0.35 dB
13. Overload indication	0.25 dB
14. High Level Stability	0.10 dB

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

End of Certificate

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

TM 706-51-M-019 Rev 02 Issue date 11/21

Certificate of Calibration

Customer

Name : A.T.S. Laboratory Group (Thailand) Co., Ltd.  
Address : 104 Soi Phantimakan 40, Phantimakan Road, Suai Luang, Bangkok 10250

Certificate No : 24-SI-M-022  
Request No : Req-2023-2675

Unit Under Calibration Details

Measurement item : Sound Level Meter  
Manufacturer : RION  
Model : NI-42  
Serial Number : 00658340  
ID : BKK\_F50097  
Resolution : 0.1 dB  
Microphone Class : 2  
Microphone Model : LC-52  
Microphone S/N : 157785  
Preamplifier Model : NH-24  
Preamplifier S/N : 48094  
Instrument Status : Used

Calibration Environment and Details

Temperature : 23 °C ± 2 °C  
Humidity : 50 % RH ± 20 % RH  
Harmonic Pressure : 1013 hPa ± 10 hPa  
Received Date : 20 December 2023  
Calibrated Date : 29 January 2024  
Calibration Procedure : In-house method CP-SLM-01 based on IEC 61672-1:2013 Electroacoustics - Sound level meters - Part 1: Periodic tests  
Location of Calibration : Lab Acoustic

Reference Standard

Instrument	Brand	Model	S/N	Date calibration	Traceability
Standard Microphone	GRAS	40AN	18-273	21 August 2024	GRAS
Multi-frequency Calibrator	Qeco	Q600	EFA000234	26 July 2024	ISI
Acoustic Generator	Svanick	Svan01	131	9 October 2024	W.K. Electric

Note

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

Calibrated By : Pr  
Mr. Noppasorn Luangnam  
Service Calibration Engineer

Approved By : Pr  
Mr. Paei Mathavorn  
Calibration Engineer Supervisor  
Issue Date : 29 January 2024

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

TM 706-51-M-019 Rev 02 Issue date 11/21

Certificate No : 24-SI-M-022

Request No : Req-2023-2675

1. Indication at the calibration check frequency

UUC Setting	Measured	Before Adjust	After Adjust	UNCERTAINTY	Acceptance
FAST / A / 30-130	Level	UUC	ERR	UUC	ERR
Calibrator Setting	(dB)	(dB)	(dB)	(dB)	(dB)
1000 Hz 114 dB	113.78	114.0	-0.22	0.02	0.20

Note : Absolute sensitivity was established by the use of Sound Calibrator Brand SVAN11K, Model SV 35A, SN 58079

2. Self-generated noise, Microphone installed

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130	UUC	(± dB)
UUC Weighting	(dB)	(± dB)
A	16.8	0.10

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

UUC Setting	Measured	UNCERTAINTY
FAST / 30-130	UUC	(± dB)
UUC Weighting	(dB)	(± dB)
A	12.3	0.10
C	16.6	0.10
Z	21.2	0.10

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

UUC Setting	Deviation from various Frequency Weighting Response curve	UNCERTAINTY	Acceptance Limit
FAST / 30-130	A	(± dB)	(± dB)
STD Setting	(dB)	(dB)	(dB)
125 Hz	0.5	0.6	1.5
1000 Hz	0.0	0.0	1.0
4000 Hz	0.1	0.2	0.60
10000 Hz	-0.7	-0.8	0.70

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

TM 706-51-M-019 Rev 02 Issue date 11/21



Certificate No : 24-SLM-022  
Request No : Req 2023-2675

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

UUC Setting	Deviation from various Frequency			UNCERTAINTY	Acceptance
FAST / 30-130	Weighting Response curve				
STD Setting	A (dB)	C (dB)	Z (dB)	(± dB)	Limit (± dB)
63 Hz	17.5	-0.1	0.0	0.20	2.0
125 Hz	-0.1	0.0	0.0		1.5
250 Hz	-0.1	0.0	0.0		1.5
500 Hz	0.0	0.0	0.0		1.5
1000 Hz	0.0	0.0	0.0		1.0
3000 Hz	0.0	0.1	0.0		2.0
4000 Hz	0.0	0.0	0.0		3.0
6000 Hz	0.1	0.1	0.0		5.0
16000 Hz	-1.3	-1.4	0.0		-5, ANF

6. Frequency and time weightings at 1kHz

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

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

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IM 709-SLM-022 Rev.02 Issue date 7/11/23

Certificate No : 24-SI-M-022  
Request No : Req 2023-2675

7. Long Term Stability

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

8. Level linearity on the reference level range

UUC Setting	Anticipated	Deviation		UNCERTAINTY	Acceptance
FAST / A / 30-130	REF	UUC	ERR		
STD dB	(dB)	(dB)	(dB)	(± dB)	Limit (± dB)
135.00	135	137.9	-0.7	0.30	1.1
134.00	134	134.0	0.0		1.1
129.00	129	129.0	0.0		1.1
124.00	124	124.0	0.0		1.1
119.00	119	119.0	0.0		1.1
114.00	114	114.0	0.0		1.1
109.00	109	109.0	0.0		1.1
104.00	104	104.0	0.0		1.1
99.00	99	99.0	0.0		1.1
94.00	94	94.0	0.0		1.1
89.00	89	89.0	0.0		1.1
84.00	84	84.0	0.0		1.1
79.00	79	79.0	0.0		1.1
74.00	74	74.0	0.0		1.1
69.00	69	69.0	0.0		1.1
64.00	64	64.0	0.0		1.1
59.00	59	59.0	0.0		1.1
54.00	54	54.0	0.0		1.1
49.00	49	49.0	0.0		1.1
44.00	44	44.0	0.0		1.1
39.00	39	39.0	0.0		1.1
34.00	34	34.0	0.0		1.1
29.00	29	29.0	0.0		0.8
24.00	24	23.9	-0.1		1.1

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IM 709-SI-M-022 Rev.02 Issue date 7/11/23

Certificate No : 24-SLM-022  
Request No : Req 2023-2675

9. Level linearity including the level range control

UUC Setting	STD	Measured		UNCERTAINTY	Acceptance
FAST / A	REF	UUC	ERR		
UUC Range	(dB)	(dB)	(dB)	(± dB)	Limit (± dB)
30-130	29.60	29.8	0.2	0.30	1.1
	114	114.0	0.0		1.1

10. Tone burst response

UUC Setting	STD	Anticipated	Measured		UNCERTAINTY	Acceptance
A / 30-130	Timeburst	Ref	UUC	ERR		
UUC Time Response	(ms)	(dB)	(dB)	(dB)	(± dB)	Limit (± dB)
Fast	200	126.0	126.0	0.0	0.20	1.0
	2	109.0	109.0	0.0		+1.0, -0.5
	0.25	100.0	99.9	-0.1		+1.5, -5.0
Slow	200	119.6	119.6	0.0		1.0
	2	100.0	100.0	0.0		+1.0, -5.0
	200	126.0	126.0	0.0		1.0
SIL	2	100.0	100.0	0.0		+1.0, -2.5
	0.25	91.0	90.9	-0.1		+1.5, -5.0

11. Peak C Sound level

UUC Setting	Anticipated	Measured		UNCERTAINTY	Acceptance
FAST / C / 55-141	REF	UUC	ERR		
STD Setting	(dB)	(dB)	(dB)	(± dB)	Limit (± dB)
Complete cycle	136.4	136.4	0.00	0.20	3.0
Positive half cycle	135.4	135.2	-0.20		2.0
Negative half cycle	135.4	135.2	-0.20		2.0

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.  
IM 709-SLM-022 Rev.02 Issue date 7/11/23

Certificate No : 24-SLM-022  
Request No : Req 2023-2675

12. Overload indication

UUC Setting	Measured	UNCERTAINTY	Acceptance
FAST / A / 30-130	UUC		
STD Setting	(dB)	(± dB)	Limit (± dB)
Positive one-half cycle	139.5		
Negative one-half cycle	139.4		
Deviated	0.1	0.20	1.5

13. High Level Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance
FAST / A / 30-130	UUC		
STD Setting	(dB)	(± dB)	Limit (± dB)
Initial	129.0		
Final	129.0		
Deviated	0.0	0.00	0.30

Note :

Function	Maximum-permitted Uncertainty of measurement
1. Indicators at the calibration check frequency	Not applicable
2. Self-generated noise, Microphone installed	Not applicable
3. Self-generated noise, Microphone replaced by the electrical input signal device	Not applicable
4. Acoustic signal test of frequency weightings at 10 Hz to 4 kHz	0.40 dB
4. Acoustic signal test of frequency weightings at 4 kHz to 10 kHz	0.70 dB
5. Electrical signal test of frequency weightings, Weighting network response with relative to 1 kHz	0.20 dB
6. Frequency and time weightings at 1 kHz	0.20 dB
7. Long Term Stability	0.10 dB
8. Level linearity on the reference level range	0.30 dB
9. Level linearity including the level range control	0.30 dB
10. Tone burst response	0.30 dB
11. Peak C Sound level	0.35 dB
12. Overload indication	0.25 dB
13. High Level Stability	0.10 dB

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

End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.  
IM 709-SI-M-022 Rev.02 Issue date 7/11/23

**SITHIPORN ASSOCIATES CO., LTD.**  
**CALIBRATION LABORATORY**

451-451/1 Sirinthorn Road Bangbunru, Bangkok 10700 Thailand  
Tel : +66 2433 8331 Email : calibration@sithiporn.com

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Cert. No. : ACL24262  
Pages : 1 of 8

**Calibration Certificate**

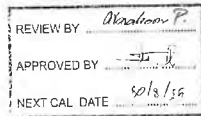
**Equipment :** SOUND LEVEL METER  
**Manufacturer :** RION  
**Model :** NL-42 / Microphone UC-52 / Preamplifier NH-24  
**Serial No.:** 00658242 / 157782 / 48097  
**ID No.:** BKK\_FS0099

**Condition As Found :** GOOD

**Customer :** ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTANAKAN 40, PHATTANAKAN ROAD,  
KHWAENG PHATTANAKAN, KHET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

**Location :** \*  
**Ambient Temperature :** ( 23.0 ± 3 ) °C  
**Pressure :** ( 101.3 ± 3 ) kPa  
**Relative Humidity :** ( 50.0 ± 20 ) %

**Received Date :** 09 AUGUST 2024  
**Calibration Date :** 30 AUGUST 2024  
**Date of Issue :** 03 SEPTEMBER 2024



**Calibrated by :** Natnakoorn Pisutpaisan

**Approved by :** *T. Petch*  
( Thunakul Peichurai )

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

**SITHIPORN ASSOCIATES CO., LTD.**  
**CALIBRATION LABORATORY**

451-451/1 Sirinthorn Road Bangbunru, Bangkok 10700 Thailand  
Tel : +66 2433 8331 Email : calibration@sithiporn.com

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Cert. No. : ACL24262  
Job No. : VC67AC0139  
Pages : 2 of 8

**Calibration Procedure :** CP-AC-01

**Calibration Method :**

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.  
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

**Condition of this result of calibration :**

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY32302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	IEL-BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	IEL-BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	IEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.  
3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).  
3.2 Thailand Institute of Scientific and Technological Research (TISTR).

*T. Petch*

**SITHIPORN ASSOCIATES CO., LTD.**  
**CALIBRATION LABORATORY**

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Cert. No. : ACL24262  
Job No. : VC67AC0139  
Pages : 3 of 8

**Summary of Measurement Result :**

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long-term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

*T. Petch*

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Cert. No. : ACL24262  
Job No. : VC67AC0139  
Page : 4 of 8

**Result of calibration :**

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	93.9	0.0	±0.5

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
17.4

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

Frequency Weighting	Weighting (dB)
A-weight	15.4
C-weight	21.4
Flat	23.2

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.2	0.2	± 1.5
1000	+0.1	-0.1	-0.1	± 1.0
8000	-1.5	-1.5	-1.4	± 5.0

*T. Petch*

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Job No. : VC67AC0139  
Pages : 5 of 8

**4. Electrical signal tests of frequency weightings**

Weighing network response with relative to 1 kHz

Frequency ( Hz )	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	0.0	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

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

**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

**5.2 Time weighting at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

**6. Long - term stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.3

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**CALIBRATION LABORATORY**

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Cert. No. : ACL24262  
Job No. : VC67AC0139  
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**7. Level linearity on the reference level range**

Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.1	0.1	± 1.1
84.0	84.1	0.1	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.1	0.1	± 1.1
69.0	69.1	0.1	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.1	0.1	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.1	0.1	± 1.1
30.0	30.2	0.2	± 1.1
29.0	29.3	0.3	± 1.1
28.0	28.4	0.4	± 1.1
27.0	27.5	0.5	± 1.1
26.0	26.6	0.6	± 1.1
25.0	25.7	0.7	± 1.1

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**8. Level linearity including the level range control**

Range	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
130	30.0	30.1	0.1	±1.1

**9. Tone burst response**

Time Weighting	Tone burst duration, Tb ( ms )	Cycle	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

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**10. Peak C sound level**

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value, L <sub>peak</sub> ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.0	0.0	±3.0
One	136.4	136.3	-0.1	±3.0

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

**11. Overload indication**

Measured value ( dB )		Deviated Value ( dB )	Acceptance Limits ( dB )
Positive one-half cycle	Negative one-half cycle		
89.6	89.5	-0.3	±1.5

**12. High level stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	137.0	137.0	0.0	±0.3

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

End of Calibration Certificate

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Cert. No. : ACL24151  
Pages : 1 of 8

**Calibration Certificate**

**Equipment :** SOUND LEVEL METER  
**Manufacturer :** RJON  
**Model :** NL-42 / Microphone UC-S2 / Preamplifier NH-24  
**Serial No.:** 00658244 / 158766 / 58768  
**ID No.:** BKK 1 S0101

**Condition As Found :** GOOD

**Customer :** ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,  
KHWAENG PHATTHANAKAN, KHET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

**Location :** -  
**Ambient Temperature :** ( 23.0 ± 3 ) °C  
**Pressure :** ( 101.3 ± 3 ) kPa  
**Relative Humidity :** ( 50.0 ± 20 ) %

**Received Date :** 14 MAY 2024  
**Calibration Date :** 29 MAY 2024  
**Date of Issue :** 30 MAY 2024

**Calibrated by :** Nuthakorn Pisulpaisan

**Approved by :**



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Cert. No. : ACL24151  
Job No. : VC67AC0089  
Pages : 2 of 8

**Calibration Procedure :** CP-AC-01

**Calibration Method :**

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).

The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each item were made by observation of each instrument's display and also with SI M's display.

**Condition of this result of calibration :**

**1. Reference Standard Instruments :**

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-4	05-FEB-25
Waveform Generator	33511B	MYS2302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MYS3220104	EELBP 21/0267	13-FEB-25
Digital Multimeter	33461A	MYS3220076	EELBP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EELBP 22/0267	15-FEB-25
Programmable Attenuator	MA1-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAJ	34560495	AA-3001-24	05-FEB-25

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained as :

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Job No. : VC67AC0089  
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**Summary of Measurement Result :**

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	-	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long-term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

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Pages : 4 of 8

**Result of calibration :**

**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	93.9	0.0	±0.3

**2. Self-generated noise**

**2.1 Normal test**

Measured Value (dB)
17.4

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

Frequency Weighting	Measured value (dB)
A-weight	13.8
C-weight	20.5
Flat	25.9

**3. Acoustical signal tests of frequency weightings**

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.3	0.3	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-0.5	-0.4	-0.4	± 5.0

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**4. Electrical signal tests of frequency weightings**

Weighting network response with relative to 1 kHz

Frequency ( Hz )	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	0.0	±2.0
125	-0.1	0.0	0.0	±1.5
250	0.0	0.0	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

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

**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

**5.2 Time weighting at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

**6. Long - term stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.3

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**7. Level linearity on the reference level range**

Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.1	0.1	± 1.1
84.0	84.1	0.1	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.1	0.1	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.1	0.1	± 1.1
54.0	54.1	0.1	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.1	0.1	± 1.1
30.0	30.1	0.1	± 1.1
29.0	29.2	0.2	± 1.1
28.0	28.3	0.3	± 1.1
27.0	27.4	0.4	± 1.1
26.0	26.5	0.5	± 1.1
25.0	25.5	0.5	± 1.1

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**8. Level linearity including the level range control**

Range	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Auto	94.0	94.0	0.0	±1.1

**9. Tone burst response**

Time Weighting	Tone burst duration, Tb ( ms )	Cycle	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	0.25	1	108.0	107.9	-0.1	1.5 : -5.0
	2	8	117.0	117.0	0.0	1.0 : -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 : -5.0
	200	800	127.6	127.6	0.0	±1.0
	2	1	99.0	98.9	-0.1	1.5 : -5.0
SEL	2	8	108.0	108.0	0.0	1.0 : -2.5
	200	800	128.0	128.1	0.1	±1.0

**10. Peak C sound level**

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value, Lepeak ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.0	0.0	±3.0
One	136.4	136.2	-0.2	±3.0

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

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**11. Overload indication**

Measured value ( dB )		Deviated Value ( dB )	Acceptance Limits ( dB )
Positive one-half cycle	Negative one-half cycle		
89.6	89.6	0.0	±1.5

**12. High level stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A + weight	137.0	137.0	0.0	±0.3

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

End of Calibration Certificate

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Cert. No. : ACL24006  
Pages : 1 of 8

**Calibration Certificate**

**Equipment :** SOUND LEVEL METER  
**Manufacturer :** RION  
**Model :** NL-42 / Microphone UC-52 / Preamplifier NH-24  
**Serial No.:** 00858521 / 158765 / 58767  
**ID No.:** BKK\_FS0111

**Condition As Found :** GOOD

**Customer :** ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,  
KHWANG PHATTHANAKAN, KHET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

**Location :** \*  
**Ambient Temperature :** ( 23.0 ± 3 ) °C  
**Pressure :** ( 101.3 ± 3 ) kPa  
**Relative Humidity :** ( 50.0 ± 20 ) %

**Received Date :** 19 DECEMBER 2023  
**Calibration Date :** 05-08 JANUARY 2024  
**Date of Issue :** 09 JANUARY 2024

**Calibrated by :** Nathakorn Pisutpaisan

**Approved by :**

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Job No. : VC67AC0043  
Pages : 2 of 8

**Calibration Procedure :** CP-AC-01

**Calibration Method :**

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).

The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

**Condition of this result of calibration :**

**1. Reference Standard Instruments :**

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-23	07-FEB-24
Waveform Generator	33511B	MY52302742	EF-0010-23	07-FEB-24
Digital Multimeter	33461A	MY53220104	111.BP 30/0266	13-FEB-24
Digital Multimeter	33461A	MY53220076	EEL.BP 29/0266	13-FEB-24
Digital Multimeter	34461A	MY60024273	EEL.BP 31/0266	14-FEB-24
Programmable Attenuator	MA1-1070	62100114	EF-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KA1	34560495	AA-3002-23	14-FEB-24

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is unrecable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Pages : 3 of 8

**Summary of Measurement Result :**

Parameter	Uncertainty	Maximum-permitted
	(dB)	uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	-	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long-term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

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**Result of calibration :**

**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	93.9	0.0	±0.3

**2. Self-generated noise**

**2.1 Normal test**

Measured Value (dB)
14.6

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

Frequency Weighting	Measured value (dB)
A-weight	12.6
C-weight	19.2
Flat	24.8

**3. Acoustical signal tests of frequency weightings**

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.5	0.5	0.5	±1.5
1000	0.0	0.0	0.0	±1.0
8000	-1.5	-1.5	-1.4	±5.0

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**4. Electrical signal tests of frequency weightings**

Weighting network response with relative to 1 kHz

Frequency ( Hz )	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	0.0	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

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

**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

**5.2 Time weighting at 1 kHz**

Frequency Weightings	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

**6. Long - term stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.3

*7. Petch*

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**CALIBRATION LABORATORY**

451-451/1 Sinthorn Road Bangpurnu Bangkok 10700 Thailand  
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Cert. No. : ACL24006  
Job No. : VC67AC0043  
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**7. Level linearity on the reference level range**

Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	29.9	-0.1	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.8	-0.2	± 1.1

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**8. Level linearity including the level range control**

Range	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Auto	94.0	94.0	0.0	±1.1

**9. Tone burst response**

Time Weighting	Tone burst duration, Tb ( ms )	Cycle	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	0.25	1	108.0	107.9	-0.1	1.5 : -5.0
	2	8	117.0	117.0	0.0	1.0 : -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 : -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 : -5.0
SEL	2	8	108.0	108.0	0.0	1.0 : -2.5
	200	800	128.0	128.0	0.0	±1.0

**10. Peak C sound level**

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value, L <sub>peak</sub> ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.0	0.0	±3.0
One	136.4	136.1	-0.3	±3.0

Number of cycle in test signal	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

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**11. Overload indication**

Measured value ( dB )		Deviated Value ( dB )	Acceptance Limits ( dB )
Positive one-half cycle	Negative one-half cycle		
89.6	89.5	-0.1	±1.5

**12. High level stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	137.0	137.0	0.0	±0.3

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor  $k = 2$   
or any value following calculation providing a level of confidence of approximately 95 %

End of Calibration Certificate

*7. Petch*

### Certificate of Calibration

### Customers

Name: ALS Laboratory Group Thailand Co., Ltd. Certificate No.: 24-SLM-070  
Address: 164 S. Phatthanabon Rd. Phatthanabon Road, Suan Luang, Bangkok 10250 Request No.: Req 2024 0241

### Learn Under Culbrooks Details

Measurement item	Visual Level Meter	Microphone Class	1
Material source	10000	Microphone Model	40CD
Model	CU81	Micro phone SN	S31574
Serial Number	1000	Preamplifier Model	PR622N
ID	BKK_110129	Preamplifier SN	1507169
Result	0.1 dB	Instrument Status	Used

#### Calibration Environment and Details

Temperature	23 °C ± 2 °C
Humidity	50% RH ± 20% RH
Barometric Pressure	1013 mPa ± 10 mPa
Received Date	31 January 2024
Validated Date	21 February 2024
Calibration Procedure	In-house method CP-SI-M-01 based on IEC 61072-3:2013 Ultrasonics – Sound level meters – Part 3: Periodic test
Location of Calibration	Lab AUSTEC

#### Reference Standard

Instrument	Brand	Model	S/N	Due calibration	Traceability
Standard Microphone	GRAS	40AN	188273	21 August 2024	GRAS
Multifrequency Calibrator	Questek	Questek	11A09624	26 July 2024	TSL
Audio Generator	Sony	SigalDJ	131	9 October 2024	WR Fluke

State

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

Calibrated By : me  
Mr. Nongkoon Luangnart  
Service Calibration Engineer

Approved By : Mr. P. S. Mathavare  
Calibration Engineer Supervisor  
Issue Date : 24 February, 2024

The results refer only to the items highlighted. The certificate shall not be reproduced (except in full, without written approval of the Issuing Instrument) (see 1.43).

Certificate No	24-SI-M-070
Request No	Req-2024-0243

1. Indication at the calibration check frequency

UIC Setting		Before Adjust		After Adjust		UNCERTAINTY ( $\pm$ dB)	Acceptance Limits ( $\pm$ dB)
FAST / A, 20-138	Level	UIC (dB)	ERR (dB)	UIC (dB)	ERR (dB)		
Calibrate Setting		(dB)	(dB)	(dB)	(dB)		
93 dB, 100 Hz, 100 Hz		93 dB	93 S	93 S	93 S	$\pm 2.0$	$\pm 0.3$

Note: Absolute sensitivity was established by the use of Standard Calibrator: Brand SV (NTEK, Model: SV 35A, SN: 58079).

## 2. Self-generated noise, Microphone installed

ULC Setting	Measured	UNCERTAINTY
FAST / 26-138		
ULC Weighting		
A	172	± 10

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

UUC Setting	Measured	UNCERTAINTY
TAST / 20-138		
UUC Wringing	(dR)	( $\pm$ dR)
A	11.2	0.10
C	12.5	0.10
Z	27.6	0.16

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

FUT Setting	Deviation from various Frequency Weighting Response curve			UNCERTAINTY	Acceptance Limit
	A	C	Z		
FAST (20-130)				( $\pm$ dB)	( $\pm$ dB)
STD Setting	(dB)	(dB)	(dB)		
125 Hz	0.3	-0.2	-0.2	0.60	1.0
160 Hz	0.0	0.0	0.0	0.50	0.7
400 Hz	0.4	0.4	0.4	0.60	1.0
800 Hz	0.3	0.2	0.3	0.70	+1.5/-2.5

The results related only to the normal oil used. The certificate will not be reproduced except in full without written approval of the Insurance Instrument Co. Ltd.

Certificate No.	21-SI-M-070
Request No.	Req-2024-0243

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

U/C Setting	Deviation from various Frequency Weighting Response curves			EMF UNCERTAINTY ( $\pm$ dB)	Acceptance Limit ( $\pm$ dB)
1A51 / 20.13 Hz	A (dB)	C (dB)	Z (dB)		
STD Setting				0.20	
83 Hz	-0.3	-2.1	-9.1		1.0
125 Hz	-0.1	0.0	0.0		1.0
250 Hz	0.1	0.0	0.0		1.0
500 Hz	-0.1	0.0	0.0		1.0
1000 Hz	0.0	0.0	0.0		0.7
2000 Hz	0.2	0.2	0.3		1.0
4000 Hz	0.0	0.0	0.6		1.0
8000 Hz	-1.6	-1.6	-1.1		-1.5, -2.5
16000 Hz	-2.8	-2.4	2.0	-2.5, -16.0	

## 6. Frequency and time weightings at 1 kHz

UNC Setting	STD	Measured		UNCERTAINTY	Acceptance
1.53 / 20.10	REF	UNC	ERR		Limit
UNC Weighting	UNC	(dB)	(dB)	(± dB)	(± dB)
A	114.00	114.0	0.0		0.20
C	118.00	114.0	0.0	0.20	0.20
Z	114.00	114.0	0.0		0.20

UIC Setting	STD	Measured		UNCERTAINTY	Acceptance Limit
2σ(118 °A)	REF (dB)	FUCL (dB)	FMR (dB)		
UIC Time Response				± 2 dB	± 2 dB
Fast	134 dB	133 dB	0.0	± 2σ	0.0
Slow	134 dB	134.0	0.0		0.0
Log	134 dB	133.0	0.0		0.0

The results related only to the *in situ* calibrated. This content will be reproduced except in full to ensure written approval of the copyright owner(s).

Certificate No.	24-SL-M-070
Request No.	Req-2024-0124

### 7. Long Term Stability

UIC Setting	Measured	UNCERTAINTY	
FAST - A/26138	UIC	(+ dB)	Limit (- dB)
STB Setting	(dB)		
Initial	114.0		
Final	114.0		
Described	0.0	0.10	0.10

8. Level linearity on the reference level range

Level: uncertainty of the reference length range					UNCERTAINTY ( ± dB)	Acceptance Limit ( ± dB)
L/C Setting (ASS: A - 20: L3)	Antipode		Deviation			
	REF (dB)	UCC (dB)	EMR (dB)			
SFD-AR					0.00	
136.00	136	136.0	206			0.0
134.00	134	134.0	0.0			0.0
129.00	129	129.0	0.0			0.0
124.00	124	124.0	0.0			0.0
119.00	119	119.0	0.0			0.0
114.00	114	114.0	0.0			0.0
109.00	109	109.0	0.0			0.0
104.00	104	104.0	0.0			0.0
99.00	99	99.0	0.0			0.0
94.00	94	94.0	0.0			0.0
89.00	89	89.0	0.0			0.0
84.00	84	84.0	0.0			0.0
79.00	79	79.0	0.0			0.0
74.00	74	74.0	0.0			0.0
69.00	69	69.0	0.0			0.0
64.00	64	64.0	0.0			0.0
59.00	59	59.0	0.0			0.0
54.00	54	54.0	0.0			0.0
49.00	49	49.0	0.0			0.0
44.00	44	44.0	0.0			0.0
39.00	39	39.0	0.0			0.0
34.00	34	34.0	0.0			0.0
29.00	29	29.0	0.0			0.0
24.00	24	24.0	0.0		0.0	
19.00	19	19.0	0.0		0.0	

The results relate only to the item calibrated. The estimate shall not be reproduced except in full without written approval of the testative Institute (I. 14)

Certificate No : 24-SLM-070  
Request No : Req/2024/043

#### 9. Level linearity including the level range control

UUC Setting	STD	Measured	UNCERTAINTY	Acceptance Limit
EAST / A	REF	UUC (dB)	ERR (dB)	( $\pm$ dB)
UUC Range	(dB)	(dB)	(dB)	( $\pm$ dB)
20-135	23.90	24.2	0.3	0.5
	114	114.0	0.0	0.5

#### 10. Tone burst response

UUC Setting	STD	Anticipated	Measured	UNCERTAINTY	Acceptance Limit
A 20-135	Toneburst	Ref	UUC (dB)	ERR (dB)	( $\pm$ dB)
UUC Time Response	(ms)	(dB)	(dB)	(dB)	( $\pm$ dB)
Freq	200	124.6	124.0	0.0	0.5
	2	117.0	117.0	0.0	+1.0, -1.5
	0.25	108.0	107.9	-0.1	+1.0, -0.5
Slow	200	127.6	127.5	-0.1	0.5
	2	106.0	107.9	-0.1	+1.0, -2.0
	200	128.0	128.0	0.0	0.5
SEL	2	100.0	100.0	0.0	+1.0, -1.5
	0.25	99.0	98.6	-0.4	+1.0, -1.0

#### 11. Peak C Sound level

UUC Setting	Anticipated	Measured	UNCERTAINTY	Acceptance Limit
EAST / C / 90-136	REF	UUC (dB)	ERR (dB)	( $\pm$ dB)
STD Setting	(dB)	(dB)	(dB)	( $\pm$ dB)
Complete cycle	121.4	121.6	-0.20	2.0
Positive half cycle	120.4	120.2	-0.20	1.0
Negative half cycle	120.4	120.2	0.20	1.0

The result is valid only for the item calibrated. The certificate is valid only if reproduced except in full with the prior written approval of the head of Calibration Laboratory.

ISO 17025:2017 Rev. 02 Issue date 2019.12.1

Certificate No : 24-SLM-070  
Request No : Req/2024/043

#### 12. Overload indication

UUC Setting	Measured	UNCERTAINTY	Acceptance Limit
EAST / A / 20-135	UUC	( $\pm$ dB)	( $\pm$ dB)
STD Setting	(dB)	( $\pm$ dB)	( $\pm$ dB)
Positive one-half cycle	140.5		
Negative one-half cycle	140.5		
Distorted	-0.2	0.20	1.5

#### 13. High Level Stability

UUC Setting	Measured	UNCERTAINTY	Acceptance Limit
EAST / A / 20-135	UUC	( $\pm$ dB)	( $\pm$ dB)
STD Setting	(dB)	( $\pm$ dB)	( $\pm$ dB)
Initial	127.0		
Final	127.0		
Distorted	0.0	0.10	0.10

Note :

Function	Maximum-permitted Uncertainty of measurement
1. Indication at the calibration check frequency	Not applicable
2. Self-generated noise, microphone installed	Not applicable
3. Self-generated noise, microphone replaced by the external input signal device	Not applicable
4. Acoustic signal of frequency weighting at 10 Hz to 4 kHz	0.60 dB
5. Acoustic signal level of frequency weighting at 4 kHz to 10 kHz	0.70 dB
6. Electrical signal level of frequency weighting. Weighting network response within 1 kHz	0.70 dB
7. Frequency and time weighting at 1 Hz	0.20 dB
7.1 long Term Stability	0.10 dB
8. Level linearity on the reference level range	0.50 dB
9. Level linearity, including the level range control	0.70 dB
10. Tone burst response	0.30 dB
11. Peak C Sound level	0.25 dB
12. Overload indication	0.25 dB
13. High Level Stability	0.10 dB

1. Acceptance Limit and Maximum-permitted Uncertainty was IEC 6072-3:2013

End of Certificate

The result is valid only for the item calibrated. The certificate is valid only if reproduced except in full with the prior written approval of the head of Calibration Laboratory.

ISO 17025:2017 Rev. 02 Issue date 2019.12.1

## SITHIPORN ASSOCIATES CO., LTD. CALIBRATION LABORATORY

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Cert No. : ACL24343  
Pages : 1 of 8

## Calibration Certificate

**Equipment :** SOUND LEVEL METER  
**Manufacturer :** RION  
**Model :** NL-42 / Microphone UC-52 / Preamplifier NH-24  
**Serial No.:** 00584983 / 158777 / 58778  
**ID No.:** BKK\_FS0926

**Condition As Found :** GOOD

**Customer :** ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,  
KHWAENG PHATTHANAKAN, KHET SUANLUANG,  
BANGKOK, 10250 THAILAND.

**Location :** -  
**Ambient Temperature :** ( 23.0  $\pm$  3 ) °C  
**Pressure :** ( 101.3  $\pm$  3 ) kPa  
**Relative Humidity :** ( 50.0  $\pm$  20 ) %

**Received Date :** 01 NOVEMBER 2024  
**Calibration Date :** 12 NOVEMBER 2024  
**Date of Issue :** 13 NOVEMBER 2024

**Calibrated by :** Nuthakorn Pisutpaisan

**Approved by :**

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

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Cert No. : ACL24343  
Job No. : VC68AC0027  
Pages : 2 of 8

**Calibration Procedure :** CP-AC-01

#### Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM). The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with anechoic chamber and Reference Standard Instruments.  
For test results of each item was by observation of each Instruments display and also with SLM's display.

#### Condition of this result of calibration :

##### 1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand)
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR)

*N. Pich*



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Cert. No. : ACL24343  
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**Summary of Measurement Result :**

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long-term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

*T. Petch.*

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**Result of calibration :**

**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	93.9	0.0	±0.3

**2. Self-generated noise**

**2.1 Normal test**

Measured Value (dB)
13.8

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

Frequency Weighting	Weighting (dB)
A-weight	12.6
C-weight	19.1
Flat	24.6

**3. Acoustical signal tests of frequency weightings**

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			Acceptance Limits
	Flat	C-weight	A-weight	
125	0.6	0.7	0.7	±1.5
1000	0.1	0.1	0.1	±1.0
8000	-1.5	-1.4	-1.4	±5.0

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**4. Electrical signal tests of frequency weightings**

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

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

**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.2
C-weight	94.0	94.0	0.0	±0.2
Flat	94.0	94.0	0.0	±0.2

**5.2 Time weighting at 1 kHz**

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	±0.1
Slow	94.0	94.0	0.0	±0.1
Leq	94.0	94.0	0.0	±0.1

**6. Long-term stability**

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

*T. Petch.*

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Tel: +66 2433 8331 Email: calibration@sithiporn.com

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Cert. No. : ACL24343  
Job No. : VC68AC0027  
Pages : 6 of 8

**7. Level linearity on the reference level range**

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	132.9	-0.1	±1.1
132.0	131.9	-0.1	±1.1
131.0	130.9	-0.1	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
30.0	30.0	0.0	±1.1
29.0	29.0	0.0	±1.1
28.0	28.0	0.0	±1.1
27.0	27.0	0.0	±1.1
26.0	26.0	0.0	±1.1
25.0	24.9	-0.1	±1.1

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**8. Level linearity including the level range control**

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	94.0	94.0	0.0	±1.1

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
130	29.0	29.0	0.0	±1.1

**9. Tone burst response**

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

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**10. Peak C sound level**

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	130.0	130.0	0.0	±3.0
One	133.4	133.4	0.0	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

**11. Overload indication**

Measured value (dB)		Deviated Value	Acceptance Limits
Positive one-half cycle	Negative one-half cycle	(dB)	(dB)
89.5	89.5	0.0	±1.5

**12. High level stability**

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	±0.3

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

End of Calibration Certificate

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Cert. No. : ACL24108  
Pages : 1 of 8

**Calibration Certificate**

Equipment : SOUND LEVEL METER  
Manufacturer : RJON  
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24  
Serial No. : 00710644 / L57228 / 10645  
ID No. : BKK\_FS0028

Condition As Found : GOOD

Customer : AIS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTIYANAKAN 40, PHATTHANAKAN ROAD,  
KIJWAENG PHATTHANAKAN, KIJET SUAN LUANG,

Location : -  
Ambient Temperature : ( 23.0 ± 3 ) °C  
Pressure : ( 101.3 ± 3 ) kPa  
Relative Humidity : ( 50.0 ± 20 ) %

Received Date : 03 APRIL 2024  
Calibration Date : 09-11 APRIL 2024  
Date of Issue : 12 APRIL 2024

Calibrated by : Nabakorn Pisunpaian

Approved by :

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Cert. No. : ACL24108  
Job No. : VC67AC0075  
Pages : 2 of 8

Calibration Procedure : CP-AC-01

**Calibration Method :**

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

**Condition of this result of calibration :**

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-4	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL_BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL_BP 20/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAI	34560495	AA-3001-24	05-FEB-25

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

*Nabakorn Pisunpaian*

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Job No. : VC67AC0075  
Pages : 3 of 8

**Summary of Measurement Result :**

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C' sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

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Job No. : VC67AC0075  
Pages : 4 of 8

**Result of calibration :**

**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	93.9	0.0	±0.3

**2. Self-generated noise**

**2.1 Normal test**

Measured Value (dB)
14.6

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

Frequency Weighting	Measured value (dB)
A - weight	13.1
C - weight	19.8
Flat	25.2

**3. Acoustical signal tests of frequency weightings**

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.8	0.8	0.9	± 1.5
1000	0.2	0.2	0.2	± 1.0
8000	-2.6	-2.5	-2.5	±5.0

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Job No. : VC67AC0075  
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**4. Electrical signal tests of frequency weightings**

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	-0.1	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

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

**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

**5.2 Time weighting at 1 kHz**

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

**6. Long - term stability**

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

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Pages : 6 of 8

**7. Level linearity on the reference level range**

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.1	0.1	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.1	0.1	± 1.1
69.0	69.1	0.1	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.1	0.1	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.0	0.0	± 1.1
26.0	26.0	0.0	± 1.1
25.0	24.9	-0.1	± 1.1

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**8. Level linearity including the level range control**

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

**9. Tone burst response**

Time Weighting	Tone burst duration, T <sub>b</sub> (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
SEL	200	800	128.0	128.0	0.0	±1.0

**10. Peak C sound level**

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L <sub>peak</sub> (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.4	135.7	-0.7	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.1	0.1	±2.0
Positive half cycle	135.4	135.3	-0.1	±2.0
Negative half cycle	135.4	135.3	-0.1	±2.0

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**11. Overload indication**

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle	0.2	±1.5
89.5	89.7		

**12. High level stability**

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

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

End of Calibration Certificate

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Cert. No. : ACL24203  
Pages : 1 of 8

**Calibration Certificate**

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-52A Microphone UC-59 / Preamplifier NH-25  
Serial No.: 00531304 / 23452 / 32980  
ID No.: SRT TS0022

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATHANAKAN 40, PHATHANAKAN ROAD,  
KHUAEANG PHATHANAKAN, KHUET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

Location :  
Ambient Temperature : ( 23.0 ± 3 ) °C  
Pressure : ( 101.3 ± 2 ) kPa  
Relative Humidity : ( 50.0 ± 20 ) %

Received Date : 17 JUNE 2024  
Calibration Date : 03-04 JULY 2024  
Date of Issue : 05 JULY 2024

Calibrated by : Nattakorn Pisutaporn

Approved by :

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Cert. No. : ACL24203  
Job No. : VC67AC0108  
Pages : 2 of 8

Calibration Procedure : CP-AC-01

**Calibration Method :**

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.  
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

**Condition of this result of calibration :**

**1. Reference Standard Instruments :**

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KAJ	34560495	AA-3001-24	05-FEB-25

- This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
- This certificate is traceable to the international system of unit maintained at :
  - National Institute of Metrology (Thailand).
  - Thailand Institute of Scientific and Technological Research (TISTR).

*T. Reteh*

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Job No. : VC67AC0108  
Pages : 3 of 8

**Summary of Measurement Result :**

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

*T. Petch*

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**Result of calibration :**

**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	±0.3

**2. Self-generated noise**

**2.1 Normal test**

Measured Value (dB)
13.8

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

Frequency Weighting	Measured value (dB)
A - weight	9.8
C - weight	14.3
Flat	20.1

**3. Acoustical signal tests of frequency weightings**

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.0	0.0	± 1.0
1000	0.0	0.0	0.0	± 0.7
8000	0.0	0.1	0.1	+ 1.5, - 2.5

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Job No. : VC67AC0108  
Pages : 5 of 8

**4. Electrical signal tests of frequency weightings**

Weighting network response with relative in 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±1.0
125	0.0	0.1	0.0	±1.0
250	0.0	0.0	0.0	±1.0
500	0.0	0.0	0.0	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.1	0.1	+ 1.5, - 2.5
16000	0.0	-1.2	-1.2	+ 2.5, -16.0

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

**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

**5.2 Time weighting at 1 kHz**

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

**6. Long - term stability**

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.1

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**CALIBRATION LABORATORY**

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Cert. No. : ACL24203  
Job No. : VC67AC0108  
Pages : 6 of 8

**7. Level linearity on the reference level range**

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.0	0.0	±0.8
30.0	30.0	0.0	±0.8
29.0	29.0	0.0	±0.8
28.0	28.0	0.0	±0.8
27.0	27.0	0.0	±0.8
26.0	26.0	0.0	±0.8
25.0	25.0	0.0	±0.8

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Pages : 7 of 8

**8. Level linearity including the level range control**

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±0.8

**9. Tone burst response**

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 ; -3.0
	2	8	117.0	117.0	0.0	1.0 ; -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 ; -3.0
	200	800	127.6	127.6	0.0	±0.5
	0.25	1	99.0	98.9	-0.1	1.0 ; -3.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -1.5
	200	800	128.0	128.0	0.0	±0.5

**10. Peak C sound level**

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L <sub>peak</sub> (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.1	0.1	±2.0
One	136.4	136.2	-0.2	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±1.0
Positive half cycle	135.4	135.2	-0.2	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

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**11. Overload indication**

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle	0.0	±1.5
89.6	89.6		

**12. High level stability**

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.1

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

End of Calibration Certificate

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Cert. No. : ACL24004  
Pages : 1 of 8

**Calibration Certificate**

Equipment : SOUND LEVEL METER  
Manufacturer : RION  
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24  
Serial No. : 00672737 / 158772 / 58773  
ID No. : BKK\_FS0927

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,  
KHWAENG PHATTHANAKAN, KHET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

Location : +  
Ambient Temperature : ( 23.0 ± 3 ) °C  
Pressure : ( 101.3 ± 3 ) kPa  
Relative Humidity : ( 50.0 ± 20 ) %

Received Date : 19 DECEMBER 2023  
Calibration Date : 05-08 JANUARY 2024  
Date of Issue : 09 JANUARY 2024

Calibrated by : Nuthakorn Pisutpaisan

Approved by :

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

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Cert. No. : ACL24004  
Job No. : VC67AC0043  
Pages : 2 of 8

Calibration Procedure : CP-AC-01

**Calibration Method :**

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

**Condition of this result of calibration :**

**1. Reference Standard Instruments :**

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-23	07-FEB-24
Waveform Generator	33511B	MY52302742	EF-0010-23	07-FEB-24
Digital Multimeter	33461A	MY53220104	EEL-BP 30/0266	13-FEB-24
Digital Multimeter	33461A	MY53220076	EEL-BP 29/0266	13-FEB-24
Digital Multimeter	33461A	MY60024273	EEL-BP 31/0266	14-FEB-24
Programmable Attenuator	MAT-1070	62100114	EF-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KA1	34560495	AA-3002-23	14-FEB-24

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

3.1 National Institute of Metrology (Thailand).

3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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Job No. : VC67AC0043  
Pages : 3 of 8

**Summary of Measurement Result :**

Parameter	Uncertainty	Maximum-permitted
	(dB)	uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	-	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C' sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

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Job No. : VC67AC0043  
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**Result of calibration :**

**1. Absolute sensitivity**

Reference Acoustic Signal ( dB )	Measured Value ( dB )	Deviation ( dB )	Acceptance Limit ( dB )
93.9 (93.98)	93.9	0.0	±0.3

**2. Self-generated noise**

**2.1 Normal test**

Measured Value ( dB )
13.8

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

Frequency Weighting	Measured value ( dB )
A - weight	9.9
C - weight	16.4
Flat	22.2

**3. Acoustical signal tests of frequency weightings**

Meter free-field acoustic response at a level of 84 dB

Frequency ( Hz )	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.3	0.3	0.3	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-0.6	-0.6	-0.5	±5.0

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**4. Electrical signal tests of frequency weightings**

Weighting network response with relative to 1 kHz

Frequency ( Hz )	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	-0.1	±2.0
125	-0.1	0.0	-0.1	±1.5
250	-0.1	0.0	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.0	0.0	±5.0

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

**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	93.9	-0.1	± 0.2
C - weight	94.0	93.9	-0.1	± 0.2
Flat	94.0	94.0	0.0	± 0.2

**5.2 Time weighting at 1 kHz**

Frequency Weighting	Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
Fast	94.0	93.9	-0.1	± 0.1
Slow	94.0	93.9	-0.1	± 0.1
Leq	94.0	94.0	0.0	± 0.1

**6. Long - term stability**

Frequency Weighting	SLM Display at initial ( dB )	SLM Display at final ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
A - weight	94.0	94.0	0.0	± 0.3

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Pages : 6 of 8

**7. Level linearity on the reference level range**

Anticipated Value ( dB )	Measured Value ( dB )	Deviated Value ( dB )	Acceptance Limits ( dB )
137.0	137.0	0.0	± 1.1
136.0	136.1	0.1	± 1.1
135.0	135.1	0.1	± 1.1
134.0	134.1	0.1	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.1	0.1	± 1.1
114.0	114.1	0.1	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.1	0.1	± 1.1
99.0	99.1	0.1	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	26.0	0.0	± 1.1
25.0	24.9	-0.1	± 1.1

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**8. Level linearity including the level range control**

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

**9. Tone burst response**

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	116.9	-0.1	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

**10. Peak C sound level**

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L <sub>peak</sub> (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.4	135.8	-0.6	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

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**11. Overload indication**

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.7	89.5	-0.2	±1.5

**12. High level stability**

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	±0.3

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

End of Calibration Certificate

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Cert. No. : ACL24211  
Pages : 1 of 8

**Calibration Certificate**

**Equipment :** SOUND LEVEL METER  
**Manufacturer :** RION  
**Model :** NL-52A / Microphone UC-59 / Preamplifier NH-25  
**Serial No.:** 00531302 / 23450 / 32978  
**ID No.:** SRT-PS0020

**Condition As Found :** GOOD

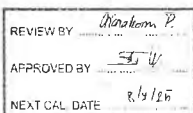
**Customer :** ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PHA THANAKAN 40, PHATTHANAKAN ROAD,  
KJITWAENG PHA THANAKAN, KHET SUAN LUANG,  
BANGKOK, 10250 THAILAND.

**Location :** -  
**Ambient Temperature :** ( 23.0 ± 3 ) °C  
**Pressure :** ( 101.3 ± 3 ) kPa  
**Relative Humidity :** ( 50.0 ± 20 ) %

**Received Date :** 24 JUNE 2024  
**Calibration Date :** 08-09 JULY 2024  
**Date of Issue :** 12 JULY 2024

**Calibrated by :** Nathakorn Pisutpaisan

**Approved by :**



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Cert. No. : ACL24211  
Job No. : VC67AC0111  
Pages : 2 of 8

**Calibration Procedure :** CP-AC-01

**Calibration Method :**

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).  
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.  
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

**Condition of this result of calibration :**

**1. Reference Standard Instruments :**

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EI-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EI-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL-BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL-BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL-BP 22/0267	15-FEB-25
Programmable Attenuator	MA1-1070	62100114	EF-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand)
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

*T. Retan*

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Cert. No. : ACL24211  
Job No. : VC67AC0111  
Pages : 3 of 8

**Summary of Measurement Result :**

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long-term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

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Job No. : VC67AC0111  
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**Result of calibration :**

**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	±0.3

**2. Self-generated noise**

**2.1 Normal test**

Measured Value (dB)
14.2

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

Frequency Weighting	Weighting (dB)
A-weight	9.9
C-weight	15.2
Flat	20.7

**3. Acoustical signal tests of frequency weightings**

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.1	0.1	± 1.0
1000	0.0	0.0	0.0	± 0.7
8000	0.3	0.4	0.4	+ 1.5, - 2.5

*T. Petch*

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Job No. : VC67AC0111  
Pages : 5 of 8

**4. Electrical signal tests of frequency weightings**

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.1	±1.0
125	0.0	0.1	0.0	±1.0
250	0.0	0.0	0.0	±1.0
500	0.0	0.1	0.0	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.1	0.1	+ 1.5, - 2.5
16000	0.0	-1.2	-1.2	+ 2.5, -16.0

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

**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
A-weight	94.0	94.0	0.0	± 0.2
C-weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

**5.2 Time weighting at 1 kHz**

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

**6. Long-term stability**

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits
A-weight	94.0	94.0	0.0	± 0.1

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**7. Level linearity on the reference level range**

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
137.0	137.0	0.0	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	53.9	-0.1	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	38.9	-0.1	±0.8
34.0	33.9	-0.1	±0.8
30.0	29.9	-0.1	±0.8
29.0	28.9	-0.1	±0.8
28.0	27.9	-0.1	±0.8
27.0	26.9	-0.1	±0.8
26.0	25.9	-0.1	±0.8
25.0	24.9	-0.1	±0.8

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**8. Level linearity including the level range control**

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±0.8

**9. Tone burst response**

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 : -3.0
	2	8	117.0	117.0	0.0	1.0 : -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 : -3.0
	200	800	127.6	127.6	0.0	±0.5
	0.25	1	99.0	98.9	-0.1	1.0 : -3.0
SEL	2	8	108.0	108.0	0.0	1.0 : -1.5
	200	800	128.0	128.0	0.0	±0.5

**10. Peak C sound level**

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
One	136.4	136.3	-0.1	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±1.0
Positive half cycle	135.4	135.2	-0.2	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

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**11. Overload indication**

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.6	89.8	0.2	±1.5

**12. High level stability**

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	±0.1

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

End of Calibration Certificate

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Cert. No. : ACL24215  
Pages : 1 of 8

**Calibration Certificate**

**Equipment :** SOUND LEVEL METER  
**Manufacturer :** RJON  
**Model :** NL-52A / Microphone UC-59 / Preamplifier NH-25  
**Serial No.:** 00531307 / 23456 / 32983  
**ID No.:** NNG\_FS0023

**Condition As Found :** GOOD

**Customer :** ALS LABORATORY GROUP (THAILAND) CO., LTD.  
104 PIATTHANAKAN 40, PHATTHANAKAN ROAD,  
KHWAENG PIATTHANAKAN, KHET SUAN LUANG,  
BANGKOK. 10250 THAILAND.

**Location :** -  
**Ambient Temperature :** ( 23.0 ± 3 ) °C  
**Pressure :** ( 101.3 ± 3 ) kPa  
**Relative Humidity :** ( 50.0 ± 20 ) %

**Received Date :** 24 JUNE 2024  
**Calibration Date :** 08-09 JULY 2024  
**Date of Issue :** 12 JULY 2024

REVIEW BY: *Naihakorn Pisuaisan*  
APPROVED BY: *[Signature]*  
NEXT CAL DATE: 8/1/25

Calibrated by : Naihakorn Pisuaisan

Approved by :

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

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Job No. : VC67AC0112  
Pages : 2 of 8

**Calibration Procedure :** CP-AC-01

**Calibration Method :**

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM). The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

**Condition of this result of calibration :**

**1. Reference Standard Instruments :**

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-24	05-FEB-25
Waveform Generator	33511B	MY52302742	EF-0007-24	05-FEB-25
Digital Multimeter	33461A	MY53220104	EEL BP 21/0267	13-FEB-25
Digital Multimeter	33461A	MY53220076	EEL BP 20/0267	15-FEB-25
Digital Multimeter	34461A	MY60024273	EEL BP 22/0267	15-FEB-25
Programmable Attenuator	MAT-1070	62100114	EI-0008-24	05-FEB-25
Condenser Microphone	4180	2977900	AA-1001-24	12-FEB-25
Measuring Amplifier	NA-42KA1	34560495	AA-3001-24	05-FEB-25

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.

3. This certificate is traceable to the international system of unit maintained at :

- 3.1 National Institute of Metrology (Thailand),
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

*T. Petch*

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**Summary of Measurement Result :**

Parameter	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	0.2	N/A
2. Self-generated noise	0.2	N/A
3. Acoustical signal tests of frequency weightings		
125 Hz	0.3	0.6
1000 Hz	0.3	0.6
8000 Hz	0.3	0.7
4. Electrical signal tests of frequency weightings		
For 10 Hz to 4 kHz	0.3	0.6
For > 4 kHz to 10 kHz	0.3	0.7
For > 10 kHz to 20 kHz	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

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**Result of calibration :**

**1. Absolute sensitivity**

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.94)	94.0	0.0	±0.3

**2. Self-generated noise**

**2.1 Nominal test**

Measured Value (dB)
13.5

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

Frequency Weighting	Weighting (dB)
A - weight	8.7
C - weight	14.0
Flat	19.7

**3. Acoustical signal tests of frequency weightings**

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	±1.0
1000	0.1	0.1	0.1	±0.7
8000	0.1	0.2	0.2	±1.5, ±2.5

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Job No. : VC67AC0112  
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**4. Electrical signal tests of frequency weightings**

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±1.0
125	0.0	0.0	0.0	±1.0
250	0.0	0.0	0.0	±1.0
500	0.0	0.0	-0.1	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.0	0.0	+1.5, -2.5
16000	0.0	-1.2	-1.2	+2.5, -16.0

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

**5.1 Frequency weightings at 1 kHz**

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	±0.2
C - weight	94.0	94.0	0.0	±0.2
Flat	94.0	94.0	0.0	±0.2

**5.2 Time weighting at 1 kHz**

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	±0.1
Slow	94.0	94.0	0.0	±0.1
Lsq	94.0	94.0	0.0	±0.1

**6. Long - term stability**

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	±0.1

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**7. Level linearity on the reference level range**

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.1	0.1	±0.8
136.0	136.1	0.1	±0.8
135.0	135.1	0.1	±0.8
134.0	134.1	0.1	±0.8
133.0	133.1	0.1	±0.8
132.0	132.1	0.1	±0.8
131.0	131.0	0.0	±0.8
129.0	129.1	0.1	±0.8
124.0	124.0	0.0	±0.8
119.0	119.1	0.1	±0.8
114.0	114.1	0.1	±0.8
109.0	109.1	0.1	±0.8
104.0	104.1	0.1	±0.8
99.0	99.1	0.1	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.0	0.0	±0.8
30.0	30.0	0.0	±0.8
29.0	29.0	0.0	±0.8
28.0	28.0	0.0	±0.8
27.0	27.0	0.0	±0.8
26.0	26.0	0.0	±0.8
25.0	25.0	0.0	±0.8

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**8. Level linearity including the level range control**

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±0.8

**9. Tone burst response**

Time Weighting	Tone burst duration, Th (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 : -3.0
	2	8	117.0	117.0	0.0	1.0 : -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 : -3.0
	200	800	127.6	127.6	0.0	±0.5
SEL	0.25	1	99.0	98.9	-0.1	1.0 : -3.0
	2	8	108.0	108.0	0.0	1.0 : -1.5
	200	800	128.0	128.1	0.1	±0.5

**10. Peak C sound level**

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
One	136.4	135.7	-0.7	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±1.0
Positive half cycle	135.4	135.2	-0.2	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

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**11. Overload indication**

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.8	89.5	-0.3	±1.5

**12. High level stability**

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.1

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

End of Calibration Certificate

T. Petch



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TEL 0-2717-3000-29 FAX 0-2718-9484



**Certificate of Calibration**

Cert. No.: 24CH1295  
Page: 1 of 3

Equipment : pH Meter  
Manufacturer : Hach  
Model : HQ411d  
Serial No. : 200100031163  
ID No. : BKK\_EN0342  
Condition As-Received : Used Item  
Received Date : 16 October 2024  
Calibration Date : 17 October 2024  
Reference : 2410-0548DSC-5  
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.  
104 Phatthanakan 40, Phatthanakan Rd.,  
Khaeng Phatthanakan, Khet Suan Luang,  
Bangkok 10250 Thailand  
Ambient Temperature : (25 ± 2.5) °C  
Relative Humidity : (50 ± 15) %  
Calibration Procedure : In - house method :  
- CP-CH5 by direct measurement with certified reference material (CRM)  
- CP-CH8 by comparison with temperature standard  
Calibrated by : Warakorn Lemgagrakul  
Approved by : Sathip  
Approved Signatory  
( ) Unnopphol Harachai  
( ) Ponpan Paipim  
(✓) Sathip Meangmai  
Issue Date : 21 October 2024

REVIEW BY: Jinda K  
APPROVED BY: Sathip P  
NEXT CAL DATE: 17/10/25

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



Cert. No.: 24CH1295  
Page: 2 of 3

**Condition of this calibration result**

**1. Reference Standard Instrument**

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Ref. Standard Thermometer	2188080	130RC044	2411022	16 Sep 2025

- This Certification 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 Akkreditierungsstelle, Accredited No D-RM-15184-01-00  
:The measurement results are traceable to SI through CPA chem Ltd.,  
ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	1034203	27 Sep 2026
pH 6.999	Hach Lange GmbH	C03145	28 Feb 2026
pH 10.010	CPA chem	1034205	28 Sep 2025

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

**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 (±)	Coverage factor k
pH Electrode S/N: 230473042902	4.008	4.028	174.6	0.0044	2.00
	6.999	7.014	1.4	0.0084	2.05
	10.010	10.018	-172.8	0.0066	2.00

**Remark** - Can not connect the BNC because the plug does not match with the socket.



Cert.No.: 24CH1295  
Page.: 3 of 3

#### Calibration Results

Function : Temperature Measurement

(\*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : PHC281  
- Serial No : 230473042902  
Dimension of probe  
- Length : 103 mm,  
- Diameter : 12 mm,  
- Immersion Depth : 90 mm,

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.002	25.0	-0.002	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 %.

-000-



REVIEW BY: *Chaitan P.*  
APPROVED BY: *Manoel P.*  
NEXT CAL DATE: 12/09/25

LAB# 2104-90

#### Test Report

Customer	ALS Laboratory Group (Thailand) Co., Ltd.
Equipment	Cleanroom
Manufacturer	HACH
Equipment Model	DR300 □ Pocket II
ID No	BK-LG0089
Calibration Serial No.	23020001902
Sensor Serial No.	-
Date of test	12/03/2024
Period	1 Year
Environment: temperature	25 °C
Humidity	65 %RH

#### Results

##### Instrument Checked

Item	Characteristic	Before	After	Pass	Fail
1	Visual Inspect	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
2	Power Supply (4.5 ~ 6.0 VDC)	6.0 VDC		<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
3	Display Check	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
4	Key/panel Check	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
5	Function System Program	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

##### Warning and Error Checked

Item	Event	Before	After	Pass	Fail
6	Error Ind.	<input checked="" type="checkbox"/> None	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
		<input type="checkbox"/> Alarm	<input type="checkbox"/> Alarm	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail

##### Check with Standard

Item	Characteristic	Before	After	Pass	Fail
DPO-CHLORINEUR					
7	Blank (6.05 mg/L)	0.00 mg/L	0.00 mg/L	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
8	Standard CQ No. 1 (0.19 ± 0.09 mg/L)	0.20 mg/L	0.19 mg/L	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
9	Standard CQ No. 2 (0.87 ± 0.10 mg/L)	0.87 mg/L	0.87 mg/L	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
10	Standard CQ No. 3 (1.55 ± 0.14 mg/L)	1.55 mg/L	1.55 mg/L	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
DPO-CHLORINEUR					
11	Blank (0.0 mg/L)	0.0 mg/L	0.0 mg/L	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
12	Standard CQ No. 1 (0.22 ± 0.02 mg/L)	0.22 mg/L	0.22 mg/L	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
13	Standard CQ No. 2 (0.42 ± 0.03 mg/L)	0.42 mg/L	0.42 mg/L	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
14	Standard CQ No. 3 (0.70 ± 0.06 mg/L)	0.70 mg/L	0.70 mg/L	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail

ฉบับนี้จัดทำขึ้นโดย บริษัท ฮาช 311 จำกัด เลขที่ 755/4 หมู่ 5 ต.บางพลีใหญ่ อ.บางพลี จ.สมุทรปราการ 10750  
Tel : 06-1021026-3529 | Fax : 06-021026-3572 | Tax ID : 0105552107330 | Email : thha@hach.com | www.th.hach.com



LAB# 2400590

#### Summary of results

- ☒ The equipment can work normally and reliably. ☒ The equipment can work reliably. ☒ The equipment can work reliably. ☒ The equipment can work reliably.

#### Remarks

#### Calibration Equipment Used

Equipment	Equipment ID
Standard Aqueous DPO-CHLORINEUR	Lot No. A3020
Standard Aqueous DPO-CHLORINEUR	Lot No. A2104
Digital multi meter	S/N : 21190010
Thermo hygrometer	S/N : 45140147

Test By : WILAILAK S. (Miss Wilailak Sawangpui) Service Engineer  
Approved by : (Mr. Suwan Sutyangkul) Position: Assistant Service Division Manager

ฉบับนี้จัดทำขึ้นโดย บริษัท ฮาช 311 จำกัด เลขที่ 755/4 หมู่ 5 ต.บางพลีใหญ่ อ.บางพลี จ.สมุทรปราการ 10750  
Tel : 06-1021026-3529 | Fax : 06-021026-3572 | Tax ID : 0105552107330 | Email : thha@hach.com | www.th.hach.com

ID No.: BK, EN0003  
Manufacturer: Sartorius  
Page No.: 1 of 2

Customer Name: ALS Laboratory Group (Thailand) Co., Ltd.  
104 Phatthanakan 40/Phatthanakan Rd, Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250

Calibrated Place: Lab Room

Calibrated By: Mr. Chuchai Inthana  
Calibration Date: Friday, August 02, 2024  
Calibration Procedure No.: This calibration was conducted by using in-house calibration procedure number (WI-003) Based on UKAS LAB 14: 2019

Metrological data:  
Capacity: 220 g Readability: 0.0001 g  
Ambients Condition:  
Temperature: 23.0 °C ± 5.0 °C  
Humidity: 55.0 % RH ± 10.0 % RH  
Pressure: \*

Reasons for calibration  
☒ New installation ☒ Service / Repair ☒ Recalibration / Maintenance  
Equipment Condition: ☒ Good Operate ☐ Fail

Measurement Method UKAS Publication Ref: Lab 14

The measurement uncertainty stated 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 the Guide to Expression of Uncertainty in Measurement (GUM). The calibration certificate documents the traceability to National Standards, which realise the unit of measurement according to the International Standard System of Units (SI). Report of Tolerance came from list of Sartorius Metrological Specifications.

#### Traceability:

Model Number	Description	Traceability	Certificate No	Due Date
YCS011-522-00	Sartorius weight set 100g - 500g E2VCS011-522-00	ITS	M23081975	23-Aug-2025
Testo 174 H	Thermo-hygrometer, Testo 174H	ENTECH	INT 661303.H068140	12-Nov-2024

This certificate is valid only for the equipment used.

This certificate may not be reproduced other than in full except with the prior written approval of the Verification Operation Division Sartorius (Thailand) Co., Ltd.

SOP FM 33 03 February 2022

Mr. Chuchai Inthana (Technical Manager)







## Metrology

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoh, Saraburi 18110, Thailand.  
Saraburi Tel : +66 3627 3096 Fax : +66 3627 3100  
Bangkok Tel : +668 9205 6851 , +669 8247 2360  
Website : www.scieco.co.th E-Mail : callbrate@scg.com



Certificate No. T240904

Page 1 of 3

### Certificate of Calibration

Equipment : Chamber ( Oven )

Manufacturer : Memmert

Model : UF 450

Serial No. : B717.0531

Customer Code : BKK\_EN0273

ID No. : T8042A4

Customer : ALS Laboratory Group (Thailand) Co.,Ltd.

104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan,

Khet Suan Luang, Bangkok 10250

Customer Location : Laboratory (Oven Room)

Date of Receipt : 08 May 2024

Calibrated By : [Redacted] (Temperature Calibration Manager)

Approved By : [Redacted] Sungechum (Metrology Manager)

Date of Issue : [Redacted]

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.

FM-L14 11/18-08-66



## Metrology

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoh, Saraburi 18110, Thailand.



Certificate No. T240904

Page 2 of 3

### Calibration Report

Equipment : Chamber ( Oven )

Date of Calibration : 14 May 2024

Environment : Temperature : 26.5-28.1 °C

Line Voltage : 226.7-229.8 V

Relative Humidity : 51 - 57 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert nine resistance thermometer detectors into its chamber , the other one resistance thermometer detector use for ambient temperature measurement . The calibration was done in according to WI-T20 ( based on ASTM E145-94 ( Recapproved 2001 ) and AS2853-1986 ).

All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
RTD	100 ohm	21-(CH1-10)	T231955	17 November 2024
DATA LOGGER	34970A	T121	T231955	17 November 2024

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 :

Time Constant 1 Hour 30 Minute At 104 °C

Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max

☐ Close

☒ Not Available

5. Adjustment :

( X ) without adjustment

( ) after adjustment

Approved By: [Redacted]

FM-L15 11/18-08-66



## Metrology

SCI ECO Services Company Limited

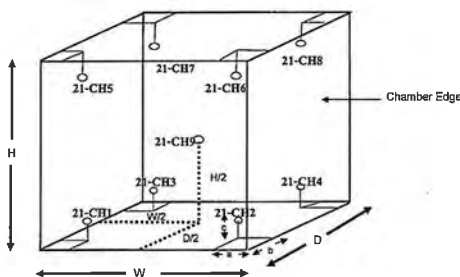
33/2 Moo 3, T.Banpa, A.Kaengkhoh, Saraburi 18110, Thailand.



Certificate No. T240904

Page 3 of 3

### Calibration Report



Remark :

Internal Dimensions of Chamber : W (Width) = 104 cm. , H (Height) = 72 cm. and D (Depth) = 60 cm.  
Size of Installed Standard sensor number 21-CH1 to number 21-CH8 : a = 5 cm. , b = 5 cm. and c = 5 cm.  
Size of Installed Standard sensor number 21-CH9 : W/2 = 104 cm./2 , H/2 = 72 cm./2 and D/2 = 60 cm./2

Measurement Results

Calibration Point	Average Standard Reading at each position (°C)							
	21-CH1	21-CH2	21-CH3	21-CH4	21-CH5	21-CH6	21-CH7	21-CH8
104	103.4	103.4	103.7	103.6	103.3	104.6	103.3	104.0
180	179.5	181.1	179.2	179.5	179.0	181.3	179.8	180.2

Chamber (Oven)			Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (±°C)	Uniformity (°C)	Uncertainty (±°C)	Coverage Factor k
	Min	Max					
104.0	103.9	104	104.0	0.14	1.27	0.44	2.00
180.0	179.9	180.1	180.0	0.39	2.29	0.76	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: [Redacted]

FM-L15 11/18-08-66



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)

CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL.0-2717-3000-29 FAX.0-2719-9484



### Certificate of Calibration

Cert.No.: 24CH1171

Page.: 1 of 2

Equipment :

pH Meter

Manufacturer :

Mettler Toledo

Model :

Seven2Go pH

Serial No. :

C117620932

ID No. :

BKK\_LG0044

Condition As-Received:

Used Item

Received Date :

19 September 2024

Calibration Date :

20 September 2024

Reference :

2408-0699DSC-11

Submitted by :

ALS Laboratory Group (Thailand) Co.,Ltd.  
104 Phatthanakan 40, Phatthanakan Rd.,  
Khwaeng Phatthanakan, Khet Suan Luang,  
Bangkok 10250 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)

Calibrated by :

Warakorn Lemagatrakul

Approved by :

Saithip  
Approved Signatory

( ) Unnoppol Harachai

( ) Ponpan Paipim

(✓) Saithip Meangmai

Issue Date :

23 September 2024

The Uncertainties are for a confidence probability of approximately 95%

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Cert.No.: 24CH1171  
Page.: 2 of 2

#### Condition of this calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	56070044	70RC340	22E1978	17 Jun 2023

- This Certification is traceable to SI Through Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials :The measurement results are traceable to SI through Hach Lenge GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-RM-15164-01-00

:The measurement results are traceable to SI through CPA chem Ltd.,

ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.006	Hach Lenge GmbH	C03146	23 Feb 2026
pH 7.000	Hach Lenge GmbH	C03020	13 Dec 2024
pH 9.997	CPA chem	970853	25 Apr 2025

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 (smV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter S/N : C117620932	4.00	177.48	177	4.00	0.58	2.00
	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-177	10.00	0.58	2.00

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 (±)	Coverage factor k
pH Electrode S/N.: 3223910	4.006	4.01	181	0.0077	2.00
	7.000	7.00	5	0.0084	2.00
	9.997	10.00	-171	0.0092	2.00

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-



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES  
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250  
TEL. 0-2717-3000-29 FAX 0-2719-9484



## Certificate of Calibration

Cert. No.: 24LM152  
Page.: 1 of 2

Equipment : pH Meter with Sensor

Manufacturer : Mettler Toledo

Model : Seven2Go pH

Serial No. : C117620932

ID No. : BKK\_LG0044

Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.  
104 Phatthanakan 40, Phatthanakan Rd.,  
Khwaeng Phatthanakan, Khet Suan Luang,  
Bangkok 10250 Thailand

Location : TPA On Site Calibration Laboratory

Received Order : 19 September 2024

Calibrated Date : 20 September 2024

Ambient Temperature : ( 26 ± 10 ) °C

Relative Humidity : ( 50 ± 30 ) %

AC Line Voltage : ( 220 ± 22 ) V

Calibrated by : Warakorn Lemgagtrakul

Approved by :

( ) Ponpan Paipim  
( ) Suwit Imjai  
(✓) Kunchit Promprat

Issue Date : 26 September 2024

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 : pH Meter with Sensor  
Condition As-Received : Used Item  
Reference : 2409-0699DSC-12

Cert. No.: 24LM152  
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	231216	TPA	11 Oct 2024

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.: 3223910

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
20.0	100	20.003	20.0	-0.003	0.19	2.00
25.0	100	25.000	25.0	0.000	0.19	2.00
30.0	100	30.002	30.1	0.098	0.19	2.00
35.0	100	35.004	35.1	0.096	0.19	2.00
40.0	100	40.003	40.1	0.097	0.19	2.00
45.0	100	45.004	45.1	0.096	0.19	2.00
50.0	100	50.004	50.1	0.096	0.19	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 %.

-00-

BKK\_EL0043

#### Agilent Technologies

Agilent Technologies (Thailand) Limited  
8 CHULALONGKORJIT 201 UNIT A-B  
565 RAMA 4 ROAD, SAIYI, BANGKOK  
Bangkok 10500 Thailand  
Tel: +66 217 6383  
Fax: +66 232 6331  
Email: ccc.svc@agilent.com  
Website: www.agilent.com/thai

#### Customer Contact:

ALS Laboratory Group (Thailand) Co  
Ltd Head Office

104 Phatthanakan 40 Phatthanakan Rd  
Khwaeng Phatthanakan Khet Suan  
TAX ID: 01055400048-5

chanatanan.mchum@alsglobal.com  
227153780

#### Invoice To:

ALS Laboratory Group (Thailand) Co  
Ltd Head Office

104 Phatthanakan 40 Phatthanakan Rd  
Khwaeng Phatthanakan Khet Suan

#### Delivery Site:

ALS Laboratory Group (Thailand) Co  
Ltd Head Office

104 Phatthanakan 40 Phatthanakan Rd  
Khwaeng Phatthanakan Khet Suan

#### Location:

Room  
Bldg  
Lab  
Dept

#### SERVICE REPORT

Customer Purchase  
Order Number:

Customer Number:  
73371213

Service Request:

Service Request Date:

Service Order:  
600667060

Service Confirmation:  
600667060

#### Direct Inquires to:

Contact Name  
Contact E-mail  
Contact Telephone  
Contact Fax

Customer Contact Center:  
ccc.smi@agilent.com  
+662 637 6362  
+662 637 4334

Agilent Technologies (Thailand) Limited Head Office

8 Chulalongkrajit 201 Unit A-B  
565 Rama 4 Road Saiyit Bangkok  
Bangkok 10500 Thailand  
Tel: 01055400048-5

Customer Contact Center  
285 Nongkhai Road Nongkhai  
Sukhothai Road Bangkok 10110 Thailand  
Tel: 01055400048-5  
Fax: 01055400048-5

Page 1 of 1



Service Instrument:

Model Number	Model Description	Serial Number	System Handle	Parent Asset
SYS-IM-7890	ICPMS 7800 System			
G8410A	SPS 4 Autosampler	AU15430722	ICP MS 7800	SYS-IM-7890
G8411A	ISIS 3 for Agilent 7850/7800/8800	JP16610227	ICP MS 7800	SYS-IM-7890
G3292A	PSC 616ST Chiller	2U15A1548	ICP MS 7800	SYS-IM-7890
G8403A	Agilent 7800 ICP-MS	JP15471169	ICP MS 7800	SYS-IM-7890

Service Items:

Item	Service/Part #	Description	Qty	Entitlement	Service Start	Service End
1000	EQI	Enterprise Operational Qualification	1.00	Agreement Entitlement 100 % covered	04.10.2024	04.10.2024
1010	5185-6850	ICP-MS Checkout Solutions	1.00	Agreement Entitlement 100 % covered		

Additional Information:

Service Information:

<b>Problem Description:</b> *WU-EOD-IM-7800-6001253655	
<b>Service Provided:</b> Perform OQ Hardware, Test CDS logon, auto sampler, Auto tune, BG and 20 Min stability. I calibrate the instrument No BKK_EL0043 test off pass	
<b>Service Overview Code:</b> Reason Code: Scheduled Service Diagnosis Code: Scheduled Service Resolution Code: Scheduled Service	
<b>Reported Hours:</b> 7.0	<b>Travel Hours:</b>
<b>Customer Field Service Representative Name:</b> Panithee Kuresathain	<b>Date:</b> 08 Oct 2024
<b>Customer Name:</b> Supakwan Mak	<b>Date:</b> 08 Oct 2024
<b>Additional Comments:</b>	



## Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A Kaengkhohi, Saraburi 18110

Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109

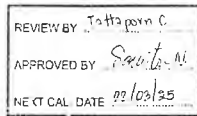
Website : www.scieco.co.th E-Mail : calibrate@scg.co.th

Certificate No. T231676

Page 1 of 6

### Certificate of Calibration

**Equipment** : HEATING BLOCK  
**Manufacturer** : Environmental Express  
**Model** : SC 196  
**Serial No.** : 6974CECW3285  
**Customer Code** : BKK\_EL0054  
**ID No.** : T5306A3  
**Customer** : ALS Laboratory Group (Thailand) Co.,Ltd.  
104 Phatthanakun 40, Phatthanakan Rd., Khwaeng Phatthanakan,  
Khet Suan Luang, Bangkok 10250  
**Customer Location** : Acid Digestion Lab  
**Date of Receipt** : 13 September 2023  
**Calibrated By** : Saneek Musikawan ( Site Calibration Manager )  
**Approved By** : [Signature] Nakuakred ( Site Calibration Manager )  
**Date of Issue** : [Signature]  
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 Metrological Center.



## Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A Kaengkhohi, Saraburi 18110

Telephone : +66 2 586 5792-4 Fax : +66 2 586 5109

Website : www.scieco.co.th E-Mail : calibrate@scg.co.th

Certificate No. T231676

Page 2 of 6

### Calibration Report

**Equipment** : HEATING BLOCK  
**Date of Calibration** : 22 September 2023  
**Environment** : Temperature : 21.8-23.1 °C  
Line Voltage : 221.6-226.3 V  
Relative Humidity : 55 - 65 %RH

**Condition of this results of calibration :**

1. This equipment was calibrated by insert 20 standard thermocouples type T into its chamber, the other one standard thermocouples type T use for ambient temperature measurement. The calibration was done in according to WI-T20.

All data show below were final values and the initial data from customer request. The temperature scale used was based on ITS - 90.

**2. Reference Standard Instrument:**

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	TYPE T	TN21-TN30	T230014	17 January 2024
TC	TYPE T	TN31-TN40	T230014	17 January 2024
DATA LOGGER	34970A	1151	T230014	17 January 2024

**3. This certificate is traceable to :**

National Institute of Metrology ( Thailand ) through Metrological Center ( NSC-IISF-IIS 17025 CALIBRATION 0244 )

**4. Condition of calibrated item : good**

**Equipment Description :**

Time Constant : 2 Hour 20 Minute At 95 °C  
Fresh Air Damper : ☐ Open ☐ Min ☐ Medium ☐ Max  
☐ Close  
☒ Not Available

**5. Adjustment :**

( ) without adjustment

( X ) after adjustment

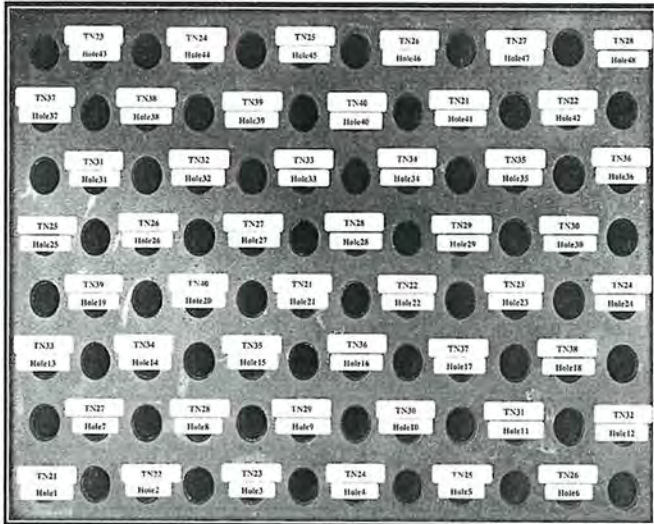
Approved By : [Signature]



Certificate No. T231676

Page 3 of 6

### Calibration Report



FRONT CONTROL

Approved By: \_\_\_\_\_

FM-L13 108-30-05-57



Certificate No T231676

Page 4 of 6

### Calibration Report

#### Measurement Results

Calibration Point		Average Standard Reading at each position (°C)					
R1 Hole1-Hole6		TN21	TN22	TN23	TN24	TN25	TN26
CAL POINT	Max	95.01	94.41	95.20	95.41	94.51	95.17
	Min	94.57	93.95	94.75	94.92	94.00	94.72
	Average	94.79	94.18	94.98	95.17	94.26	94.95
R2 Hole7-Hole12		TN27	TN28	TN29	TN30	TN31	TN32
	Max	95.36	95.43	95.19	95.16	95.35	94.97
	Min	94.94	94.95	94.72	94.71	94.90	94.57
	Average	95.15	95.19	94.96	94.94	95.13	94.77
R3 Hole13-Hole18		TN33	TN34	TN35	TN36	TN37	TN38
	Max	95.37	95.50	95.22	95.21	95.23	95.31
	Min	94.99	95.09	94.78	94.82	94.88	94.96
	Average	95.18	95.30	95.00	95.02	95.11	95.13
R4 Hole19-Hole24		TN39	TN40	TN21	TN22	TN23	TN24
	Max	95.59	94.42	94.52	94.24	94.63	94.67
	Min	95.21	94.06	94.10	93.80	94.28	94.27
	Average	95.40	94.24	94.33	94.06	94.45	94.47
R5 Hole25-Hole30		TN25	TN26	TN27	TN28	TN29	TN30
	Max	95.19	95.38	92.93	95.30	95.14	95.03
	Min	94.83	95.03	92.56	94.95	94.79	94.70
	Average	95.01	95.20	92.75	95.12	94.96	94.87
R6 Hole31-Hole36		TN31	TN32	TN33	TN34	TN35	TN36
	Max	94.63	94.90	94.77	94.31	94.24	93.87
	Min	94.24	94.55	94.44	93.98	93.92	93.56
	Average	94.42	94.72	94.60	94.14	94.08	93.71
R7 Hole37-Hole42		TN37	TN38	TN39	TN40	TN21	TN22
	Max	94.30	94.44	94.04	93.81	94.89	95.35
	Min	93.95	94.05	93.67	93.48	94.39	94.90
	Average	94.13	94.24	93.86	93.65	94.64	95.12
R8 Hole43-Hole48		TN23	TN24	TN25	TN26	TN27	TN28
	Max	95.99	95.63	95.28	95.29	95.45	94.87
	Min	95.57	95.15	94.82	94.84	94.99	94.48
	Average	95.78	95.39	95.05	95.07	95.22	94.68

Approved \_\_\_\_\_

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### Calibration Report

#### Measurement Results

Calibration Point		Average Standard Reading at each position (°C)					
R1 Hole1-Hole6		TN21	TN22	TN23	TN24	TN25	TN26
CAL POINT	Max	105.23	104.32	105.43	105.25	104.44	105.27
	Min	104.94	103.95	105.15	105.04	104.11	104.96
	Average	105.09	104.13	105.29	105.15	104.28	105.12
R2 Hole7-Hole12		TN27	TN28	TN29	TN30	TN31	TN32
	Max	105.30	105.12	105.18	105.22	105.12	105.16
	Min	105.11	104.92	104.96	105.00	104.92	104.97
	Average	105.20	105.02	105.07	105.11	105.02	105.06
R3 Hole13-Hole18		TN33	TN34	TN35	TN36	TN37	TN38
	Max	105.37	105.63	105.02	104.80	104.69	105.19
	Min	105.17	105.37	104.75	104.59	104.50	105.00
	Average	105.27	105.50	104.88	104.69	104.60	105.09
R4 Hole19-Hole24		TN39	TN40	TN21	TN22	TN23	TN24
	Max	105.31	104.43	106.41	104.71	105.63	105.82
	Min	105.08	104.22	106.15	104.41	105.37	105.56
	Average	105.19	104.33	106.28	104.56	105.50	105.69
R5 Hole25-Hole30		TN25	TN26	TN27	TN28	TN29	TN30
	Max	104.95	106.26	103.34	105.78	105.59	105.87
	Min	104.67	105.96	103.08	105.56	105.36	105.68
	Average	104.81	106.11	103.21	105.67	105.48	105.77
R6 Hole31-Hole36		TN31	TN32	TN33	TN34	TN35	TN36
	Max	104.75	104.86	104.80	105.20	104.50	104.29
	Min	104.54	104.63	104.59	105.00	104.32	104.18
	Average	104.65	104.75	104.69	105.10	104.41	104.28
R7 Hole37-Hole42		TN37	TN38	TN39	TN40	TN21	TN22
	Max	104.30	104.90	104.85	104.65	104.88	104.85
	Min	104.09	104.72	104.66	104.49	104.63	104.52
	Average	104.19	104.81	104.75	104.57	104.76	104.68
R8 Hole43-Hole48		TN23	TN24	TN25	TN26	TN27	TN28
	Max	105.71	105.45	105.39	105.61	105.42	105.19
	Min	105.45	105.61	105.14	105.27	105.18	104.94
	Average	105.58	105.73	105.27	105.44	105.30	105.07

Approved By: \_\_\_\_\_

FM-L13 108-30-05-57



Certificate No. T231676

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### Calibration Report

#### Measurement Results:

HEATING BLOCK			Temperature Distribution	
Settling (°C)	Reading (°C)		Stability (± °C)	Uncertainty (± °C)
	Min , Max	Average		
100.0	100.3 , 100.5	100.4	0.26	0.81
107.0	107.0 , 107.1	107.1	0.19	0.76

\* 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 %

Approved By: \_\_\_\_\_

FM-L13 108-30-05-57



## Metrology

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.  
Saraburi Tel : +66 3627 3095 Fax : +66 3627 3100  
Bangkok Tel : +668 9205 6851, +669 8247 2360  
Website : www.scieco.co.th E-Mail : calibrate@scg.com

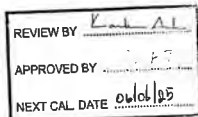


Certificate No. T232160

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### 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 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan,  
Khet Suan Luang, Bangkok 10250  
Customer Location : Laboratory  
Date of Receipt : 29 November 2023  
Calibrated By : Atiphong Rongrat ( Technician )  
Approved By : Boonchai Suriyawong (Site Calibration Manager)  
Date of Issue : 09 JAN 2024



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.

FM-L14 11/9/18-08-66



## Metrology

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.



Certificate No. T232160

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### Calibration Report

Equipment : Chamber ( Cooling Room )  
Date of Calibration : 6 December 2023  
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 use for ambient temperature measurement. The calibration was done in according to WI-T20 ( based on ASTM E145-94 ( Reapproved 2001) and AS2853-1986 ). 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	TN161-TN170	T230773	10 April 2024
TC	TYPE T	TN171-TN180	T230773	10 April 2024
DATA LOGGER	34970A	TI49	T230773	10 April 2024
- This certificate is traceable to : National Institute of Metrology ( Thailand ) through Metrological Center ( NSC-TIS-17025 CALIBRATION 0244 ).
- Condition of calibrated item : good  
Equipment Description :

Time Constant	1 Hour	30 Minute	At 3 °C
Fresh Air Damper	<input type="checkbox"/> Open	<input type="checkbox"/> Min	<input type="checkbox"/> Medium <input type="checkbox"/> Max
	<input type="checkbox"/> Close		
	<input checked="" type="checkbox"/> Not Available		
- Adjustment :  
( X ) without adjustment ( ) after adjustment

Approved By:

FM-L15 11/8/18-08-66



## Metrology

SCI ECO Services Company Limited

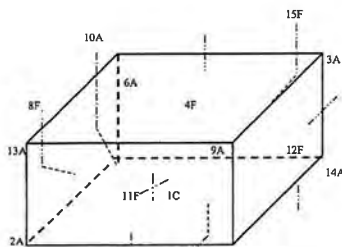
33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.



Certificate No. T232160

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### Calibration Report



C = Centre, F = Centre of Face, A = Corner, E = Centre of Edge

1C = TN161	12F = TN172
2A = TN162	13A = TN173
3A = TN163	14A = TN174
4F = TN164	15F = TN175
5A = TN165	16E = TN176
6A = TN166	
7F = TN167	
8F = TN168	
9A = TN169	
10A = TN170	
11F = TN171	

Approved By:

FM-L15 11/8/18-08-66



## Metrology

SCI ECO Services Company Limited

33/2 Moo 3, T.Banpa, A.Kaengkhoi, Saraburi 18110, Thailand.



Certificate No. T232160

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### Calibration Report

#### Measurement Results

Calibration Point	Average Standard Reading at each position (°C)										
	TN161	TN162	TN163	TN164	TN165	TN166	TN167	TN168	TN169	TN170	TN171
3.0	2.83	3.34	2.95	3.46	3.45	3.76	3.25	3.46	3.39	3.50	3.58
	TN172	TN174	TN175	TN176							
	3.33	3.39	3.15	3.43							

Chamber ( Cooling Room )		Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (±°C)	Uniformity (°C)	Coverage Factor k
	Min	Max				
3.0	2.8	4.1	3.5	3.36	1.10	2.00

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%.

Approved By:

FM-L15 11/8/18-08-66



## ภาคผนวก จ

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สำเนาหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

ที่ อก ๐๓๑๐(๑)/ ๑ ๖ ๑ ๖ ๘



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒ ๐ พฤศจิกายน ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอนอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอบริการของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๔ สิงหาคม ๒๕๖๖

- สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผน  
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ แผน  
๓. ขอบข่ายบริการที่ได้ขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๑ แผน

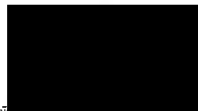
ตามหนังสืออ้างถึง บริษัท เอนอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุหนังสือ  
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๕ สภาที่ ตั้งเลขที่ ๑๐๕ ขอบข่ายบริการ ๔๐  
ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ได้บริษัท เอนอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด  
ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ตามสิ่งที่ส่งมาด้วย ๑  
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ ๕๘๑ ราย ตามสิ่งที่ส่งมาด้วย ๒  
ค. ขอบข่ายบริการที่ได้ขึ้นทะเบียนให้วิเคราะห์เป็นน้ำเสีย น้ำดื่ม อากาศเสีย สิ่งปฏิกูล  
หรือวัสดุที่ไม่ใช่แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะมีผลต่ออายุในวันที่ ๒ กันยายน ๒๕๖๗ หากประสงค์จะต่ออายุหนังสือ  
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ  
กรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ทั้งผ่านเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ



ปิดท้ายด้วยลายเซ็นของผู้แทน  
ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษ  
ปฏิบัติการทางอากาศและเฝ้าระวังมลพิษ

กองวิจัยและเฝ้าระวังมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๒๑๒ ต่อ ๒๑๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๒๑๒ ต่อ ๒๑๓๕

ไปรษณีย์อิเล็กทรอนิกส์ sarabon@dlw.mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



สิ่งที่ส่งมาด้วย ๑

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอนอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๒๐๕  
ที่ อก ๐๓๑๐(๑)/ ๑ ๖ ๑ ๖ ๘ ลงวันที่ ๒ ๐ พฤศจิกายน ๒๕๖๖

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

- ๑) นางสาวบุษพาพร จันทร์ปลั่ง  
๒) นางสาวชัชชัย โกมารกุล ณ นคร  
๓) นายศราวุธ จิตราชนา  
๔) นางสาวกนกกร เชนา  
๕) นายสุริยา สอนแก้ว  
๖) นายวิชาญ ชุนหวัด

ทะเบียนเลขที่ ๖-๒๐๕-๖-๐๐๐๑  
ทะเบียนเลขที่ ๖-๒๐๕-๖-๐๐๐๒  
ทะเบียนเลขที่ ๖-๒๐๕-๖-๐๐๐๓  
ทะเบียนเลขที่ ๖-๒๐๕-๖-๐๐๐๔  
ทะเบียนเลขที่ ๖-๒๐๕-๖-๐๐๐๕  
ทะเบียนเลขที่ ๖-๒๐๕-๖-๐๐๐๖

31/11/2023

สิ่งที่ส่งมาด้วย ๒

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอนอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๒๐๕  
ที่ อก ๐๓๑๐(๑)/ ๑ ๖ ๑ ๖ ๘ ลงวันที่ ๒ ๐ พฤศจิกายน ๒๕๖๖

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕๘๑ ราย

- ๑) นายภาณุพงศ์ กิตติคุณวัฒน์  
๒) นายภัทรพล สว่างใจธรรม  
๓) นายธนธิป เทือกชัยคำ  
๔) นายศิริโชค พงษ์ประม  
๕) นายณัฐพล ตั้งแสง  
๖) นางสาวจินดา ไชยธรรม  
๗) นางสาวสราวิทย์ น้อยเจริญ  
๘) นางสาวณัฏฐาภรณ์ อิมขม  
๙) นางสาวนันทพร ลายแสง  
๑๐) นางสาวนันทวี สมบูรณ์  
๑๑) นางสาวศรียา เอ็มอ้างค์  
๑๒) นางสาวธัญพร มงคลจิรังค์  
๑๓) นางสาวศิริลักษณ์ บุญนาค  
๑๔) นายณพพงศ์ จันทะนันท์  
๑๕) นายณเศรษฐ์ โคมารณ์  
๑๖) นายธนากร จริยา  
๑๗) นางสาวเกศรินทร์ แก้วมัน  
๑๘) นางสาวสุวิมล ชัยเรืองวุฒิ  
๑๙) นางสาวสุชาดา ธรรมถาวร  
๒๐) นางสาวเนก้า ชัยเดชบุญ  
๒๑) นางสาวศศิธร หนูสวัสดิ์  
๒๒) นางสาวสาลักษณ์ ภูมิกายาพร  
๒๓) นายณณสิทธิ์ สิงหา  
๒๔) นายณณสิทธิ์ โพธิ์พิสุทธิ์  
๒๕) ว่าที่ร้อยตรีหญิง พรรณิกา ช่างเจริญ  
๒๖) นางจิตตา คำภูแก้ว  
๒๗) นางสาววรรณกร รักษ์  
๒๘) นางสาวพนรัตน์ แยมกรณต์  
๒๙) นายจุลเดช วารินทร์  
๓๐) นางสาวศุภาวรัตน์ ร้องคำ  
๓๑) นายพรมณ์ ศรีปิ่นนคร  
๓๒) นายสุกิต คุ้มสิน  
๓๓) ว่าที่ร้อยตรี เติมเกียรติ อมรศรีเสริม  
๓๔) นางสาววริยา สว่างนา  
๓๕) นายอนุพงศ์ รัตนศิริประเสริฐ

ทะเบียนเลขที่ ๖-๒๐๕-๖-๐๐๐๑  
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ทะเบียนเลขที่ ๖-๒๐๕-๖-๐๐๓๕

31/11/2023

๓๖) นางสาวจุฑาทิพย์

- ๒ -

- ๓๖) นางสาวจุฑาทิพย์ โอนันต์ไชย  
๓๗) นางสาวจารุวรรณ พิมพ์อักษร  
๓๘) นางสาวประจักษ์ทิพย์ กิจไพศาลศักดิ์  
๓๙) นางสาวเดือนใจ ทางกลาง  
๔๐) นางสาวจิราพร ศิริวงษา  
๔๑) นายวรารักษ์ ภูริรักษ์  
๔๒) นายพนม วิริยะสกล  
๔๓) นายอดิธ เจนจบ  
๔๔) นายณณกร ช่างเพชร  
๔๕) นายภูริช พรหมสะอาด  
๔๖) นายณเดช โภคาพิพัฒน์  
๔๗) นายชวฤทธิ์ วงษ์จันทร์  
๔๘) นายอาทิตย์ ศรีเสนา  
๔๙) นายเจษฎินทร คงศักดิ์ไทย  
๕๐) นายธีร ภูมิจัย  
๕๑) นายณณณันต์ โอน  
๕๒) นายณณวัฒน์ ทุมพู  
๕๓) นางสาวสุภาวดี ภูมิก  
๕๔) นางสาวกมลพร ขาวสนมบุญ  
๕๕) นางสาวธิดา ภูมิจัย  
๕๖) นางสาวภาณุมาศ นามวัฒน์  
๕๗) นางสาวอุไรรัตน์ ที่สงร้างเป็น  
๕๘) นายธีรวัฒน์ ปางสุข  
๕๙) นายอิทธิพล ยะโส  
๖๐) นายประพนธ์ วรรณสุข  
๖๑) นายชยธร พงษ์ทิพย์  
๖๒) นางสาวกนกวรรณ จันทนา  
๖๓) นายสิทธิชัย ธงเงิน  
๖๔) นางสาวณัฏฐา ใจบุญ  
๖๕) นางสาวพรรณนิตา คุ้มคง  
๖๖) นายณวัฒน์ ศรีวิชัย  
๖๗) นายสุวิภา ทองอ่อน  
๖๘) นายวิญญู ภูมิจัย  
๖๙) นายสมบุญ บุตรจันทร์  
๗๐) นายวิวัฒน์ ไชยเมธา  
๗๑) นายณณกรณ์ เต็มพูน  
๗๒) นายธีรวัฒน์ ขาวสอ  
๗๓) นายณัฏฐ์ นามบุรี  
๗๔) นายอัศวเดช จอสภา

ทะเบียนเลขที่ ๖-๒๐๕-๖-๐๐๓๖  
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ทะเบียนเลขที่ ๖-๒๐๕-๖-๐๐๗๔

31/11/2023

๗๕) นายประเสริฐ



เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๒๐๐๔  
ที่ ออก ๐๓๑๐(๑)/ ๑ ๖ ๑ ๖ ๘ ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๓๔ รายการ

น้ำเสีย จำนวน 60 รายการ

ลำดับวิธี	สารมลพิษ	วิธีการตรวจหา
1	Aldicarb	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
2	Aldicarb Sulfone	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
3	Aldicarb Sulfoxide	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
5	Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
6	Barium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
7	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
8	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
9	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
10	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
11	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method <sup>(4)</sup> 2) 5-Day BOD Test, Membrane Electrode Method <sup>(4)</sup>
12	Carbaryl	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
13	Carbofuran	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
14	Cadmium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
15	Chemical Oxygen Demand	1) Closed Reflux, Colorimetric Method <sup>(4)</sup> 2) Closed Reflux, Titrimetric Method <sup>(4)</sup>
16	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
17	Chromium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
18	Color	APHA Weighted-Ordinate Spectrophotometric Method <sup>(4)</sup>

ลำดับที่	สารเคมี	วิธีการวิเคราะห์
19	Copper	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
20	Cyanide	Distillation, Colorimetric Method <sup>(4)</sup>
21	2,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
22	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
23	2,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
24	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
25	2,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
26	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
27	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
28	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
29	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
30	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
31	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
32	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
33	Formaldehyde	Distillation, Colorimetric Method <sup>(4)</sup>
34	Free Chlorine	1) DPD Ferrous Titrimetric Method <sup>(4)</sup> 2) DPD Colorimetric Method <sup>(4)</sup>
35	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
36	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ 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> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>

40 Manganese...

ลำดับที่	สารเคมี	วิธีการวิเคราะห์
40	Manganese	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
41	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass spectrometric Method <sup>(4)</sup>
42	Methiocarb	High-Performance Liquid Chromatographic Method <sup>(4)</sup>
43	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ 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> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method <sup>(4)</sup> 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> 2) Distillation, Direct Photometric Method <sup>(4)</sup>
51	Selenium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ 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/ Mass Spectrometric Method <sup>(4)</sup>
59	Trivalent Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation <sup>(4)</sup>
60	Zinc	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>

น้ำไดคัล...

น้ำไดคัล จำนวน 126 รายการ

ลำดับที่	สารเคมี	วิธีการวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
5	Antimony	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
8	Barium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
9	Benzo(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
13	Benzoic Acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>

18 Bis(2-ethylhexyl)phthalate...

ลำดับที่	สารเคมี	วิธีการวิเคราะห์
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
33	Chromium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation <sup>(4)</sup>
35	Chromium (VI)	Colorimetric Method <sup>(4)</sup>

36 Chrysene...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
37	Cyanide	Distillation, Colorimetric Method <sup>(4)</sup>
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
39	DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
40	DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
41	DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
43	Di-n-Butyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
47	3,3-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>

56 1,3-Dichloropropene...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
57	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
58	Diethyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
63	Di-n-octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
69	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
70	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
74	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
75	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>

76 γ-HCH...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
76	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
81	Lead	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
82	Manganese	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
83	Mercury	1) Digestion, Cold Vapor Atomic Absorption Spectrometric Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
84	Methanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
86	Methyl bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
87	Methylene chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
90	Methyl tert-butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
92	Nickel	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>

94 N-Nitrosodiphenylamine...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB 1242 - PCB 1248 - PCB 1254 - PCB 1260	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
98	pH	Electrometric Method <sup>(4)</sup>
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
100	Phenol	1) Distillation, Chloroform Extraction Method <sup>(4)</sup> 2) Distillation, Direct Photometric Method <sup>(4)</sup> 3) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
102	Selenium	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
103	Silver	1) Digestion, Inductively Coupled Plasma Method <sup>(4)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(4)</sup>
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(4)</sup>
109	TPH (C <sub>8</sub> -C <sub>16</sub> )	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(4,25)</sup>

110 TPH (C<sub>8</sub>-C<sub>16</sub>)...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
110	TPH (C <sub>10</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>30</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>(6)</sup>
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method <sup>(6)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(6)</sup>
120	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
121	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
122	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
123	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
124	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(6)</sup>
126	Zinc	1) Digestion, Inductively Coupled Plasma Method <sup>(6)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(6)</sup>

อากาศเสีย...

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อากาศเสีย (ปล่องระบาย) จำนวน 28 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
2	Arsenic	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
3	Beryllium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
4	Cadmium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
5	Carbon Monoxide	1) Instrumental Analyzer Method <sup>(5)</sup> 2) Sampling Bag Non-Dispersive Infrared Method <sup>(5)</sup>
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method <sup>(5)</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>(5)</sup>
7	Chromium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
8	Cobalt	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
9	Copper	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
10	Cresol	Adsorption Sampling, Gas Chromatographic Method <sup>(5)</sup>
11	Dioxins	Isokinetic Sampling <sup>(5)</sup>
12	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method <sup>(5)</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>(5)</sup>
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method <sup>(5)</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>(5)</sup>
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method <sup>(5)</sup>

15 Lead...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	Lead	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
16	Manganese	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
17	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>(5)</sup>
18	Nickel	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
19	Opacity	Ringelmann's Method <sup>(2)</sup>
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method <sup>(5)</sup> 2) Absorption Sampling, Alkaline Permanganate/Colorimetric Method <sup>(5)</sup> 3) Instrumental Analyzer Method <sup>(5)</sup>
21	Selenium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
22	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method <sup>(5)</sup> 2) Instrumental Analyzer Method <sup>(5)</sup>
23	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method <sup>(5)</sup>
24	Tellurium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
25	Tin	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
26	Total Suspended Particulate	1) Isokinetic Sampling, Gravimetric Method <sup>(5)</sup> 2) Paired Train, Isokinetic Sampling, Gravimetric Method <sup>(5)</sup>

27 Vanadium...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Vanadium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>(5)</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(5)</sup>
28	Xylene	Adsorption Sampling, Gas Chromatographic Method <sup>(5)</sup>

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,2,24)</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,2,24)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,2,24)</sup>
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>

5 Beryllium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,18)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,18)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(3,9,26)</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,26)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,26)</sup>
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,18)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
9	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method <sup>(1,4,16,19)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method <sup>(1,4,17,19)</sup> 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>(7,18,19)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>(7,18,19)</sup>

10 Chromium (VI).....

ลำดับที่	สารมลพิษ	วิธีการตรวจ
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method <sup>(1,6,19)</sup> 2) Alkaline Digestion, Colorimetric Method <sup>(8,19)</sup>
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,14)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 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> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 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> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup>
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup>
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup>
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,26)</sup>

2) Soxhlet...

ลำดับที่	สารเคมี	วิธีการหาผล
17	Dieldrin	2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,20)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,20)</sup>
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,20)</sup> 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,20)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,20)</sup>
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,20)</sup> 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,20)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,20)</sup>
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(14,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(14,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,20)</sup> 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,20)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,20)</sup>

22 Mercury.

ลำดับที่	สารมลพิษ	วิธีการทาง
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(1,6,20)</sup> 2) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>(1,6,30)</sup> 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(20)</sup> 4) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>(30)</sup> 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method <sup>(2,21)</sup>
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction Gas Chromatographic/Mass Spectrometric Method <sup>(3,9,28)</sup> 2) Soxhlet Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(10,26)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1,126)</sup>
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction Gas Chromatographic/Mass Spectrometric Method <sup>(3,9,28)</sup> 2) Soxhlet Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(10,26)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic / Mass Spectrometric Method <sup>(1,126)</sup>
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,6,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 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> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,6,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,18)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
27	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,28)</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>(10,26)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic Method <sup>(1,126)</sup>

- 2-Chlorobiphenyl.



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	- 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5'-Trichlorobiphenyl - 2,4',5'-Trichlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4',4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6'-Heptachlorobiphenyl - 2,2',3,4',5,5',6'-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6'-Nonachlorobiphenyl Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(1,9,24)</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,28)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,24)</sup> Electrometric Method <sup>(23,24)</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 5) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 6) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 7) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
29	pH	
30	Selenium	

31 Silver...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 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>(1,9,28)</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,28)</sup> 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
35	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>(1,4,16)</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(1,4,17)</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 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>(10,28)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>
2	Acetone	1) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(15,23)</sup> 2) Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method <sup>(13)</sup>
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,28)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>
4	Anthracene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,28)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>
5	Antimony	1) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,28)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>
8	Barium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method <sup>(7,17)</sup>
9	Benz(a)anthracene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,28)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(15,23)</sup>

11 Benzo(b)fluoranthene

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	Benzo(b)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,28)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>
12	Benzo(k)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,28)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>
13	Benzolc acid	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,28)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>
14	Benzo(a)pyrene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,28)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>
15	Benzo(g,h,i)perylene	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,28)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 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>(10,28)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>
18	Bis(2-ethylhexyl)phthalate	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,28)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(15,23)</sup>
20	Bromofom	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>(15,23)</sup>
21	Butanol	Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method <sup>(13,23)</sup>
22	Butyl Benzyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(10,28)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>(11,28)</sup>

23 Cadmium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
24	Carbazole	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
28	p-Chloroaniline	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
32	2-Chlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
33	Chromium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method <sup>(7,8,16,19)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, 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/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ 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/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
39	DDD	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
40	DDE	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
41	DDT	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
42	Dibenz(a,h)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
43	Di-n-Butyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
47	3,3-Dichlorobenzidine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>

49 1,2-Dichloroethane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
53	2,4-Dichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
58	Diethyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
59	2,4-Dimethylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
60	2,4-Dinitrophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
61	2,4-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
62	2,6-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ 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/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
67	Fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
68	Fluorene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
70	Heptachlor epoxide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
73	n-Hexane	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup> 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method <sup>(13)</sup>

73 n-Hexane...

ลำดับที่	สารมลพิษ	วิธีการตรวจ
74	$\alpha$ -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
75	$\beta$ -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
76	$\gamma$ -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
77	Hexachlorocyclopentadiene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
78	Hexachloroethane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
79	Indeno(1,2,3-cd)pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
80	Isophorone	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
81	Lead	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
82	Manganese	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>(29)</sup> 2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry <sup>(21)</sup> 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method <sup>(30)</sup>

84 Methanol...

ลำดับที่	สารมลพิษ	วิธีการตรวจ
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup> 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
88	2-methylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
89	2-Methylnaphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
91	Naphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
92	Nickel	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
93	Nitrobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
94	N-Nitrosodiphenylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
95	N-Nitrosodi-n-propylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>

96 Polychlorinated biphenyls (PCBs)

ลำดับที่	สารมลพิษ	วิธีการตรวจ
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4,4'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6'-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6'-Nonachlorobiphenyl	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
97	Pentachlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
98	Phenanthrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>

99 Phenol...

ลำดับที่	สารมลพิษ	วิธีการตรวจ
99	Phenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
100	Pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
101	Selenium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
102	Silver	1) Digestion, Inductively Coupled Plasma Method <sup>(7,16)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
103	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(10,26)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(11,26)</sup>
108	TPH (C <sub>5</sub> -C <sub>9</sub> )	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
109	TPH (C <sub>10</sub> -C <sub>16</sub> )	1) Automate Extraction, Gas Chromatographic Method <sup>(11,22)</sup> 2) Solvent Extraction, Gas Chromatographic Method <sup>(12,22)</sup> 3) Ultrasonic Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
110	TPH (C <sub>16</sub> -C <sub>30</sub> )	1) Automate Extraction, Gas Chromatographic Method <sup>(11,22)</sup> 2) Solvent Extraction, Gas Chromatographic Method <sup>(12,22)</sup> 3) Ultrasonic Extraction, Gas Chromatographic Method <sup>(22,31)</sup>
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(15,25)</sup>
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ 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/ Mass Spectrometric Method <sup>(1,2a)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(1,2a)</sup>
116	2,4,6-Trichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(1,2a)</sup> 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>(1,2a)</sup>
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(1,2a)</sup>
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(1,2a)</sup>
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(1,2a)</sup>
121	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(1,2a)</sup>
122	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(1,2a)</sup>
123	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(1,2a)</sup>
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>(1,2a)</sup>
125	Zinc	1) Digestion, Inductively Coupled Plasma Method <sup>(7,14)</sup> 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method <sup>(7,17)</sup>

#### เอกสารอ้างอิง

- กระทรวงอุตสาหกรรม, ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2566. เรื่อง การจัดการสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว. ราชกิจจานุเบกษา. 31 พฤษภาคม 2566. เล่มที่ 140 ตอนที่ 126 ง.
- กระทรวงอุตสาหกรรม, ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเหล็กในดินที่เจือปนในอากาศที่ระบายออกจากระบบของหม้อไอน์โรซึ่งใช้แก๊สเป็นเชื้อเพลิง. ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนที่ 125.
- สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.
- APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 24<sup>th</sup> ed. Washington, DC: APHA, 2023.

5. United States...

- United States Environmental Protection Agency. Standards of Performance for New Stationary Sources. 40 CFR 60, Appendix A, 2023.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. SW-846, 2014.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Acid Digestion of Sludges and Sediments and Soils. SW-846 Method 3050B, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Alkaline Digestion for Hexavalent Chromium. SW-846 Method 3060A, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Separatory Funnel Liquid-Liquid Extraction. SW-846 Method 3510C, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Soxhlet Extraction. SW-846 Method 3540C, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Automated Soxhlet Extraction. SW-846 Method 3541, 1994.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Microscale Solvent Extraction (MSE). SW-846 Method 3570, 2002.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Volatile Organic Compounds (VOCs) in Various Sample Matrices Using Equilibrium Headspace Analysis. SW-846 Method 5021A, 2014.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Purge-and-Trap for Aqueous Samples. SW-846 Method 5030B, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. SW-846 Method 5035, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Inductively Coupled Plasma-Atomic Emission Spectrometry. SW-846 Method 6010B, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Inductively Coupled Plasma-Mass Spectrometry. SW-846 Method 6020A, 2007.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Antimony and Arsenic (Atomic Absorption, Borohydride Reduction). SW-846 Method 7062, 1994. (เพิ่มใหม่)
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Chromium, Hexavalent (Colorimetric). SW-846 Method 7196A, 1992.

20. United States...

- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique). SW-846 Method 7471B, 2007.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Mercury in Solids and Solutions by Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry. SW-846 Method 7473, 2007.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Nonhalogenated Organics by Gas Chromatography. SW-846 Method 8015C, 2007.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. pH Electrometric Measurement. SW-846 Method 9040C, 2004.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Soil and Waste pH. SW-846 Method 9045D, 2004.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Volatile Organic Compounds by Gas Chromatography/  
Mass Spectrometry (GC/MS). SW-846 Method 8260D, 2018.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Semivolatile Organic Compounds by Gas Chromatography/  
Mass Spectrometry (GC/MS). SW-846 Method 8270E, 2018.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Total and Amenable Cyanide: Distillation SW-846 Method 9010B, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Cyanide Extraction Procedure for Solids and Oil SW-846 Method 9013A, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Cyanide in Waters and Extracts Using Titrimetric and Manual Spectrophotometric Procedures. SW-846 Method 9014, 2014.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Mercury in Sediment and Tissue Samples by Atomic Fluorescence Spectrometry. SW-846 Method 7474, 2007.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Ultrasonic Extraction. SW-846 Method 3550C, 2007.

20. United States...

- ที่ ๒๑ ๐๑๓๐๑/๔๑๑๒๑
- กรมโรงงานอุตสาหกรรม  
กรมการตรวจประเมิน  
เขตราชบุรี กรุงเทพฯ ๑๐๔๐๐
- ๒๕ มิถุนายน ๒๕๖๖
- เรื่อง เสนอขออนุมัติการขอตั้งศูนย์ปฏิบัติการวิเคราะห์
- เรียน กรมการผู้จัดการ บริษัท เอลเอส แอนด์เอส กรุ๊ป (ประเทศไทย) จำกัด
- อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์นอกเขต  
จังหวัดที่ ๒๑ มีนามว่า ๒๕๖๖
- ตามที่ท่านได้ยื่นเรื่อง บริษัท เอลเอส แอนด์เอส กรุ๊ป (ประเทศไทย) จำกัด ขอตั้งศูนย์ปฏิบัติการ  
วิเคราะห์นอกเขต เขตราชบุรี เมื่อวันที่ ๒๕ มิถุนายน ๒๕๖๖ โดยมีรายละเอียดดังนี้
๑. ขออนุมัติตั้งศูนย์ปฏิบัติการวิเคราะห์นอกเขต เขตราชบุรี จำนวน ๓ ราย
๒. ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์นอกเขต จำนวน ๑๒ ราย
๓. ขออนุมัติตั้งศูนย์ปฏิบัติการวิเคราะห์นอกเขต เขตราชบุรี จำนวน ๑๒ ราย
๔. ขออนุมัติตั้งศูนย์ปฏิบัติการวิเคราะห์นอกเขต เขตราชบุรี จำนวน ๑๒ ราย
๕. ขออนุมัติตั้งศูนย์ปฏิบัติการวิเคราะห์นอกเขต เขตราชบุรี จำนวน ๑๒ ราย
๖. ขออนุมัติตั้งศูนย์ปฏิบัติการวิเคราะห์นอกเขต เขตราชบุรี จำนวน ๑๒ ราย
๗. ขออนุมัติตั้งศูนย์ปฏิบัติการวิเคราะห์นอกเขต เขตราชบุรี จำนวน ๑๒ ราย
๘. ขออนุมัติตั้งศูนย์ปฏิบัติการวิเคราะห์นอกเขต เขตราชบุรี จำนวน ๑๒ ราย
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๑๖. ขออนุมัติตั้งศูนย์ปฏิบัติการวิเคราะห์นอกเขต เขตราชบุรี จำนวน ๑๒ ราย
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๒๐. ขออนุมัติตั้งศูนย์ปฏิบัติการวิเคราะห์นอกเขต เขตราชบุรี จำนวน ๑๒ ราย

อนึ่ง หัวข้อฉบับนี้...

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือที่อยู่รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
ในวันที่ ๒ กันยายน ๒๕๖๙

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นาย  
รอง  
เจ้า

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร ๐ ๒๔๓๐ ๖๖๑๒ ต่อ ๒๓๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๖๑๒ ต่อ ๒๑๕๙

ไปรษณีย์อิเล็กทรอนิกส์ sarabang-jw@mail.go.th



"อุตสาหกรรมก้าวหน้า ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ที่ อก ๐๓๑๑/ ๑๒๓๖ ๘ /

กรมโรงงานอุตสาหกรรม

ถนนพหลโยธินที่ ๒ แขวงทุ่งพญาไท

เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๘ ธันวาคม ๒๕๖๗

เรื่อง ยกเลิกบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบลอจิสติกส์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๒ ธันวาคม ๒๕๖๗

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบลอจิสติกส์ จำกัด (ประเทศไทย) จำกัด ห้องปฏิบัติการ  
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๕๐ ถนนพัฒนาการ แขวงพัฒนาการ  
เขตสวนหลวง กรุงเทพมหานคร ขอยกเลิกบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์  
จำนวน ๘ ราย ได้แก่

- |                               |                            |
|-------------------------------|----------------------------|
| ๑) นายประพนธ์ วรรณชัย         | ทะเบียนเลขที่ ๖-๒๐๔-จ ๐๐๖๐ |
| ๒) นายจิรณัฐ ขาวละออ          | ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๒ |
| ๓) นายพิรพัฒน์ กำคำ           | ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๘ |
| ๔) นางสาวอรุยา คำคล่อง        | ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๓๔ |
| ๕) นายกิตติพงศ์ แซ่ลี         | ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๔๔ |
| ๖) นายจิรเมธ ประเสริฐศิริพงษ์ | ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๐ |
| ๗) นายภัทรพงษ์ มณฑาทอง        | ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๗ |
| ๘) นางสาวจรรวณ กระจำพันธุ์    | ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๘๑ |

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร ๐ ๒๔๓๐ ๖๖๑๒ ต่อ ๒๓๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๖๑๒ ต่อ ๒๑๕๙

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