

ภาคผนวก ญ

ใบรับรองผลการตรวจวิเคราะห์



Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Puakdaeng,
Amphur Puakdaeng, Rayong Thailand 21140
P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466523
Date Received : Jun 17, 2024
Date Reported : Jun 25, 2024
Report Number : 3021617-1

Page 1 of 1

Sample Number : 2466523-1
Sample Description : Emission from Stationary Source
Location : Boiler Stack
Measurement Date : Jun 17, 2024

Stack Description					
Ambient Temperature	30.6	°C	Diameter	0.49	m
Ambient Pressure	749.7	mmHg	Shape	Circle	
Type of Process	Combustion		Stack Temperature	143	°C
Type of Fuel	Natural Gas		Moisture	13.04	%
			Oxygen	8.21	%
			Carbon dioxide	7.31	%
			Gas Velocity	3.20	m/s
			Flow Rate	1337	Nm ³ /hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)		Nitrogen Dioxide (ppm)	
				at Actual O ₂	at 7% O ₂	at Actual O ₂	at 7% O ₂
1	11:40 AM - 12:00 PM	8.61	7.08	62.19	70.35	2.02	2.28
2	12:01 PM - 12:21 PM	8.11	7.37	59.60	64.75	2.02	2.20
3	12:22 PM - 12:42 PM	7.90	7.49	58.26	62.29	2.08	2.23
Average (ppm)		8.21	7.31	60.02	65.80	2.04	2.23
Guideline (ppm)					200		
Result (mg/m ³)				112.92	123.79	3.84	4.20
Emission Rate at Actual O ₂ (g/s)				0.0419		0.0014	
Method				US EPA Method 7E		US EPA Method 10	

Sampled By : Sakit Phaisanphit

Guideline : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Technical Management

Wichan Choonharat

Manager
โทรศัพท์ ๖-๒๐4-๐-0006

Approved by

Sarayuth Jitranont

Assistant General Manager
โทรศัพท์ ๖-๒๐4-๐-0003

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Puakdaeng, Amphur
Puakdaeng, Rayong Thailand 21140
P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466545
Date Received : Jun 17, 2024
Date Reported : Jul 10, 2024
Report Number : 3021628-2

Page 1 of 1

Sample Number : 2466545-1
Sampled Date : Jun 17, 2024
Sample Description : Emission from Stationary Source
Location : Scrubber Stack
Date Analysis Commenced : Jun 18, 2024
Condition of Sample : Extracted into one filter paper placed in plastic petri dish, one plastic bottle, one 10-L air sampling bag and two sorbent tubes, refrigerated

Stack Description					
Ambient Pressure	750	mmHg	Diameter	1.59	m
Ambient Temperature	30.6	°C	Shape	Circle	
Type of Process	Process		Stack Temperature	54.0	°C
Type of Fuel	-		Moisture	12.42	%
			Oxygen	18.7	%
			Carbon Dioxide	1.0	%
			Gas Velocity	17.4	m/s
			Flow Rate (Actual O ₂)	97682	Nm ³ /hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
Air Testing							
Acrylic Acid	10:10 AM - 10:25 AM	ppm	-	1.0	<1.0	Based on OSHA, ID 28	Bangkok
Propylene glycol	10:10 AM - 10:25 AM	ppm	-	1.00	<1.00	United States Environmental Protection Agency, EPA Method 18	Bangkok
Total VOCs as Propane	10:10 AM - 10:20 AM	ppm	-	1.0	15.3	United States Environmental Protection Agency, EPA Method 25A	Bangkok

Sampled By : Tinnakorn Kulchart

Remark :

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

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Puakdaeng,
Amphur Puakdaeng, Rayong Thailand 21140
P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466538
Date Received : Jun 17, 2024
Date Reported : Jun 25, 2024
Report Number : 3021636-1

Page 1 of 1

Sample Number : 2466538-1
Sample Description : Emission from Stationary Source
Location : Scrubber Stack
Measurement Date : Jun 17, 2024

Stack Description					
Ambient Temperature	30.6	°C	Diameter	1.59	m
Ambient Pressure	749.7	mmHg	Shape	Circle	
Type of Process	Process		Stack Temperature	54	°C
Type of Fuel	-		Moisture	12.48	%
			Oxygen	18.72	%
			Carbon dioxide	1.01	%
			Gas Velocity	17.34	m/s
			Flow Rate	97506	Nm ³ /hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)		Nitrogen Dioxide (ppm)	
				at Actual O ₂	at 7% O ₂	at Actual O ₂	at 7% O ₂
1	10:05 AM - 10:25 AM	18.73	1.01	0.47	3.00	0.42	2.66
2	10:26 AM - 10:46 AM	18.71	1.01	0.51	3.21	0.48	3.04
3	10:47 AM - 11:07 AM	18.71	1.00	0.47	2.98	0.43	2.76
Average (ppm)		18.72	1.01	0.48	3.07	0.44	2.82
Guideline (ppm)					-		
Result (mg/m ³)				0.91	5.77	0.83	5.30
Emission Rate at Actual O ₂ (g/s)				0.0245		0.0225	
Method				US EPA Method 7E		US EPA Method 10	

Sampled By : Sakit Phaisanphit

Guideline : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Technical Management

Wichan Choonharat

Manager
โทรศัพท์ ๖-๒๐4-๐-0006

Approved by

Sarayuth Jitranont

Assistant General Manager
โทรศัพท์ ๖-๒๐4-๐-0003

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Puakdaeng, Amphur
Puakdaeng, Rayong Thailand 21140
P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466551
Date Received : Jun 18, 2024
Date Reported : Jun 26, 2024
Report Number : 3021644-1

Page 1 of 1

Sample Number : 2466551-1
Sampled Date : Jun 18, 2024
Sample Description : Emission from Stationary Source
Location : Packaging Baghouse Stack (GPS 47P 0733163, 1438822) (BH-1080)
Date Analysis Commenced : Jun 19, 2024
Condition of Sample : Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description					
Ambient Pressure	749	mmHg	Diameter	0.45 x 0.35	m
Ambient Temperature	30.0	°C	Shape	Rectangular	
Type of Process	Process		Stack Temperature	48.0	°C
Type of Fuel	-		Moisture	2.76	%
			Oxygen	20.9	%
			Carbon Dioxide	0.0	%
			Gas Velocity	7.2	m/s
			Flow Rate (Actual O ₂)	3637	Nm ³ /hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Testing Location
Air Testing								
Total Suspended Particulate	09:30 AM - 10:24 AM	mg/m ³	-	0.5	<0.5	400	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : Tinnakorn Kulchart

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanita Kulsurwong

Scientist (4)
โทรศัพท์ ๖-๓๒๓-๐-๙๔๔๒

Approved by

Dej Changchon

Senior Manager
โทรศัพท์ ๖-๓๒๓-๐-๙๔๔๒

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur
Plaekdaeng, Rayong Thailand 21140
P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466549
Date Received : Jun 18, 2024
Date Reported : Jun 26, 2024
Report Number: 3021642-1

Page 1 of 1

Sample Number : 2466549-1
Sampled Date : Jun 18, 2024
Sample Description : Emission from Stationary Source
Location : Process Baghouse Stack (GPS 47P 0733140, 1438817)
Date Analysis Commenced : Jun 19, 2024
Condition of Sample : Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description	
Ambient Pressure	749 mmHg
Ambient Temperature	30.0 °C
Type of Process	Process
Type of Fuel	-
Diameter	0.50 x 0.45 m
Shape	Rectangular
Stack Temperature	100 °C
Moisture	1.26 %
Gas Velocity	21.3 m/s
Flow Rate (Actual O2)	11160 Nm ³ /hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOQ)	Result	Guideline Limit	Method	Testing Location
Total Suspended Particulate	10:35 AM - 11:20 AM	mg/m ³	-	0.5	<0.5	400	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Sampled By : Tinnakorn Kulchatt

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

Thanitak.

Thanita Kulchattong
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Approved by

D. Chongchun

Dej Chongchun
Senior Manager
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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur
Plaekdaeng, Rayong Thailand 21140
P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466554
Date Received : Jun 24, 2024
Date Reported : Jun 28, 2024
Report Number: 3021646-1

Page 1 of 1

Sample Description : Air Quality
Location : บ้านนาบารวม (GPS 47P 0728363, 1441336)
Parameter : Nitrogen dioxide (ppm)
Measurement Date : Jun 15, 2024 - Jun 22, 2024
Measurement by : Anuvet Tema

Time	2466554-8 Jun 15, 2024	2466554-9 Jun 16, 2024	2466554-10 Jun 17, 2024	2466554-11 Jun 18, 2024	2466554-12 Jun 19, 2024	2466554-13 Jun 20, 2024	2466554-14 Jun 21, 2024
12:00 PM - 01:00 PM	0.002	0.003	0.003	0.002	0.002	0.002	0.002
01:00 PM - 02:00 PM	0.001	0.002	0.002	0.002	0.001	0.002	0.001
02:00 PM - 03:00 PM	0.001	0.009	0.002	0.002	0.002	0.002	0.002
03:00 PM - 04:00 PM	<0.001	0.001	0.001	0.002	0.001	0.002	0.002
04:00 PM - 05:00 PM	<0.001	0.001	<0.001	0.002	0.001	0.002	0.004
05:00 PM - 06:00 PM	<0.001	0.001	<0.001	0.002	0.002	0.002	0.005
06:00 PM - 07:00 PM	<0.001	<0.001	<0.001	0.003	0.002	0.003	0.003
07:00 PM - 08:00 PM	<0.001	<0.001	<0.001	0.002	0.003	0.002	0.003
08:00 PM - 09:00 PM	<0.001	0.001	<0.001	0.001	0.002	0.002	0.003
09:00 PM - 10:00 PM	0.001	0.001	<0.001	0.002	0.001	0.002	0.002
10:00 PM - 11:00 PM	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.002
11:00 PM - 12:00 AM	0.002	0.001	0.001	0.001	0.001	<0.001	0.001
12:00 AM - 01:00 AM	0.002	0.001	0.001	0.001	0.001	<0.001	<0.001
01:00 AM - 02:00 AM	0.002	0.002	0.002	0.001	<0.001	0.002	<0.001
02:00 AM - 03:00 AM	0.002	0.004	0.002	<0.001	0.001	0.002	<0.001
03:00 AM - 04:00 AM	0.002	0.003	0.002	0.002	0.001	0.002	<0.001
04:00 AM - 05:00 AM	0.002	0.002	0.002	0.002	0.002	<0.001	<0.001
05:00 AM - 06:00 AM	0.002	0.002	0.002	0.002	<0.001	<0.001	<0.001
06:00 AM - 07:00 AM	0.002	0.003	0.003	0.003	<0.001	0.001	0.001
07:00 AM - 08:00 AM	0.002	0.004	0.002	0.003	<0.001	<0.001	0.001
08:00 AM - 09:00 AM	0.002	0.003	0.003	0.003	0.001	0.002	0.001
09:00 AM - 10:00 AM	0.003	0.006	0.004	0.003	0.001	0.002	0.002
10:00 AM - 11:00 AM	0.003	0.002	0.003	0.003	0.002	0.002	0.002
11:00 AM - 12:00 PM	0.003	0.006	0.003	0.004	0.002	0.002	0.002
Average	0.002	0.002	0.002	0.002	0.001	0.002	0.002
1hr - Maximum	0.003	0.006	0.004	0.004	0.003	0.003	0.005
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

Saranya C.

Saranya Chalermtamrong
Scientist (4)

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Analysis / Test Report

Lot ID: 2466554
Date Received : Jun 24, 2024
Date Reported : Jun 28, 2024
Report Number: 3030960-1

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur
Plaekdaeng, Rayong Thailand 21140
P/O : 4984975585
Project Name : Monitoring
Project Location :

Page 1 of 1

Sample Description : Air Quality
Location : บ้านนาบารวม (GPS 47P 0733097, 1438770)
Parameter : Nitrogen dioxide (ppm)
Measurement Date : Jun 15, 2024 - Jun 22, 2024
Measurement by : Anuvet Tema

Time	2466554-1 Jun 15, 2024	2466554-2 Jun 16, 2024	2466554-3 Jun 17, 2024	2466554-4 Jun 18, 2024	2466554-5 Jun 19, 2024	2466554-6 Jun 20, 2024	2466554-7 Jun 21, 2024
11:00 AM - 12:00 PM	<0.001	<0.001	0.003	<0.001	<0.001	0.002	<0.001
12:00 PM - 01:00 PM	<0.001	<0.001	0.004	0.001	<0.001	<0.001	<0.001
01:00 PM - 02:00 PM	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001
02:00 PM - 03:00 PM	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
03:00 PM - 04:00 PM	<0.001	<0.001	0.001	<0.001	<0.001	0.002	<0.001
04:00 PM - 05:00 PM	<0.001	<0.001	0.002	<0.001	0.001	<0.001	<0.001
05:00 PM - 06:00 PM	0.001	0.003	0.002	0.002	0.001	<0.001	0.001
06:00 PM - 07:00 PM	<0.001	0.003	0.002	0.002	<0.001	<0.001	<0.001
07:00 PM - 08:00 PM	0.001	0.005	0.004	0.003	0.001	<0.001	0.002
08:00 PM - 09:00 PM	0.001	0.003	0.002	0.004	0.001	<0.001	<0.001
09:00 PM - 10:00 PM	0.002	0.002	0.004	0.002	0.004	<0.001	0.001
10:00 PM - 11:00 PM	0.001	0.002	0.007	<0.001	0.003	<0.001	0.002
11:00 PM - 12:00 AM	0.001	0.002	0.005	0.003	0.002	<0.001	<0.001
12:00 AM - 01:00 AM	<0.001	0.002	0.009	0.001	0.002	<0.001	<0.001
01:00 AM - 02:00 AM	0.001	<0.001	0.003	0.002	<0.001	<0.001	<0.001
02:00 AM - 03:00 AM	0.002	<0.001	0.002	0.001	<0.001	<0.001	<0.001
03:00 AM - 04:00 AM	0.001	0.001	0.002	0.002	<0.001	<0.001	<0.001
04:00 AM - 05:00 AM	0.003	0.002	0.004	0.009	<0.001	<0.001	0.002
05:00 AM - 06:00 AM	0.005	<0.001	0.007	0.003	<0.001	<0.001	<0.001
06:00 AM - 07:00 AM	0.006	0.004	0.005	0.006	0.005	0.002	0.002
07:00 AM - 08:00 AM	0.006	0.003	0.006	0.003	0.007	0.003	0.002
08:00 AM - 09:00 AM	0.004	0.003	0.006	0.003	0.002	0.002	0.002
09:00 AM - 10:00 AM	0.004	0.002	0.004	0.001	0.002	0.001	0.004
10:00 AM - 11:00 AM	0.002	0.003	0.002	<0.001	0.003	<0.001	0.004
Average	0.002	0.002	0.004	0.003	0.002	<0.001	0.002
1hr - Maximum	0.008	0.005	0.009	0.011	0.007	0.003	0.004
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

Saranya C.

Saranya Chalermtamrong
Scientist (4)

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur
Plaekdaeng, Rayong Thailand 21140
P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466556
Date Received : Jun 24, 2024
Date Reported : Jun 28, 2024
Report Number: 3021647-1

Page 1 of 1

Sample Description : Air Quality
Location : บ้านนาบารวม (GPS 47P 0733097, 1438770)
Date Analysis Commenced : Jun 25, 2024
Condition of Sample : Drawn into one glass filter paper (8x10 inch) placed in plastic bag

Sample Number	Sampled Date	Total Suspended Particulate (mg/m ³)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2466556-1	Jun 15 - Jun 16, 2024	0.040	753	30
2466556-2	Jun 16 - Jun 17, 2024	0.043	753	29
2466556-3	Jun 17 - Jun 18, 2024	0.038	753	29
2466556-4	Jun 18 - Jun 19, 2024	0.034	753	29
2466556-5	Jun 19 - Jun 20, 2024	0.032	753	29
2466556-6	Jun 20 - Jun 21, 2024	0.033	753	30
2466556-7	Jun 21 - Jun 22, 2024	0.033	753	29

Guideline

Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B

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

Sampled By : Anuvet Tema

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

Approved by

Thanitak.

Thanita Kulchattong
Scientist (4)

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S:\Reports_Air Ambient2Day_1 (10 24AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng,
Amphur Plaekdaeng, Rayong Thailand 21140
P/O : ๒๒๔๖3๒๕
Project Name : Monitoring
Project Location :

Lot ID: 2466556
Date Received : Jun 24, 2024
Date Reported : Jun 28, 2024
Report Number: 3021647-2

Page 1 of 1

Sample Description	Air Quality			
Location	๒๒๒๒๒๒๒๒ (GPS 47P 0728363, 1441136)			
Date Analysis Commenced	Jun 25, 2024			
Condition of Sample	Drawn into one glass filter paper (6x10 inch) placed in plastic bag			
Sample Number	Sampled Date	Total Suspended Particulate (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2466556-8	Jun 15 ~ Jun 16, 2024	0.045	753	30
2466556-9	Jun 16 ~ Jun 17, 2024	0.040	753	29
2466556-10	Jun 17 ~ Jun 18, 2024	0.059	753	29
2466556-11	Jun 18 ~ Jun 19, 2024	0.050	753	29
2466556-12	Jun 19 ~ Jun 20, 2024	0.048	753	29
2466556-13	Jun 20 ~ Jun 21, 2024	0.038	753	30
2466556-14	Jun 21 ~ Jun 22, 2024	0.052	753	29
Guideline	0.32			

Reference Method

Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B

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

Sampled By : Anuwit Tema

Remark :

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

Approved by

Thanitak
Thanit Kulsurivong
Scientist (4)

Results apply to the sample(s) as submitted, unless the sampling was restricted to 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.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Plaekdaeng, Amphur Plaekdaeng, Rayong
Thailand 21140
P/O :
Project Name : Factory 1 Monthly
Project Location : ESTE

Lot ID: 23145388
Date Received : Jan 03, 2024
Date Reported : Jan 10, 2024
Report Number : 2868566-1

Page 1 of 2

Sample Number	23145388-1						
Sampled Date	Jan 03, 2024 11:25 AM						
Sample Description	Wastewater						
Contract ID	L_ESTE_022_2550	Plot	S-40	Site	BASF (Thai) Limited.		
Date Analysis Commenced	Jan 03, 2024						
Condition of Sample	Contained in one amber glass bottle and four plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)						
Physical Property	Yellow, some odour, solid and turbid						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	5.3	≤500	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COO	mg/L	1.5	25	44	≤750	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH (on site) *	-	-	-	7.6	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	31.0	≤45	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	15.4	≤100	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Nitrogen (C), part 4500-N (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤200	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant

Sampling By : Sirivut Ruangsom วิสุต งามสงาม ๓-323-๓-9475 , Thanasoun Namakunna ๓-204-๓-9592

Remark :

- LOD : Limit of Detection

Technical Management

N. Banngit
Narumon Banchoangkit
Supervisor
๓-323-๓-9445

Approved by

D. Chongchon
Dej Chongchon
Senior Manager
๓-323-๓-9442

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Analysis / Test Report



TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Plaekdaeng, Amphur Plaekdaeng, Rayong
Thailand 21140
P/O :
Project Name : Factory 1 Monthly
Project Location : ESTE

Lot ID: 23145388
Date Received : Jan 03, 2024
Date Reported : Jan 10, 2024
Report Number : 2868566-1

Page 1 of 1

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

Page 1 of 1

Sample Number	23145388-1						
Sampled Date	Jan 03, 2024 11:25 AM						
Sample Description	Wastewater						
Contract ID	L_ESTS_022_2550	Plot	S-40	Site BASF (Thai) Limited.			
Date Analysis Commenced	Jan 05, 2024						
Condition of Sample	Contained in one amber glass bottle and four plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)						
Physical Property	Yellow, some odour, solid and turbid						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phosphate as P	mg/L	0.002	0.005	3.492	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (F)	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant

Sampling By : Sirivut Ruangsom , Thanasoun Namakunna

Remark :

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

Technical Management

N. Banngit
Narumon Banchoangkit
Supervisor
๓-323-๓-9445

Approved by

D. Chongchon
Dej Chongchon
Senior Manager
๓-323-๓-9442

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Analysis / Test Report



Lot ID: 23145388

Date Received : Jan 03, 2024
Date Reported : Jan 10, 2024
Report Number : 2868566-3

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Plaekdaeng, Amphur Plaekdaeng, Rayong
Thailand 21140
P/O :
Project Name : Factory 1 Monthly
Project Location : ESTE

Page 1 of 1

Sample Number	23145388-1						
Sampled Date	Jan 03, 2024 11:25 AM						
Sample Description	Wastewater						
Contract ID	L_ESTS_022_2550	Plot	S-40	Site BASF (Thai) Limited.			
Date Analysis Commenced	Jan 05, 2024						
Condition of Sample	Contained in one amber glass bottle and four plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)						
Physical Property	Yellow, some odour, solid and turbid						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phosphate as P	mg/L	0.002	0.005	3.492	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (F)	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant

Sampling By : Sirivut Ruangsom , Thanasoun Namakunna

Remark :

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

Approved by

N. Banngit
Narumon Banchoangkit
Supervisor

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Analysis / Test Report



TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong
Thailand 21140

Lot ID: 248001
Date Received : Feb 08, 2024
Date Reported : Feb 14, 2024
Report Number : 2894297-1

P/O :
Project Name : Factory 1 Monthly
Project Location : ESIE

Page 1 of 2

Sample Number : 248001-1
Sampled Date : Feb 08, 2024 2:05 PM
Sample Description : Wastewater
Contract ID : L_ESIE_022_2550 Plot : S-40 Site : BASF (Tha) Limited.
Date Analysis Commenced : Feb 08, 2024
Condition of Sample : Contained in one amber glass bottle and four plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property : Yellow, some odour, solid, and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	16.5	≤500	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	125	≤750	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH (on site) *	-	-	-	7.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature °C	Degree C	-	-	34.2	≤45	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	20.6	≤100	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part 4610 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	15	≤200	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Tanasit Wongsachai รหัสประจำตัว 3-323-9-9460 , Kerdbundit Kitisupavanit รหัสประจำตัว 3-204-9-0001

Remark :
- LOD : Limit of Detection

Technical Management

N.Bangmit

Narumon Banchongkit
Supervisor
รหัสประจำตัว 3-323-9-9445

Approved by

D.Changnon

Dej Changnon
Senior Manager
รหัสประจำตัว 3-323-9-9442

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Analysis / Test Report



TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong
Thailand 21140

Lot ID: 248001
Date Received : Feb 08, 2024
Date Reported : Feb 14, 2024
Report Number : 2894297-1

P/O :
Project Name : Factory 1 Monthly
Project Location : ESIE

Page 2 of 2

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Technical Management

N.Bangmit

Narumon Banchongkit
Supervisor
รหัสประจำตัว 3-323-9-9445

Approved by

D.Changnon

Dej Changnon
Senior Manager
รหัสประจำตัว 3-323-9-9442

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Analysis / Test Report

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong
Thailand 21140

Lot ID: 248001
Date Received : Feb 08, 2024
Date Reported : Feb 14, 2024
Report Number : 2894297-3

P/O :
Project Name : Factory 1 Monthly
Project Location : ESIE

Page 1 of 3

Sample Number : 248001-1
Sampled Date : Feb 08, 2024 2:05 PM
Sample Description : Wastewater
Contract ID : L_ESIE_022_2550 Plot : S-40 Site : BASF (Tha) Limited.
Date Analysis Commenced : Feb 10, 2024
Condition of Sample : Contained in one amber glass bottle and four plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property : Yellow, some odour, solid, and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phosphate as P	mg/L	0.002	0.005	2.401	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (F)	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Tanasit Wongsachai , Kerdbundit Kitisupavanit

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

Approved by

N.Bangmit

Narumon Banchongkit
Supervisor

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Analysis / Test Report



TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong
Thailand 21140

Lot ID: 2420754
Date Received : Mar 13, 2024
Date Reported : Mar 18, 2024
Report Number : 2919012-2

P/O :
Project Name : Factory 1 Monthly
Project Location : ESIE

Page 1 of 2

Sample Number : 2420754-1
Sampled Date : Mar 13, 2024 11:15 AM
Sample Description : Wastewater
Contract ID : L_ESIE_022_2550 Plot : S-40 Site : BASF (Tha) Limited.
Date Analysis Commenced : Mar 13, 2024
Condition of Sample : Contained in one amber glass bottle and four plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property : Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	13.4	≤500	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	57	≤750	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH (on site) *	-	-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature °C	Degree C	-	-	31.8	≤45	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	20.2	≤100	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part 4610 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	10	≤200	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Tanasit Wongsachai รหัสประจำตัว 3-323-9-9460 , Samart Khumpline รหัสประจำตัว 3-204-9-0004

Remark :
- LOD : Limit of Detection

Technical Management

N.Bangmit

Narumon Banchongkit
Supervisor
รหัสประจำตัว 3-323-9-9445

Approved by

D.Changnon

Dej Changnon
Senior Manager
รหัสประจำตัว 3-323-9-9442

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Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong
Thailand 21140

P/O :
Project Name : Factory 1 Monthly
Project Location : ESIE

Lot ID: 2420754
Date Received : Mar 13, 2024
Date Reported : Mar 18, 2024
Report Number : 2919012-1

Page 1 of 2

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

Technical Management

N. Bangmit

Narumon Banchongkit
Supervisor
โทรศัพท์ ๖-323-๙-๙445

Approved by

D. Khun

Dej Changchon
Senior Manager
โทรศัพท์ ๖-323-๙-๙442

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Analysis / Test Report

Lot ID: 2420754

Date Received : Mar 13, 2024
Date Reported : Mar 18, 2024
Report Number : 2919012-3

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong
Thailand 21140

P/O :
Project Name : Factory 1 Monthly
Project Location : ESIE

Sample Number : 2420754-1
Sampled Date : Mar 13, 2024 11:15 AM
Sample Description : Wastewater
Contract ID : L_ESIE_022_2550 Plot : S-40 Site : BASF (Thai) Limited.
Date Analysis Commenced : Mar 14, 2024
Condition of Sample : Contained in one amber glass bottle and four plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property : Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phosphate as P	mg/L	0.002	0.005	2.623	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (F)	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant

Sampling By : Tanasit Wongsachai , Samart Khumpluee

Remark :

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

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Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong
Thailand 21140

P/O :
Project Name : Factory 1 Monthly
Project Location : ESIE

Lot ID: 2433417
Date Received : Apr 01, 2024
Date Reported : Apr 08, 2024
Report Number : 2946226-1

Page 1 of 2

Sample Number : 2433417-1
Sampled Date : Apr 01, 2024 2:57 PM
Sample Description : Wastewater
Contract ID : L_ESIE_022_2550 Plot : S-40 Site : BASF (Thai) Limited.
Date Analysis Commenced : Apr 01, 2024
Condition of Sample : Contained in one amber glass bottle and four plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property : Yellow, some odour, no solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	9.8	<500	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O C	Rayong
COD	mg/L	1.5	25	57	<750	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	<10	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH (on site) *		-		7.3	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-		32.5	<45	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	21.1	<100	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part 4500-N (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	10	<200	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant

Sampling By : Tanasit Wongsachai โทรศัพท์ ๖-323-๙-๙460 , Panopong Manit โทรศัพท์ ๖-204-๙-0109

Remark :

- LOD : Limit of Detection

Technical Management

Photchana S.

Photchana Seeda
Scientist (S)
โทรศัพท์ ๖-323-๙-๙446

Approved by

D. Khun

Dej Changchon
Senior Manager
โทรศัพท์ ๖-323-๙-๙442

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.

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Analysis / Test Report

Lot ID: 2433417

Date Received : Apr 01, 2024
Date Reported : Apr 08, 2024
Report Number : 2946226-3

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong
Thailand 21140

P/O :
Project Name : Factory 1 Monthly
Project Location : ESIE

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

Photchana S.

Photchana Seeda
Scientist (S)
โทรศัพท์ ๖-323-๙-๙446

Approved by

D. Khun

Dej Changchon
Senior Manager
โทรศัพท์ ๖-323-๙-๙442

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0 (Report)_AL_01_01 (1-4000)



Analysis / Test Report

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Plaikaeng, Amphur Plaikaeng, Rayong
Thailand 21140

Lot ID: 2433417
Date Received : Apr 01, 2024
Date Reported : Apr 07, 2024
Report Number : 2946226-3

P/O :
Project Name : Factory 1 Monthly
Project Location : ESIE

Page 1 of 1

Sample Number : 2433417-1
Sample Date : Apr 01, 2024 2:57 PM
Sample Description : Wastewater
Contract ID : L_ESIE_022_2550 Plot : S-40 Site : BASF (Tha) Limited.
Date Analysis Commenced : Apr 02, 2024
Condition of Sample : Contained in one amber glass bottle and four plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property : Yellow, some odour, no solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phosphate as P	mg/L	0.002	0.005	1.491	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (F)	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Tanasit Wongsachai , Panupong Manit

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

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

Dej Changchon
Senior Manager

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Analysis / Test Report

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Plaikaeng, Amphur Plaikaeng, Rayong
Thailand 21140

P/O :
Project Name : Factory 1 Monthly
Project Location : ESIE

Page 1 of 2

Sample Number : 2443883-1
Sample Date : May 09, 2024 11:30 AM
Sample Description : Wastewater
Contract ID : L_ESIE_022_2550 Plot : S-40 Site : BASF (Tha) Limited.
Date Analysis Commenced : May 09, 2024
Condition of Sample : Contained in one amber glass bottle and four plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property : Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	27.4	≤500	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O 5	Rayong
CO ₂	mg/L	1.5	25	181	≤750	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	3	≤10	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH (on site) *	-	-	-	8.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature °F	Degree C	-	-	32.8	≤45	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	37.8	≤100	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Nitrogen (C), part 4500-N (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	33	≤200	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Tanasit Wongsachai ๓๓๓๓๓๓๓ ๓-323-๙๙๔๐ , Samart Khumplhee ๓๓๓๓๓๓๓ ๓-๓๐4-๙๐๘4

Remark :
- LOD : Limit of Detection

Technical Management

Photchana S.
Photchana Seeda
Scientist (4)
๓๓๓๓๓๓๓ ๓-323-๙๙๔๐

Approved by

Dej Changchon
Senior Manager
๓๓๓๓๓๓๓ ๓-323-๙๙๔๐

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

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Plaikaeng, Amphur Plaikaeng, Rayong
Thailand 21140

Lot ID: 2443883
Date Received : May 09, 2024
Date Reported : May 16, 2024
Report Number : 2976576-1

P/O :
Project Name : Factory 1 Monthly
Project Location : ESIE

Page 1 of 1

- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Photchana S.
Photchana Seeda
Scientist (4)
๓๓๓๓๓๓๓ ๓-323-๙๙๔๐

Approved by

Dej Changchon
Senior Manager
๓๓๓๓๓๓๓ ๓-323-๙๙๔๐

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Analysis / Test Report

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Plaikaeng, Amphur Plaikaeng, Rayong
Thailand 21140

P/O :
Project Name : Factory 1 Monthly
Project Location : ESIE

Page 1 of 1

Sample Number : 2443883-1
Sample Date : May 09, 2024 11:30 AM
Sample Description : Wastewater
Contract ID : L_ESIE_022_2550 Plot : S-40 Site : BASF (Tha) Limited.
Date Analysis Commenced : May 10, 2024
Condition of Sample : Contained in one amber glass bottle and four plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property : Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phosphate as P	mg/L	0.002	0.005	2.983	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (F)	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Tanasit Wongsachai , Samart Khumplhee

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

Approved by

Photchana S.
Photchana Seeda
Scientist (4)

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Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong
Thailand 21140

Lot ID: 2456619
Date Received : Jun 13, 2024
Date Reported : Jun 18, 2024
Report Number : 2997819-1

P/O :
Project Name : Factory / Monthly
Project Location : ESIE

Page 1 of 2

Sample Number : 2456619-1
Sampled Date : Jun 13, 2024 10:45 AM
Sample Description : Wastewater
Contract ID : L_ESIE_022_2550 Plot : S-40 Site : BASF (Thai) Limited.
Date Analysis Commenced : Jun 13, 2024
Condition of Sample : Contained in one amber glass bottle and four plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property : Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	14.4	≤500	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COO	mg/L	1.5	25	42	≤750	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH (on site) *	-	-	-	7.6	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature °C	Degree C	-	-	32.7	≤45	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	23.8	≤100	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NHO (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	12	≤200	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.029/2567 : General Standards for Wastewater drainage into central wastewater treatment systems in Industrial Estates.
Sampling By : Warunyo Chimphalee โทรสาร ๖-323-๙-0020, Samart Khumplee โทรสาร ๖-204-๙-0084

Remark :
- LOD : Limit of Detection

Technical Management

Photchana S.

Photchana Seeda
Scientist (4)
โทรสาร ๖-323-๙-9446

Approved by

D. Chongchon

Dej Chongchon
Senior Manager
โทรสาร ๖-323-๙-9442

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Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong
Thailand 21140

Lot ID: 2456619
Date Received : Jun 13, 2024
Date Reported : Jun 18, 2024
Report Number : 2997819-1

P/O :
Project Name : Factory / Monthly
Project Location : ESIE

Page 2 of 2

- "nd" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Photchana S.

Photchana Seeda
Scientist (4)
โทรสาร ๖-323-๙-9446

Approved by

D. Chongchon

Dej Chongchon
Senior Manager
โทรสาร ๖-323-๙-9442

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Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong
Thailand 21140

Lot ID: 2456619
Date Received : Jun 13, 2024
Date Reported : Jun 18, 2024
Report Number : 2997819-3

P/O :
Project Name : Factory / Monthly
Project Location : ESIE

Page 1 of 1

Sample Number : 2456619-1
Sampled Date : Jun 13, 2024 10:45 AM
Sample Description : Wastewater
Contract ID : L_ESIE_022_2550 Plot : S-40 Site : BASF (Thai) Limited.
Date Analysis Commenced : Jun 15, 2024
Condition of Sample : Contained in one amber glass bottle and four plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property : Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phosphate as P	mg/L	0.002	0.005	1.289	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (E)	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.029/2567 : General Standards for Wastewater drainage into central wastewater treatment systems in Industrial Estates.
Sampling By : Warunyo Chimphalee , Samart Khumplee

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

Approved by

Photchana S.

Photchana Seeda
Scientist (4)

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng,
Rayong Thailand 21140

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number : 3036756-1

P/O :
Project Name : Monitoring
Project Location :

Page 1 of 1

Sample Number	2415744-1		
Parameter	Noise (Leq 24 hrs.)		
Location	ใกล้ตัวบ้านภายในบริเวณโรงงาน (GPS 47P 073319E, 1438992)		
Measurement Date	Jun 15 - Jun 16, 2024		
Measurement by	Anuwat Tema		
Sound Level meter	Serial No. 233183		
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	55.4	62.0	54.3
11:00 AM - 12:00 PM	55.0	65.3	53.7
12:00 PM - 01:00 PM	55.6	64.8	54.3
01:00 PM - 02:00 PM	55.8	62.0	54.6
02:00 PM - 03:00 PM	55.5	78.0	54.2
03:00 PM - 04:00 PM	56.1	67.0	54.7
04:00 PM - 05:00 PM	55.4	67.3	54.2
05:00 PM - 06:00 PM	55.6	66.0	54.4
06:00 PM - 07:00 PM	56.3	68.2	55.4
07:00 PM - 08:00 PM	56.2	63.0	55.3
08:00 PM - 09:00 PM	56.3	64.3	55.3
09:00 PM - 10:00 PM	56.6	73.8	55.4
10:00 PM - 11:00 PM	55.9	62.5	55.1
11:00 PM - 12:00 AM	56.3	62.3	55.5
12:00 AM - 01:00 AM	66.1	63.0	55.5
01:00 AM - 02:00 AM	56.9	66.4	56.0
02:00 AM - 03:00 AM	56.2	61.8	55.4
03:00 AM - 04:00 AM	56.2	62.1	55.3
04:00 AM - 05:00 AM	57.6	70.4	56.2
05:00 AM - 06:00 AM	57.1	62.7	56.2
06:00 AM - 07:00 AM	57.1	65.0	56.0
07:00 AM - 08:00 AM	55.0	70.1	54.2
08:00 AM - 09:00 AM	54.8	61.5	53.5
09:00 AM - 10:00 AM	54.3	62.6	53.5
Leq Average 24 hrs. (dB(A))	56.0		
Lmax (dB(A))		78.0	
L90 (dB(A))			55.1
Ldn (dB(A))	62.9		
Standard (dB(A))	70	115	
Reference Method	ISO1996-1 and 1996-2		
Standard	1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วยเสียง 2. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียงสำหรับโรงงานอุตสาหกรรม และมาตรฐานเสียงสำหรับโรงงานอุตสาหกรรม โรงงาน พ.ศ. 2548		
Remark	The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.		

Technical Management

Chontichak

Chontichak Subongchorn
Scientist (3)

Approved by

Supt S.

Supt Salameh
Section Head

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Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036750-1

Page 1 of 1

Sample Number : 2415744-2
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดภัณฑ์เคมีภัณฑ์โรงงาน (GPS 47P 0733191, 1438992)
Measurement Date : Jun 16 - Jun 17, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 233183

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	54.3	58.8	53.3
11:00 AM - 12:00 PM	54.2	57.5	53.2
12:00 PM - 01:00 PM	55.2	65.0	54.1
01:00 PM - 02:00 PM	62.0	90.5	54.2
02:00 PM - 03:00 PM	55.1	70.6	54.1
03:00 PM - 04:00 PM	54.7	63.5	53.7
04:00 PM - 05:00 PM	55.3	69.3	54.4
05:00 PM - 06:00 PM	55.2	63.6	54.2
06:00 PM - 07:00 PM	56.1	69.5	55.1
07:00 PM - 08:00 PM	55.6	63.9	54.7
08:00 PM - 09:00 PM	55.5	64.5	54.6
09:00 PM - 10:00 PM	55.5	64.5	54.7
10:00 PM - 11:00 PM	55.6	61.7	54.8
11:00 PM - 12:00 AM	55.7	60.8	54.9
12:00 AM - 01:00 AM	55.7	71.9	54.8
01:00 AM - 02:00 AM	55.7	63.8	54.8
02:00 AM - 03:00 AM	55.8	64.0	54.9
03:00 AM - 04:00 AM	56.1	69.1	55.0
04:00 AM - 05:00 AM	55.8	72.2	54.8
05:00 AM - 06:00 AM	56.9	72.1	55.8
06:00 AM - 07:00 AM	56.5	68.8	55.5
07:00 AM - 08:00 AM	56.7	71.6	55.9
08:00 AM - 09:00 AM	56.8	60.5	56.0
09:00 AM - 10:00 AM	56.0	66.7	55.1

Leq Average 24 hrs. (dB(A)) : 56.3
Lmax (dB(A)) : 90.5
L90 (dB(A)) : 54.8
Ldn (dB(A)) : 62.5
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงจากโรงงาน และเครื่องมือเสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supt S
Supt. Salameth
Section Head

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Life Sciences

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RIGHT SOLUTIONS RIGHT PARTNER

S-Reports_Air Noise (p11-01A0)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036750-1

Page 1 of 1

Sample Number : 2415744-3
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดภัณฑ์เคมีภัณฑ์โรงงาน (GPS 47P 0733191, 1438992)
Measurement Date : Jun 17 - Jun 18, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 233183

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	55.8	60.9	54.9
11:00 AM - 12:00 PM	55.4	68.2	54.4
12:00 PM - 01:00 PM	62.6	94.4	54.6
01:00 PM - 02:00 PM	56.2	69.5	55.2
02:00 PM - 03:00 PM	55.8	63.2	54.8
03:00 PM - 04:00 PM	56.0	71.3	55.0
04:00 PM - 05:00 PM	55.4	60.8	54.3
05:00 PM - 06:00 PM	55.3	64.8	54.4
06:00 PM - 07:00 PM	56.7	62.7	55.5
07:00 PM - 08:00 PM	55.9	62.0	55.1
08:00 PM - 09:00 PM	56.4	63.3	55.6
09:00 PM - 10:00 PM	56.5	61.4	55.6
10:00 PM - 11:00 PM	56.2	62.1	55.3
11:00 PM - 12:00 AM	57.2	64.0	56.1
12:00 AM - 01:00 AM	56.8	60.4	55.8
01:00 AM - 02:00 AM	56.9	62.8	56.0
02:00 AM - 03:00 AM	55.9	61.0	55.1
03:00 AM - 04:00 AM	56.2	69.7	56.3
04:00 AM - 05:00 AM	57.5	62.2	56.5
05:00 AM - 06:00 AM	56.8	65.6	55.9
06:00 AM - 07:00 AM	57.1	71.1	56.0
07:00 AM - 08:00 AM	55.6	64.3	54.7
08:00 AM - 09:00 AM	56.6	90.2	54.7
09:00 AM - 10:00 AM	55.5	65.5	54.7

Leq Average 24 hrs. (dB(A)) : 56.3
Lmax (dB(A)) : 90.2
L90 (dB(A)) : 55.1
Ldn (dB(A)) : 63.0
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงจากโรงงาน และเครื่องมือเสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supt S
Supt. Salameth
Section Head

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RIGHT SOLUTIONS RIGHT PARTNER

S-Reports_Air Noise (p11-01A0)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036750-1

Page 1 of 1

Sample Number : 2415744-4
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดภัณฑ์เคมีภัณฑ์โรงงาน (GPS 47P 0733191, 1438992)
Measurement Date : Jun 18 - Jun 19, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 233183

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	55.8	68.3	54.8
11:00 AM - 12:00 PM	55.2	62.7	54.2
12:00 PM - 01:00 PM	55.6	86.9	54.0
01:00 PM - 02:00 PM	55.5	69.7	54.3
02:00 PM - 03:00 PM	55.6	64.5	54.3
03:00 PM - 04:00 PM	55.7	64.9	54.6
04:00 PM - 05:00 PM	54.8	61.8	53.9
05:00 PM - 06:00 PM	55.2	62.9	54.1
06:00 PM - 07:00 PM	56.5	65.2	55.2
07:00 PM - 08:00 PM	56.1	66.9	55.0
08:00 PM - 09:00 PM	56.1	67.0	55.2
09:00 PM - 10:00 PM	56.6	66.5	55.6
10:00 PM - 11:00 PM	56.1	63.6	55.2
11:00 PM - 12:00 AM	56.7	60.3	55.6
12:00 AM - 01:00 AM	56.7	67.9	56.7
01:00 AM - 02:00 AM	57.4	69.0	56.3
02:00 AM - 03:00 AM	56.2	67.7	55.4
03:00 AM - 04:00 AM	56.1	63.0	55.4
04:00 AM - 05:00 AM	57.0	61.2	55.9
05:00 AM - 06:00 AM	56.9	73.4	55.7
06:00 AM - 07:00 AM	57.5	62.7	56.3
07:00 AM - 08:00 AM	56.8	65.3	54.9
08:00 AM - 09:00 AM	55.6	60.8	54.6
09:00 AM - 10:00 AM	56.1	65.3	54.8

Leq Average 24 hrs. (dB(A)) : 56.2
Lmax (dB(A)) : 86.9
L90 (dB(A)) : 55.0
Ldn (dB(A)) : 63.0
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงจากโรงงาน และเครื่องมือเสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supt S
Supt. Salameth
Section Head

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S-Reports_Air Noise (p11-01A0)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036750-1

Page 1 of 1

Sample Number : 2415744-5
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดภัณฑ์เคมีภัณฑ์โรงงาน (GPS 47P 0733191, 1438992)
Measurement Date : Jun 19 - Jun 20, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 233183

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	56.0	61.8	54.8
11:00 AM - 12:00 PM	54.6	78.2	53.6
12:00 PM - 01:00 PM	56.3	65.3	54.8
01:00 PM - 02:00 PM	56.5	65.7	55.2
02:00 PM - 03:00 PM	57.0	69.3	55.5
03:00 PM - 04:00 PM	57.6	64.9	56.1
04:00 PM - 05:00 PM	57.5	62.7	56.2
05:00 PM - 06:00 PM	57.0	61.8	55.7
06:00 PM - 07:00 PM	58.1	64.0	56.7
07:00 PM - 08:00 PM	57.6	62.3	56.3
08:00 PM - 09:00 PM	58.0	62.2	56.7
09:00 PM - 10:00 PM	58.0	64.5	56.6
10:00 PM - 11:00 PM	57.8	61.6	56.5
11:00 PM - 12:00 AM	58.2	62.5	56.9
12:00 AM - 01:00 AM	58.2	65.7	56.8
01:00 AM - 02:00 AM	58.1	61.3	56.9
02:00 AM - 03:00 AM	57.8	63.0	56.5
03:00 AM - 04:00 AM	57.8	61.0	56.5
04:00 AM - 05:00 AM	58.6	71.1	57.3
05:00 AM - 06:00 AM	58.5	73.2	57.3
06:00 AM - 07:00 AM	58.4	62.4	57.1
07:00 AM - 08:00 AM	57.1	63.4	55.7
08:00 AM - 09:00 AM	56.8	65.5	55.3
09:00 AM - 10:00 AM	56.5	68.4	54.9

Leq Average 24 hrs. (dB(A)) : 57.5
Lmax (dB(A)) : 78.2
L90 (dB(A)) : 56.3
Ldn (dB(A)) : 64.4
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงจากโรงงาน และเครื่องมือเสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supt S
Supt. Salameth
Section Head

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RIGHT SOLUTIONS RIGHT PARTNER

S-Reports_Air Noise (p12-01B0)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036763-1

Page 1 of 1

Sample Number : 2415744-6
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์ในโรงงาน (GPS 47P 0733191, 1438992)
Measurement Date : Jun 20 - Jun 21, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 233183

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	57.0	61.8	55.8
11:00 AM - 12:00 PM	56.2	62.9	54.7
12:00 PM - 01:00 PM	56.2	78.7	64.4
01:00 PM - 02:00 PM	56.2	61.3	54.6
02:00 PM - 03:00 PM	55.4	64.8	54.1
03:00 PM - 04:00 PM	55.6	68.1	54.6
04:00 PM - 05:00 PM	55.7	62.7	54.6
05:00 PM - 06:00 PM	55.7	64.6	54.4
06:00 PM - 07:00 PM	56.6	64.6	55.4
07:00 PM - 08:00 PM	56.9	61.7	56.0
08:00 PM - 09:00 PM	57.1	64.8	54.2
09:00 PM - 10:00 PM	58.3	71.9	57.1
10:00 PM - 11:00 PM	57.4	64.5	56.5
11:00 PM - 12:00 AM	57.5	61.4	56.7
12:00 AM - 01:00 AM	57.8	61.6	57.1
01:00 AM - 02:00 AM	57.6	65.0	56.9
02:00 AM - 03:00 AM	57.8	67.5	57.0
03:00 AM - 04:00 AM	57.9	63.5	57.1
04:00 AM - 05:00 AM	58.0	63.1	57.2
05:00 AM - 06:00 AM	57.7	61.1	57.1
06:00 AM - 07:00 AM	57.7	61.3	57.1
07:00 AM - 08:00 AM	57.9	61.5	57.2
08:00 AM - 09:00 AM	58.0	65.5	57.3
09:00 AM - 10:00 AM	57.7	61.9	57.4

Leq Average 24 hrs. (dB(A)) : 57.2
Lmax (dB(A)) : 84.8
L90 (dB(A)) : 56.5
Ldn (dB(A)) : 64.0
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงในโรงงาน และพื้นที่เสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. AN ALS Limited Company

Life Sciences

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RIGHT SOLUTIONS RIGHT PARTNER

S-Report: Air Noise (pt 11-01AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036763-1

Page 1 of 1

Sample Number : 2415744-7
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์ในโรงงาน (GPS 47P 0733191, 1438992)
Measurement Date : Jun 21 - Jun 22, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 233183

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	57.1	63.8	56.3
11:00 AM - 12:00 PM	57.0	63.2	56.2
12:00 PM - 01:00 PM	56.8	62.0	56.0
01:00 PM - 02:00 PM	57.3	62.6	56.3
02:00 PM - 03:00 PM	56.8	70.2	55.8
03:00 PM - 04:00 PM	57.1	80.0	56.0
04:00 PM - 05:00 PM	57.4	66.2	56.2
05:00 PM - 06:00 PM	57.6	67.9	56.5
06:00 PM - 07:00 PM	58.4	65.2	57.4
07:00 PM - 08:00 PM	57.5	64.6	56.6
08:00 PM - 09:00 PM	57.3	63.2	56.4
09:00 PM - 10:00 PM	58.0	66.8	56.9
10:00 PM - 11:00 PM	57.5	62.2	56.8
11:00 PM - 12:00 AM	57.9	64.9	57.1
12:00 AM - 01:00 AM	57.8	66.2	57.1
01:00 AM - 02:00 AM	57.5	61.6	56.8
02:00 AM - 03:00 AM	57.9	62.5	57.3
03:00 AM - 04:00 AM	58.0	76.1	57.3
04:00 AM - 05:00 AM	57.5	68.3	56.6
05:00 AM - 06:00 AM	57.3	61.7	56.5
06:00 AM - 07:00 AM	57.3	61.8	56.5
07:00 AM - 08:00 AM	57.5	63.7	56.7
08:00 AM - 09:00 AM	56.9	62.0	56.0
09:00 AM - 10:00 AM	57.5	74.3	56.7

Leq Average 24 hrs. (dB(A)) : 57.5
Lmax (dB(A)) : 80.0
L90 (dB(A)) : 56.6
Ldn (dB(A)) : 64.0
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงในโรงงาน และพื้นที่เสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. AN ALS Limited Company

Life Sciences

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RIGHT SOLUTIONS RIGHT PARTNER

S-Report: Air Noise (pt 11-01AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036763-1

Page 1 of 1

Sample Number : 2415744-8
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์ในโรงงาน (GPS 47P 0733219, 1438820)
Measurement Date : Jun 15 - Jun 16, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	63.6	82.0	62.8
11:00 AM - 12:00 PM	63.7	80.0	62.4
12:00 PM - 01:00 PM	62.3	76.1	62.3
01:00 PM - 02:00 PM	63.5	83.4	62.2
02:00 PM - 03:00 PM	63.5	79.7	62.3
03:00 PM - 04:00 PM	63.3	77.0	62.3
04:00 PM - 05:00 PM	63.7	90.1	62.3
05:00 PM - 06:00 PM	63.2	72.0	62.4
06:00 PM - 07:00 PM	63.6	83.3	62.8
07:00 PM - 08:00 PM	63.7	74.7	63.0
08:00 PM - 09:00 PM	63.7	68.6	63.1
09:00 PM - 10:00 PM	64.1	72.0	63.4
10:00 PM - 11:00 PM	64.2	67.7	63.6
11:00 PM - 12:00 AM	64.4	70.2	63.7
12:00 AM - 01:00 AM	64.5	67.7	63.8
01:00 AM - 02:00 AM	64.5	74.1	63.8
02:00 AM - 03:00 AM	64.7	70.6	64.0
03:00 AM - 04:00 AM	64.6	67.4	63.9
04:00 AM - 05:00 AM	64.3	68.0	63.6
05:00 AM - 06:00 AM	64.5	72.8	63.8
06:00 AM - 07:00 AM	64.4	74.6	63.6
07:00 AM - 08:00 AM	63.6	73.5	62.7
08:00 AM - 09:00 AM	63.3	71.0	62.4
09:00 AM - 10:00 AM	63.2	73.5	62.4

Leq Average 24 hrs. (dB(A)) : 63.9
Lmax (dB(A)) : 90.1
L90 (dB(A)) : 62.8
Ldn (dB(A)) : 70.7
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงในโรงงาน และพื้นที่เสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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Life Sciences

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RIGHT SOLUTIONS RIGHT PARTNER

S-Report: Air Noise (pt 11-01AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036763-1

Page 1 of 1

Sample Number : 2415744-9
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์ในโรงงาน (GPS 47P 0733219, 1438820)
Measurement Date : Jun 16 - Jun 17, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	63.2	72.9	62.3
11:00 AM - 12:00 PM	63.1	75.9	62.2
12:00 PM - 01:00 PM	63.3	80.0	62.4
01:00 PM - 02:00 PM	63.4	78.7	62.4
02:00 PM - 03:00 PM	63.7	70.1	62.8
03:00 PM - 04:00 PM	63.0	68.9	62.3
04:00 PM - 05:00 PM	63.3	70.7	62.6
05:00 PM - 06:00 PM	63.7	73.9	62.9
06:00 PM - 07:00 PM	64.4	72.9	63.6
07:00 PM - 08:00 PM	64.6	65.7	63.7
08:00 PM - 09:00 PM	64.3	69.9	63.6
09:00 PM - 10:00 PM	64.4	69.6	63.6
10:00 PM - 11:00 PM	64.4	69.1	63.7
11:00 PM - 12:00 AM	64.6	65.7	63.9
12:00 AM - 01:00 AM	64.7	73.5	64.0
01:00 AM - 02:00 AM	64.8	67.9	64.0
02:00 AM - 03:00 AM	64.9	67.8	64.2
03:00 AM - 04:00 AM	65.0	68.8	64.3
04:00 AM - 05:00 AM	64.8	68.3	64.1
05:00 AM - 06:00 AM	65.4	73.7	64.5
06:00 AM - 07:00 AM	65.4	73.3	64.7
07:00 AM - 08:00 AM	65.3	71.7	64.6
08:00 AM - 09:00 AM	65.1	79.0	64.4
09:00 AM - 10:00 AM	64.3	76.1	63.5

Leq Average 24 hrs. (dB(A)) : 64.4
Lmax (dB(A)) : 80.0
L90 (dB(A)) : 63.6
Ldn (dB(A)) : 71.2
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงในโรงงาน และพื้นที่เสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. AN ALS Limited Company

Life Sciences

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RIGHT SOLUTIONS RIGHT PARTNER

S-Report: Air Noise (pt 11-01AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036765-1

Page 1 of 1

Sample Number : 2415744-10
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์ด้านโรงงาน (GPS 47P 0733219, 1438820)
Measurement Date : Jun 17 - Jun 18, 2024
Measurement by : Anuwet Tema
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	63.6	78.6	62.6
11:00 AM - 12:00 PM	63.6	86.1	62.9
12:00 PM - 01:00 PM	62.6	76.0	62.8
01:00 PM - 02:00 PM	63.9	80.4	62.7
02:00 PM - 03:00 PM	63.6	81.7	62.6
03:00 PM - 04:00 PM	63.2	72.9	62.5
04:00 PM - 05:00 PM	63.5	68.4	62.5
05:00 PM - 06:00 PM	63.7	72.4	62.5
06:00 PM - 07:00 PM	64.1	72.5	63.7
07:00 PM - 08:00 PM	64.3	75.2	63.5
08:00 PM - 09:00 PM	64.5	72.4	63.7
09:00 PM - 10:00 PM	64.5	68.6	63.8
10:00 PM - 11:00 PM	64.8	68.6	64.1
11:00 PM - 12:00 AM	64.9	68.2	64.2
12:00 AM - 01:00 AM	64.9	69.6	64.2
01:00 AM - 02:00 AM	64.9	77.4	64.1
02:00 AM - 03:00 AM	64.6	68.1	63.9
03:00 AM - 04:00 AM	64.5	67.6	63.9
04:00 AM - 05:00 AM	64.7	67.9	63.9
05:00 AM - 06:00 AM	65.0	66.0	64.2
06:00 AM - 07:00 AM	65.2	76.0	64.4
07:00 AM - 08:00 AM	65.1	84.1	64.0
08:00 AM - 09:00 AM	64.1	89.7	62.6
09:00 AM - 10:00 AM	62.8	81.8	62.4

Leq Average 24 hrs. (dB(A)) : 64.3
Lmax (dB(A)) : 89.7
L90 (dB(A)) : 63.5
Ldn (dB(A)) : 71.1
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงในโรงงาน และพื้นที่เสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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Life Sciences

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RIGHT SOLUTIONS RIGHT PARTNER

S-Report: Air Noise (p11-02A6)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036765-1

Page 1 of 1

Sample Number : 2415744-11
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์ด้านโรงงาน (GPS 47P 0733219, 1438820)
Measurement Date : Jun 18 - Jun 19, 2024
Measurement by : Anuwet Tema
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	63.4	80.8	62.0
11:00 AM - 12:00 PM	63.7	81.1	62.2
12:00 PM - 01:00 PM	62.4	76.4	62.4
01:00 PM - 02:00 PM	63.0	80.0	61.9
02:00 PM - 03:00 PM	63.5	90.5	61.9
03:00 PM - 04:00 PM	62.6	69.7	61.8
04:00 PM - 05:00 PM	62.9	78.0	61.9
05:00 PM - 06:00 PM	63.4	70.1	62.5
06:00 PM - 07:00 PM	63.8	73.3	63.0
07:00 PM - 08:00 PM	65.0	91.3	63.2
08:00 PM - 09:00 PM	64.3	71.5	63.4
09:00 PM - 10:00 PM	64.5	74.2	63.7
10:00 PM - 11:00 PM	64.4	68.1	63.7
11:00 PM - 12:00 AM	64.4	68.1	63.9
12:00 AM - 01:00 AM	64.6	68.6	63.8
01:00 AM - 02:00 AM	64.5	70.0	63.8
02:00 AM - 03:00 AM	64.5	67.6	63.9
03:00 AM - 04:00 AM	64.1	68.7	63.4
04:00 AM - 05:00 AM	64.3	67.8	63.6
05:00 AM - 06:00 AM	64.3	70.8	63.7
06:00 AM - 07:00 AM	64.3	75.9	63.6
07:00 AM - 08:00 AM	63.9	82.0	63.0
08:00 AM - 09:00 AM	63.6	73.9	62.7
09:00 AM - 10:00 AM	63.6	69.4	62.5

Leq Average 24 hrs. (dB(A)) : 64.0
Lmax (dB(A)) : 91.3
L90 (dB(A)) : 63.0
Ldn (dB(A)) : 70.7
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงในโรงงาน และพื้นที่เสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. AN ALS Limited Company

Life Sciences

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RIGHT SOLUTIONS RIGHT PARTNER

S-Report: Air Noise (p11-02A6)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036762-1

Page 1 of 1

Sample Number : 2415744-12
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์ด้านโรงงาน (GPS 47P 0733219, 1438820)
Measurement Date : Jun 19 - Jun 20, 2024
Measurement by : Anuwet Tema
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	63.4	80.7	62.2
11:00 AM - 12:00 PM	62.9	80.8	62.0
12:00 PM - 01:00 PM	63.3	73.5	62.4
01:00 PM - 02:00 PM	63.1	71.7	62.3
02:00 PM - 03:00 PM	64.1	82.0	62.4
03:00 PM - 04:00 PM	64.2	72.9	62.7
04:00 PM - 05:00 PM	63.5	76.4	62.6
05:00 PM - 06:00 PM	63.4	72.0	62.6
06:00 PM - 07:00 PM	64.2	80.8	63.2
07:00 PM - 08:00 PM	64.2	75.5	63.4
08:00 PM - 09:00 PM	64.3	71.4	63.5
09:00 PM - 10:00 PM	64.5	68.9	63.7
10:00 PM - 11:00 PM	64.6	70.3	63.9
11:00 PM - 12:00 AM	64.5	72.3	63.7
12:00 AM - 01:00 AM	64.3	68.4	63.6
01:00 AM - 02:00 AM	64.1	67.4	63.4
02:00 AM - 03:00 AM	64.1	69.1	63.4
03:00 AM - 04:00 AM	64.0	67.5	63.4
04:00 AM - 05:00 AM	64.2	69.1	63.5
05:00 AM - 06:00 AM	64.4	75.7	63.7
06:00 AM - 07:00 AM	64.2	76.9	63.4
07:00 AM - 08:00 AM	63.7	76.7	62.8
08:00 AM - 09:00 AM	63.8	82.4	62.5
09:00 AM - 10:00 AM	64.2	79.5	62.3

Leq Average 24 hrs. (dB(A)) : 64.0
Lmax (dB(A)) : 92.0
L90 (dB(A)) : 63.2
Ldn (dB(A)) : 70.6
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงในโรงงาน และพื้นที่เสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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Life Sciences

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RIGHT SOLUTIONS RIGHT PARTNER

S-Report: Air Noise (p11-02A6)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036762-1

Page 1 of 1

Sample Number : 2415744-13
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์ด้านโรงงาน (GPS 47P 0733219, 1438820)
Measurement Date : Jun 20 - Jun 21, 2024
Measurement by : Anuwet Tema
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	65.3	82.1	63.4
11:00 AM - 12:00 PM	63.6	80.2	62.0
12:00 PM - 01:00 PM	65.2	75.2	63.5
01:00 PM - 02:00 PM	64.5	80.2	62.9
02:00 PM - 03:00 PM	63.3	81.0	62.6
03:00 PM - 04:00 PM	64.6	72.5	63.0
04:00 PM - 05:00 PM	62.9	74.2	61.9
05:00 PM - 06:00 PM	63.0	68.2	62.3
06:00 PM - 07:00 PM	64.5	76.0	62.7
07:00 PM - 08:00 PM	63.9	80.6	63.0
08:00 PM - 09:00 PM	63.0	68.0	63.2
09:00 PM - 10:00 PM	64.1	72.1	63.4
10:00 PM - 11:00 PM	64.2	67.7	63.4
11:00 PM - 12:00 AM	63.9	68.1	63.3
12:00 AM - 01:00 AM	61.9	70.0	61.2
01:00 AM - 02:00 AM	63.9	69.1	63.1
02:00 AM - 03:00 AM	63.9	67.8	63.2
03:00 AM - 04:00 AM	63.9	68.1	63.1
04:00 AM - 05:00 AM	63.9	70.0	63.2
05:00 AM - 06:00 AM	64.0	73.2	63.2
06:00 AM - 07:00 AM	63.8	80.2	63.0
07:00 AM - 08:00 AM	64.3	89.5	62.2
08:00 AM - 09:00 AM	62.0	84.2	60.8
09:00 AM - 10:00 AM	66.1	79.3	63.7

Leq Average 24 hrs. (dB(A)) : 64.1
Lmax (dB(A)) : 89.5
L90 (dB(A)) : 63.1
Ldn (dB(A)) : 70.4
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงในโรงงาน และพื้นที่เสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. AN ALS Limited Company

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RIGHT SOLUTIONS RIGHT PARTNER

S-Report: Air Noise (p11-02A6)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036770-1

Page 1 of 1

Sample Number : 2415744-14
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์โรงงาน (GPS 47P 0733219, 1438820)
Measurement Date : Jun 21 - Jun 22, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	62.1	79.3	60.3
11:00 AM - 12:00 PM	61.2	76.9	60.2
12:00 PM - 01:00 PM	64.3	82.6	62.1
01:00 PM - 02:00 PM	63.2	79.9	61.5
02:00 PM - 03:00 PM	64.3	72.2	62.1
03:00 PM - 04:00 PM	63.7	79.7	61.9
04:00 PM - 05:00 PM	61.5	75.3	61.0
05:00 PM - 06:00 PM	62.9	90.0	61.2
06:00 PM - 07:00 PM	62.1	73.1	61.4
07:00 PM - 08:00 PM	61.9	70.6	61.4
08:00 PM - 09:00 PM	61.8	67.1	61.4
09:00 PM - 10:00 PM	62.6	67.3	62.2
10:00 PM - 11:00 PM	62.2	67.1	61.8
11:00 PM - 12:00 AM	62.6	68.2	62.2
12:00 AM - 01:00 AM	63.6	70.5	63.2
01:00 AM - 02:00 AM	63.7	70.6	63.3
02:00 AM - 03:00 AM	63.8	66.4	63.4
03:00 AM - 04:00 AM	64.0	66.3	63.6
04:00 AM - 05:00 AM	64.0	68.3	63.7
05:00 AM - 06:00 AM	63.9	71.1	63.4
06:00 AM - 07:00 AM	63.5	81.8	63.1
07:00 AM - 08:00 AM	64.0	90.3	62.7
08:00 AM - 09:00 AM	63.6	72.9	62.7
09:00 AM - 10:00 AM	64.0	82.9	62.6

Leq Average 24 hrs. (dB(A)) : 63.2
Lmax (dB(A)) : 92.9
L90 (dB(A)) : 62.1
Ldn (dB(A)) : 69.9
Standard (dB(A)) : 70 115
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 2540 (พ.ร.บ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงในโรงงาน และพื้นที่เสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ร.บ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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Life Sciences

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S-Report: Air Noise (pt 11-05AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036770-1

Page 1 of 1

Sample Number : 2415744-15
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์โรงงาน (GPS 47P 0733052, 1438860)
Measurement Date : Jun 15 - Jun 16, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 1222724

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	62.6	76.7	60.3
11:00 AM - 12:00 PM	61.5	69.6	60.1
12:00 PM - 01:00 PM	61.6	75.8	60.7
01:00 PM - 02:00 PM	61.9	75.3	59.5
02:00 PM - 03:00 PM	61.1	78.3	59.3
03:00 PM - 04:00 PM	61.0	81.4	59.0
04:00 PM - 05:00 PM	61.9	84.5	59.5
05:00 PM - 06:00 PM	61.4	77.6	59.5
06:00 PM - 07:00 PM	61.3	73.3	59.9
07:00 PM - 08:00 PM	61.8	73.4	60.1
08:00 PM - 09:00 PM	62.1	75.7	60.7
09:00 PM - 10:00 PM	62.9	74.0	61.2
10:00 PM - 11:00 PM	63.7	82.6	61.4
11:00 PM - 12:00 AM	62.2	72.8	61.0
12:00 AM - 01:00 AM	62.2	76.4	60.6
01:00 AM - 02:00 AM	62.0	77.3	60.7
02:00 AM - 03:00 AM	62.8	83.1	60.8
03:00 AM - 04:00 AM	62.1	78.1	60.8
04:00 AM - 05:00 AM	61.3	85.9	60.5
05:00 AM - 06:00 AM	61.5	69.2	60.7
06:00 AM - 07:00 AM	62.1	74.0	61.1
07:00 AM - 08:00 AM	62.0	73.2	60.9
08:00 AM - 09:00 AM	62.5	72.0	61.1
09:00 AM - 10:00 AM	61.6	76.8	60.4

Leq Average 24 hrs. (dB(A)) : 62.4
Lmax (dB(A)) : 94.5
L90 (dB(A)) : 60.6
Ldn (dB(A)) : 68.7
Standard (dB(A)) : 70 115
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 2540 (พ.ร.บ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงในโรงงาน และพื้นที่เสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ร.บ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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Life Sciences

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RIGHT SOLUTIONS RIGHT PARTNER

S-Report: Air Noise (pt 11-05AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036771-1

Page 1 of 1

Sample Number : 2415744-16
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์โรงงาน (GPS 47P 0733052, 1438860)
Measurement Date : Jun 16 - Jun 17, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 1222724

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	67.6	74.7	66.7
11:00 AM - 12:00 PM	66.9	75.5	66.9
12:00 PM - 01:00 PM	61.0	74.8	59.4
01:00 PM - 02:00 PM	60.3	76.7	58.4
02:00 PM - 03:00 PM	61.2	81.5	59.2
03:00 PM - 04:00 PM	60.8	76.7	59.1
04:00 PM - 05:00 PM	62.3	89.2	59.8
05:00 PM - 06:00 PM	61.3	65.3	60.9
06:00 PM - 07:00 PM	61.2	64.1	60.8
07:00 PM - 08:00 PM	61.2	63.7	60.8
08:00 PM - 09:00 PM	61.2	66.1	60.8
09:00 PM - 10:00 PM	61.3	63.9	60.9
10:00 PM - 11:00 PM	61.3	64.0	60.9
11:00 PM - 12:00 AM	61.4	61.0	61.0
12:00 AM - 01:00 AM	61.4	64.3	61.0
01:00 AM - 02:00 AM	61.5	64.7	61.1
02:00 AM - 03:00 AM	61.2	73.4	60.7
03:00 AM - 04:00 AM	61.2	65.2	60.8
04:00 AM - 05:00 AM	62.3	70.4	61.0
05:00 AM - 06:00 AM	61.1	70.4	60.6
06:00 AM - 07:00 AM	62.1	73.5	61.0
07:00 AM - 08:00 AM	61.0	72.2	60.5
08:00 AM - 09:00 AM	61.0	78.5	60.4
09:00 AM - 10:00 AM	61.4	72.7	60.8

Leq Average 24 hrs. (dB(A)) : 62.3
Lmax (dB(A)) : 89.2
L90 (dB(A)) : 60.8
Ldn (dB(A)) : 68.1
Standard (dB(A)) : 70 115
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 2540 (พ.ร.บ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงในโรงงาน และพื้นที่เสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ร.บ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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Life Sciences

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S-Report: Air Noise (pt 11-05AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036771-1

Page 1 of 1

Sample Number : 2415744-17
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์โรงงาน (GPS 47P 0733052, 1438860)
Measurement Date : Jun 17 - Jun 18, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 1222724

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	61.8	68.4	61.3
11:00 AM - 12:00 PM	61.0	71.6	61.1
12:00 PM - 01:00 PM	61.7	68.7	61.2
01:00 PM - 02:00 PM	61.7	65.3	61.3
02:00 PM - 03:00 PM	61.8	66.9	61.4
03:00 PM - 04:00 PM	61.9	69.4	61.4
04:00 PM - 05:00 PM	61.8	64.9	61.4
05:00 PM - 06:00 PM	61.8	64.3	61.4
06:00 PM - 07:00 PM	61.9	64.4	61.5
07:00 PM - 08:00 PM	61.6	63.7	61.5
08:00 PM - 09:00 PM	62.1	67.3	61.7
09:00 PM - 10:00 PM	62.1	65.9	61.7
10:00 PM - 11:00 PM	62.0	67.6	61.5
11:00 PM - 12:00 AM	61.8	66.8	61.4
12:00 AM - 01:00 AM	61.9	66.7	61.5
01:00 AM - 02:00 AM	61.8	66.0	61.4
02:00 AM - 03:00 AM	61.8	65.3	61.4
03:00 AM - 04:00 AM	61.6	65.1	61.3
04:00 AM - 05:00 AM	61.6	72.0	61.1
05:00 AM - 06:00 AM	61.7	71.4	61.2
06:00 AM - 07:00 AM	61.6	66.7	61.2
07:00 AM - 08:00 AM	61.9	66.4	61.5
08:00 AM - 09:00 AM	61.8	72.8	61.4
09:00 AM - 10:00 AM	62.0	68.5	61.8

Leq Average 24 hrs. (dB(A)) : 61.8
Lmax (dB(A)) : 72.8
L90 (dB(A)) : 61.4
Ldn (dB(A)) : 68.2
Standard (dB(A)) : 70 115
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 2540 (พ.ร.บ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงในโรงงาน และพื้นที่เสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ร.บ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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Life Sciences

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RIGHT SOLUTIONS RIGHT PARTNER

S-Report: Air Noise (pt 11-05AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036773-1

Page 1 of 1

Sample Number	2415744-10		
Parameter	Noise (Leq 24 hrs.)		
Location	ทิศทางด้านทิศเหนือของถนนในโรงงาน (GPS 47P 0733052, 1438860)		
Measurement Date	Jun 18 - Jun 19, 2024		
Measurement by	Anuwat Tema		
Sound Level meter	Serial No. 1222724		
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	63.0	82.1	60.9
11:00 AM - 12:00 PM	61.0	78.3	59.0
12:00 PM - 01:00 PM	61.6	71.2	58.4
01:00 PM - 02:00 PM	60.3	71.6	58.7
02:00 PM - 03:00 PM	61.8	77.0	59.4
03:00 PM - 04:00 PM	61.0	73.7	59.1
04:00 PM - 05:00 PM	61.2	72.4	59.4
05:00 PM - 06:00 PM	61.2	73.3	59.5
06:00 PM - 07:00 PM	61.4	74.3	60.0
07:00 PM - 08:00 PM	62.1	81.7	60.2
08:00 PM - 09:00 PM	62.0	75.7	60.4
09:00 PM - 10:00 PM	62.7	84.5	60.2
10:00 PM - 11:00 PM	62.1	78.1	60.5
11:00 PM - 12:00 AM	64.0	86.4	64.4
12:00 AM - 01:00 AM	67.3	79.5	65.3
01:00 AM - 02:00 AM	66.9	74.3	66.0
02:00 AM - 03:00 AM	61.4	72.6	60.2
03:00 AM - 04:00 AM	61.5	71.8	60.8
04:00 AM - 05:00 AM	62.5	84.5	60.4
05:00 AM - 06:00 AM	61.1	69.6	60.3
06:00 AM - 07:00 AM	61.5	67.7	60.7
07:00 AM - 08:00 AM	61.6	69.8	60.7
08:00 AM - 09:00 AM	62.1	77.0	61.1
09:00 AM - 10:00 AM	61.7	67.8	61.1
Leq Average 24 hrs. (dB(A))	62.7		
Lmax (dB(A))		85.6	
L90 (dB(A))			60.3
Ldn (dB(A))	70.2		
Standard (dB(A))	70	115	
Reference Method : ISO1996-1 and 1996-2			
Standard :	1. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่ามาตรฐานเสียงในโรงงาน พ.ศ. 2540 (พ.ร.บ. 2540) (สำหรับโรงงานอุตสาหกรรมประเภทที่ 15) 2. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่ามาตรฐานเสียงในโรงงาน และระดับเสียงที่สังเกตการณ์ในโรงงาน พ.ศ. 2548		
Remark :	The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.		

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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RIGHT SOLUTIONS RIGHT PARTNER

S-Report: Air Noise (pt 11 05AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036773-1

Page 1 of 1

Sample Number	2415744-19		
Parameter	Noise (Leq 24 hrs.)		
Location	ทิศทางด้านทิศเหนือของถนนในโรงงาน (GPS 47P 0733052, 1438860)		
Measurement Date	Jun 19 - Jun 20, 2024		
Measurement by	Anuwat Tema		
Sound Level meter	Serial No. 1222724		
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	61.8	69.0	61.3
11:00 AM - 12:00 PM	61.9	71.7	61.4
12:00 PM - 01:00 PM	61.8	66.8	61.5
01:00 PM - 02:00 PM	61.9	70.9	61.5
02:00 PM - 03:00 PM	61.9	65.4	61.5
03:00 PM - 04:00 PM	61.9	74.1	61.4
04:00 PM - 05:00 PM	61.9	64.9	61.1
05:00 PM - 06:00 PM	61.9	68.0	61.5
06:00 PM - 07:00 PM	61.9	65.6	61.6
07:00 PM - 08:00 PM	61.9	64.3	61.5
08:00 PM - 09:00 PM	61.9	64.4	61.5
09:00 PM - 10:00 PM	61.9	66.4	61.5
10:00 PM - 11:00 PM	62.0	65.3	61.6
11:00 PM - 12:00 AM	61.7	68.8	61.2
12:00 AM - 01:00 AM	61.5	66.6	61.1
01:00 AM - 02:00 AM	62.5	73.0	61.4
02:00 AM - 03:00 AM	62.5	83.6	61.6
03:00 AM - 04:00 AM	62.2	86.8	61.4
04:00 AM - 05:00 AM	61.8	68.5	61.3
05:00 AM - 06:00 AM	61.7	73.7	61.2
06:00 AM - 07:00 AM	62.1	70.7	61.1
07:00 AM - 08:00 AM	63.0	70.5	62.0
08:00 AM - 09:00 AM	62.2	70.4	61.8
09:00 AM - 10:00 AM	62.3	66.5	62.0
Leq Average 24 hrs. (dB(A))	62.0		
Lmax (dB(A))		86.8	
L90 (dB(A))			61.5
Ldn (dB(A))	68.4		
Standard (dB(A))	70	115	
Reference Method : ISO1996-1 and 1996-2			
Standard :	1. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่ามาตรฐานเสียงในโรงงาน พ.ศ. 2540 (พ.ร.บ. 2540) (สำหรับโรงงานอุตสาหกรรมประเภทที่ 15) 2. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่ามาตรฐานเสียงในโรงงาน และระดับเสียงที่สังเกตการณ์ในโรงงาน พ.ศ. 2548		
Remark :	The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.		

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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RIGHT SOLUTIONS RIGHT PARTNER

S-Report: Air Noise (pt 11 05AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036773-1

Page 1 of 1

Sample Number	2415744-20		
Parameter	Noise (Leq 24 hrs.)		
Location	ทิศทางด้านทิศเหนือของถนนในโรงงาน (GPS 47P 0733052, 1438860)		
Measurement Date	Jun 20 - Jun 21, 2024		
Measurement by	Anuwat Tema		
Sound Level meter	Serial No. 1222724		
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	62.4	64.8	62.1
11:00 AM - 12:00 PM	61.3	64.7	62.0
12:00 PM - 01:00 PM	62.5	66.8	62.1
01:00 PM - 02:00 PM	62.4	66.4	62.0
02:00 PM - 03:00 PM	62.3	64.7	62.0
03:00 PM - 04:00 PM	62.4	65.1	62.0
04:00 PM - 05:00 PM	61.8	64.7	61.4
05:00 PM - 06:00 PM	62.3	72.4	62.0
06:00 PM - 07:00 PM	62.3	69.8	61.9
07:00 PM - 08:00 PM	62.2	69.5	61.8
08:00 PM - 09:00 PM	62.2	65.5	61.9
09:00 PM - 10:00 PM	62.4	68.4	62.0
10:00 PM - 11:00 PM	62.3	65.0	61.9
11:00 PM - 12:00 AM	61.8	71.4	61.4
12:00 AM - 01:00 AM	61.7	76.2	61.2
01:00 AM - 02:00 AM	62.0	90.2	61.3
02:00 AM - 03:00 AM	61.8	86.3	61.3
03:00 AM - 04:00 AM	62.2	71.6	61.5
04:00 AM - 05:00 AM	61.9	74.0	60.9
05:00 AM - 06:00 AM	61.8	75.3	60.2
06:00 AM - 07:00 AM	61.8	78.2	59.9
07:00 AM - 08:00 AM	61.4	76.4	59.8
08:00 AM - 09:00 AM	61.0	74.2	59.5
09:00 AM - 10:00 AM	61.6	73.1	59.9
Leq Average 24 hrs. (dB(A))	62.0		
Lmax (dB(A))		90.2	
L90 (dB(A))			61.5
Ldn (dB(A))	68.4		
Standard (dB(A))	70	115	
Reference Method : ISO1996-1 and 1996-2			
Standard :	1. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่ามาตรฐานเสียงในโรงงาน พ.ศ. 2540 (พ.ร.บ. 2540) (สำหรับโรงงานอุตสาหกรรมประเภทที่ 15) 2. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่ามาตรฐานเสียงในโรงงาน และระดับเสียงที่สังเกตการณ์ในโรงงาน พ.ศ. 2548		
Remark :	The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.		

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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S-Report: Air Noise (pt 11 05AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036773-1

Page 1 of 1

Sample Number	2415744-21		
Parameter	Noise (Leq 24 hrs.)		
Location	ทิศทางด้านทิศเหนือของถนนในโรงงาน (GPS 47P 0733052, 1438860)		
Measurement Date	Jun 21 - Jun 22, 2024		
Measurement by	Anuwat Tema		
Sound Level meter	Serial No. 1222724		
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	61.9	75.8	60.1
11:00 AM - 12:00 PM	61.7	75.1	60.0
12:00 PM - 01:00 PM	61.6	70.9	60.0
01:00 PM - 02:00 PM	61.6	78.0	60.1
02:00 PM - 03:00 PM	61.7	74.8	60.6
03:00 PM - 04:00 PM	61.6	73.5	60.6
04:00 PM - 05:00 PM	61.4	71.7	60.5
05:00 PM - 06:00 PM	61.3	69.3	60.4
06:00 PM - 07:00 PM	61.2	70.7	60.3
07:00 PM - 08:00 PM	61.2	71.3	60.3
08:00 PM - 09:00 PM	62.4	80.0	61.2
09:00 PM - 10:00 PM	62.2	78.9	60.7
10:00 PM - 11:00 PM	62.9	75.3	61.4
11:00 PM - 12:00 AM	63.1	77.0	61.5
12:00 AM - 01:00 AM	62.7	81.9	60.5
01:00 AM - 02:00 AM	62.2	75.3	60.8
02:00 AM - 03:00 AM	63.2	79.8	61.7
03:00 AM - 04:00 AM	62.5	81.3	60.7
04:00 AM - 05:00 AM	63.1	77.2	61.7
05:00 AM - 06:00 AM	63.2	78.8	61.1
06:00 AM - 07:00 AM	62.0	74.2	60.3
07:00 AM - 08:00 AM	61.3	73.3	59.5
08:00 AM - 09:00 AM	60.5	76.0	59.1
09:00 AM - 10:00 AM	61.6	70.9	61.0
Leq Average 24 hrs. (dB(A))	62.1		
Lmax (dB(A))		81.9	
L90 (dB(A))			60.5
Ldn (dB(A))	69.0		
Standard (dB(A))	70	115	
Reference Method : ISO1996-1 and 1996-2			
Standard :	1. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่ามาตรฐานเสียงในโรงงาน พ.ศ. 2540 (พ.ร.บ. 2540) (สำหรับโรงงานอุตสาหกรรมประเภทที่ 15) 2. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่ามาตรฐานเสียงในโรงงาน และระดับเสียงที่สังเกตการณ์ในโรงงาน พ.ศ. 2548		
Remark :	The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.		

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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Life Sciences

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RIGHT SOLUTIONS RIGHT PARTNER

S-Report: Air Noise (pt 11 05AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaikaeng, Amphur Plaikaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036777-1

Page 1 of 1

Sample Number : 2415744-22
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์โรงงาน (GPS 47P 0733267, 1438947)
Measurement Date : Jun 15 - Jun 16, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 1222723

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	53.6	77.4	51.3
11:00 AM - 12:00 PM	52.1	76.3	50.9
12:00 PM - 01:00 PM	52.7	68.4	50.8
01:00 PM - 02:00 PM	54.1	77.8	52.1
02:00 PM - 03:00 PM	54.7	79.9	52.5
03:00 PM - 04:00 PM	54.1	87.0	52.2
04:00 PM - 05:00 PM	54.9	64.2	52.5
05:00 PM - 06:00 PM	52.9	62.6	51.3
06:00 PM - 07:00 PM	53.8	68.9	51.8
07:00 PM - 08:00 PM	53.1	65.2	51.9
08:00 PM - 09:00 PM	53.3	69.7	51.8
09:00 PM - 10:00 PM	53.9	72.0	52.1
10:00 PM - 11:00 PM	52.4	68.7	51.3
11:00 PM - 12:00 AM	52.6	64.6	51.4
12:00 AM - 01:00 AM	52.2	66.7	51.1
01:00 AM - 02:00 AM	53.7	64.9	52.1
02:00 AM - 03:00 AM	52.4	68.4	51.4
03:00 AM - 04:00 AM	52.5	65.4	51.7
04:00 AM - 05:00 AM	55.3	65.5	53.3
05:00 AM - 06:00 AM	54.7	68.9	53.0
06:00 AM - 07:00 AM	54.5	70.7	53.7
07:00 AM - 08:00 AM	53.4	69.4	51.3
08:00 AM - 09:00 AM	50.4	70.0	48.8
09:00 AM - 10:00 AM	49.8	64.6	48.3

Leq Average 24 hrs. (dB(A)) : 53.4
Lmax (dB(A)) : 84.2
L90 (dB(A)) : 51.7
Ldn (dB(A)) : 59.9
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงจากโรงงาน และเครื่องมือเสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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S-Reports_Air Noise (p11 06AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaikaeng, Amphur Plaikaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036777-1

Page 1 of 1

Sample Number : 2415744-23
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์โรงงาน (GPS 47P 0733267, 1438947)
Measurement Date : Jun 16 - Jun 17, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 1222723

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	49.9	61.7	48.2
11:00 AM - 12:00 PM	48.6	67.9	47.3
12:00 PM - 01:00 PM	52.8	67.4	46.7
01:00 PM - 02:00 PM	50.7	70.5	49.2
02:00 PM - 03:00 PM	49.8	70.7	48.2
03:00 PM - 04:00 PM	50.7	65.8	48.7
04:00 PM - 05:00 PM	51.6	69.4	49.7
05:00 PM - 06:00 PM	49.8	62.4	48.7
06:00 PM - 07:00 PM	50.7	70.4	49.1
07:00 PM - 08:00 PM	50.1	69.0	49.1
08:00 PM - 09:00 PM	51.3	62.5	49.7
09:00 PM - 10:00 PM	50.5	66.7	49.7
10:00 PM - 11:00 PM	50.3	68.4	49.4
11:00 PM - 12:00 AM	50.0	65.0	49.2
12:00 AM - 01:00 AM	49.8	67.5	48.9
01:00 AM - 02:00 AM	51.3	74.3	50.2
02:00 AM - 03:00 AM	50.4	69.1	49.6
03:00 AM - 04:00 AM	50.3	61.2	49.5
04:00 AM - 05:00 AM	49.9	64.2	49.0
05:00 AM - 06:00 AM	52.9	70.3	50.7
06:00 AM - 07:00 AM	51.7	68.3	50.7
07:00 AM - 08:00 AM	51.8	65.3	50.4
08:00 AM - 09:00 AM	52.9	70.1	51.6
09:00 AM - 10:00 AM	53.9	66.3	51.5

Leq Average 24 hrs. (dB(A)) : 51.2
Lmax (dB(A)) : 87.6
L90 (dB(A)) : 49.3
Ldn (dB(A)) : 57.5
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงจากโรงงาน และเครื่องมือเสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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RIGHT SOLUTIONS RIGHT PARTNER

S-Reports_Air Noise (p11 06AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaikaeng, Amphur Plaikaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036777-1

Page 1 of 1

Sample Number : 2415744-24
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์โรงงาน (GPS 47P 0733267, 1438947)
Measurement Date : Jun 17 - Jun 18, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 1222723

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	52.6	69.2	51.4
11:00 AM - 12:00 PM	52.8	75.6	51.6
12:00 PM - 01:00 PM	53.5	91.8	50.9
01:00 PM - 02:00 PM	54.4	91.1	51.5
02:00 PM - 03:00 PM	53.1	78.4	51.6
03:00 PM - 04:00 PM	52.7	63.7	51.0
04:00 PM - 05:00 PM	52.4	83.1	50.8
05:00 PM - 06:00 PM	58.3	101.1	50.1
06:00 PM - 07:00 PM	52.3	70.9	50.2
07:00 PM - 08:00 PM	52.3	64.3	51.3
08:00 PM - 09:00 PM	53.3	66.1	52.0
09:00 PM - 10:00 PM	53.4	66.7	52.0
10:00 PM - 11:00 PM	52.0	67.2	50.9
11:00 PM - 12:00 AM	53.7	67.5	52.1
12:00 AM - 01:00 AM	53.6	66.0	52.0
01:00 AM - 02:00 AM	53.5	67.6	52.3
02:00 AM - 03:00 AM	53.9	78.0	52.7
03:00 AM - 04:00 AM	53.1	65.4	52.3
04:00 AM - 05:00 AM	55.4	66.7	53.6
05:00 AM - 06:00 AM	53.8	66.9	52.4
06:00 AM - 07:00 AM	53.1	68.9	51.8
07:00 AM - 08:00 AM	51.7	66.5	50.6
08:00 AM - 09:00 AM	51.4	71.5	50.1
09:00 AM - 10:00 AM	56.0	72.0	54.7

Leq Average 24 hrs. (dB(A)) : 53.7
Lmax (dB(A)) : 101.1
L90 (dB(A)) : 51.6
Ldn (dB(A)) : 60.1
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงจากโรงงาน และเครื่องมือเสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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S-Reports_Air Noise (p11 07AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaikaeng, Amphur Plaikaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036777-1

Page 1 of 1

Sample Number : 2415744-25
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์โรงงาน (GPS 47P 0733267, 1438947)
Measurement Date : Jun 18 - Jun 19, 2024
Measurement by : Anuwat Tema
Sound Level meter : Serial No. 1222723

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	53.5	76.2	52.0
11:00 AM - 12:00 PM	53.9	69.6	52.5
12:00 PM - 01:00 PM	54.3	90.4	50.8
01:00 PM - 02:00 PM	54.0	83.4	51.8
02:00 PM - 03:00 PM	57.0	95.2	51.7
03:00 PM - 04:00 PM	53.4	65.5	51.5
04:00 PM - 05:00 PM	55.0	92.3	52.0
05:00 PM - 06:00 PM	50.5	64.9	49.4
06:00 PM - 07:00 PM	52.1	68.9	50.6
07:00 PM - 08:00 PM	52.7	72.5	51.1
08:00 PM - 09:00 PM	52.4	67.9	51.0
09:00 PM - 10:00 PM	53.2	66.6	51.8
10:00 PM - 11:00 PM	52.3	64.4	51.2
11:00 PM - 12:00 AM	52.6	65.1	51.3
12:00 AM - 01:00 AM	53.8	61.9	52.1
01:00 AM - 02:00 AM	54.7	71.5	53.2
02:00 AM - 03:00 AM	54.7	68.9	53.2
03:00 AM - 04:00 AM	53.0	65.5	52.4
04:00 AM - 05:00 AM	54.7	61.8	51.0
05:00 AM - 06:00 AM	54.2	70.1	52.7
06:00 AM - 07:00 AM	55.6	66.7	53.8
07:00 AM - 08:00 AM	55.1	64.8	53.1
08:00 AM - 09:00 AM	53.7	69.7	51.7
09:00 AM - 10:00 AM	55.4	80.6	53.0

Leq Average 24 hrs. (dB(A)) : 54.0
Lmax (dB(A)) : 95.2
L90 (dB(A)) : 51.8
Ldn (dB(A)) : 60.5
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยมาตรฐานเสียง 15 (พ.ศ. 2540) เรื่องการควบคุมการรบกวนเสียงในชุมชน
2. ประกาศกระทรวงอุตสาหกรรม เรื่องการควบคุมมาตรฐานเสียงจากโรงงาน และเครื่องมือเสียงที่เกิดจากการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supat Salameth
Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. AN ALS Limited Company

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RIGHT SOLUTIONS RIGHT PARTNER

S-Reports_Air Noise (p11 07AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036782-1

Page 1 of 1

Sample Number : 2415744-26
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์โรงงาน (GPS 47P 0733267, 1438947)
Measurement Date : Jun 19 - Jun 20, 2024
Measurement by : Anuwet Tema
Sound Level meter : Serial No. 1222723

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	54.9	71.0	52.9
11:00 AM - 12:00 PM	53.9	66.7	52.1
12:00 PM - 01:00 PM	54.6	71.1	52.8
01:00 PM - 02:00 PM	56.3	81.4	54.2
02:00 PM - 03:00 PM	56.6	88.0	54.2
03:00 PM - 04:00 PM	56.0	89.0	54.2
04:00 PM - 05:00 PM	54.7	64.9	52.3
05:00 PM - 06:00 PM	53.1	63.8	52.1
06:00 PM - 07:00 PM	54.1	78.6	52.9
07:00 PM - 08:00 PM	52.5	64.4	51.4
08:00 PM - 09:00 PM	53.6	66.2	51.6
09:00 PM - 10:00 PM	52.9	70.8	51.6
10:00 PM - 11:00 PM	52.0	66.6	51.0
11:00 PM - 12:00 AM	52.2	66.7	52.0
12:00 AM - 01:00 AM	54.1	62.0	52.3
01:00 AM - 02:00 AM	54.7	70.7	52.9
02:00 AM - 03:00 AM	54.2	63.9	53.0
03:00 AM - 04:00 AM	52.8	62.6	52.0
04:00 AM - 05:00 AM	54.8	64.4	53.0
05:00 AM - 06:00 AM	54.4	67.6	53.0
06:00 AM - 07:00 AM	55.4	69.2	53.8
07:00 AM - 08:00 AM	54.6	63.2	52.7
08:00 AM - 09:00 AM	54.2	66.0	52.7
09:00 AM - 10:00 AM	55.0	72.4	52.3

Leq Average 24 hrs. (dB(A)) : 54.4
Lmax (dB(A)) : 88.0
L90 (dB(A)) : 52.7
Ldn (dB(A)) : 60.6
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงอุตสาหกรรม เรื่อง ค่ามาตรฐานเสียงรบกวนในโรงงาน พ.ศ. 2540
2. ประกาศกระทรวงอุตสาหกรรม เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน และระดับเสียงที่สังเกตการณ์ในชุมชน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
Scientist (3)

Approved by

Supt S
Supt. Salameth
Section Head

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S-Report: Air Noise rpt (11 07AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036782-1

Page 1 of 1

Sample Number : 2415744-27
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์โรงงาน (GPS 47P 0733267, 1438947)
Measurement Date : Jun 20 - Jun 21, 2024
Measurement by : Anuwet Tema
Sound Level meter : Serial No. 1222723

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	54.4	66.9	52.7
11:00 AM - 12:00 PM	54.3	68.6	52.8
12:00 PM - 01:00 PM	52.8	54.8	51.4
01:00 PM - 02:00 PM	56.4	95.6	52.6
02:00 PM - 03:00 PM	55.1	78.2	52.6
03:00 PM - 04:00 PM	53.7	74.3	51.8
04:00 PM - 05:00 PM	54.6	64.4	52.5
05:00 PM - 06:00 PM	53.4	65.1	51.6
06:00 PM - 07:00 PM	54.9	66.8	52.6
07:00 PM - 08:00 PM	53.6	79.2	51.7
08:00 PM - 09:00 PM	53.1	64.9	51.7
09:00 PM - 10:00 PM	53.6	75.0	52.1
10:00 PM - 11:00 PM	52.8	66.0	51.8
11:00 PM - 12:00 AM	54.9	69.7	52.1
12:00 AM - 01:00 AM	56.0	74.7	53.5
01:00 AM - 02:00 AM	58.1	90.5	53.0
02:00 AM - 03:00 AM	55.3	74.7	52.4
03:00 AM - 04:00 AM	52.6	72.1	51.5
04:00 AM - 05:00 AM	54.9	67.5	53.0
05:00 AM - 06:00 AM	54.5	64.3	52.9
06:00 AM - 07:00 AM	54.3	68.6	52.6
07:00 AM - 08:00 AM	53.9	73.1	52.0
08:00 AM - 09:00 AM	57.5	84.0	51.6
09:00 AM - 10:00 AM	57.6	82.0	52.7

Leq Average 24 hrs. (dB(A)) : 55.0
Lmax (dB(A)) : 95.6
L90 (dB(A)) : 52.5
Ldn (dB(A)) : 61.5
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงอุตสาหกรรม เรื่อง ค่ามาตรฐานเสียงรบกวนในโรงงาน พ.ศ. 2540
2. ประกาศกระทรวงอุตสาหกรรม เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน และระดับเสียงที่สังเกตการณ์ในชุมชน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

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Chonticha Subongkroh
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S-Report: Air Noise rpt (11 07AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2415744
Date Received : Jun 24, 2024
Date Reported : Jun 26, 2024
Report Number: 3036782-1

Page 1 of 1

Sample Number : 2415744-28
Parameter : Noise (Leq 24 hrs.)
Location : คลังสารพัดประโยชน์โรงงาน (GPS 47P 0733267, 1438947)
Measurement Date : Jun 21 - Jun 22, 2024
Measurement by : Anuwet Tema
Sound Level meter : Serial No. 1222723

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	58.3	97.5	52.3
11:00 AM - 12:00 PM	55.8	81.3	52.4
12:00 PM - 01:00 PM	60.7	91.8	50.5
01:00 PM - 02:00 PM	63.3	85.2	53.8
02:00 PM - 03:00 PM	62.5	89.2	52.3
03:00 PM - 04:00 PM	55.0	60.3	51.5
04:00 PM - 05:00 PM	54.5	75.5	50.2
05:00 PM - 06:00 PM	60.7	98.4	49.8
06:00 PM - 07:00 PM	56.6	84.7	47.9
07:00 PM - 08:00 PM	51.1	74.2	48.1
08:00 PM - 09:00 PM	50.7	69.1	48.9
09:00 PM - 10:00 PM	51.3	76.8	49.7
10:00 PM - 11:00 PM	54.0	75.5	51.3
11:00 PM - 12:00 AM	54.6	72.7	52.5
12:00 AM - 01:00 AM	64.0	66.6	51.5
01:00 AM - 02:00 AM	53.4	66.9	50.9
02:00 AM - 03:00 AM	51.7	63.7	50.1
03:00 AM - 04:00 AM	49.4	67.3	48.5
04:00 AM - 05:00 AM	51.4	62.5	50.1
05:00 AM - 06:00 AM	52.4	64.9	51.1
06:00 AM - 07:00 AM	52.8	64.9	51.3
07:00 AM - 08:00 AM	58.7	74.7	51.1
08:00 AM - 09:00 AM	54.7	77.1	51.9
09:00 AM - 10:00 AM	54.4	77.3	51.8

Leq Average 24 hrs. (dB(A)) : 56.9
Lmax (dB(A)) : 98.4
L90 (dB(A)) : 51.1
Ldn (dB(A)) : 60.6
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงอุตสาหกรรม เรื่อง ค่ามาตรฐานเสียงรบกวนในโรงงาน พ.ศ. 2540
2. ประกาศกระทรวงอุตสาหกรรม เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน และระดับเสียงที่สังเกตการณ์ในชุมชน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Chontichak
Chonticha Subongkroh
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Approved by

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S-Report: Air Noise rpt (11 07AM)



Analysis / Test Report



TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466747
Date Received : Jun 18, 2024
Date Reported : Jun 21, 2024
Report Number: 3032550-1

Page 1 of 1

Sample Number : 2466747-1
Parameter : Noise (Leq 12 hrs.)
Location : Packing (1st Floor)
Measurement Date : Jun 17, 2024
Measurement by : Nattakorn Vongkhyoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:07 PM - 11:07 PM	67.3	83.4	62.1
11:07 PM - 12:07 AM	69.1	84.4	62.6
12:07 AM - 01:07 AM	66.2	83.4	62.6
01:07 AM - 02:07 AM	68.4	84.5	63.0
02:07 AM - 03:07 AM	68.2	83.4	62.4
03:07 AM - 04:07 AM	67.0	83.4	62.3
04:07 AM - 05:07 AM	69.4	84.8	63.8
05:07 AM - 06:07 AM	69.6	83.4	64.2
06:07 AM - 07:07 AM	67.7	86.5	62.5
07:07 AM - 08:07 AM	68.2	86.6	62.5
08:07 AM - 09:07 AM	73.2	90.6	62.7
09:07 AM - 10:07 AM	69.4	83.5	63.1

Leq Average 12 hrs. (dB(A)) : 69.0
Lmax (dB(A)) : 90.6
Standard (dB(A)) : 87
Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2548
ในการประกอบกิจการโรงงานหรืออาคารขนาดใหญ่เกิน 10,000 ตารางเมตรขึ้นไป
Note : L_{peak} = 109.6 dB (C)

Technical Management

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S-Report: Air Noise rpt (2 24PM)



Analysis / Test Report

Client : BASF (Thai) Limited
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Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466747
Date Received : Jun 18, 2024
Date Reported : Jun 21, 2024
Report Number: 3032560-1

Page 1 of 1

Sample Number : 2466747-2
Parameter : Noise (Leq 12 hrs.)
Location : Band Dryer Area (2nd Floor)
Measurement Date : Jun 17, 2024
Measurement by : Nattakarn Vongnyoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:56 PM - 09:56 PM	90.1	91.9	89.8
09:56 PM - 10:56 PM	89.6	95.2	87.3
10:56 PM - 11:56 PM	89.9	91.5	89.5
11:56 PM - 12:56 AM	90.0	91.1	89.7
12:56 AM - 01:56 AM	90.1	92.1	89.7
01:56 AM - 02:56 AM	90.1	91.5	89.8
02:56 AM - 03:56 AM	90.0	91.3	89.7
03:56 AM - 04:56 AM	90.0	91.5	89.7
04:56 AM - 05:56 AM	90.0	91.2	89.7
05:56 AM - 06:56 AM	90.1	91.3	89.8
06:56 AM - 07:56 AM	90.1	92.0	89.8
07:56 AM - 08:56 AM	90.1	91.7	89.8
Leq Average 12 hrs. (dB(A))	90.0		
Lmax (dB(A))		95.2	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดมลพิษทางเสียง (การวัดค่าเฉลี่ย) และ มาตรฐานการตรวจวัดมลพิษทางเสียง (การวัดค่าสูงสุด)			
Note : L _{Cpeak} = 115.6 dB (C)			

Technical Management

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S:\Reports_Air Noise rpt (2.24P8)



Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466747
Date Received : Jun 18, 2024
Date Reported : Jun 21, 2024
Report Number: 3032561-1

Page 1 of 1

Sample Number : 2466747-3
Parameter : Noise (Leq 12 hrs.)
Location : Polybet Area (3rd Floor)
Measurement Date : Jun 17, 2024
Measurement by : Nattakarn Vongnyoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:26 AM - 10:26 AM	80.8	85.4	80.5
10:26 AM - 11:26 AM	80.6	88.5	80.4
11:26 AM - 12:26 PM	80.6	85.4	80.4
12:26 PM - 01:26 PM	80.5	88.4	80.3
01:26 PM - 02:26 PM	80.5	88.3	80.3
02:26 PM - 03:26 PM	80.5	88.4	80.3
03:26 PM - 04:26 PM	80.4	88.4	80.3
04:26 PM - 05:26 PM	80.5	88.4	80.3
05:26 PM - 06:26 PM	80.5	88.5	80.3
06:26 PM - 07:26 PM	80.6	88.4	80.4
07:26 PM - 08:26 PM	80.6	88.5	80.4
08:26 PM - 09:26 PM	80.4	88.3	80.2
Leq Average 12 hrs. (dB(A))	80.5		
Lmax (dB(A))		88.5	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดมลพิษทางเสียง (การวัดค่าเฉลี่ย) และ มาตรฐานการตรวจวัดมลพิษทางเสียง (การวัดค่าสูงสุด)			
Note : L _{Cpeak} = 105.1 dB (C)			

Technical Management

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S:\Reports_Air Noise rpt (2.24P8)



Analysis / Test Report

Client : BASF (Thai) Limited
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Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466747
Date Received : Jun 18, 2024
Date Reported : Jun 21, 2024
Report Number: 3032562-1

Page 1 of 1

Sample Number : 2466747-4
Parameter : Noise (Leq 12 hrs.)
Location : Extruder 2 (2nd Floor) ชั่วคราว
Measurement Date : Jun 17, 2024
Measurement by : Nattakarn Vongnyoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:48 AM - 10:48 AM	93.4	95.3	92.7
10:48 AM - 11:48 AM	93.5	95.3	92.9
11:48 AM - 12:48 PM	93.4	95.7	92.8
12:48 PM - 01:48 PM	93.4	95.1	92.7
01:48 PM - 02:48 PM	93.6	95.4	92.8
02:48 PM - 03:48 PM	93.5	95.4	92.8
03:48 PM - 04:48 PM	93.5	95.2	92.9
04:48 PM - 05:48 PM	93.5	95.3	92.8
05:48 PM - 06:48 PM	93.5	95.1	92.8
06:48 PM - 07:48 PM	93.4	95.2	92.7
07:48 PM - 08:48 PM	93.2	94.9	92.5
08:48 PM - 09:48 PM	93.3	95.2	92.6
Leq Average 12 hrs. (dB(A))	93.4		
Lmax (dB(A))		95.7	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดมลพิษทางเสียง (การวัดค่าเฉลี่ย) และ มาตรฐานการตรวจวัดมลพิษทางเสียง (การวัดค่าสูงสุด)			
Note : L _{Cpeak} = 118.3 dB (C)			

Technical Management

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S:\Reports_Air Noise rpt (2.24P8)



Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466747
Date Received : Jun 18, 2024
Date Reported : Jun 21, 2024
Report Number: 3032563-1

Page 1 of 1

Sample Number : 2466747-5
Parameter : Noise (Leq 12 hrs.)
Location : Product Surge Tank (2nd Floor)
Measurement Date : Jun 17, 2024
Measurement by : Nattakarn Vongnyoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:34 PM - 11:34 PM	82.1	83.6	81.7
11:34 PM - 12:34 AM	82.3	83.7	81.9
12:34 AM - 01:34 AM	82.4	83.8	82.0
01:34 AM - 02:34 AM	82.4	83.6	82.0
02:34 AM - 03:34 AM	82.3	88.7	82.0
03:34 AM - 04:34 AM	82.3	83.7	81.9
04:34 AM - 05:34 AM	82.3	81.8	82.0
05:34 AM - 06:34 AM	82.4	83.7	82.0
06:34 AM - 07:34 AM	82.4	88.8	82.1
07:34 AM - 08:34 AM	82.4	83.7	82.1
08:34 AM - 09:34 AM	82.3	84.2	81.9
09:34 AM - 10:34 AM	82.2	84.1	81.8
Leq Average 12 hrs. (dB(A))	82.3		
Lmax (dB(A))		88.8	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดมลพิษทางเสียง (การวัดค่าเฉลี่ย) และ มาตรฐานการตรวจวัดมลพิษทางเสียง (การวัดค่าสูงสุด)			
Note : L _{Cpeak} = 109.7 dB (C)			

Technical Management

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S:\Reports_Air Noise rpt (2.24P8)



Analysis / Test Report

Client : BASF (Thai) Limited
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Rayong Thailand 21140
P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466747
Date Received : Jun 18, 2024
Date Reported : Jun 21, 2024
Report Number: 3032564-1

Page 1 of 1

Sample Number : 2466747-6
Parameter : Noise (Leq 12 hrs.)
Location : Sifter room (3rd Floor)
Measurement Date : Jun 17, 2024
Measurement by : Nattakarn Vongnyoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:31 AM - 10:31 AM	84.1	85.7	83.7
10:31 AM - 11:31 AM	83.7	91.3	82.3
11:31 AM - 12:31 PM	82.9	86.3	83.6
12:31 PM - 01:31 PM	83.6	85.2	83.1
01:31 PM - 02:31 PM	83.4	85.0	83.2
02:31 PM - 03:31 PM	83.4	92.3	83.1
03:31 PM - 04:31 PM	83.5	85.1	83.2
04:31 PM - 05:31 PM	83.3	85.1	83.1
05:31 PM - 06:31 PM	83.5	85.1	83.1
06:31 PM - 07:31 PM	84.7	89.4	82.9
07:31 PM - 08:31 PM	83.6	92.5	83.3
08:31 PM - 09:31 PM	83.3	92.2	83.0
Leq Average 12 hrs. (dB(A))	83.6		
Lmax (dB(A))		92.5	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดเสียงรบกวน (เสียง) ในอาคารและบริเวณใกล้เคียง ในการวัดค่าเสียงรบกวนในเวลากลางคืนค่าเสียงรบกวนต้องไม่เกินค่ามาตรฐาน Note : LCpeak = 113.6 dB (C)			

Technical Management

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S:\Reports_Air Noise rpt (2.25PM)



Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plauckdaeng, Amphur Plauckdaeng,
Rayong Thailand 21140
P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466747
Date Received : Jun 18, 2024
Date Reported : Jun 21, 2024
Report Number: 3032564-1

Page 1 of 1

Sample Number : 2466747-7
Parameter : Noise (Leq 12 hrs.)
Location : Rotex SZ 1080 (3rd Floor)
Measurement Date : Jun 17, 2024
Measurement by : Nattakarn Vongnyoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:34 AM - 10:34 AM	82.9	85.1	82.1
10:34 AM - 11:34 AM	82.5	85.2	81.9
11:34 AM - 12:34 PM	82.6	91.4	81.9
12:34 PM - 01:34 PM	82.8	85.3	82.0
01:34 PM - 02:34 PM	82.5	85.1	81.7
02:34 PM - 03:34 PM	82.3	85.0	81.5
03:34 PM - 04:34 PM	82.2	84.3	81.7
04:34 PM - 05:34 PM	82.3	84.3	81.7
05:34 PM - 06:34 PM	82.6	85.3	82.0
06:34 PM - 07:34 PM	82.7	89.1	82.0
07:34 PM - 08:34 PM	82.5	95.4	81.7
08:34 PM - 09:34 PM	81.9	84.2	80.7
Leq Average 12 hrs. (dB(A))	82.5		
Lmax (dB(A))		95.4	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดเสียงรบกวน (เสียง) ในอาคารและบริเวณใกล้เคียง ในการวัดค่าเสียงรบกวนในเวลากลางคืนค่าเสียงรบกวนต้องไม่เกินค่ามาตรฐาน Note : LCpeak = 127.2 dB (C)			

Technical Management

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Scientist (3)

Approved by

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Analysis / Test Report

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Rayong Thailand 21140
P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466747
Date Received : Jun 18, 2024
Date Reported : Jun 21, 2024
Report Number: 3032564-1

Page 1 of 1

Sample Number : 2466747-8
Parameter : Noise (Leq 12 hrs.)
Location : K Tron PC1060 (3rd Floor)
Measurement Date : Jun 17, 2024
Measurement by : Nattakarn Vongnyoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:29 AM - 10:29 AM	84.7	99.5	80.9
10:29 AM - 11:29 AM	84.7	99.4	80.7
11:29 AM - 12:29 PM	84.7	99.5	80.7
12:29 PM - 01:29 PM	84.7	99.3	80.7
01:29 PM - 02:29 PM	84.6	99.5	80.6
02:29 PM - 03:29 PM	82.4	99.4	75.1
03:29 PM - 04:29 PM	82.8	99.4	75.1
04:29 PM - 05:29 PM	84.6	99.4	80.2
05:29 PM - 06:29 PM	84.6	99.4	80.4
06:29 PM - 07:29 PM	84.7	99.4	80.7
07:29 PM - 08:29 PM	84.6	101.6	77.3
08:29 PM - 09:29 PM	84.5	101.5	77.2
Leq Average 12 hrs. (dB(A))	84.4		
Lmax (dB(A))		101.6	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดเสียงรบกวน (เสียง) ในอาคารและบริเวณใกล้เคียง ในการวัดค่าเสียงรบกวนในเวลากลางคืนค่าเสียงรบกวนต้องไม่เกินค่ามาตรฐาน Note : LCpeak = 115.1 dB (C)			

Technical Management

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P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466747
Date Received : Jun 18, 2024
Date Reported : Jun 21, 2024
Report Number: 3032564-1

Page 1 of 1

Sample Number : 2466747-9
Parameter : Noise (Leq 12 hrs.)
Location : Control Room (1st Floor)
Measurement Date : Jun 17, 2024
Measurement by : Nattakarn Vongnyoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:37 PM - 10:37 PM	59.4	74.7	52.6
10:37 PM - 11:37 PM	57.2	76.5	52.7
11:37 PM - 12:37 AM	56.2	72.3	52.9
12:37 AM - 01:37 AM	59.6	71.2	53.0
01:37 AM - 02:37 AM	54.4	67.3	52.7
02:37 AM - 03:37 AM	55.3	71.2	53.1
03:37 AM - 04:37 AM	55.3	71.0	52.7
04:37 AM - 05:37 AM	57.2	73.3	52.7
05:37 AM - 06:37 AM	59.7	73.4	52.7
06:37 AM - 07:37 AM	63.3	84.9	52.8
07:37 AM - 08:37 AM	63.3	83.2	53.0
08:37 AM - 09:37 AM	65.7	85.9	53.3
Leq Average 12 hrs. (dB(A))	60.4		
Lmax (dB(A))		85.9	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดเสียงรบกวน (เสียง) ในอาคารและบริเวณใกล้เคียง ในการวัดค่าเสียงรบกวนในเวลากลางคืนค่าเสียงรบกวนต้องไม่เกินค่ามาตรฐาน Note : LCpeak = 104.0 dB (C)			

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P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466747
Date Received : Jun 18, 2024
Date Reported : Jun 21, 2024
Report Number: 3032568-1

Page 1 of 1

Sample Number : 2466747-10
Parameter : Noise (Leq 12 hrs.)
Location : BH 1101 4Fl
Measurement Date : Jun 17, 2024
Measurement by : Nattakarn Vongnyoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:37 AM - 10:37 AM	88.6	90.2	86.0
10:37 AM - 11:37 AM	87.8	89.0	87.3
11:37 AM - 12:37 PM	87.7	88.8	87.4
12:37 PM - 01:37 PM	87.7	88.5	87.4
01:37 PM - 02:37 PM	87.6	88.7	87.4
02:37 PM - 03:37 PM	87.6	88.5	87.4
03:37 PM - 04:37 PM	87.6	88.7	87.3
04:37 PM - 05:37 PM	87.7	88.6	87.4
05:37 PM - 06:37 PM	88.0	89.2	87.7
06:37 PM - 07:37 PM	88.4	89.3	88.0
07:37 PM - 08:37 PM	82.9	84.7	85.5
08:37 PM - 09:37 PM	86.2	83.9	82.7
Leq Average 12 hrs. (dB(A))	87.2		
Lmax (dB(A))		94.7	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจสอบการวัดเสียงและสภาวะแวดล้อมทางเสียง ในการปฏิบัติงานในโรงงานอุตสาหกรรมและอาคารพาณิชย์ตามมาตรฐาน ม.ร.บ.สงวน			
Note : LCpeak = 121.8 dB (C)			

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P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466747
Date Received : Jun 18, 2024
Date Reported : Jun 21, 2024
Report Number: 3032569-1

Page 1 of 1

Sample Number : 2466747-11
Parameter : Noise (Leq 12 hrs.)
Location : EN Room (1st Floor)
Measurement Date : Jun 17, 2024
Measurement by : Nattakarn Vongnyoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:04 PM - 11:04 PM	75.9	83.1	73.9
11:04 PM - 12:04 AM	76.5	88.0	75.4
12:04 AM - 01:04 AM	76.9	82.5	75.6
01:04 AM - 02:04 AM	75.5	91.0	74.2
02:04 AM - 03:04 AM	75.1	88.9	73.9
03:04 AM - 04:04 AM	75.0	81.1	74.0
04:04 AM - 05:04 AM	75.1	82.2	74.0
05:04 AM - 06:04 AM	75.1	81.0	74.1
06:04 AM - 07:04 AM	75.9	84.7	74.4
07:04 AM - 08:04 AM	76.4	82.3	75.4
08:04 AM - 09:04 AM	75.5	81.5	74.3
09:04 AM - 10:04 AM	76.2	82.8	75.4
Leq Average 12 hrs. (dB(A))	75.8		
Lmax (dB(A))		91.0	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจสอบการวัดเสียงและสภาวะแวดล้อมทางเสียง ในการปฏิบัติงานในโรงงานอุตสาหกรรมและอาคารพาณิชย์ตามมาตรฐาน ม.ร.บ.สงวน			
Note : LCpeak = 113.2 dB (C)			

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P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2466747
Date Received : Jun 18, 2024
Date Reported : Jun 21, 2024
Report Number: 3032570-1

Page 1 of 1

Sample Number : 2466747-12
Parameter : Noise (Leq 12 hrs.)
Location : Utility Room (1st Floor)
Measurement Date : Jun 17, 2024
Measurement by : Nattakarn Vongnyoo

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:41 PM - 10:41 PM	88.1	92.2	86.9
10:41 PM - 11:41 PM	88.6	94.8	87.7
11:41 PM - 12:41 AM	88.7	92.5	88.0
12:41 AM - 01:41 AM	88.6	92.7	87.8
01:41 AM - 02:41 AM	88.8	93.2	88.0
02:41 AM - 03:41 AM	88.6	93.2	87.8
03:41 AM - 04:41 AM	89.1	94.8	87.9
04:41 AM - 05:41 AM	88.6	93.9	87.6
05:41 AM - 06:41 AM	88.9	92.7	88.0
06:41 AM - 07:41 AM	88.6	92.3	87.8
07:41 AM - 08:41 AM	88.7	93.5	87.9
08:41 AM - 09:41 AM	88.6	92.4	87.7
Leq Average 12 hrs. (dB(A))	88.7		
Lmax (dB(A))		94.8	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจสอบการวัดเสียงและสภาวะแวดล้อมทางเสียง ในการปฏิบัติงานในโรงงานอุตสาหกรรมและอาคารพาณิชย์ตามมาตรฐาน ม.ร.บ.สงวน			
Note : LCpeak = 106.9 dB (C)			

Technical Management

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Rayong Thailand 21140
P/O : 4984975585
Project Name : Monitoring
Project Location :

Lot ID: 2415755
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number: 2627217-1

Page 1 of 1

Sample Number : 2415755-1
Parameter : Noise (Leq 12 hrs.)
Location : Packing (1st Floor)
Measurement Date : Feb 27, 2024
Measurement by : Sitpavit Suwanarat

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:22 AM - 10:22 AM	70.2	85.7	63.8
10:22 AM - 11:22 AM	71.4	86.9	65.0
11:22 AM - 12:22 PM	71.0	86.5	64.6
12:22 PM - 01:22 PM	73.0	88.5	66.8
01:22 PM - 02:22 PM	72.8	88.3	66.4
02:22 PM - 03:22 PM	72.2	90.0	64.4
03:22 PM - 04:22 PM	72.1	90.9	65.3
04:22 PM - 05:22 PM	73.2	91.0	65.4
05:22 PM - 06:22 PM	72.2	97.2	66.1
06:22 PM - 07:22 PM	71.9	96.9	65.8
07:22 PM - 08:22 PM	73.0	98.0	66.9
08:22 PM - 09:22 PM	73.8	92.8	66.4
Leq Average 12 hrs. (dB(A))	72.4		
Lmax (dB(A))		98.0	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจสอบการวัดเสียงและสภาวะแวดล้อมทางเสียง ในการปฏิบัติงานในโรงงานอุตสาหกรรมและอาคารพาณิชย์ตามมาตรฐาน ม.ร.บ.สงวน			
Note : LCpeak = 109.8 dB (C)			

Technical Management

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415755
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number: 2927219-1

Page 1 of 1

Sample Number : 2415755-2
Parameter : Noise (Leq 12 hrs.)
Location : Band Dryer Area (2nd Floor)
Measurement Date : Feb 27, 2024
Measurement by : Sitpavit Suwinnarat

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	88.3	92.7	87.8
10:00 AM - 11:00 AM	87.8	89.0	87.6
11:00 AM - 12:00 PM	87.7	90.1	87.5
12:00 PM - 01:00 PM	87.6	88.6	87.3
01:00 PM - 02:00 PM	87.5	88.5	87.3
02:00 PM - 03:00 PM	87.5	89.1	87.3
03:00 PM - 04:00 PM	87.7	89.3	87.4
04:00 PM - 05:00 PM	87.8	89.4	87.5
05:00 PM - 06:00 PM	87.8	89.1	87.5
06:00 PM - 07:00 PM	87.7	92.1	87.2
07:00 PM - 08:00 PM	87.6	89.3	87.5
08:00 PM - 09:00 PM	87.5	89.2	87.4
Leq Average 12 hrs. (dB(A))	87.7		
Lmax (dB(A))		92.7	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดเสียงรบกวน (Leq 12 ชั่วโมง) ตามมาตรฐานการตรวจวัดเสียงรบกวนในอาคารของ ม.ป.ช. และ ม.ป.ว.บ.			
Note : LCpeak = 115.3 dB (C)			

Technical Management

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415755
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number: 2927219-1

Page 1 of 1

Sample Number : 2415755-3
Parameter : Noise (Leq 12 hrs.)
Location : Polybet Area (3rd Floor)
Measurement Date : Feb 27, 2024
Measurement by : Sitpavit Suwinnarat

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:29 PM - 10:29 PM	78.3	84.8	77.8
10:29 PM - 11:29 PM	77.8	83.0	77.2
11:29 PM - 12:29 AM	77.7	83.4	77.1
12:29 AM - 01:29 AM	77.9	84.3	77.5
01:29 AM - 02:29 AM	77.6	83.4	77.0
02:29 AM - 03:29 AM	77.4	83.2	76.9
03:29 AM - 04:29 AM	77.6	83.1	77.1
04:29 AM - 05:29 AM	77.6	83.5	77.1
05:29 AM - 06:29 AM	77.7	85.7	77.2
06:29 AM - 07:29 AM	78.0	94.9	77.2
07:29 AM - 08:29 AM	77.8	94.7	77.0
08:29 AM - 09:29 AM	77.6	94.5	76.9
Leq Average 12 hrs. (dB(A))	77.8		
Lmax (dB(A))		94.9	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดเสียงรบกวน (Leq 12 ชั่วโมง) ตามมาตรฐานการตรวจวัดเสียงรบกวนในอาคารของ ม.ป.ช. และ ม.ป.ว.บ.			
Note : LCpeak = 111.3 dB (C)			

Technical Management

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415755
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number: 2927220-1

Page 1 of 1

Sample Number : 2415755-4
Parameter : Noise (Leq 12 hrs.)
Location : Extruder 2 (2nd Floor) ฝั่งซ้าย
Measurement Date : Feb 27, 2024
Measurement by : Sitpavit Suwinnarat

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:01 AM - 10:01 AM	87.6	93.0	86.9
10:01 AM - 11:01 AM	87.5	90.7	86.8
11:01 AM - 12:01 PM	87.5	90.9	86.9
12:01 PM - 01:01 PM	87.6	90.7	87.0
01:01 PM - 02:01 PM	87.7	90.9	87.1
02:01 PM - 03:01 PM	87.5	90.6	86.9
03:01 PM - 04:01 PM	87.5	90.3	86.9
04:01 PM - 05:01 PM	87.5	90.4	86.8
05:01 PM - 06:01 PM	87.6	90.3	86.9
06:01 PM - 07:01 PM	87.4	90.1	86.7
07:01 PM - 08:01 PM	87.6	90.7	87.0
08:01 PM - 09:01 PM	87.6	90.7	87.0
Leq Average 12 hrs. (dB(A))	87.6		
Lmax (dB(A))		93.0	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดเสียงรบกวน (Leq 12 ชั่วโมง) ตามมาตรฐานการตรวจวัดเสียงรบกวนในอาคารของ ม.ป.ช. และ ม.ป.ว.บ.			
Note : LCpeak = 114.1 dB (C)			

Technical Management

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S-Reports_Air Noise-01 (12-06PM)



Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Plaekdaeng, Amphur Plaekdaeng,
Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415755
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number: 2927221-1

Page 1 of 1

Sample Number : 2415755-5
Parameter : Noise (Leq 12 hrs.)
Location : Product Surge Tank (2nd Floor)
Measurement Date : Feb 27, 2024
Measurement by : Sitpavit Suwinnarat

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 PM - 10:00 PM	81.9	83.1	81.6
10:00 PM - 11:00 PM	81.9	90.0	81.6
11:00 PM - 12:00 AM	81.9	83.1	81.6
12:00 AM - 01:00 AM	81.9	83.2	81.6
01:00 AM - 02:00 AM	81.4	83.1	80.5
02:00 AM - 03:00 AM	81.3	85.0	80.8
03:00 AM - 04:00 AM	81.1	83.0	80.4
04:00 AM - 05:00 AM	81.6	91.2	81.3
05:00 AM - 06:00 AM	81.7	82.7	81.5
06:00 AM - 07:00 AM	81.8	89.7	81.5
07:00 AM - 08:00 AM	81.7	89.8	81.4
08:00 AM - 09:00 AM	81.7	83.0	81.4
Leq Average 12 hrs. (dB(A))	81.7		
Lmax (dB(A))		91.2	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดเสียงรบกวน (Leq 12 ชั่วโมง) ตามมาตรฐานการตรวจวัดเสียงรบกวนในอาคารของ ม.ป.ช. และ ม.ป.ว.บ.			
Note : LCpeak = 111.6 dB (C)			

Technical Management

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S-Reports_Air Noise-01 (12-06PM)



Analysis / Test Report

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Rayong Thailand 21140

Lot ID: 2415755
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number: 2927222-1

P/O :
Project Name : Monitoring
Project Location :

Page 1 of 1

Sample Number : 2415755-6
Parameter : Noise (Leq 12 hrs.)
Location : Sifter room (3rd Floor)
Measurement Date : Feb 27, 2024
Measurement by : Sitpavit Suwannarat

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:48 PM - 09:48 PM	83.4	86.0	81.1
09:48 PM - 10:48 PM	84.4	85.6	84.2
10:48 PM - 11:48 PM	84.5	85.8	84.4
11:48 PM - 12:48 AM	84.5	85.8	84.4
12:48 AM - 01:48 AM	84.6	85.8	84.4
01:48 AM - 02:48 AM	84.9	86.3	84.5
02:48 AM - 03:48 AM	85.1	86.3	84.7
03:48 AM - 04:48 AM	84.6	85.9	84.5
04:48 AM - 05:48 AM	84.6	85.8	84.4
05:48 AM - 06:48 AM	84.6	85.9	84.4
06:48 AM - 07:48 AM	84.6	85.8	84.5
07:48 AM - 08:48 AM	84.7	85.9	84.5

Leq Average 12 hrs. (dB(A))

84.6

Lmax (dB(A))

86.3

Standard (dB(A))

87

Reference Method : ISO1996-1 and 1996-2

Standard : มาตรฐานการตรวจวัดเสียงรบกวน และ การกำหนดระดับความดังเสียง

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Note : LCpeak = 108.8 dB (C)

Technical Management

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S-Reports_Air Noise-qr (12-07PM)



Analysis / Test Report

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Rayong Thailand 21140

Lot ID: 2415755
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number: 2927222-1

P/O :
Project Name : Monitoring
Project Location :

Page 1 of 1

Sample Number : 2415755-7
Parameter : Noise (Leq 12 hrs.)
Location : Rotex SZ 1080 (3rd Floor)
Measurement Date : Feb 27, 2024
Measurement by : Sitpavit Suwannarat

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 PM - 10:00 PM	85.9	91.1	78.7
10:00 PM - 11:00 PM	85.6	87.0	85.3
11:00 PM - 12:00 AM	85.4	86.9	85.0
12:00 AM - 01:00 AM	85.0	86.4	84.5
01:00 AM - 02:00 AM	84.8	86.5	84.5
02:00 AM - 03:00 AM	85.1	86.7	84.8
03:00 AM - 04:00 AM	85.2	86.8	84.8
04:00 AM - 05:00 AM	85.4	87.2	85.1
05:00 AM - 06:00 AM	85.4	87.6	85.1
06:00 AM - 07:00 AM	85.4	87.0	85.1
07:00 AM - 08:00 AM	85.6	87.2	85.3
08:00 AM - 09:00 AM	85.5	87.7	85.2

Leq Average 12 hrs. (dB(A))

85.4

Lmax (dB(A))

91.1

Standard (dB(A))

87

Reference Method : ISO1996-1 and 1996-2

Standard : มาตรฐานการตรวจวัดเสียงรบกวน และ การกำหนดระดับความดังเสียง

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Note : LCpeak = 109.2 dB (C)

Technical Management

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Rayong Thailand 21140

Lot ID: 2415755
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number: 2927222-1

P/O :
Project Name : Monitoring
Project Location :

Page 1 of 1

Sample Number : 2415755-8
Parameter : Noise (Leq 12 hrs.)
Location : K-Ton PC1060 (3rd Floor)
Measurement Date : Feb 27, 2024
Measurement by : Sitpavit Suwannarat

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:33 PM - 09:33 PM	85.0	101.6	80.2
09:33 PM - 10:33 PM	85.6	102.2	80.8
10:33 PM - 11:33 PM	85.5	102.1	80.7
11:33 PM - 12:33 AM	85.4	102.0	80.6
12:33 AM - 01:33 AM	85.5	101.6	81.0
01:33 AM - 02:33 AM	85.8	101.9	81.3
02:33 AM - 03:33 AM	85.2	101.8	80.4
03:33 AM - 04:33 AM	85.6	102.2	80.8
04:33 AM - 05:33 AM	85.3	101.3	80.3
05:33 AM - 06:33 AM	85.4	101.4	80.4
06:33 AM - 07:33 AM	85.4	102.0	80.6
07:33 AM - 08:33 AM	85.6	101.6	80.6

Leq Average 12 hrs. (dB(A))

85.4

Lmax (dB(A))

102.2

Standard (dB(A))

87

Reference Method : ISO1996-1 and 1996-2

Standard : มาตรฐานการตรวจวัดเสียงรบกวน และ การกำหนดระดับความดังเสียง

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Note : LCpeak = 118.1 dB (C)

Technical Management

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Lot ID: 2415755
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number: 2927222-1

P/O :
Project Name : Monitoring
Project Location :

Page 1 of 1

Sample Number : 2415755-9
Parameter : Noise (Leq 12 hrs.)
Location : Control Room (1st Floor)
Measurement Date : Feb 27, 2024
Measurement by : Sitpavit Suwannarat

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:48 AM - 09:48 AM	61.2	80.8	53.1
09:48 AM - 10:48 AM	59.1	72.0	54.0
10:48 AM - 11:48 AM	59.8	74.4	54.6
11:48 AM - 12:48 PM	57.7	71.8	54.2
12:48 PM - 01:48 PM	60.8	78.0	54.7
01:48 PM - 02:48 PM	61.0	86.1	54.5
02:48 PM - 03:48 PM	64.7	83.3	54.5
03:48 PM - 04:48 PM	62.6	78.5	54.3
04:48 PM - 05:48 PM	59.6	78.2	54.1
05:48 PM - 06:48 PM	58.6	76.0	53.7
06:48 PM - 07:48 PM	58.8	76.2	53.9
07:48 PM - 08:48 PM	58.7	76.1	53.8

Leq Average 12 hrs. (dB(A))

60.6

Lmax (dB(A))

86.1

Standard (dB(A))

87

Reference Method : ISO1996-1 and 1996-2

Standard : มาตรฐานการตรวจวัดเสียงรบกวน และ การกำหนดระดับความดังเสียง

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Note : LCpeak = 104.7 dB (C)

Technical Management

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Rayong Thailand 21140

Lot ID: 2415755
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number: 2927226-1

P/O :
Project Name : Monitoring
Project Location :

Page 1 of 1

Sample Number : 2415755-10
Parameter : Noise (Leq 12 hrs.)
Location : BH 1101 (4th Floor)
Measurement Date : Feb 27, 2024
Measurement by : Sitpavit Suwannarat

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:03 PM - 10:03 PM	88.6	89.7	88.5
10:03 PM - 11:03 PM	88.7	89.6	88.4
11:03 PM - 12:03 AM	88.6	89.6	88.3
12:03 AM - 01:03 AM	88.6	89.6	88.4
01:03 AM - 02:03 AM	88.5	89.5	88.1
02:03 AM - 03:03 AM	87.4	88.5	87.2
03:03 AM - 04:03 AM	86.3	87.2	86.2
04:03 AM - 05:03 AM	88.8	91.0	88.5
05:03 AM - 06:03 AM	88.8	89.9	88.6
06:03 AM - 07:03 AM	88.8	89.9	88.6
07:03 AM - 08:03 AM	88.6	89.7	88.4
08:03 AM - 09:03 AM	88.7	89.8	88.5
Leq Average 12 hrs. (dB(A))	88.6		
Lmax (dB(A))		91.0	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดผลกระทบสิ่งแวดล้อมทางเสียงของโรงงานอุตสาหกรรม ในการวัดค่าเสียงที่โรงงานอุตสาหกรรมและการวัดค่าเสียงในชุมชนตาม ม.ร.ว.บ.ม.บ.บ.			
Note : LCpeak = 110.9 dB (C)			

Technical Management

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S-Reports_Air Noise (pt 12 08PM)



Analysis / Test Report

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Rayong Thailand 21140

Lot ID: 2415755
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number: 2927227-1

P/O :
Project Name : Monitoring
Project Location :

Page 1 of 1

Sample Number : 2415755-11
Parameter : Noise (Leq 12 hrs.)
Location : EN Room (1st Floor)
Measurement Date : Feb 27, 2024
Measurement by : Sitpavit Suwannarat

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:29 AM - 10:29 AM	80.6	83.2	80.4
10:29 AM - 11:29 AM	80.7	83.4	80.5
11:29 AM - 12:29 PM	80.7	83.2	80.5
12:29 PM - 01:29 PM	80.7	83.3	80.5
01:29 PM - 02:29 PM	80.3	85.7	79.8
02:29 PM - 03:29 PM	80.6	83.3	80.4
03:29 PM - 04:29 PM	80.4	83.4	79.8
04:29 PM - 05:29 PM	80.7	83.3	80.5
05:29 PM - 06:29 PM	80.7	83.3	80.5
06:29 PM - 07:29 PM	80.7	83.4	80.5
07:29 PM - 08:29 PM	80.7	83.2	80.6
08:29 PM - 09:29 PM	80.7	83.3	80.5
Leq Average 12 hrs. (dB(A))	80.6		
Lmax (dB(A))		85.7	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดผลกระทบสิ่งแวดล้อมทางเสียงของโรงงานอุตสาหกรรม ในการวัดค่าเสียงที่โรงงานอุตสาหกรรมและการวัดค่าเสียงในชุมชนตาม ม.ร.ว.บ.ม.บ.บ.			
Note : LCpeak = 108.6 dB (C)			

Technical Management

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Rayong Thailand 21140

Lot ID: 2415755
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number: 2927228-1

P/O :
Project Name : Monitoring
Project Location :

Page 1 of 1

Sample Number : 2415755-12
Parameter : Noise (Leq 12 hrs.)
Location : Utility Room (1st Floor)
Measurement Date : Feb 27, 2024
Measurement by : Sitpavit Suwannarat

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	87.2	90.9	85.7
10:00 AM - 11:00 AM	87.0	90.7	85.5
11:00 AM - 12:00 PM	87.5	91.2	86.0
12:00 PM - 01:00 PM	87.4	91.5	85.9
01:00 PM - 02:00 PM	87.1	92.8	85.7
02:00 PM - 03:00 PM	87.4	91.1	85.9
03:00 PM - 04:00 PM	87.1	91.5	85.7
04:00 PM - 05:00 PM	87.1	92.0	85.9
05:00 PM - 06:00 PM	86.8	91.7	85.6
06:00 PM - 07:00 PM	87.3	93.4	85.7
07:00 PM - 08:00 PM	87.3	95.0	85.8
08:00 PM - 09:00 PM	87.4	93.5	85.8
Leq Average 12 hrs. (dB(A))	87.2		
Lmax (dB(A))		95.0	
Standard (dB(A))	87	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : มาตรฐานการตรวจวัดผลกระทบสิ่งแวดล้อมทางเสียงของโรงงานอุตสาหกรรม ในการวัดค่าเสียงที่โรงงานอุตสาหกรรมและการวัดค่าเสียงในชุมชนตาม ม.ร.ว.บ.ม.บ.บ.			
Note : LCpeak = 107.9 dB (C)			

Technical Management

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Analysis / Test Report

Client : BASF (Thai) Limited
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Rayong Thailand 21140

Lot ID: 2466750
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3034694-1

P/O : 4904975585
Project Name : Monitoring
Project Location :

Page 1 of 1

Sample Number : 2466750-1
Parameter : Octave band
Location : Packing (1st Floor)
Measurement Date : Jun 17, 2024
Measurement By : Nattakorn Vongyipo

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
10:07 PM - 11:07 PM	67.3	22.6	36.1	43.0	54.0	56.3	59.8	59.5	59.8	60.3	58.0	52.9
11:07 PM - 12:07 AM	69.1	24.3	38.0	44.6	55.4	57.3	61.0	61.2	61.7	62.5	60.3	55.1
12:07 AM - 01:07 AM	66.2	22.6	36.2	42.9	54.9	56.4	59.8	59.3	58.7	58.1	53.2	46.1
01:07 AM - 02:07 AM	68.4	24.8	38.2	44.4	56.2	57.5	61.2	61.6	61.3	61.2	56.6	49.5
02:07 AM - 03:07 AM	68.2	24.2	38.0	44.7	56.2	57.5	60.3	60.8	61.0	61.1	57.7	52.1
03:07 AM - 04:07 AM	67.0	22.9	36.7	42.9	54.8	56.5	59.7	59.9	59.5	59.6	56.5	51.0
04:07 AM - 05:07 AM	69.4	25.1	38.7	45.1	56.7	57.9	61.4	62.2	62.0	62.3	59.7	54.2
05:07 AM - 06:07 AM	69.6	25.2	38.7	45.1	57.1	58.1	61.6	62.4	62.2	62.4	59.9	54.4
06:07 AM - 07:07 AM	67.7	23.1	36.7	43.1	55.1	56.7	60.5	60.7	60.4	60.2	56.9	50.3
07:07 AM - 08:07 AM	68.2	24.6	38.2	44.4	55.8	57.6	60.8	61.8	60.9	61.0	55.9	48.3
08:07 AM - 09:07 AM	73.2	24.7	38.3	44.6	56.3	57.7	60.7	62.2	64.1	67.6	68.3	63.2
09:07 AM - 10:07 AM	69.4	20.9	34.5	40.8	52.5	53.9	56.9	58.4	60.3	63.8	64.5	59.4
Average	69.0	23.9	37.5	44.0	55.6	57.1	60.4	61.0	61.2	62.4	61.2	55.8

Reference Method : ANSI Standard S1.6-1984

Technical Management

Supot S.
Tanyatong Hongkongravit
Supervisor

Approved by

Supot S.
Supot Salameth
Section Head

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S-Reports_Air Noise

S-Reports_Air Noise, Octave band (pt 12 08PM)



Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Puakdaeng,
Amphur Phukdaeng, Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466750
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3034685-1

Page 1 of 1

Sample Number : 2466750-2
Parameter : Octave band
Location : Band Dryer Area (2nd Floor)
Measurement Date : Jun 17, 2024
Measurement By : Nattakarn Vonginyoo

Time	Leq	Result (dB(A))									
		16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
08:56 PM - 09:56 PM	90.1	41.7	54.6	68.5	78.8	87.0	82.8	82.2	78.2	71.9	61.0
09:56 PM - 10:56 PM	89.6	41.9	54.5	68.1	78.4	86.1	82.6	82.2	78.4	72.0	61.2
10:56 PM - 11:56 PM	89.9	42.7	55.0	68.3	78.5	86.6	82.6	82.2	79.2	72.0	61.1
11:56 PM - 12:56 AM	90.0	42.4	55.0	68.2	78.5	86.8	82.6	82.2	78.3	72.1	61.2
12:56 AM - 01:56 AM	90.1	42.2	55.0	68.3	78.7	86.9	82.8	82.2	78.2	72.0	61.1
01:56 AM - 02:56 AM	90.1	42.1	55.0	68.4	78.7	86.9	82.8	82.2	78.2	72.0	61.0
02:56 AM - 03:56 AM	90.0	42.0	55.1	68.4	78.7	86.9	82.8	82.1	78.2	71.9	61.1
03:56 AM - 04:56 AM	90.0	42.0	55.1	68.3	78.6	86.9	82.8	82.1	78.2	71.9	61.0
04:56 AM - 05:56 AM	90.0	42.2	55.1	68.3	78.7	86.9	82.8	82.2	78.2	72.0	60.9
05:56 AM - 06:56 AM	90.1	42.1	55.1	68.3	78.7	87.0	82.9	82.2	78.2	71.9	60.9
06:56 AM - 07:56 AM	90.1	42.4	55.1	68.4	78.7	87.0	82.9	82.2	78.2	71.8	61.0
07:56 AM - 08:56 AM	90.1	42.2	55.1	68.3	78.8	87.0	82.9	82.2	78.2	71.9	61.1
Average	90.0	42.2	55.0	68.3	78.7	86.8	82.8	82.2	78.2	72.0	61.1

Reference Method : ANSI Standard S1.6-1984

Technical Management

Tanyatorm Mongkonpravit
Supervisor

Approved by

Supot Salamteb
Section Head

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Analysis / Test Report

Client : BASF (Thai) Limited
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Amphur Phukdaeng, Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466750
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3034685-1

Page 1 of 1

Sample Number : 2466750-3
Parameter : Octave band
Location : Polybelt Area (3rd Floor)
Measurement Date : Jun 17, 2024
Measurement By : Nattakarn Vonginyoo

Time	Leq	Result (dB(A))									
		16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
09:26 AM - 10:26 AM	80.8	29.9	43.6	55.4	68.6	71.8	73.4	74.2	74.1	72.3	67.4
10:26 AM - 11:26 AM	80.6	29.6	43.5	55.3	68.2	71.6	73.1	74.0	73.9	72.3	67.3
11:26 AM - 12:26 PM	80.6	29.6	43.6	55.3	68.2	71.6	73.1	74.0	73.9	72.3	67.5
12:26 PM - 01:26 PM	80.5	29.5	43.5	55.3	68.0	71.5	73.0	74.0	73.8	72.2	67.3
01:26 PM - 02:26 PM	80.5	29.4	43.4	55.3	68.1	71.4	72.9	74.0	73.8	72.2	67.4
02:26 PM - 03:26 PM	80.5	29.4	43.4	55.3	68.0	71.4	72.9	74.0	73.8	72.2	67.4
03:26 PM - 04:26 PM	80.4	29.5	43.6	55.5	68.0	71.4	72.9	73.9	73.7	72.1	67.2
04:26 PM - 05:26 PM	80.3	29.5	43.7	55.4	68.1	71.4	72.9	74.0	73.7	72.2	67.4
05:26 PM - 06:26 PM	80.5	29.6	43.9	55.6	68.1	71.4	73.0	74.0	73.8	72.2	67.3
06:26 PM - 07:26 PM	80.6	29.9	43.9	55.5	68.2	71.5	73.0	74.0	73.9	72.3	67.4
07:26 PM - 08:26 PM	80.6	29.6	43.6	55.4	68.1	71.6	73.1	74.1	73.9	72.3	67.4
08:26 PM - 09:26 PM	80.4	29.3	43.3	55.2	67.9	71.3	72.8	73.9	73.7	72.1	67.3
Average	80.5	29.6	43.6	55.4	68.1	71.5	73.0	74.0	73.8	72.2	67.4

Reference Method : ANSI Standard S1.6-1984

Technical Management

Tanyatorm Mongkonpravit
Supervisor

Approved by

Supot Salamteb
Section Head

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Amphur Phukdaeng, Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466750
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3034687-1

Page 1 of 1

Sample Number : 2466750-4
Parameter : Octave band
Location : Extruder 2 (2nd Floor) Sussu
Measurement Date : Jun 17, 2024
Measurement By : Nattakarn Vonginyoo

Time	Leq	Result (dB(A))									
		16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
09:48 AM - 10:48 AM	93.4	32.4	48.6	66.3	84.3	92.0	83.5	79.2	73.9	68.9	60.4
10:48 AM - 11:48 AM	93.5	32.5	48.7	66.6	84.3	92.1	83.7	79.5	73.9	69.2	60.5
11:48 AM - 12:48 PM	93.4	32.5	48.6	66.8	84.2	92.0	83.6	79.4	73.8	69.2	60.2
12:48 PM - 01:48 PM	93.4	32.4	48.6	66.7	84.2	91.9	83.5	79.3	73.6	69.2	60.1
01:48 PM - 02:48 PM	93.6	32.1	48.7	66.7	84.3	92.2	83.8	79.5	73.9	69.1	60.1
02:48 PM - 03:48 PM	93.5	32.3	48.6	66.6	84.3	92.1	83.7	79.6	73.9	68.9	60.2
03:48 PM - 04:48 PM	93.5	32.3	48.6	66.6	84.3	92.1	83.8	79.6	73.8	69.0	60.2
04:48 PM - 05:48 PM	93.5	32.3	48.7	66.6	84.2	92.1	83.8	79.6	73.7	69.0	60.4
05:48 PM - 06:48 PM	93.5	32.2	48.9	66.5	84.1	92.0	83.7	79.6	73.8	69.1	61.7
06:48 PM - 07:48 PM	93.4	32.3	48.9	66.6	84.2	92.0	83.7	79.5	73.8	68.9	60.5
07:48 PM - 08:48 PM	93.2	32.2	48.4	66.5	84.0	91.7	83.3	79.1	73.4	69.0	59.9
08:48 PM - 09:48 PM	93.3	32.1	48.4	66.4	84.1	91.5	83.5	79.4	73.7	68.7	60.0
Average	93.4	32.3	48.6	66.6	84.2	92.0	83.6	79.4	73.8	69.0	60.4

Reference Method : ANSI Standard S1.6-1984

Technical Management

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Supervisor

Approved by

Supot Salamteb
Section Head

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P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466750
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3034688-1

Page 1 of 1

Sample Number : 2466750-5
Parameter : Octave band
Location : Product Surge Tank (2nd Floor)
Measurement Date : Jun 17, 2024
Measurement By : Nattakarn Vonginyoo

Time	Leq	Result (dB(A))									
		16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
10:34 PM - 11:34 PM	82.1	31.6	48.9	58.2	69.0	77.5	75.2	75.0	72.4	70.1	66.9
11:34 PM - 12:34 AM	82.3	31.8	49.0	58.3	69.0	77.7	75.3	75.2	72.7	70.2	67.2
12:34 AM - 01:34 AM	82.4	31.7	49.2	58.5	69.2	77.8	75.5	75.3	72.7	70.2	67.4
01:34 AM - 02:34 AM	82.4	31.5	49.3	58.6	69.2	77.8	75.4	75.3	72.6	70.3	67.3
02:34 AM - 03:34 AM	82.3	31.7	49.3	58.6	69.2	77.8	75.4	75.2	72.6	70.2	67.0
03:34 AM - 04:34 AM	82.3	31.5	49.3	58.5	69.2	77.8	75.4	75.1	72.4	70.2	67.1
04:34 AM - 05:34 AM	82.3	31.6	49.3	58.5	69.2	77.8	75.4	75.2	72.5	70.4	67.1
05:34 AM - 06:34 AM	82.4	31.6	49.3	58.6	69.4	77.8	75.5	75.3	72.6	70.4	67.1
06:34 AM - 07:34 AM	82.4	31.7	49.3	58.7	69.3	77.8	75.5	75.3	72.7	70.6	66.9
07:34 AM - 08:34 AM	82.4	31.5	49.2	58.7	69.2	77.8	75.4	75.4	72.6	70.8	67.3
08:34 AM - 09:34 AM	82.3	31.5	49.1	58.6	69.1	77.8	75.2	75.3	72.4	70.6	67.2
09:34 AM - 10:34 AM	82.2	31.4	49.0	58.5	69.0	77.7	75.1	75.2	72.3	70.5	67.1
Average	82.3	31.6	49.2	58.5	69.2	77.8	75.4	75.2	72.5	70.4	67.1

Reference Method : ANSI Standard S1.6-1984

Technical Management

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Supervisor

Approved by

Supot Salamteb
Section Head

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Amphur Puakdaeng, Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466750
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3034699-1

Page 1 of 1

Sample Number : 2466750-6
Parameter : Octave band
Location : Sifter room (3rd Floor)
Measurement Date : Jun 17, 2024
Measurement By : Nattakarn Vonginyoo

Time	Leq	Result (dB(A))									
		16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
09:31 AM - 10:31 AM	84.1	29.8	48.3	58.1	72.4	79.4	77.5	75.5	74.2	74.1	68.3
10:31 AM - 11:31 AM	83.7	29.1	48.3	57.6	72.0	79.0	77.2	75.3	74.2	73.5	67.2
11:31 AM - 12:31 PM	83.9	28.6	48.4	57.8	72.1	79.1	77.2	75.0	74.1	74.2	69.1
12:31 PM - 01:31 PM	83.6	28.6	48.1	57.8	72.1	79.1	77.2	74.7	73.5	73.3	67.6
01:31 PM - 02:31 PM	83.4	28.6	47.9	57.7	72.1	79.1	77.1	74.6	73.1	72.6	66.0
02:31 PM - 03:31 PM	83.4	28.4	47.8	57.5	72.0	78.8	77.0	74.6	73.4	73.1	67.5
03:31 PM - 04:31 PM	83.5	28.3	47.9	57.5	72.1	78.8	76.9	74.5	73.4	73.4	68.8
04:31 PM - 05:31 PM	83.3	28.3	48.2	57.3	72.1	78.8	76.9	74.6	73.0	72.4	66.1
05:31 PM - 06:31 PM	83.5	28.5	48.1	57.5	72.2	78.8	77.0	74.7	73.3	73.2	67.9
06:31 PM - 07:31 PM	83.7	28.6	47.8	57.6	72.2	78.9	77.0	75.0	74.2	73.7	68.8
07:31 PM - 08:31 PM	83.6	28.6	48.0	57.7	72.2	79.0	77.2	74.8	73.6	73.3	67.7
08:31 PM - 09:31 PM	83.3	28.3	47.7	57.4	71.9	78.7	76.9	74.5	73.3	73.0	67.4
Average	83.6	28.7	48.0	57.6	72.1	79.0	77.1	74.8	73.6	73.3	67.8

Reference Method : ANSI Standard S1.6-1984

Technical Management

Tanyatorn Mongkonpravit
Supervisor

Approved by

Supot Salameh
Section Head

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Amphur Puakdaeng, Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466750
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3034699-1

Page 1 of 1

Sample Number : 2466750-7
Parameter : Octave band
Location : Rotex SZ 1080 (3rd Floor)
Measurement Date : Jun 17, 2024
Measurement By : Nattakarn Vonginyoo

Time	Leq	Result (dB(A))									
		16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
09:34 AM - 10:34 AM	82.9	27.5	43.1	55.8	69.8	72.9	74.7	78.6	75.6	73.0	68.3
10:34 AM - 11:34 AM	82.5	26.9	42.4	55.7	69.5	72.5	74.3	78.1	74.9	73.6	67.7
11:34 AM - 12:34 PM	82.6	26.3	42.8	55.6	69.6	72.6	74.4	77.9	74.9	73.9	68.5
12:34 PM - 01:34 PM	82.8	27.4	43.0	55.5	69.8	73.0	74.8	78.0	75.4	73.7	68.3
01:34 PM - 02:34 PM	82.5	27.3	42.1	55.5	69.6	72.6	74.5	77.8	74.9	73.6	67.9
02:34 PM - 03:34 PM	82.3	26.7	41.9	55.5	69.4	72.5	74.4	77.5	74.6	73.5	68.1
03:34 PM - 04:34 PM	82.2	26.0	42.3	55.5	69.5	72.4	74.3	77.5	74.5	73.3	68.2
04:34 PM - 05:34 PM	82.3	26.3	42.6	55.6	69.6	72.6	74.3	77.8	74.5	73.0	67.7
05:34 PM - 06:34 PM	82.6	27.4	42.9	55.6	69.8	72.7	74.7	78.1	74.8	73.5	68.3
06:34 PM - 07:34 PM	82.7	29.8	42.4	55.6	69.8	72.7	74.7	78.3	75.3	73.1	68.4
07:34 PM - 08:34 PM	82.5	31.2	47.8	58.3	69.6	77.1	75.3	76.2	73.7	71.4	67.1
08:34 PM - 09:34 PM	81.9	31.7	48.9	57.7	68.6	77.0	75.0	75.1	72.5	70.2	66.8
Average	82.5	28.3	44.2	56.1	69.6	73.8	74.6	77.7	74.7	73.1	68.0

Reference Method : ANSI Standard S1.6-1984

Technical Management

Tanyatorn Mongkonpravit
Supervisor

Approved by

Supot Salameh
Section Head

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Amphur Puakdaeng, Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466750
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3034699-1

Page 1 of 1

Sample Number : 2466750-8
Parameter : Octave band
Location : K Tron PC1080 (3rd Floor)
Measurement Date : Jun 17, 2024
Measurement By : Nattakarn Vonginyoo

Time	Leq	Result (dB(A))									
		16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
09:29 AM - 10:29 AM	84.7	27.7	47.4	51.2	65.8	74.7	77.8	74.2	74.6	77.9	78.0
10:29 AM - 11:29 AM	84.7	27.4	47.4	51.2	65.4	74.6	77.5	74.1	74.5	78.1	78.2
11:29 AM - 12:29 PM	84.7	27.8	47.6	51.1	65.5	74.6	77.4	74.1	74.5	78.1	78.2
12:29 PM - 01:29 PM	84.7	27.7	47.4	51.1	66.2	74.7	77.4	74.3	74.7	78.1	78.2
01:29 PM - 02:29 PM	84.6	27.6	47.2	51.0	65.9	74.6	77.4	74.2	74.4	77.9	78.0
02:29 PM - 03:29 PM	82.4	27.5	47.1	50.8	64.5	74.2	75.2	73.0	72.9	74.9	74.8
03:29 PM - 04:29 PM	82.8	27.9	47.0	50.7	63.8	73.3	74.7	72.8	73.4	78.2	78.2
04:29 PM - 05:29 PM	84.6	27.9	47.5	50.8	64.9	74.3	77.1	73.8	74.3	78.2	78.3
05:29 PM - 06:29 PM	84.6	28.0	47.8	50.9	65.1	74.5	77.3	74.1	74.2	78.2	78.2
06:29 PM - 07:29 PM	84.7	28.7	48.1	51.1	65.2	74.6	77.5	74.2	74.3	78.1	78.2
07:29 PM - 08:29 PM	84.6	29.7	49.3	53.0	66.7	76.4	77.4	75.2	75.1	77.1	77.0
08:29 PM - 09:29 PM	84.5	29.6	49.2	52.9	66.6	76.3	77.3	75.1	75.0	77.0	76.9
Average	84.4	28.2	47.8	51.4	65.5	74.8	77.1	74.1	74.4	77.6	77.6

Reference Method : ANSI Standard S1.6-1984

Technical Management

Tanyatorn Mongkonpravit
Supervisor

Approved by

Supot Salameh
Section Head

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Puakdaeng,
Amphur Puakdaeng, Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466750
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3034699-1

Page 1 of 1

Sample Number : 2466750-9
Parameter : Octave band
Location : Control Room (1st Floor)
Measurement Date : Jun 17, 2024
Measurement By : Nattakarn Vonginyoo

Time	Leq	Result (dB(A))									
		16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
09:37 PM - 10:37 PM	59.4	7.9	26.4	35.3	37.9	42.8	50.4	50.6	57.6	46.1	33.3
10:37 PM - 11:37 PM	57.2	8.7	26.5	37.4	38.2	42.9	51.1	51.2	52.8	46.3	35.5
11:37 PM - 12:37 AM	56.2	8.6	25.8	37.1	38.0	42.9	49.3	50.0	52.2	44.8	34.6
12:37 AM - 01:37 AM	59.6	9.0	26.0	44.2	39.5	46.8	53.5	56.0	51.9	46.0	36.4
01:37 AM - 02:37 AM	54.4	7.6	26.1	37.0	38.0	42.5	48.1	49.1	49.1	42.7	30.0
02:37 AM - 03:37 AM	55.3	7.7	25.5	38.3	38.1	43.1	49.1	49.8	50.2	43.9	35.9
03:37 AM - 04:37 AM	55.3	7.8	26.2	36.9	38.0	42.6	48.2	49.5	50.9	44.5	35.0
04:37 AM - 05:37 AM	57.2	8.1	27.0	44.4	39.7	44.5	50.1	51.2	52.6	45.9	37.7
05:37 AM - 06:37 AM	59.7	9.8	29.3	49.7	42.6	46.3	51.9	53.0	55.5	47.6	42.2
06:37 AM - 07:37 AM	63.3	9.5	27.8	37.5	41.6	46.6	59.2	57.3	57.8	50.2	35.5
07:37 AM - 08:37 AM	63.3	9.4	29.5	41.9	40.5	47.3	58.9	58.2	57.4	49.1	38.3
08:37 AM - 09:37 AM	65.7	11.8	31.9	44.3	42.9	49.7	61.3	60.6	59.8	51.5	40.7
Average	60.4	9.0	27.8	42.7	40.0	45.8	55.2	54.9	55.3	47.3	37.4

Reference Method : ANSI Standard S1.6-1984

Technical Management

Tanyatorn Mongkonpravit
Supervisor

Approved by

Supot Salameh
Section Head

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Amphur Puakdaeng, Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466750
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3034693-1

Page 1 of 1

Sample Number : 2466750-10
Parameter : Octave band
Location : BH 1101 4Fl
Measurement Date : Jun 17, 2024
Measurement By : Nattakarn Vonginyoo

Time	Leq	Result (dB(A))										
		16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:37 AM - 10:37 AM	88.6	35.4	47.7	52.4	69.4	79.6	84.0	85.3	72.8	71.2	65.0	48.3
10:37 AM - 11:37 AM	87.8	34.8	47.5	51.9	69.1	79.1	83.5	84.2	72.4	70.9	64.8	47.9
11:37 AM - 12:37 PM	87.7	34.0	47.5	51.8	68.9	78.4	83.3	84.2	72.1	70.8	64.8	48.0
12:37 PM - 01:37 PM	87.7	33.7	47.5	51.9	68.9	78.4	83.2	84.3	72.0	70.7	64.8	48.0
01:37 PM - 02:37 PM	87.6	33.6	47.3	51.8	68.8	78.3	83.1	84.4	71.9	70.7	64.9	47.9
02:37 PM - 03:37 PM	87.6	33.7	47.3	51.6	68.9	78.3	83.1	84.3	71.9	70.7	64.8	48.0
03:37 PM - 04:37 PM	87.6	33.7	47.2	51.8	69.0	78.2	83.1	84.3	71.8	70.6	64.8	48.0
04:37 PM - 05:37 PM	87.7	33.7	47.2	51.7	69.0	78.3	83.2	84.4	71.8	70.6	64.9	48.0
05:37 PM - 06:37 PM	88.0	33.8	47.4	51.6	69.2	78.3	83.3	85.0	71.9	70.6	64.9	48.1
06:37 PM - 07:37 PM	88.3	33.9	47.6	51.7	69.2	78.3	83.4	85.5	72.0	70.8	65.0	48.2
07:37 PM - 08:37 PM	82.9	30.1	43.2	54.6	67.7	74.9	77.5	79.4	69.9	67.9	60.7	43.1
08:37 PM - 09:37 PM	66.2	8.6	27.5	46.8	42.6	51.1	56.5	57.8	64.2	54.2	40.6	28.4
Average	87.2	33.4	46.8	51.9	68.6	77.9	82.6	84.0	71.6	70.2	64.2	47.4

Reference Method : ANSI Standard S1.6-1984

Technical Management

Tanyatorn Mongkonpravit
Supervisor

Approved by

Supot Salameth
Section Head

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Analysis / Test Report

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Amphur Puakdaeng, Rayong Thailand 21140
P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466750
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3034694-1

Page 1 of 1

Sample Number : 2466750-11
Parameter : Octave band
Location : EH Room (1st Floor)
Measurement Date : Jun 17, 2024
Measurement By : Nattakarn Vonginyoo

Time	Leq	Result (dB(A))										
		16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
10:04 PM - 11:04 PM	75.9	23.2	41.2	53.5	62.6	64.6	66.7	68.9	69.4	69.5	65.1	53.2
11:04 PM - 12:04 AM	76.5	22.9	41.3	53.5	62.6	64.7	67.5	70.3	70.2	69.6	65.2	53.8
12:04 AM - 01:04 AM	76.4	23.1	41.2	53.5	62.4	64.6	67.1	70.9	69.5	69.5	65.2	53.8
01:04 AM - 02:04 AM	75.5	23.4	41.4	53.5	62.3	64.1	66.2	68.6	69.2	69.2	64.8	52.9
02:04 AM - 03:04 AM	75.1	23.5	40.9	53.2	62.5	63.9	65.8	67.8	68.4	69.1	64.8	52.7
03:04 AM - 04:04 AM	75.0	23.4	40.7	53.1	62.5	63.5	65.5	67.5	68.3	69.1	64.8	52.7
04:04 AM - 05:04 AM	75.1	23.4	40.9	53.4	62.6	63.8	65.6	67.7	68.3	69.1	64.8	52.7
05:04 AM - 06:04 AM	75.1	23.6	41.0	53.4	62.5	63.7	65.7	68.0	68.5	69.1	64.8	52.7
06:04 AM - 07:04 AM	75.9	23.9	41.4	53.6	62.7	64.3	66.5	68.9	69.9	69.3	65.0	53.1
07:04 AM - 08:04 AM	76.4	23.8	41.2	53.7	63.1	64.7	67.4	70.0	69.9	69.6	65.3	53.8
08:04 AM - 09:04 AM	75.5	23.7	40.9	53.5	62.8	64.4	66.2	68.3	68.8	69.4	65.1	53.1
09:04 AM - 10:04 AM	76.2	22.9	41.0	53.3	62.2	64.4	66.9	70.7	69.3	69.3	65.0	53.6
Average	75.8	23.4	41.1	53.4	62.6	64.2	66.5	69.1	69.2	69.3	65.0	53.2

Reference Method : ANSI Standard S1.6-1984

Technical Management

Tanyatorn Mongkonpravit
Supervisor

Approved by

Supot Salameth
Section Head

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P/O : 4904975585
Project Name : Monitoring
Project Location :

Lot ID: 2466750
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3034695-1

Page 1 of 1

Sample Number : 2466750-12
Parameter : Octave band
Location : Utility Room (1st Floor)
Measurement Date : Jun 17, 2024
Measurement By : Nattakarn Vonginyoo

Time	Leq	Result (dB(A))										
		16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:41 PM - 10:41 PM	88.1	36.4	44.2	57.3	66.1	72.0	78.3	82.1	81.5	83.1	76.5	60.0
10:41 PM - 11:41 PM	88.6	36.4	44.0	57.6	66.7	72.0	78.2	82.6	81.8	84.1	77.6	60.3
11:41 PM - 12:41 AM	88.7	36.5	44.1	57.6	66.8	72.1	78.2	82.5	81.9	84.2	77.6	60.5
12:41 AM - 01:41 AM	88.6	36.5	44.1	57.7	66.7	72.0	78.1	82.7	82.0	83.9	77.4	60.4
01:41 AM - 02:41 AM	88.8	36.4	44.1	57.5	66.6	71.9	78.1	82.7	82.0	84.3	77.8	60.3
02:41 AM - 03:41 AM	88.6	36.4	44.0	57.3	66.3	71.9	77.6	82.8	81.9	83.9	77.5	60.2
03:41 AM - 04:41 AM	89.1	36.5	44.1	57.4	66.4	71.8	77.6	82.9	81.8	85.0	78.5	60.4
04:41 AM - 05:41 AM	88.6	36.5	44.2	57.5	66.6	71.8	77.4	82.8	81.8	84.1	77.5	60.2
05:41 AM - 06:41 AM	88.9	36.7	44.3	57.6	66.2	72.3	77.1	83.2	82.0	84.4	77.9	60.4
06:41 AM - 07:41 AM	88.6	36.7	44.4	57.7	67.2	72.1	77.6	82.9	81.9	83.9	77.4	60.3
07:41 AM - 08:41 AM	88.7	36.6	44.2	57.6	66.7	72.2	78.1	82.6	81.9	84.2	77.7	60.5
08:41 AM - 09:41 AM	88.6	36.4	44.0	57.3	65.9	72.0	76.8	82.9	81.7	84.1	77.6	60.1
Average	89.7	36.5	44.1	57.5	66.5	72.0	77.8	82.7	81.9	84.1	77.6	60.3

Reference Method : ANSI Standard S1.6-1984

Technical Management

Tanyatorn Mongkonpravit
Supervisor

Approved by

Supot Salameth
Section Head

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Analysis / Test Report

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Amphur Puakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415760
Date Received : Feb 28, 2024
Date Reported : Mar 06, 2024
Report Number : 2928365-1

Page 1 of 1

Sample Number : 2415760-1
Parameter : Octave band
Location : Packing (1st Floor)
Measurement Date : Feb 27, 2024
Measurement By : Sitpanit Suwannarat

Time	Leq	Result (dB(A))										
		16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:22 AM - 10:22 AM	70.2	27.2	40.3	49.0	56.1	57.7	63.3	63.4	63.1	63.7	57.1	45.4
10:22 AM - 11:22 AM	71.4	28.4	41.5	50.2	57.3	58.9	64.5	64.6	64.3	64.9	58.3	46.6
11:22 AM - 12:22 PM	71.0	28.0	41.1	49.8	56.9	58.5	64.1	64.2	63.9	64.5	57.9	46.2
12:22 PM - 01:22 PM	73.0	30.0	43.1	51.8	58.9	60.5	66.1	66.2	65.9	66.5	59.9	48.2
01:22 PM - 02:22 PM	72.8	29.8	42.9	51.6	58.7	60.3	65.9	66.0	65.7	66.3	59.7	48.0
02:22 PM - 03:22 PM	72.2	27.6	40.3	50.6	59.7	59.9	67.1	66.9	64.5	61.4	53.6	41.6
03:22 PM - 04:22 PM	73.1	28.5	41.2	51.5	60.6	60.8	68.0	67.8	65.4	62.3	54.5	42.5
04:22 PM - 05:22 PM	73.2	28.6	41.3	51.6	60.7	60.9	68.1	67.9	65.5	62.4	54.6	42.6
05:22 PM - 06:22 PM	72.2	21.0	36.7	44.6	56.1	58.2	61.4	62.2	63.0	66.6	66.8	59.6
06:22 PM - 07:22 PM	71.9	20.7	36.4	44.3	55.8	57.9	61.1	61.9	62.7	66.3	66.5	59.3
07:22 PM - 08:22 PM	73.0	21.8	37.5	45.4	56.9	59.0	62.2	63.0	63.8	67.4	67.6	60.4
08:22 PM - 09:22 PM	73.6	31.1	43.8	53.3	61.5	59.9	65.4	66.2	65.8	66.9	65.3	57.1
Average	72.4	28.0	41.1	50.3	58.7	59.5	65.4	65.5	64.6	65.3	62.8	54.9

Reference Method : ANSI Standard S1.6-1984

Technical Management

Saranya Chalermthamrong
Scientist (4)

Approved by

Supot Salameth
Section Head

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415760
Date Received : Feb 29, 2024
Date Reported : Mar 06, 2024
Report Number : 2928366-1

Page 1 of 1

Sample Number : 2415760-2
Parameter : Octave band
Location : Band Dryer Area (2nd Floor)
Measurement Date : Feb 27, 2024
Measurement By : Sitpavit Suwannarat

Time	Result (dB(A))										
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
09:00 AM - 10:00 AM	88.3	41.0	55.3	65.8	78.3	84.0	81.6	81.3	77.5	70.3	60.8
10:00 AM - 11:00 AM	87.8	40.7	55.1	64.9	78.0	83.4	81.2	80.9	77.4	70.3	60.7
11:00 AM - 12:00 PM	87.7	40.4	54.9	64.8	77.9	83.3	81.0	80.8	77.3	70.4	60.7
12:00 PM - 01:00 PM	87.6	40.7	54.9	64.8	77.7	83.2	80.8	80.7	77.3	70.3	60.9
01:00 PM - 02:00 PM	87.5	40.7	54.8	64.7	77.5	83.1	80.7	80.7	77.2	70.2	60.5
02:00 PM - 03:00 PM	87.5	41.0	54.9	64.8	77.8	83.1	80.7	80.8	77.2	70.3	60.5
03:00 PM - 04:00 PM	87.7	40.9	55.2	64.9	78.1	83.2	80.9	80.9	77.3	70.2	60.6
04:00 PM - 05:00 PM	87.8	41.0	55.2	65.0	78.3	83.3	81.1	81.0	77.4	70.2	60.6
05:00 PM - 06:00 PM	87.8	41.0	55.2	65.0	78.1	83.3	81.2	81.0	77.4	70.3	60.5
06:00 PM - 07:00 PM	87.7	40.4	54.7	65.2	77.7	83.4	81.0	80.7	76.9	69.7	60.2
07:00 PM - 08:00 PM	87.6	40.6	55.0	64.8	77.8	83.1	81.0	80.9	77.2	70.2	61.3
08:00 PM - 09:00 PM	87.5	40.5	54.9	64.7	77.7	83.0	80.9	80.8	77.1	70.1	61.2
Average	87.7	40.7	55.0	65.0	77.9	83.3	81.0	80.9	77.3	70.2	60.7

Reference Method : ANSI Standard S1.6-1984

Technical Management

Saranya Chalerthamrong
Scientist (4)

Approved by

Supot Salameh
Section Head

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415760
Date Received : Feb 29, 2024
Date Reported : Mar 06, 2024
Report Number : 2928367-1

Page 1 of 1

Sample Number : 2415760-3
Parameter : Octave band
Location : Polybelt Area (3rd Floor)
Measurement Date : Feb 27, 2024
Measurement By : Sitpavit Suwannarat

Time	Result (dB(A))										
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
09:29 PM - 10:29 PM	78.3	24.1	39.6	52.8	60.3	67.3	69.3	71.9	73.0	71.0	66.9
10:29 PM - 11:29 PM	77.8	23.4	39.4	50.9	59.8	66.0	68.4	71.2	72.3	71.0	66.9
11:29 PM - 12:29 AM	77.7	23.9	40.4	51.0	59.7	65.7	68.3	71.0	72.2	70.9	66.9
12:29 AM - 01:29 AM	77.9	24.1	40.4	51.0	60.0	66.0	68.9	71.5	72.4	71.0	66.9
01:29 AM - 02:29 AM	77.6	24.0	40.1	51.0	59.7	65.7	68.5	71.0	72.0	70.8	66.7
02:29 AM - 03:29 AM	77.4	24.1	40.1	50.8	59.4	65.4	68.3	70.6	71.7	70.7	66.7
03:29 AM - 04:29 AM	77.6	24.2	39.8	51.6	59.9	65.4	68.6	70.9	72.3	70.7	66.7
04:29 AM - 05:29 AM	77.6	24.3	39.3	51.4	60.0	65.6	68.5	70.9	72.1	70.7	66.7
05:29 AM - 06:29 AM	77.7	24.6	39.4	52.1	60.2	65.7	68.5	71.2	72.3	70.7	66.7
06:29 AM - 07:29 AM	78.0	26.2	40.6	52.9	61.2	66.1	68.9	71.5	72.5	70.9	66.8
07:29 AM - 08:29 AM	77.8	26.0	40.4	52.7	61.0	65.9	68.7	71.3	72.3	70.7	66.6
08:29 AM - 09:29 AM	77.6	25.8	40.2	52.5	60.8	65.7	68.5	71.1	72.1	70.5	66.4
Average	77.8	24.7	40.0	51.8	60.2	65.9	68.6	71.2	72.3	70.8	66.7

Reference Method : ANSI Standard S1.6-1984

Technical Management

Saranya Chalerthamrong
Scientist (4)

Approved by

Supot Salameh
Section Head

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122-153 EMAIL



Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Puakdaeng,
Amphur Puakdaeng, Rayong Thailand 21140

P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415760
Date Received : Feb 28, 2024
Date Reported : Mar 06, 2024
Report Number : 2928366-1

Page 1 of 1

Sample Number : 2415760-4
Parameter : Octave band
Location : Extruder 2 (2nd Floor) шума
Measurement Date : Feb 27, 2024
Measurement By : Sitpavit Suwannarat

Time	Result (dB(A))										
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
09:01 AM - 10:01 AM	87.6	32.5	46.5	61.2	78.6	85.6	77.7	76.3	74.3	71.6	61.6
10:01 AM - 11:01 AM	87.5	32.3	46.4	61.1	78.2	85.5	77.4	75.8	73.6	71.6	61.2
11:01 AM - 12:01 PM	87.5	32.3	46.3	61.1	78.1	85.7	77.5	75.6	73.3	71.5	61.3
12:01 PM - 01:01 PM	87.6	32.2	46.1	61.3	78.1	85.8	77.6	75.5	73.9	72.1	60.7
01:01 PM - 02:01 PM	87.7	32.0	46.0	61.3	78.0	85.9	77.7	75.5	74.3	72.0	60.0
02:01 PM - 03:01 PM	87.5	32.0	46.1	61.3	78.1	85.6	77.7	75.6	73.8	71.4	60.0
03:01 PM - 04:01 PM	87.5	32.3	46.1	61.4	78.4	85.6	77.7	75.9	73.8	71.2	59.6
04:01 PM - 05:01 PM	87.5	32.5	46.3	61.4	78.3	85.5	77.7	76.3	74.1	71.5	60.7
05:01 PM - 06:01 PM	87.6	32.3	46.4	61.5	78.3	85.6	77.7	76.4	74.3	71.8	61.4
06:01 PM - 07:01 PM	87.4	32.1	46.2	61.3	78.1	85.4	77.5	76.2	74.1	71.6	61.2
07:01 PM - 08:01 PM	87.6	32.1	46.2	61.4	78.2	85.7	77.8	75.7	73.9	71.5	60.1
08:01 PM - 09:01 PM	87.6	32.2	46.1	61.3	78.1	85.8	77.6	75.5	73.9	72.1	60.7
Average	87.6	32.2	46.2	61.3	78.2	85.6	77.8	75.9	74.0	71.7	60.8

Reference Method : ANSI Standard S1.6-1984

Technical Management

Saranya Chalerthamrong
Scientist (4)

Approved by

Supot Salameh
Section Head

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Amphur Puakdaeng, Rayong Thailand 21140

P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415760
Date Received : Feb 28, 2024
Date Reported : Mar 06, 2024
Report Number : 2928367-1

Page 1 of 1

Sample Number : 2415760-5
Parameter : Octave band
Location : Product Surge Tank (2nd Floor)
Measurement Date : Feb 27, 2024
Measurement By : Sitpavit Suwannarat

Time	Result (dB(A))										
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
09:00 PM - 10:00 PM	81.9	32.1	48.7	59.7	68.7	76.9	74.6	76.0	72.7	68.5	55.5
10:00 PM - 11:00 PM	81.9	32.1	48.7	59.8	68.7	77.0	74.6	76.0	72.6	68.5	55.2
11:00 PM - 12:00 AM	81.9	32.0	48.7	59.7	68.6	77.0	74.7	75.9	72.4	68.4	55.0
12:00 AM - 01:00 AM	81.9	32.2	48.8	59.9	68.7	77.1	74.8	75.8	72.4	68.4	54.7
01:00 AM - 02:00 AM	81.4	32.2	48.9	59.8	68.0	75.5	74.5	75.9	72.5	68.3	54.9
02:00 AM - 03:00 AM	81.3	31.1	49.0	60.1	68.1	74.2	74.5	76.4	72.7	68.2	54.7
03:00 AM - 04:00 AM	81.1	31.0	48.9	60.5	68.5	74.5	74.3	75.8	72.4	68.1	54.9
04:00 AM - 05:00 AM	81.6	31.3	49.1	61.3	69.8	76.0	74.8	75.5	72.7	68.5	54.8
05:00 AM - 06:00 AM	81.7	31.5	49.0	61.4	69.8	76.0	74.7	75.9	72.9	68.4	54.7
06:00 AM - 07:00 AM	81.8	31.6	48.9	61.5	69.8	76.2	74.8	75.9	72.9	69.4	54.8
07:00 AM - 08:00 AM	81.7	31.5	48.8	61.4	69.7	76.1	74.7	75.8	72.8	68.3	54.6
08:00 AM - 09:00 AM	81.7	32.0	48.6	59.7	68.5	76.9	74.6	75.6	72.2	68.2	54.5
Average	81.7	31.7	48.8	60.5	69.0	76.2	74.8	75.9	72.6	68.4	54.9

Reference Method : ANSI Standard S1.6-1984

Technical Management

Saranya Chalerthamrong
Scientist (4)

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Supot Salameh
Section Head

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Amphur Puakdaeng, Rayong Thailand 21140

P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415760
Date Received : Feb 29, 2024
Date Reported : Mar 06, 2024
Report Number : 2928370-1

Page 1 of 1

Sample Number : 2415760-6
Parameter : Octave band
Location : Sifter room (3rd Floor)
Measurement Date : Feb 27, 2024
Measurement By : Sitpavit Suwanmarat

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:48 PM - 09:48 PM	83.4	32.5	47.8	56.5	71.7	77.8	77.6	77.4	72.8	70.1	65.1	55.9
09:48 PM - 10:48 PM	84.4	33.3	48.5	57.4	72.8	78.9	78.7	78.1	73.7	70.8	65.4	55.8
10:48 PM - 11:48 PM	84.5	33.4	48.7	57.5	72.7	79.0	78.8	78.3	73.8	71.4	66.6	57.4
11:48 PM - 12:48 AM	84.5	33.6	49.3	57.7	72.7	79.1	78.9	78.4	73.8	70.8	65.2	55.5
12:48 AM - 01:48 AM	84.6	33.7	49.3	57.7	72.7	79.2	78.9	78.4	73.8	70.6	64.6	54.8
01:48 AM - 02:48 AM	84.9	33.8	49.4	58.2	72.8	79.7	79.3	78.7	74.1	70.9	64.9	55.1
02:48 AM - 03:48 AM	85.1	33.8	50.4	58.1	72.8	80.1	79.3	78.6	74.4	70.7	64.6	54.6
03:48 AM - 04:48 AM	84.6	33.6	49.7	57.9	72.8	79.4	78.9	78.3	74.2	70.6	64.8	54.9
04:48 AM - 05:48 AM	84.6	34.1	49.7	58.0	72.8	79.2	78.8	78.3	74.2	70.7	64.9	55.0
05:48 AM - 06:48 AM	84.6	34.1	49.8	58.0	72.8	79.2	78.8	78.4	74.2	70.6	64.8	55.0
06:48 AM - 07:48 AM	84.6	34.1	49.7	58.0	72.8	79.2	78.8	78.5	74.2	70.6	64.8	55.0
07:48 AM - 08:48 AM	84.7	33.8	49.8	58.0	72.9	79.2	78.8	78.5	74.2	71.1	65.9	56.5
Average	84.6	33.7	49.4	57.8	72.7	79.2	78.8	78.3	74.0	70.8	65.2	55.5

Reference Method : ANSI Standard S1.6-1984

Technical Management

Saranya C.

Saranya Chalerthamrong
Scientist (4)

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Supot S.

Supot Salameh
Section Head

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Amphur Puakdaeng, Rayong Thailand 21140

P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415760
Date Received : Feb 29, 2024
Date Reported : Mar 06, 2024
Report Number : 2928371-1

Page 1 of 1

Sample Number : 2415760-7
Parameter : Octave band
Location : Rotex SZ 1080 (3rd Floor)
Measurement Date : Feb 27, 2024
Measurement By : Sitpavit Suwanmarat

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:00 PM - 10:00 PM	85.9	29.6	44.5	57.1	70.5	73.4	76.2	82.6	77.8	77.3	72.7	64.6
10:00 PM - 11:00 PM	85.6	27.2	43.8	56.7	70.2	73.7	75.9	82.9	77.4	74.0	70.6	63.2
11:00 PM - 12:00 AM	85.4	27.0	44.0	56.9	70.4	73.9	76.2	82.4	77.2	74.5	71.4	65.2
12:00 AM - 01:00 AM	85.0	27.1	44.1	56.9	70.4	74.0	76.3	81.6	77.3	74.2	70.5	62.4
01:00 AM - 02:00 AM	84.8	26.9	44.3	56.7	70.3	73.8	76.1	81.6	77.0	73.8	70.1	62.0
02:00 AM - 03:00 AM	85.1	26.8	44.3	57.0	70.5	74.1	76.2	81.8	77.5	74.5	70.2	62.3
03:00 AM - 04:00 AM	85.2	26.9	44.4	56.8	70.5	74.1	76.3	81.8	78.0	74.2	70.1	61.7
04:00 AM - 05:00 AM	85.4	26.0	44.7	56.6	70.3	74.0	76.4	82.1	78.3	74.5	70.2	61.6
05:00 AM - 06:00 AM	85.4	28.6	44.7	56.9	70.6	74.2	76.7	82.0	78.4	74.2	70.2	61.5
06:00 AM - 07:00 AM	85.4	27.6	44.4	57.0	70.7	74.3	76.8	82.1	78.1	74.3	70.3	61.6
07:00 AM - 08:00 AM	85.6	27.8	44.6	57.2	70.9	74.5	77.0	82.3	78.3	74.5	70.5	61.8
08:00 AM - 09:00 AM	85.5	28.7	44.8	57.0	70.7	74.3	76.8	82.1	78.5	74.3	70.3	61.6
Average	85.4	27.8	44.4	56.9	70.5	74.0	76.4	82.1	77.8	74.6	70.7	62.7

Reference Method : ANSI Standard S1.6-1984

Technical Management

Saranya C.

Saranya Chalerthamrong
Scientist (4)

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Supot Salameh
Section Head

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415760
Date Received : Feb 28, 2024
Date Reported : Mar 06, 2024
Report Number : 2928372-1

Page 1 of 1

Sample Number : 2415760-8
Parameter : Octave band
Location : K Tron PC1060 (3rd Floor)
Measurement Date : Feb 27, 2024
Measurement By : Sitpavit Suwanmarat

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:33 PM - 09:33 PM	85.0	26.1	44.5	50.7	65.6	74.3	74.0	76.0	75.8	79.8	78.7	71.4
09:33 PM - 10:33 PM	85.6	26.7	45.1	51.3	66.2	74.9	74.0	76.6	76.4	80.4	79.3	72.0
10:33 PM - 11:33 PM	85.5	26.6	45.0	51.2	66.1	74.8	73.9	76.5	76.3	80.3	79.2	71.9
11:33 PM - 12:33 AM	85.4	26.5	44.9	51.1	66.0	74.7	73.8	76.4	76.2	80.2	79.1	71.8
12:33 AM - 01:33 AM	85.5	27.1	43.8	50.7	65.6	73.8	75.9	75.9	75.6	79.6	79.6	72.6
01:33 AM - 02:33 AM	85.8	27.4	44.1	51.0	65.9	74.1	76.2	76.2	76.9	79.9	79.9	72.9
02:33 AM - 03:33 AM	85.2	26.3	44.7	50.9	65.8	74.5	73.6	76.2	76.0	80.0	78.9	71.6
03:33 AM - 04:33 AM	85.6	26.7	45.1	51.3	66.2	74.9	74.0	76.6	76.4	80.4	79.3	72.0
04:33 AM - 05:33 AM	85.3	26.6	43.2	49.9	60.0	73.4	75.5	75.6	76.1	79.6	79.5	72.5
05:33 AM - 06:33 AM	85.4	26.7	43.3	50.0	66.1	73.5	75.6	75.7	76.2	79.7	79.6	72.6
06:33 AM - 07:33 AM	85.4	26.5	44.9	51.1	66.0	74.7	73.8	76.4	76.2	80.2	79.1	71.8
07:33 AM - 08:33 AM	85.6	26.9	43.5	50.2	66.3	73.7	75.8	75.9	76.4	79.9	79.8	72.8
Average	85.4	26.7	44.4	50.8	66.2	74.3	74.7	76.2	76.3	80.0	79.3	72.2

Reference Method : ANSI Standard S1.6-1984

Technical Management

Saranya C.

Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.

Supot Salameh
Section Head

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415760
Date Received : Feb 28, 2024
Date Reported : Mar 06, 2024
Report Number : 2928373-1

Page 1 of 1

Sample Number : 2415760-9
Parameter : Octave band
Location : Control Room (1st Floor)
Measurement Date : Feb 27, 2024
Measurement By : Sitpavit Suwanmarat

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:48 AM - 09:48 AM	61.2	10.0	28.2	34.3	39.4	47.0	55.1	56.3	56.3	49.0	33.5	28.3
09:48 AM - 10:48 AM	58.1	9.4	25.3	33.9	41.6	49.3	52.1	52.1	52.8	44.3	35.9	24.8
10:48 AM - 11:48 AM	59.8	8.6	24.5	33.6	42.8	48.2	53.3	54.0	55.6	45.4	34.5	26.8
11:48 AM - 12:48 PM	57.7	8.3	23.6	33.1	40.2	47.0	50.0	51.1	54.4	42.8	31.2	24.3
12:48 PM - 01:48 PM	60.8	8.2	24.9	35.4	40.7	48.9	54.0	54.8	56.9	47.3	38.1	31.2
01:48 PM - 02:48 PM	61.0	9.1	24.6	32.1	40.9	49.1	54.0	55.4	55.6	53.0	40.1	28.7
02:48 PM - 03:48 PM	64.7	10.9	24.8	33.2	42.6	50.9	59.4	60.5	58.6	50.3	37.6	26.9
03:48 PM - 04:48 PM	62.6	10.6	27.3	37.9	43.5	51.4	57.3	58.0	56.3	48.2	34.2	25.2
04:48 PM - 05:48 PM	59.6	11.3	25.6	33.8	39.7	47.8	53.2	54.2	55.0	46.6	37.5	27.7
05:48 PM - 06:48 PM	58.6	11.3	26.2	33.7	39.8	47.3	52.0	52.3	54.7	45.5	34.9	26.1
06:48 PM - 07:48 PM	58.8	11.5	26.4	33.9	40.0	47.5	52.2	52.5	54.9	45.7	35.1	26.3
07:48 PM - 08:48 PM	58.7	11.4	26.3	33.8	39.9	47.4	52.1	52.4	54.8	45.6	35.0	26.2
Average	60.6	10.2	25.8	34.3	41.1	48.7	54.5	55.4	55.7	47.9	36.2	27.3

Reference Method : ANSI Standard S1.6-1984

Technical Management

Saranya C.

Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.

Supot Salameh
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S:\Report\Air Noise_Octave band.rpt (9.48AM)

122-153 EMAIL



Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng,
Amphur Pluakdaeng, Rayong Thailand 21140

P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415760
Date Received : Feb 29, 2024
Date Reported : Mar 06, 2024
Report Number : 2928375-1

Page 1 of 1

Sample Number : 2415760-10
Parameter : Octave band
Location : BH 1101 (4th Floor)
Measurement Date : Feb 27, 2024
Measurement By : Stpavit Suwanmarat

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:03 PM - 10:03 PM	88.8	35.2	50.3	55.3	72.4	80.7	84.1	84.7	75.6	74.6	66.1	50.9
10:03 PM - 11:03 PM	88.7	35.3	50.4	55.3	72.3	80.7	84.2	84.3	75.7	74.7	66.1	50.9
11:03 PM - 12:03 AM	88.6	35.4	50.4	55.4	72.4	80.7	84.3	84.1	75.6	74.7	66.1	51.0
12:03 AM - 01:03 AM	88.6	35.5	50.2	55.5	72.4	80.7	84.4	84.0	75.5	74.8	66.1	51.0
01:03 AM - 02:03 AM	88.5	35.4	50.3	55.5	72.2	80.7	84.4	83.8	75.4	74.8	66.1	51.0
02:03 AM - 03:03 AM	87.4	35.1	50.8	55.0	71.1	79.8	83.6	81.8	74.6	74.5	65.9	50.5
03:03 AM - 04:03 AM	88.3	35.4	50.2	55.2	72.1	80.4	84.1	83.5	75.6	74.8	67.4	51.6
04:03 AM - 05:03 AM	88.8	35.1	49.8	55.2	72.8	80.7	84.3	84.5	76.2	75.1	67.6	51.9
05:03 AM - 06:03 AM	88.8	34.8	49.8	55.2	72.8	80.5	84.3	84.4	76.3	75.2	68.2	52.4
06:03 AM - 07:03 AM	88.8	34.6	49.8	55.3	73.0	80.5	84.3	84.4	76.3	75.1	67.8	52.2
07:03 AM - 08:03 AM	88.6	34.4	49.6	55.2	72.7	80.2	84.1	84.3	76.1	75.0	67.9	52.2
08:03 AM - 09:03 AM	88.7	34.7	49.7	55.1	72.7	80.4	84.2	84.3	76.2	75.1	68.1	52.3
Average	88.6	35.1	50.1	55.3	72.4	80.5	84.2	84.1	75.8	74.9	67.0	51.5

Reference Method : ANSI Standard S1.6-1984

Technical Management

Saranya C.

Saranya Chalerthamrong
Scientist (4)

Approved by

Supt S

Supot Salameh
Section Head

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Amphur Pluakdaeng, Rayong Thailand 21140

P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415760
Date Received : Feb 29, 2024
Date Reported : Mar 06, 2024
Report Number : 2928375-1

Page 1 of 1

Sample Number : 2415760-11
Parameter : Octave band
Location : EH Room (1st Floor)
Measurement Date : Feb 27, 2024
Measurement By : Stpavit Suwanmarat

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:29 AM - 10:29 AM	80.6	29.9	43.9	55.3	65.6	71.7	73.8	74.6	74.1	71.0	66.3	55.9
10:29 AM - 11:29 AM	80.7	30.3	44.2	54.9	66.8	72.7	73.6	74.4	74.1	71.0	66.3	55.7
11:29 AM - 12:29 PM	80.7	30.4	44.4	54.9	66.7	72.6	73.7	74.4	74.1	71.0	66.3	55.7
12:29 PM - 01:29 PM	80.7	30.4	44.3	54.9	66.8	72.7	73.7	74.4	74.1	71.0	66.3	55.7
01:29 PM - 02:29 PM	80.3	30.2	44.1	54.9	65.7	72.0	73.6	73.6	73.6	70.8	66.0	55.5
02:29 PM - 03:29 PM	80.6	30.7	44.3	55.2	64.8	71.5	74.1	74.5	74.2	71.1	66.3	55.8
03:29 PM - 04:29 PM	80.4	30.7	44.3	55.3	65.4	71.6	73.8	74.2	73.9	71.0	66.2	55.7
04:29 PM - 05:29 PM	80.7	30.7	44.1	55.9	66.2	71.9	74.1	74.5	74.1	71.1	66.3	55.9
05:29 PM - 06:29 PM	80.7	30.7	44.3	55.8	66.2	71.8	74.1	74.5	74.1	71.1	66.3	55.9
06:29 PM - 07:29 PM	80.7	30.6	44.4	55.7	66.1	71.8	74.1	74.6	74.1	71.1	66.3	55.9
07:29 PM - 08:29 PM	80.7	30.6	44.4	55.7	66.0	71.8	74.2	74.6	74.2	71.1	66.3	55.9
08:29 PM - 09:29 PM	80.7	30.5	44.7	55.7	65.9	71.7	74.1	74.6	74.2	71.1	66.3	55.9
Average	80.6	30.5	44.3	55.4	66.1	72.0	73.9	74.4	74.1	71.0	66.3	55.8

Reference Method : ANSI Standard S1.6-1984

Technical Management

Saranya C.

Saranya Chalerthamrong
Scientist (4)

Approved by

Supt S

Supot Salameh
Section Head

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Amphur Pluakdaeng, Rayong Thailand 21140

P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415760
Date Received : Feb 28, 2024
Date Reported : Mar 06, 2024
Report Number : 2928376-1

Page 1 of 1

Sample Number : 2415760-12
Parameter : Octave band
Location : Utility Room (1st Floor)
Measurement Date : Feb 27, 2024
Measurement By : Stpavit Suwanmarat

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:00 AM - 10:00 AM	87.2	30.7	43.3	54.2	63.1	69.2	78.5	78.3	78.4	83.8	77.9	62.4
10:00 AM - 11:00 AM	87.0	30.5	43.1	54.0	62.9	69.0	78.3	78.1	78.2	83.6	77.7	62.2
11:00 AM - 12:00 PM	87.5	31.0	43.6	54.5	63.4	69.5	78.8	78.6	78.7	84.1	78.2	62.7
12:00 PM - 01:00 PM	87.4	30.4	43.3	54.3	62.6	69.5	78.8	78.0	78.2	84.2	78.2	62.1
01:00 PM - 02:00 PM	87.1	30.0	43.1	54.2	62.3	69.0	78.2	77.4	78.0	84.0	78.0	61.7
02:00 PM - 03:00 PM	87.4	30.9	43.5	54.4	63.3	69.4	78.7	78.5	78.6	84.0	78.1	62.6
03:00 PM - 04:00 PM	87.1	30.8	42.9	54.3	63.3	68.6	78.2	78.1	78.1	83.9	77.9	62.4
04:00 PM - 05:00 PM	87.1	31.1	43.2	54.3	63.2	68.8	77.9	78.3	78.4	83.8	77.9	62.6
05:00 PM - 06:00 PM	86.9	30.8	42.9	54.0	62.9	68.5	77.6	78.0	78.1	83.5	77.6	62.3
06:00 PM - 07:00 PM	87.3	30.8	43.0	54.2	62.9	68.8	78.1	78.0	78.0	84.2	78.2	62.4
07:00 PM - 08:00 PM	87.3	30.5	43.1	54.2	62.5	69.0	78.4	77.9	78.0	84.1	78.1	62.0
08:00 PM - 09:00 PM	87.4	30.9	43.1	54.3	63.0	68.9	78.2	78.1	78.1	84.3	78.3	62.5
Average	87.2	30.7	43.2	54.2	63.0	69.0	78.3	78.1	78.2	84.0	78.0	62.3

Reference Method : ANSI Standard S1.6-1984

Technical Management

Saranya C.

Saranya Chalerthamrong
Scientist (4)

Approved by

Supt S

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Pluakdaeng, Rayong Thailand 21140

P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466752
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3021894-1

Page 1 of 4

Sample Number : 2466752-1
Sampled Date : Jun 17, 2024
Sample Description : Noise Dose
Location : Operator Technician
Personal Sampling : anduridg workfauat
Date Analysis Commenced : Jun 18, 2024

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing	Noise Dose (12 hrs.) (Calculated from Leq)	%	-	1	67.6	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
Noise Dose (8 hrs.)	08:30 AM - 08:30 PM	%	-	1	63.1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (12 hrs.)	08:30 AM - 08:30 PM	dB(A)	-	-	81.3	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (8 hrs.)	08:30 AM - 08:30 PM	dB(A)	-	-	83.0	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong

Guideline :

- Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
- Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)

* MOL : Recommended guideline limit for 12 working hours should not be over 83 dB(A)

Note : LCPeak = 137.7 dB(A), Lmax = 114.1 dB (A)

Sampled By : Natthanin Vongviyo

Remark :

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

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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466752
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3021894-1

Page 3 of 4

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:30 AM - 08:30 PM	%	-	-	70.8	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
Noise Dose (8 hrs.)	08:30 AM - 08:30 PM	%	-	-	66.1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (12 hrs.) (Calculated from Lavg)	08:30 AM - 08:30 PM	dB(A)	-	-	81.5	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (8 hrs.)	08:30 AM - 08:30 PM	dB(A)	-	-	83.3	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)

Note : LCpeak = 137.1 dB(A), Lmax = 110.6 dB (A)

Sampled By : Nattakam Vongyoo

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

Approved by

Supot Salameth
Section Head

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122-153 (ENG)



Analysis / Test Report

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Pluakdaeng, Rayong Thailand 21140
P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466752
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3021894-1

Page 3 of 4

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:30 AM - 08:30 PM	%	-	-	110	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
Noise Dose (8 hrs.)	08:30 AM - 08:30 PM	%	-	-	105	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (12 hrs.) (Calculated from Lavg)	08:30 AM - 08:30 PM	dB(A)	-	-	83.4	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (8 hrs.)	08:30 AM - 08:30 PM	dB(A)	-	-	85.2	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)

Note : LCpeak = 138.0 dB(A), Lmax = 115.6 dB (A)

Sampled By : Nattakam Vongyoo

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

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122-153 (ENG)



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Pluakdaeng, Rayong Thailand 21140
P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466752
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3021894-1

Page 4 of 4

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:30 AM - 08:30 PM	%	-	-	11.0	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
Noise Dose (8 hrs.)	08:30 AM - 08:30 PM	%	-	-	10.5	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (12 hrs.) (Calculated from Lavg)	08:30 AM - 08:30 PM	dB(A)	-	-	73.4	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (8 hrs.)	08:30 AM - 08:30 PM	dB(A)	-	-	75.2	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)

Note : LCpeak = 137.3 dB(A), Lmax = 108.2 dB (A)

Sampled By : Nattakam Vongyoo

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

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Pluakdaeng, Rayong Thailand 21140
P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466754
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number : 3021895-1

Page 1 of 1

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (8 hrs.)	08:30 AM - 04:30 PM	%	-	-	93.3	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (8 hrs.)	08:30 AM - 04:30 PM	dB(A)	-	-	84.7	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)

Note : LCpeak = 137.0 dB(A), Lmax = 113.2 dB (A)

Sampled By : Nattakam Vongyoo

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

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Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415762
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number : 2907025-1

Page 1 of 4

Sample Number : 2415762-1
Sampled Date : Feb 27, 2024
Sample Description : Noise Dose
Location : Operator Technician
Personal Sampling : นายณัฐกร นามะจันทร์
Date Analysis Commenced : Mar 05, 2024

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	%	-	-	49.0	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
Noise Dose (8 hrs.)	08:00 AM - 08:00 PM	%	-	-	45.7	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	dB(A)	-	-	79.9	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (8 hrs.)	08:00 AM - 08:00 PM	dB(A)	-	-	81.8	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)
Note : L_{Cpeak} = 142.5 dB(A), L_{max} = 136.7 dB (A)
Sampled By : Chanon Booncheun

Remark :
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Supt. Salameth
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122-153 (ENGL)



Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur
Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415762
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number : 2907025-1

Page 2 of 4

Sample Number : 2415762-2
Sampled Date : Feb 27, 2024
Sample Description : Noise Dose
Location : Shift Leader
Personal Sampling : นายสุวิทย์ นามะจันทร์
Date Analysis Commenced : Mar 05, 2024

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	%	-	-	17.8	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
Noise Dose (8 hrs.)	08:00 AM - 08:00 PM	%	-	-	16.6	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	dB(A)	-	-	75.5	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (8 hrs.)	08:00 AM - 08:00 PM	dB(A)	-	-	77.2	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)
Note : L_{Cpeak} = 135.3 dB(A), L_{max} = 107.1 dB (A)
Sampled By : Chanon Booncheun

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

Approved by

Supt. Salameth
Section Head

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Analysis / Test Report

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Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415762
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number : 2907025-1

Page 3 of 4

Sample Number : 2415762-3
Sampled Date : Feb 27, 2024
Sample Description : Noise Dose
Location : EBI Technician
Personal Sampling : นายณัฐกร นามะจันทร์
Date Analysis Commenced : Mar 05, 2024

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	%	-	-	79.4	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
Noise Dose (8 hrs.)	08:00 AM - 08:00 PM	%	-	-	75.9	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	dB(A)	-	-	82.0	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (8 hrs.)	08:00 AM - 08:00 PM	dB(A)	-	-	83.8	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)
Note : L_{Cpeak} = 136.5 dB(A), L_{max} = 112.9 dB (A)
Sampled By : Chanon Booncheun

Remark :
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Analysis / Test Report

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Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415762
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number : 2907025-1

Page 4 of 4

Sample Number : 2415762-4
Sampled Date : Feb 27, 2024
Sample Description : Noise Dose
Location : Packaging Technician
Personal Sampling : นายณัฐกร นามะจันทร์
Date Analysis Commenced : Mar 05, 2024

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	%	-	-	13.8	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
Noise Dose (8 hrs.)	08:00 AM - 08:00 PM	%	-	-	13.2	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	dB(A)	-	-	74.4	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (8 hrs.)	08:00 AM - 08:00 PM	dB(A)	-	-	76.2	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)
Note : L_{Cpeak} = 141.8 dB(A), L_{max} = 115.3 dB (A)
Sampled By : Chanon Booncheun

Remark :
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Puakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415765
Date Received : Feb 29, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

Page 1 of 1

Sample Number	2415765-1								
Sampled Date	Feb 27, 2024								
Sample Description	Noise Dose								
Location	Mechanical Technician								
Personal Sampling	Personal								
Date Analysis Commenced	Mar 05, 2024								

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (8 hrs.)	08:00 AM - 04:00 PM	%	-	-	41.7	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong
TWA (8 hrs.)	08:00 AM - 04:00 PM	dB(A)	-	-	81.2	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Rayong

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
Note : L_{peak} = 133.5 dB(A), L_{max} = 115.7 dB (A)

Sampled By : Chamon Booncheun

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

Approved by

Supt S.

Supt Salameh
Section Head

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Puakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

Page 1 of 1

Sample Number	2415751-1								
Sampled Date	Feb 19, 2024								
Sample Description	Air Quality								
Location	AA Storage Tank area								
Date Analysis Commenced	Feb 21, 2024								
Condition of Sample	Drawn into one sorbent tube, refrigerated								
Barometric Pressure	759 mmHg								
Atmospheric Temperature	32.0 °C								

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	10:00 AM - 12:00 PM	ppm	-	0.10	0.31	2	Based on OSHA, 28	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anuwat Tema

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

Approved by

Thanitak.

Thanita Kulurivong
Scientist (4)

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

Page 2 of 10

Sample Number	2415751-2								
Sampled Date	Feb 19, 2024								
Sample Description	Air Quality								
Location	Mix Tank Room area 1st								
Date Analysis Commenced	Feb 21, 2024								
Condition of Sample	Drawn into one sorbent tube, refrigerated								
Barometric Pressure	759 mmHg								
Atmospheric Temperature	32.0 °C								

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	10:00 AM - 12:00 PM	ppm	-	0.10	0.41	2	Based on OSHA, 28	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anuwat Tema

Remark :
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Puakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

Page 3 of 10

Sample Number	2415751-3								
Sampled Date	Feb 19, 2024								
Sample Description	Air Quality								
Location	Mix Tank Room area 2nd								
Date Analysis Commenced	Feb 21, 2024								
Condition of Sample	Drawn into one sorbent tube, refrigerated								
Barometric Pressure	759 mmHg								
Atmospheric Temperature	32.0 °C								

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anuwat Tema

Remark :
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Puakdaeng, Rayong Thailand 21140

P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

Page 4 of 16

Sample Number : 2415751-4
Sampled Date : Feb 19, 2024
Sample Description : Air Quality
Location : Stripping column 3rd floor
Date Analysis Commenced : Feb 21, 2024
Condition of Sample : Drawn into one sorbent tube, refrigerated
Barometric Pressure : 759 mmHg
Atmospheric Temperature : 32.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	10:00 AM - 12:00 PM	ppm	-	0.10	0.32	2	Based on OSHA, 28	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anuwit Tema

Remark :
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Thanita Kulsrivong
Scientist (4)

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Puakdaeng, Rayong Thailand 21140

P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

Page 5 of 16

Sample Number : 2415751-5
Sampled Date : Feb 19, 2024
Sample Description : Air Quality
Location : QA lab
Date Analysis Commenced : Feb 21, 2024
Condition of Sample : Drawn into one sorbent tube, refrigerated
Barometric Pressure : 759 mmHg
Atmospheric Temperature : 25.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anuwit Tema

Remark :
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Scientist (4)

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

Page 6 of 16

Sample Number : 2415751-6
Sampled Date : Feb 19, 2024
Sample Description : Air Quality
Location : RD lab
Date Analysis Commenced : Feb 21, 2024
Condition of Sample : Drawn into one sorbent tube, refrigerated
Barometric Pressure : 759 mmHg
Atmospheric Temperature : 25.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anuwit Tema

Remark :
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Puakdaeng, Rayong Thailand 21140

P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

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Sample Number : 2415751-7
Sampled Date : Feb 19, 2024
Sample Description : Air Quality
Location : Unloading Technician
Personal Sampling : 80038
Date Analysis Commenced : Feb 21, 2024
Condition of Sample : Drawn into one filter paper placed in plastic cassette and two sorbent tubes, refrigerated
Barometric Pressure : 759 mmHg
Atmospheric Temperature : 32.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	10:00 AM - 12:00 PM	ppm	-	0.10	0.11	2	Based on OSHA, 28	MOL	Bangkok
Propylene glycol	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	Bangkok
Sodium hydroxide as NaOH	10:00 AM - 12:00 PM	mg/m3	-	0.05	<0.05	2	NIOSH (1994), 7401	MOL	Rayong

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anuwit Tema

Remark :
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Thanita Kulsrivong
Scientist (4)

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Analysis / Test Report

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Puakdaeng, Rayong Thailand 21140

P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

Page 8 of 16

Sample Number : 2415751-8
Sampled Date : Feb 19, 2024
Sample Description : Air Quality
Location : Operator Technician
Personal Sampling : Anuwet Tera
Date Analysis Commenced : Feb 21, 2024
Condition of Sample : Drawn into two sorbent tubes, refrigerated
Barometric Pressure : 759 mmHg
Atmospheric Temperature : 32.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok
Propylene glycol	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anuwet Tera

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

Approved by

Thanitak.

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Scientist (4)

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Analysis / Test Report

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Puakdaeng, Rayong Thailand 21140

P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

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Sample Number : 2415751-9
Sampled Date : Feb 19, 2024
Sample Description : Air Quality
Location : PG Storage Tank area
Date Analysis Commenced : Feb 21, 2024
Condition of Sample : Drawn into one sorbent tube, refrigerated
Barometric Pressure : 759 mmHg
Atmospheric Temperature : 32.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Propylene glycol	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	Bangkok

Guideline :
Sampled By : Anuwet Tera

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

Approved by

Thanitak.

Thanita Kulurivong
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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

Page 10 of 16

Sample Number : 2415751-10
Sampled Date : Feb 19, 2024
Sample Description : Air Quality
Location : Coating Room area
Date Analysis Commenced : Feb 21, 2024
Condition of Sample : Drawn into one sorbent tube, refrigerated
Barometric Pressure : 759 mmHg
Atmospheric Temperature : 32.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Propylene glycol	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	Bangkok

Guideline :
Sampled By : Anuwet Tera

Remark :
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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

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Sample Number : 2415751-11
Sampled Date : Feb 19, 2024
Sample Description : Air Quality
Location : Initiator Room
Date Analysis Commenced : Feb 21, 2024
Condition of Sample : Drawn into two amber plastic bottles, refrigerated
Barometric Pressure : 759 mmHg
Atmospheric Temperature : 32.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Hydrogen Peroxide	10:00 AM - 12:00 PM	ppm	-	0.08	<0.08	1	OSHA, V08	MOL	Bangkok
Sulfur dioxide	10:00 AM - 12:00 PM	ppm	-	0.004	<0.004	5	NIOSH (1994), PSCAM146	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anuwet Tera

Remark :
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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

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Sample Number 2415751-12
Sampled Date Feb 19, 2024
Sample Description Air Quality
Location RD lab
Date Analysis Commenced Feb 21, 2024
Condition of Sample Drawn into one filter paper placed in plastic petri dish, one plastic bottle and one amber plastic bottle, refrigerated
Barometric Pressure 759 mmHg
Atmospheric Temperature 25.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Hydrogen Peroxide	10:00 AM - 12:00 PM	ppm	—	0.08	<0.08	1	OSHA, V16	MOL	Bangkok
Sodium hydroxide as NaOH	10:00 AM - 12:00 PM	mg/m ³	—	0.05	<0.05	2	NIOSH (1994), 7401	MOL	Rayong

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anuwet Tema

Remark :
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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

Page 13 of 16

Sample Number 2415751-13
Sampled Date Feb 19, 2024
Sample Description Air Quality
Location Oxidizing Warehouse
Date Analysis Commenced Feb 21, 2024
Condition of Sample Drawn into one amber plastic bottle, refrigerated
Barometric Pressure 759 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Hydrogen Peroxide	10:00 AM - 12:00 PM	ppm	—	0.08	<0.08	1	OSHA, V16	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anuwet Tema

Remark :
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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

Page 14 of 16

Sample Number 2415751-14
Sampled Date Feb 19, 2024
Sample Description Air Quality
Location NaOH unloading
Date Analysis Commenced Feb 23, 2024
Condition of Sample Drawn into one filter paper placed in plastic cassette
Barometric Pressure 759 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Sodium hydroxide as NaOH	10:00 AM - 12:00 PM	mg/m ³	—	0.05	<0.05	2	NIOSH (1994), 7401	MOL	Rayong

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anuwet Tema

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Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 05, 2024
Report Number : 2907015-1

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Sample Number 2415751-15
Sampled Date Feb 19, 2024
Sample Description Air Quality
Location Utility room
Date Analysis Commenced Feb 23, 2024
Condition of Sample Drawn into one filter paper placed in plastic cassette
Barometric Pressure 759 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Sodium hydroxide as NaOH	10:00 AM - 12:00 PM	mg/m ³	—	0.05	<0.05	2	NIOSH (1994), 7401	MOL	Rayong

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anuwet Tema

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Project Name : Monitoring
Project Location :

Lot ID: 2415751
Date Received : Feb 19, 2024
Date Reported : Mar 25, 2024
Report Number : 3021897-1

Page 1 of 16

Sample Number 2415751-16
Sampled Date Feb 19, 2024
Sample Description Air Quality
Location QA lab
Date Analysis Commenced Feb 23, 2024
Condition of Sample Drawn into one filter paper placed in plastic cassette
Barometric Pressure 759 mmHg
Atmospheric Temperature 25.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Sodium hydroxide as NaOH	10:00 AM - 12:00 PM	mg/m ³	—	0.05	<0.05	2	NIOSH (1994), 7401	MOL	Rayong

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Anusrit Tema

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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466755
Date Received : Jun 19, 2024
Date Reported : Jun 25, 2024
Report Number : 3021897-1

Page 1 of 16

Sample Number 2466755-1
Sampled Date Jun 19, 2024
Sample Description Air Quality
Location Packaging Area
Date Analysis Commenced Jun 20, 2024
Condition of Sample Drawn into two filter papers placed in each cassette
Barometric Pressure 756 mmHg
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	09:30 AM - 11:30 AM	mg/m ³	—	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong
Total Dust	09:30 AM - 11:30 AM	mg/m ³	—	0.15	<0.15	15	Based on NIOSH (1994), 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Tarni Octjinda

Remark :
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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466755
Date Received : Jun 19, 2024
Date Reported : Jun 25, 2024
Report Number : 3021897-1

Page 2 of 16

Sample Number 2466755-2
Sampled Date Jun 19, 2024
Sample Description Air Quality
Location Roller Mill Area
Date Analysis Commenced Jun 20, 2024
Condition of Sample Drawn into two filter papers placed in each cassette
Barometric Pressure 756 mmHg
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	09:30 AM - 11:30 AM	mg/m ³	—	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong
Total Dust	09:30 AM - 11:30 AM	mg/m ³	—	0.15	<0.15	15	Based on NIOSH (1994), 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Tarni Octjinda

Remark :
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Project Location :

Lot ID: 2466755
Date Received : Jun 19, 2024
Date Reported : Jun 25, 2024
Report Number : 3021897-1

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Sample Number 2466755-3
Sampled Date Jun 19, 2024
Sample Description Air Quality
Location EM Room area
Date Analysis Commenced Jun 20, 2024
Condition of Sample Drawn into two filter papers placed in each cassette
Barometric Pressure 756 mmHg
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	09:30 AM - 11:30 AM	mg/m ³	—	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong
Total Dust	09:30 AM - 11:30 AM	mg/m ³	—	0.15	<0.15	15	Based on NIOSH (1994), 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Tarni Octjinda

Remark :
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Project Name : Monitoring
Project Location :

Lot ID: 2466755
Date Received : Jun 19, 2024
Date Reported : Jun 25, 2024
Report Number : 3021897-1

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Sample Number 2466755-4
Sampled Date Jun 19, 2024
Sample Description Air Quality
Location Zig Zag Area
Date Analysis Commenced Jun 20, 2024
Condition of Sample Drawn into two filter papers placed in each cassette
Barometric Pressure 756 mmHg
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	09:30 AM - 11:30 AM	mg/m ³	-	0.15	<0.15	5	Based on NIOSH (1998), OSHA 0600	OSHA	Rayong
Total Dust	09:30 AM - 11:30 AM	mg/m ³	-	0.15	<0.15	15	Based on NIOSH (1994), OSHA 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Tarn Octjinda

Remark :
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Project Name : Monitoring
Project Location :

Lot ID: 2466755
Date Received : Jun 19, 2024
Date Reported : Jun 25, 2024
Report Number : 3021897-1

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Sample Number 2466755-5
Sampled Date Jun 19, 2024
Sample Description Air Quality
Location TS Lab
Date Analysis Commenced Jun 20, 2024
Condition of Sample Drawn into two filter papers placed in each cassette
Barometric Pressure 756 mmHg
Atmospheric Temperature 25.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	09:30 AM - 11:30 AM	mg/m ³	-	0.15	<0.15	5	Based on NIOSH (1998), OSHA 0600	OSHA	Rayong
Total Dust	09:30 AM - 11:30 AM	mg/m ³	-	0.15	<0.15	15	Based on NIOSH (1994), OSHA 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Tarn Octjinda

Remark :
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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466755
Date Received : Jun 19, 2024
Date Reported : Jun 25, 2024
Report Number : 3021897-1

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Sample Number 2466755-6
Sampled Date Jun 19, 2024
Sample Description Air Quality
Location Shift Leader
Personal Sampling อาณัติกร สารภักดิ์
Date Analysis Commenced Jun 20, 2024
Condition of Sample Drawn into one filter paper placed in plastic cassette
Barometric Pressure 756 mmHg
Atmospheric Temperature 25.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	09:30 AM - 11:30 AM	mg/m ³	-	0.15	<0.15	5	Based on NIOSH (1998), OSHA 0600	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Tarn Octjinda

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

Approved by

Thanitak.

Thanita Kulurivong
Scientist (1)

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122-153-0962



Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Puakdaeng, Amphur
Puakdaeng, Rayong Thailand 21140
P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466755
Date Received : Jun 19, 2024
Date Reported : Jun 25, 2024
Report Number : 3021897-1

Page 7 of 10

Sample Number 2466755-7
Sampled Date Jun 19, 2024
Sample Description Air Quality
Location Packaging Technician
Personal Sampling อานันท์กร สารภักดิ์
Date Analysis Commenced Jun 20, 2024
Condition of Sample Drawn into one filter paper placed in plastic cassette
Barometric Pressure 756 mmHg
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	09:30 AM - 11:30 AM	mg/m ³	-	0.15	<0.15	5	Based on NIOSH (1998), OSHA 0600	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Tarn Octjinda

Remark :
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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466755
Date Received : Jun 19, 2024
Date Reported : Jun 25, 2024
Report Number : 3021897-1

Page 8 of 10

Sample Number : 2466755-8
Sampled Date : Jun 19, 2024
Sample Description : Air Quality
Location : Operator Technician
Personal Sampling : Personal Sampling
Date Analysis Commenced : Jun 20, 2024
Condition of Sample : Drawn into one filter paper placed in plastic cassette
Barometric Pressure : 756 mmHg
Atmospheric Temperature : 25.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	09:30 AM - 11:30 AM	mg/m ³	-	0.15	<0.15	5	Based on NIOSH (1998), OSHA 0600		Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Tarn Octjinda

Remark :
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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466755
Date Received : Jun 19, 2024
Date Reported : Jun 25, 2024
Report Number : 3021897-1

Page 9 of 10

Sample Number : 2466755-9
Sampled Date : Jun 19, 2024
Sample Description : Air Quality
Location : Mechanical Technician
Personal Sampling : Personal Sampling
Date Analysis Commenced : Jun 20, 2024
Condition of Sample : Drawn into one filter paper placed in plastic cassette
Barometric Pressure : 756 mmHg
Atmospheric Temperature : 30.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	09:30 AM - 11:30 AM	mg/m ³	-	0.15	<0.15	5	Based on NIOSH (1998), OSHA 0600		Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Tarn Octjinda

Remark :
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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466755
Date Received : Jun 19, 2024
Date Reported : Jun 25, 2024
Report Number : 3021897-1

Page 10 of 10

Sample Number : 2466755-10
Sampled Date : Jun 19, 2024
Sample Description : Air Quality
Location : TS Technician
Personal Sampling : Personal Sampling
Date Analysis Commenced : Jun 20, 2024
Condition of Sample : Drawn into one filter paper placed in plastic cassette
Barometric Pressure : 756 mmHg
Atmospheric Temperature : 25.0 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	09:30 AM - 11:30 AM	mg/m ³	-	0.15	<0.15	5	Based on NIOSH (1998), OSHA 0600		Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Tarn Octjinda

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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

Page 1 of 10

Sample Number : 2466565-1
Sampled Date : Jun 20, 2024
Sample Description : Air Quality
Location : AA Storage Tank area
Date Analysis Commenced : Jun 22, 2024
Condition of Sample : Drawn into one sorbent tube, refrigerated
Barometric Pressure : 756 mmHg
Atmospheric Temperature : 30.4 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	09:30 AM - 11:30 AM	ppm	-	0.10	0.34	2	Based on OSHA, 28	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Tarn Octjinda

Remark :
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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

Page 2 of 16

Sample Number 2466565-2
Sampled Date Jun 20, 2024
Sample Description Air Quality
Location Mix Tank Room area 1st
Date Analysis Commenced Jun 22, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 756 mmHg
Atmospheric Temperature 30.4 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	01:50 PM - 03:50 PM	ppm	-	0.10	0.13	2	Based on OSHA, 28	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Tarn Octjinda

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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

Page 3 of 16

Sample Number 2466565-3
Sampled Date Jun 20, 2024
Sample Description Air Quality
Location Mix Tank Room area 2nd
Date Analysis Commenced Jun 22, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 756 mmHg
Atmospheric Temperature 30.4 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	01:50 PM - 03:50 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Tarn Octjinda

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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

Page 4 of 16

Sample Number 2466565-4
Sampled Date Jun 20, 2024
Sample Description Air Quality
Location Stripping column 3rd floor
Date Analysis Commenced Jun 22, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 756 mmHg
Atmospheric Temperature 30.4 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	01:50 PM - 03:50 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
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Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

Page 5 of 16

Sample Number 2466565-5
Sampled Date Jun 20, 2024
Sample Description Air Quality
Location QA lab
Date Analysis Commenced Jun 22, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 756 mmHg
Atmospheric Temperature 25.6 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	02:00 PM - 04:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok

Guideline :
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Sampled By : Tarn Octjinda

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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

Page 8 of 16

Sample Number 2466565-6
Sampled Date Jun 20, 2024
Sample Description Air Quality
Location RD lab
Date Analysis Commenced Jun 22, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 756 mmHg
Atmospheric Temperature 25.6 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	02:00 PM - 04:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok

Guideline :
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Sampled By : Tarin Oetjinda

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Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

Page 7 of 16

Sample Number 2466565-7
Sampled Date Jun 20, 2024
Sample Description Air Quality
Location Unloading Technician
Personal Sampling system: #038
Date Analysis Commenced Jun 21, 2024
Condition of Sample Drawn into one filter paper placed in plastic cassette and two sorbent tubes, refrigerated
Barometric Pressure 756 mmHg
Atmospheric Temperature 33.2 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	09:30 AM - 11:30 AM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok
Propylene glycol	09:30 AM - 11:30 AM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	Bangkok
Sodium hydroxide as NaOH	09:30 AM - 11:30 AM	mg/m3	-	0.05	<0.05	2	NIOSH (1994), 7401	MOL	Rayong

Guideline :
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Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

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Sample Number 2466565-8
Sampled Date Jun 20, 2024
Sample Description Air Quality
Location Operator Technician
Personal Sampling accurate stuff
Date Analysis Commenced Jun 21, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 756 mmHg
Atmospheric Temperature 30.4 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic acid	09:00 AM - 11:00 AM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok
Propylene glycol	09:00 AM - 11:00 AM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	Bangkok

Guideline :
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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

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Sample Number 2466565-9
Sampled Date Jun 20, 2024
Sample Description Air Quality
Location PG Storage Tank area
Date Analysis Commenced Jun 21, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 756 mmHg
Atmospheric Temperature 30.4 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Propylene glycol	09:30 AM - 11:30 AM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	Bangkok

Guideline :
Sampled By : Tarin Oetjinda

Remark :
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P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

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Sample Number 2466565-10
Sampled Date Jun 20, 2024
Sample Description Air Quality
Location Coating Room area
Date Analysis Commenced Jun 21, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 756 mmHg
Atmospheric Temperature 30.4 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Propylene glycol	09:30 AM - 11:30 AM	ppm	-	0.10	1:10	No Standard	NIOSH (1994), 5523	-	Bangkok

Guideline :
Sampled By : Tarin Octjinda

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

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RIGHT SOLUTIONS PRESENT SPARK EFFECTS

122-153-0962



Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Puakdaeng, Amphur
Puakdaeng, Rayong Thailand 21140
P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

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Sample Number 2466565-11
Sampled Date Jun 20, 2024
Sample Description Air Quality
Location Initiator Room
Date Analysis Commenced Jun 21, 2024
Condition of Sample Drawn into one amber plastic bottle, refrigerated
Barometric Pressure 756 mmHg
Atmospheric Temperature 30.4 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Hydrogen Peroxide	01:50 PM - 03:50 PM	ppm	-	0.08	<0.08	1	OSHA, V16	MOL	Bangkok
Sulfur dioxide	01:50 PM - 03:50 PM	ppm	-	0.004	<0.004	5	NIOSH (1994), PLCAM146	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Tarin Octjinda

Remark :
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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Puakdaeng, Amphur
Puakdaeng, Rayong Thailand 21140
P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

Page 12 of 16

Sample Number 2466565-12
Sampled Date Jun 20, 2024
Sample Description Air Quality
Location RD lab
Date Analysis Commenced Jun 21, 2024
Condition of Sample Drawn into one filter paper placed in plastic cassette and one amber plastic bottle, refrigerated
Barometric Pressure 756 mmHg
Atmospheric Temperature 25.6 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Hydrogen Peroxide	02:00 PM - 04:00 PM	ppm	-	0.08	<0.08	1	OSHA, V16	MOL	Bangkok
Sodium hydroxide as NaOH	02:00 PM - 04:00 PM	mg/m3	-	0.05	<0.05	2	NIOSH (1994), 7401	MOL	Rayong

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Tarin Octjinda

Remark :
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111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Puakdaeng, Amphur
Puakdaeng, Rayong Thailand 21140
P/O : 4964975585
Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

Page 13 of 16

Sample Number 2466565-13
Sampled Date Jun 20, 2024
Sample Description Air Quality
Location Oxidizing Warehouse
Date Analysis Commenced Jun 21, 2024
Condition of Sample Drawn into one amber plastic bottle, refrigerated
Barometric Pressure 756 mmHg
Atmospheric Temperature 30.4 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Hydrogen Peroxide	09:30 AM - 11:30 AM	ppm	-	0.08	<0.08	1	OSHA, V16	MOL	Bangkok

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Tarin Octjinda

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Puakdaeng, Amphur
Puakdaeng, Rayong Thailand 21140
P/O : 4904975385
Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

Page 14 of 16

Sample Number : 2466565-14
Sampled Date : Jun 20, 2024
Sample Description : Air Quality
Location : NaOH unloading
Date Analysis Commenced : Jun 22, 2024
Condition of Sample : Drawn into one filter paper placed in plastic cassette
Barometric Pressure : 756 mmHg
Atmospheric Temperature : 30.4 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Sodium hydroxide as NaOH	09:30 AM - 11:30 AM	mg/m ³	—	0.05	0.17	2	NIOSH (1994), 7401	MOL	Rayong

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Tarni Octinda

Remark :
- LOD : Limit of Detection
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Approved by

Thanita Kulurivong

Scientist (4)

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Analysis / Test Report

Client : BASF (Thai) Limited
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Puakdaeng, Rayong Thailand 21140
P/O : 4904975385
Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

Page 13 of 16

Sample Number : 2466565-15
Sampled Date : Jun 20, 2024
Sample Description : Air Quality
Location : Utility room
Date Analysis Commenced : Jun 22, 2024
Condition of Sample : Drawn into one filter paper placed in plastic cassette
Barometric Pressure : 756 mmHg
Atmospheric Temperature : 30.4 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Sodium hydroxide as NaOH	01:50 PM - 03:50 PM	mg/m ³	—	0.05	<0.05	2	NIOSH (1994), 7401	MOL	Rayong

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Tarni Octinda

Remark :
- LOD : Limit of Detection
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Approved by

Thanita Kulurivong

Scientist (4)

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Analysis / Test Report

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Puakdaeng, Rayong Thailand 21140
P/O : 4904975385
Project Name : Monitoring
Project Location :

Lot ID: 2466565
Date Received : Jun 20, 2024
Date Reported : Jul 06, 2024
Report Number : 3021675-1

Page 14 of 16

Sample Number : 2466565-16
Sampled Date : Jun 20, 2024
Sample Description : Air Quality
Location : QA lab
Date Analysis Commenced : Jun 22, 2024
Condition of Sample : Drawn into one filter paper placed in plastic cassette
Barometric Pressure : 756 mmHg
Atmospheric Temperature : 30.4 °C

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Sodium hydroxide as NaOH	02:00 PM - 04:00 PM	mg/m ³	—	0.05	0.17	2	NIOSH (1994), 7401	MOL	Rayong

Guideline :
MOL : Announcement of the Department of Labour Protection and Welfare on Threshold Limit Values of Hazardous Chemical Substances Dated August 3, B.E. 2560 (2017)
Sampled By : Tarni Octinda

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

Approved by

Thanita Kulurivong

Scientist (4)

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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ผลสอบ

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Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Stack (GSM)	Odor of Nitrogen	Analyzer, System calibration, Span				
Stack	Acrylic Acid	Console Control Unit	BK_F50518	9-Jan-24	9-Jul-24	6
Stack	Acrylic Acid	Pilot Tube	BK_F50523	9-Jan-24	9-Jul-24	6
Stack	Acrylic Acid	Flue gas Analyzer	RVG_F50564	24-Apr-24	29-Apr-25	12
Stack	Acrylic Acid	Field Rotameter	BK_F51042	1-Apr-24	1-Jul-24	3
Stack	Acrylic Acid	NPLC	BK_F10030	16-Jan-24	16-Jan-25	12
Stack	Total Suspended Particulate	Console Control Unit	BK_F50518	9-Jan-24	9-Jul-24	6
Stack	Total Suspended Particulate	Pilot Tube	BK_F50523	9-Jan-24	9-Jul-24	6
Stack	Total Suspended Particulate	Pilot Tube	BK_F50522	9-Jan-24	9-Jul-24	6
Stack	Total Suspended Particulate	Flue gas Analyzer	RVG_F50564	24-Apr-24	29-Apr-25	12
Stack	Total Suspended Particulate	Digital Balance	BK_F40309	30-Nov-23	30-Nov-24	12
Stack	Total VOC	Console Control Unit	BK_F50518	9-Jan-24	9-Jul-24	6
Stack	Total VOC	Pilot Tube	BK_F50523	9-Jan-24	9-Jul-24	6
Stack	Total VOC	Flue gas Analyzer	RVG_F50564	24-Apr-24	29-Apr-25	12
Stack	Total VOC	Field Rotameter	BK_F51042	1-Apr-24	1-Jul-24	3
Stack	Total VOC	FD Analyzer	BK_F50758	3-Jan-24	3-Jul-24	6
Ambient	Total Suspended Particulate	High Volume	RVG_F50777			On-site Calibration
Ambient	Total Suspended Particulate	Digital Balance	RVG_F50601	22-Feb-24	22-Feb-25	12
Ambient	Nitrogen Dioxide	NO _x Analyzer	RVG_F50671	4-Jan-24	4-Jul-24	6
Ambient	Nitrogen Dioxide	NO _x Analyzer	RVG_F50659	4-Jan-24	4-Jul-24	6
Noise	Leq 24 hrs	Sound Calibrator	RVG_F50696	26-Jan-24	26-Jan-25	12
Noise	Leq 24 hrs	Sound Level Meter	RVG_F50620	22-Jan-24	21-Jan-25	12
Noise	Leq 24 hrs	Sound Level Meter	RVG_F50622	25-Jan-24	24-Jan-25	12
Noise	Leq 24 hrs	Sound Level Meter	RVG_F50621	22-Jan-24	21-Jan-25	12
Noise	Leq 12 hrs	Sound Calibrator	RVG_F50615	20-Sep-23	20-Sep-24	12
Noise	Leq 12 hrs	Sound Level Meter	RVG_F50625	25-Jan-24	24-Jan-25	12
Noise	Leq 12 hrs	Sound Level Meter	RVG_F50626	25-Jan-24	24-Jan-25	12
Noise	Leq 12 hrs	Sound Level Meter	RVG_F50627	22-Jan-24	21-Jan-25	12
Noise	Leq 12 hrs	Sound Level Meter	RVG_F50629	20-Jan-23	20-Jan-24	12
Noise	Leq 12 hrs	Sound Level Meter	RVG_F50630	25-Jan-24	24-Jan-25	12
Noise	Leq 12 hrs	Sound Level Meter	RVG_F50631	10-Aug-23	10-Aug-24	12
Noise	Leq 12 hrs	Sound Calibrator	RVG_F50623	28-Feb-24	27-Feb-25	12
Noise	Leq 12 hrs	Sound Level Meter	RVG_F50627	22-Jan-24	21-Jan-25	12
Noise	Leq 12 hrs	Sound Level Meter	RVG_F50629	20-Jan-23	20-Jan-24	12
Noise	Leq 12 hrs	Sound Level Meter	RVG_F50631	10-Aug-23	10-Aug-24	12
Noise	Leq 12 hrs	Sound Level Meter	RVG_F50631	12-Jan-24	11-Jan-25	12
Noise	Leq 12 hrs	Sound Level Meter	RVG_F50632	10-Aug-23	10-Aug-24	12
Noise	Leq 12 hrs	Sound Level Meter	RVG_F50632	22-Feb-24	21-Feb-25	12
Noise	Octave band	Sound Calibrator	RVG_F50615	20-Sep-23	20-Sep-24	12
Noise	Octave band	Sound Level Meter	RVG_F50625	25-Jan-24	24-Jan-25	12
Noise	Octave band	Sound Level Meter	RVG_F50626	25-Jan-24	24-Jan-25	12
Noise	Octave band	Sound Level Meter	RVG_F50627	22-Jan-24	21-Jan-25	12
Noise	Octave band	Sound Level Meter	RVG_F50629	20-Jan-23	20-Jan-24	12
Noise	Octave band	Sound Level Meter	RVG_F50630	25-Jan-24	24-Jan-25	12
Noise	Octave band	Sound Level Meter	RVG_F50631	10-Aug-23	10-Aug-24	12
Noise	Octave band	Sound Calibrator	RVG_F50623	28-Feb-24	27-Feb-25	12
Noise	Octave band	Sound Level Meter	RVG_F50627	22-Jan-24	21-Jan-25	12
Noise	Octave band	Sound Level Meter	RVG_F50629	20-Jan-23	20-Jan-24	12
Noise	Octave band	Sound Level Meter	RVG_F50631	10-Aug-23	10-Aug-24	12
Noise	Octave band	Sound Level Meter	RVG_F50631	12-Jan-24	11-Jan-25	12
Noise	Octave band	Sound Level Meter	RVG_F50632	10-Aug-23	10-Aug-24	12
Noise	Octave band	Sound Level Meter	RVG_F50632	22-Feb-24	21-Feb-25	12
Noise	Noise Dose, TWA	Dose Badge Reader	RVG_F50621	15-Dec-23	13-Dec-24	12
Noise	Noise Dose, TWA	Dose Badge Reader	RVG_F50635	1-May-24	1-May-25	12

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Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Workplace	Acrylic Acid	RYVAL FLOWMETER	BK_F51367	18-Aug-23	18-Aug-24	12
Workplace	Acrylic Acid	Field Rotameter	RVG_F50657	1-Apr-24	1-Jul-24	3
Workplace	Acrylic Acid	NPLC	BK_F10034	16-Jan-24	16-Jan-25	12
Workplace	Total Dust	Field Rotameter	RVG_F50659	1-Apr-24	1-Jul-24	3
Workplace	Total Dust	Analytical Balance 5 D.	RVG_F50659	22-Feb-24	22-Feb-25	12
Workplace	Respirable Dust	Field Rotameter	RVG_F50659	1-Apr-24	1-Jul-24	3
Workplace	Respirable Dust	Analytical Balance 5 D.	RVG_F50659	22-Feb-24	22-Feb-25	12
Workplace	Propylene Glycol	RYVAL FLOWMETER	BK_F51367	18-Aug-23	18-Aug-24	12
Workplace	Propylene Glycol	Field Rotameter	RVG_F50657	1-Apr-24	1-Jul-24	3
Workplace	Propylene Glycol	SC BD	BK_F10036	21-Apr-23	21-Oct-24	18
Rayong Lab	BCD	DO meter with Sensor	RVG_F50672	24-Jul-23	24-Jan-25	18
Rayong Lab	BCD	Incubator	RVG_F50154	29-May-23	29-Nov-24	18
Rayong Lab	BCD	Burette	RVG_F50216	25-Sep-23	25-Sep-24	12
Rayong Lab	COO	Spectrophotometer	RVG_F50037	18-Sep-23	18-Mar-25	18
Rayong Lab	Oil & Grease	Electronic Balance	RVG_F50002	22-Feb-24	22-Feb-25	12
Rayong Lab	Oil & Grease	Hot Air Oven	RVG_F50013	21-Mar-24	21-Mar-25	12
Rayong Lab	Oil & Grease	Water Bath	RVG_F50061	21-Mar-24	21-Sep-25	18
Rayong Lab	pH in site	pH meter	RVG_F50605	4-Sep-23	4-Sep-24	12
Rayong Lab	Temperature	pH meter	RVG_F50605	4-Sep-23	4-Sep-24	12
Rayong Lab	Total Suspended Solids	Electronic Balance	RVG_F50002	22-Feb-24	22-Feb-25	12
Rayong Lab	Total Suspended Solids	Chamber Oven	RVG_F50010	21-Mar-24	21-Sep-25	18
Rayong Lab	Total Kjeldahl Nitrogen	Block Digestion Unit	RVG_F50188	11-Mar-24	11-Sep-25	12
Rayong Lab	Total Kjeldahl Nitrogen	pH Meter	RVG_F50183	19-Jan-24	19-Jan-25	12
Rayong Lab	Phosphate	Spectrophotometer	RVG_F50037	18-Sep-23	18-Mar-25	18

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Lot No. 2468523-1

ANALYZER CALIBRATION DATA

Client : BASF (Thai) Limited Location : Boiler Stack
Date : 17 Jun 24 Test Operator : Sakit P.

O₂ ANALYZER Model : TELEDYNE API 200EH Serial No. : 774

Cylinder Value (%)	Initial Analyzers Calibration Response (%)	Final Analyzers Calibration Response (%)	Difference (Percent of Span)
Zero Gas	0.04	0.01	0.12
Low-Level Gas	8.00	8.04	0.12
Span Gas	16.00	16.01	0.12

NO_x ANALYZER Model : TELEDYNE API 200EH Serial No. : 774

Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.01	0.02
Low-Level Gas	82.39	82.44	0.02
Span Gas	164.40	164.45	0.02

SO₂ ANALYZER Model : TELEDYNE API 100EH Serial No. : 437

Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.01	0.01
Low-Level Gas	78.75	78.75	0.01
Span Gas	159.90	159.90	0.01

CO ANALYZER Model : TELEDYNE API 300EM Serial No. : 451

Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	-0.01	0.00
Low-Level Gas	79.48	79.47	0.00
Span Gas	407.40	407.38	0.00

Calibrated by

Sakit P.

(Mr.Sakit Phaisanphut)

Environmental Field Scientist (4)



Lot No. 2468523-1

SYSTEM CALIBRATION BIAS AND DRIFT DATA

Client : BASF (Thai) Limited Location : Boiler Stack
Date : 17 Jun 24 Test Operator : Sakit P.

O₂ ANALYZER Cylinder Conc. (%) : 16.00 Span (%) : 25

O ₂ Analyzer Calibration Response	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	0.04	0.04	0.00	0.01	0.12
Upscale Gas	16.04	16.04	0.00	16.01	0.12

NO_x ANALYZER Cylinder Conc. (ppm) : 164.40 Span (ppm) : 200

NO _x Analyzer Calibration Response	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	0.05	0.05	0.00	0.01	0.02
Upscale Gas	164.45	164.45	0.00	164.41	0.02

SO₂ ANALYZER Cylinder Conc. (ppm) : 159.90 Span (ppm) : 200

SO ₂ Analyzer Calibration Response	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	-0.01	-0.01	0.00	0.01	0.01
Upscale Gas	159.89	159.89	0.00	159.90	0.01

CO ANALYZER Cylinder Conc. (ppm) : 407.40 Span (ppm) : 500

CO Analyzer Calibration Response	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	-0.02	-0.02	0.00	-0.01	0.00
Upscale Gas	407.38	407.38	0.00	407.39	0.00

Calibrated by

Sakit P.

(Mr.Sakit Phaisanphut)

Environmental Field Scientist (4)



EMISSION TEST RESULT

Client	BASF (Thai) Limited	Run #	1
Date	17 Jun 24	Location	Boiler Stack
Start Time	11:40	Test Operator	Saksit P.
SO ₂ Analyzer Model	TELEDYNE API 100EH	Finish Time	12:00
NO _x /O ₂ Analyzer Model	TELEDYNE API 200EH	Serial No.	437
CO/CO ₂ Analyzer Model	TELEDYNE API 300EM	Serial No.	774
		Serial No.	451

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	NO ₂ (ppm)
11:40	8.61	7.08	61.91	0.38	6.66	2.07
11:41	8.61	7.08	61.47	0.38	6.98	2.17
11:42	8.64	7.05	61.14	0.39	6.67	1.99
11:43	8.67	7.04	61.05	0.37	6.59	1.91
11:44	8.68	7.03	62.28	0.38	6.48	1.93
11:45	8.67	7.06	62.52	0.37	6.40	1.93
11:46	8.66	7.07	62.50	0.36	6.36	2.01
11:47	8.66	7.07	62.46	0.36	6.47	2.10
11:48	8.67	7.06	62.29	0.34	6.40	2.10
11:49	8.65	7.06	62.06	0.34	6.35	2.12
11:50	8.62	7.08	61.71	0.34	6.54	1.93
11:51	8.63	7.09	61.42	0.47	6.63	1.94
11:52	8.64	7.07	61.29	0.48	6.42	1.67
11:53	8.67	7.05	61.58	0.40	6.22	2.10
11:54	8.71	7.02	61.81	0.40	6.38	2.11
11:55	8.57	7.08	61.79	0.47	7.94	2.01
11:56	8.44	7.10	62.33	0.44	7.43	1.90
11:57	8.48	7.16	62.93	0.45	8.09	1.94
11:58	8.50	7.18	63.69	0.48	8.44	2.24
11:59	8.55	7.13	63.72	0.46	8.49	2.07
12:00	8.62	7.11	63.48	0.43	8.43	1.88
Average	8.61	7.08	62.18	0.40	6.40	2.02

Saksit P.

(Mr. Saksit Phaisanphit) Environmental Field Scientist (4)

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EMISSION TEST RESULT

Client	BASF (Thai) Limited	Run #	2
Date	17 Jun 24	Location	Boiler Stack
Start Time	12:01	Test Operator	Saksit P.
SO ₂ Analyzer Model	TELEDYNE API 100EH	Finish Time	12:21
NO _x /O ₂ Analyzer Model	TELEDYNE API 200EH	Serial No.	437
CO/CO ₂ Analyzer Model	TELEDYNE API 300EM	Serial No.	774
		Serial No.	451

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
12:01	8.67	7.06	61.06	0.43	6.40	1.78
12:02	8.70	7.05	61.87	0.42	6.44	1.97
12:03	8.66	7.03	62.49	0.52	6.20	1.92
12:04	8.60	7.09	62.17	0.41	6.38	1.97
12:05	8.57	7.09	61.30	0.39	6.48	1.98
12:06	8.11	7.42	60.28	0.40	11.55	1.98
12:07	7.83	7.47	53.69	0.40	13.56	1.73
12:08	7.94	7.49	57.66	0.38	13.37	1.78
12:09	8.00	7.45	53.18	0.38	12.73	1.84
12:10	8.02	7.42	53.80	0.38	12.55	2.00
12:11	8.00	7.43	53.99	0.37	12.98	2.18
12:12	7.95	7.45	53.66	0.38	12.13	2.12
12:13	7.91	7.50	54.74	0.37	13.43	2.08
12:14	7.92	7.52	53.68	0.35	13.48	2.04
12:15	7.89	7.51	53.63	0.33	13.73	2.02
12:16	7.91	7.49	53.72	0.35	13.57	2.14
12:17	7.89	7.49	53.91	0.34	12.77	2.24
12:18	7.92	7.48	53.62	0.34	13.74	2.28
12:19	7.92	7.48	53.71	0.32	13.60	2.23
12:20	7.91	7.50	53.91	0.33	13.58	2.28
12:21	7.88	7.50	53.60	0.45	13.80	2.18
Average	8.11	7.37	58.40	0.37	12.12	2.02

Saksit P.

(Mr. Saksit Phaisanphit) Environmental Field Scientist (4)

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EMISSION TEST RESULT

Client	BASF (Thai) Limited	Run #	3
Date	17 Jun 24	Location	Boiler Stack
Start Time	12:22	Test Operator	Saksit P.
SO ₂ Analyzer Model	TELEDYNE API 100EH	Finish Time	12:42
NO _x /O ₂ Analyzer Model	TELEDYNE API 200EH	Serial No.	437
CO/CO ₂ Analyzer Model	TELEDYNE API 300EM	Serial No.	774
		Serial No.	451

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
12:22	7.91	7.48	58.22	0.46	13.78	2.02
12:23	7.94	7.45	58.22	0.48	12.95	1.90
12:24	7.92	7.49	58.39	0.45	13.11	1.86
12:25	7.91	7.50	58.27	0.43	12.40	1.94
12:26	7.95	7.47	58.45	0.44	12.99	1.94
12:27	7.93	7.47	58.61	0.45	13.02	2.15
12:28	7.93	7.50	58.50	0.46	13.66	2.27
12:29	7.97	7.51	58.22	0.44	13.89	2.15
12:30	7.90	7.50	58.17	0.44	13.59	2.14
12:31	7.89	7.52	58.11	0.41	14.05	2.38
12:32	7.89	7.51	57.72	0.42	14.53	2.27
12:33	7.91	7.49	57.56	0.42	13.53	2.00
12:34	7.92	7.49	58.07	0.41	13.39	1.95
12:35	7.95	7.47	58.36	0.42	13.12	2.12
12:36	7.92	7.47	58.33	0.44	13.55	2.28
12:37	7.96	7.46	58.36	0.42	13.35	2.14
12:38	7.91	7.46	58.25	0.42	13.28	1.98
12:39	7.84	7.52	58.42	0.40	13.92	1.94
12:40	7.85	7.53	58.36	0.40	13.84	2.04
12:41	7.89	7.53	58.40	0.40	13.48	2.10
12:42	7.88	7.53	58.43	0.40	13.67	2.34
Average	7.90	7.49	58.26	0.43	13.53	2.08

Saksit P.

(Mr. Saksit Phaisanphit) Environmental Field Scientist (4)

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ANALYZER CALIBRATION DATA

Lot No. 2466538-1

Client	BASF (Thai) Limited	Location	Scrubber Stack
Date	17 Jun 24	Test Operator	Saksit P.

O ₂ ANALYZER	TELEDYNE API 200EH	Serial No.	774
Model	TELEDYNE API 200EH	Serial No.	774
Span (ppm)	200		

	Cylinder Value (%)	Initial Analyzers Calibration Response (%)	Final Analyzers Calibration Response (%)	Difference (Percent of Span)
Zero Gas	0.00	0.04	0.01	0.12
Low-Level Gas	8.00	8.04	8.01	0.12
Span Gas	16.00	16.04	16.01	0.12

NO _x ANALYZER	TELEDYNE API 200EH	Serial No.	774
Model	TELEDYNE API 200EH	Serial No.	774
Span (ppm)	200		

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.05	0.01	0.02
Low-Level Gas	82.39	82.44	82.40	0.02
Span Gas	164.40	164.45	164.41	0.02

SO ₂ ANALYZER	TELEDYNE API 100EH	Serial No.	437
Model	TELEDYNE API 100EH	Serial No.	437
Span (ppm)	200		

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.01	0.00	0.01
Low-Level Gas	78.75	78.74	78.75	0.01
Span Gas	159.60	159.69	159.60	0.01

CO ANALYZER	TELEDYNE API 300EM	Serial No.	451
Model	TELEDYNE API 300EM	Serial No.	451
Span (ppm)	500		

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	-0.02	-0.01	0.00
Low-Level Gas	79.45	79.46	79.47	0.00
Span Gas	497.40	497.35	497.35	0.00

Calibrated by

Saksit P.

(Mr. Saksit Phaisanphit) Environmental Field Scientist (4)

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Lot No. 2466528-1

SYSTEM CALIBRATION BIAS AND DRIFT DATA

Client: BASF (Thai) Limited Location: Scrubber Stack
Date: 17 Jun 24 Test Operator: Saksit P.O₂ ANALYZER
Cylinder Conc. (%) : 16.00

Span (%) : 25

	O ₂ Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Calibration Bias (% of Span)	System Calibration Response	System Calibration Bias (% of Span)	
Zero Gas	0.04	0.04	0.00	0.01	0.12	0.12
Upscale Gas	16.04	16.04	0.00	16.01	0.12	0.12

NO₂ ANALYZER
Cylinder Conc. (ppm) : 164.40

Span (ppm) : 200

	NO ₂ Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Calibration Bias (% of Span)	System Calibration Response	System Calibration Bias (% of Span)	
Zero Gas	0.05	0.05	0.00	0.02	0.02	0.02
Upscale Gas	164.45	164.45	0.00	164.41	0.02	0.02

SO₂ ANALYZER
Cylinder Conc. (ppm) : 159.90

Span (ppm) : 200

	SO ₂ Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Calibration Bias (% of Span)	System Calibration Response	System Calibration Bias (% of Span)	
Zero Gas	-0.01	-0.01	0.00	0.00	0.01	0.01
Upscale Gas	159.89	159.89	0.00	159.95	0.01	0.01

CO ANALYZER
Cylinder Conc. (ppm) : 407.40

Span (ppm) : 500

	CO Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Calibration Bias (% of Span)	System Calibration Response	System Calibration Bias (% of Span)	
Zero Gas	-0.02	-0.02	0.00	-0.01	0.00	0.00
Upscale Gas	407.38	407.38	0.00	407.39	0.00	0.00

Calibrated by

(Mr. Saksit Phaisanphisit)

Environmental Field Scientist (4)

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EMISSION TEST RESULT

Client: BASF (Thai) Limited
Date: 17 Jun 24
Start Time: 10:05
SO₂ Analyzer Model: TELEDYNE API 100EH
NO_x/O₂ Analyzer Model: TELEDYNE API 200EH
CO/CO₂ Analyzer Model: TELEDYNE API 300EHRun # 1
Location: Scrubber Stack
Test Operator: Saksit P.
Finish Time: 10:25
Serial No.: 437
Serial No.: 774
Serial No.: 451

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	NO ₂ (ppm)
10:05	16.74	1.02	0.64	0.16	57.46	0.48
10:06	16.76	1.01	0.65	0.15	58.02	0.47
10:07	16.73	1.02	0.48	0.14	55.21	0.46
10:08	16.76	1.01	0.48	0.13	56.83	0.38
10:09	16.74	1.02	0.49	0.12	56.54	0.38
10:10	16.74	1.02	0.48	0.10	62.02	0.37
10:11	16.73	1.02	0.49	0.10	56.31	0.39
10:12	16.73	1.02	0.45	0.10	50.32	0.39
10:13	16.76	1.01	0.41	0.09	54.41	0.41
10:14	16.77	0.99	0.41	0.09	59.47	0.39
10:15	16.73	1.01	0.41	0.09	54.75	0.37
10:16	16.73	1.01	0.40	0.08	59.53	0.38
10:17	16.73	1.00	0.41	0.07	57.05	0.40
10:18	16.72	1.00	0.43	0.16	57.75	0.41
10:19	16.72	1.01	0.45	0.15	59.42	0.41
10:20	16.72	1.01	0.47	0.15	57.10	0.43
10:21	16.70	1.01	0.47	0.02	53.68	0.43
10:22	16.76	0.99	0.48	0.01	55.29	0.43
10:23	16.72	1.01	0.47	0.02	52.28	0.46
10:24	16.71	1.01	0.48	0.03	57.98	0.45
10:25	16.70	1.02	0.50	0.04	54.55	0.46
Average	16.73	1.01	0.47	0.08	56.90	0.42

(Mr. Saksit Phaisanphisit)

Environmental Field Scientist (4)

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EMISSION TEST RESULT

Client: BASF (Thai) Limited
Date: 17 Jun 24
Start Time: 10:28
SO₂ Analyzer Model: TELEDYNE API 100EH
NO_x/O₂ Analyzer Model: TELEDYNE API 200EH
CO/CO₂ Analyzer Model: TELEDYNE API 300EHRun # 2
Location: Scrubber Stack
Test Operator: Saksit P.
Finish Time: 10:46
Serial No.: 437
Serial No.: 774
Serial No.: 451

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	NO ₂ (ppm)
10:28	16.69	1.03	0.51	0.04	51.80	0.48
10:27	16.71	1.03	0.51	0.04	56.83	0.48
10:28	16.73	1.01	0.51	0.06	61.10	0.48
10:29	16.76	1.00	0.49	0.06	55.88	0.48
10:30	16.73	1.00	0.49	0.06	55.26	0.44
10:31	16.71	1.01	0.50	0.06	56.42	0.42
10:32	16.76	1.00	0.51	0.07	53.81	0.42
10:33	16.72	1.01	0.51	0.07	51.59	0.43
10:34	16.70	1.02	0.51	0.07	56.56	0.45
10:35	16.73	1.01	0.50	0.09	60.00	0.48
10:36	16.73	1.01	0.51	0.08	56.83	0.48
10:37	16.72	1.01	0.50	0.09	56.34	0.49
10:38	16.73	1.01	0.50	0.10	58.09	0.51
10:39	16.72	1.01	0.51	0.10	53.25	0.50
10:40	16.70	1.02	0.51	0.11	56.22	0.48
10:41	16.70	1.03	0.50	0.11	54.36	0.49
10:42	16.67	1.03	0.50	0.12	52.91	0.51
10:43	16.71	1.02	0.50	0.13	50.48	0.51
10:44	16.70	1.02	0.52	0.13	51.91	0.51
10:45	16.71	1.02	0.52	0.14	56.25	0.52
10:46	16.72	1.02	0.52	0.14	59.78	0.50
Average	16.71	1.01	0.51	0.08	56.83	0.48

(Mr. Saksit Phaisanphisit)

Environmental Field Scientist (4)

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EMISSION TEST RESULT

Client: BASF (Thai) Limited
Date: 17 Jun 24
Start Time: 10:47
SO₂ Analyzer Model: TELEDYNE API 100EH
NO_x/O₂ Analyzer Model: TELEDYNE API 200EH
CO/CO₂ Analyzer Model: TELEDYNE API 300EHRun # 3
Location: Scrubber Stack
Test Operator: Saksit P.
Finish Time: 11:07
Serial No.: 437
Serial No.: 774
Serial No.: 451

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	NO ₂ (ppm)
10:47	16.73	1.01	0.51	0.16	56.53	0.50
10:48	16.72	1.01	0.50	0.18	53.59	0.47
10:49	16.72	1.01	0.48	0.18	59.27	0.43
10:50	16.70	1.01	0.49	0.16	56.99	0.50
10:51	16.72	1.00	0.44	0.06	54.45	0.34
10:52	16.70	1.01	0.43	0.06	51.88	0.32
10:53	16.74	1.00	0.45	0.05	53.63	0.36
10:54	16.75	1.00	0.45	0.05	56.77	0.38
10:55	16.72	1.01	0.46	0.04	53.66	0.40
10:56	16.72	1.00	0.45	0.03	59.59	0.41
10:57	16.71	1.01	0.46	0.04	52.81	0.43
10:58	16.73	1.00	0.45	0.04	54.48	0.45
10:59	16.68	1.01	0.45	0.02	53.00	0.45
11:00	16.70	1.02	0.47	0.01	52.39	0.46
11:01	16.72	1.02	0.49	0.01	52.34	0.48
11:02	16.75	1.00	0.49	0.02	51.78	0.48
11:03	16.72	1.00	0.49	0.02	51.48	0.48
11:04	16.71	1.01	0.49	0.03	53.31	0.49
11:05	16.71	1.01	0.48	0.03	52.16	0.49
11:06	16.71	1.02	0.47	0.03	51.21	0.46
11:07	16.71	1.02	0.46	0.05	51.77	0.45
Average	16.71	1.00	0.47	0.05	54.14	0.43

(Mr. Saksit Phaisanphisit)

Environmental Field Scientist (4)

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CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer: AIR LIQUIDE (THAILAND) LTD
Part Number: E04N199E3HA0002
Cylinder Number: GN0027210
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12022
Gas Code: CO,NO,NOX,SO2,BALN
Reference Number: 160-402340013-1
Cylinder Volume: 247.2 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 660
Certification Date: Feb 11, 2022
Expiration Date: Feb 11, 2030

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gas Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.
Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	80.00 PPM	82.39 PPM	G1	+/- 1.0% NIST Traceable	02/04/2022, 02/11/2022
CARBON MONOXIDE	80.00 PPM	79.48 PPM	G1	+/- 0.6% NIST Traceable	02/04/2022
NITRIC OXIDE	80.00 PPM	82.38 PPM	G1	+/- 1.0% NIST Traceable	02/04/2022, 02/11/2022
SULFUR DIOXIDE	80.00 PPM	78.75 PPM	G1	+/- 0.9% NIST Traceable	02/04/2022, 02/11/2022
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	09010212	KAL004777	98.48 PPM CARBON MONOXIDE/NITROGEN	+/- 0.5%	Oct 16, 2024
NTRM	200610-15	CCT33106	98.61 PPM NITRIC OXIDE/NITROGEN	+/- 0.9%	Oct 06, 2026
NTRM	200610-04	CCT08044	98.61 PPM NITRIC OXIDE/NITROGEN	+/- 0.9%	Oct 06, 2026
SMIS	12426889139	CC323707	4.087 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Sep 03, 2024
NTRM	11010419	KAL004813	99.6 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.6%	Jul 28, 2023

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO	FTR	Feb 03, 2022
Nicolet iS50 FTIR AUP2010245 NO	FTR	Feb 10, 2022
Nicolet iS50 FTIR AUP2010245 NO2	FTR	Jan 27, 2022
Nicolet iS50 FTIR AUP2010245 SO2	FTR	Jan 20, 2022

Triad Data Available Upon Request

NOTES: Gross Weight: 48.5 Kg
Net Weight: 8.1 Kg



CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04N199E3HA0002
Cylinder Number: ND62877
Laboratory: 124 - Riverton (SAP) - NJ
PGVP Number: B52018
Gas Code: CO,NO,NOX,SO2,BALN
Reference Number: 62-401257890-1
Cylinder Volume: 247.2 CF
Cylinder Pressure: 2215 PSIG
Valve Outlet: 660
Certification Date: Aug 07, 2018
Expiration Date: Aug 07, 2026

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gas Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.
Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	160.0 PPM	164.4 PPM	G1	+/- 1.1% NIST Traceable	07/30/2018, 08/07/2018
NITRIC OXIDE	160.0 PPM	164.4 PPM	G1	+/- 1.1% NIST Traceable	07/30/2018, 08/07/2018
SULFUR DIOXIDE	160.0 PPM	159.9 PPM	G1	+/- 1.1% NIST Traceable	07/30/2018, 08/07/2018
CARBON MONOXIDE	400.0 PPM	407.4 PPM	G1	+/- 1.1% NIST Traceable	07/30/2018
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	17065241	EB0079567	100.3 PPM NITRIC OXIDE/NITROGEN	+/- 1.0%	May 11, 2019
PRM	12358	5604119	29.86 PPM NITROGEN DIOXIDE/AIR	+/- 1.5%	May 02, 2017
GMS	7042010104	CC503941	5.101 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Jun 01, 2020
NTRM	11010414	KAL004792	99.6 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.6%	Jul 28, 2023
NTRM	15005538	CC483507	491.9 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jan 08, 2021

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 APW1100391 CO	FTR	Jul 19, 2018
Nicolet 6700 APW1100391 NO	FTR	Jul 12, 2018
Nicolet 6700 APW1100391 NO2	FTR	Aug 03, 2018
Nicolet 6700 APW1100391 SO2	FTR	Aug 02, 2018

Triad Data Available Upon Request

NOTES:
Net weight: 8107 grams
Gross weight: 47690 grams

This calibration std. has been certified in accordance with the May 2012 EPA Traceability Protocol Document EPA-600/R-12/531. All testing processes and measurements conform to the requirements of ISO/IEC 17025 and to Airgas ISO 9001:2008 and relate only to items identified on this certificate. All values are certified to be NIST Traceable with total uncertainty as detailed under Analytical Uncertainty. This document shall not be reproduced in full without written approval of the issuer.



TESTING CERT No. 3082.05

Approved for Release

Page 1 of 62-401257890-1

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E02N192E3HA0000
Cylinder Number: ND50018
Laboratory: 124 - Riverton (SAP) - NJ
PGVP Number: B52017
Gas Code: O2,BALN
Reference Number: 82-401018725-1
Cylinder Volume: 248.4 CF
Cylinder Pressure: 2214 PSIG
Valve Outlet: 590
Certification Date: Oct 23, 2017
Expiration Date: Oct 23, 2026

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gas Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
OXYGEN	8.000 %	8.003 %	G1	+/- 0.4% NIST Traceable	10/23/2017
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRMplus	09060208	CC262337	9.961 % OXYGEN/NITROGEN	+/- 0.3%	Nov 08, 2018

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Horiba MPA 510-C2-7TVMJ041	Paramagnetic	Sep 28, 2017

Triad Data Available Upon Request

NOTES:
This calibration std. has been certified in accordance with the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531. All testing processes and measurements conform to the requirements of ISO/IEC 17025 and to Airgas ISO 9001:2008 and relate only to items identified on this certificate. All values are certified to be NIST Traceable with total uncertainty as detailed under Analytical Uncertainty. This document shall not be reproduced in full without written approval of the issuer.



TESTING CERT No. 2000.02

Approved for Release

Page 1 of 82-401018725-1

THE LINDE GROUP

Linde

CERTIFICATE OF ANALYSIS

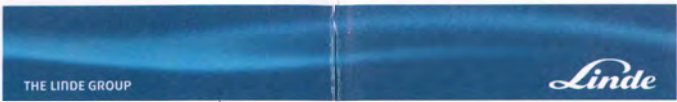
Customer Detail: ALS Laboratory Group (Thailand)
Production Order Number: 90137389
Material Number: 557200-J-44
Certification Date: 24-Sep-2016
Expiry Date: 24-Sep-2024
Cylinder Description: STEEL 47 L

The measurement of this reference material is traceable to SI through the reference standard which is traceable to the Swiss National Standard of the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and the results are expressed on a mole/mole basis, unless otherwise specified. The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k=2, providing a level of confidence of approximately 95%.

Certificate Number: 285716
Analyst: Thitirat LOYRAT
Cylinder Number: 363075
Approve: SURIYAN KAMUTHARAT
Nominal Cylinder Content: 6.560 M³
Nominal Pressure: 145.0 Bar
Valve Outlet: CGA 590 BRASS
To Be Order Please Quote: 557200-J-44

Comment: It is recommended that this product be not used below 5% of actual contents or should not be used when its gas pressure is below 150 psig.
Other impurities that detect by analytical condition of this mixture shall be report if it is more than 10% of minimum minor components.
Keep and use in well-ventilated and secure area.

Page 1 of 2



CERTIFICATE OF ANALYSIS

Analytical Result

Component	Request Concentration	Certified Concentration	Certified Uncertainty	Method	Assay Date
Oxygen in Nitrogen	16.0 %	16.0 %	±0.1 % relative	(2) I-PB-354	24-Sep-2016

Reference Standard used in Assay

Reference Standard	Cylinder No.	Concentration	Expired Date
Oxygen in Nitrogen	24362SSG	25.08 ± 0.13 %	19-Aug-2017

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Servomex 4100 O2 Analyzer	Paramagnetic	24-Sep-2016

Method of Analysis:
1. Gas Chromatograph
2. Paramagnetic Oxygen Analyzer
3. Electrochemical Oxygen Analyzer
4. Electrochemical Moisture Analyzer
5. Total Hydrocarbon Analyzer
6. Other specified

Cylinder Number: 363075
Production Order Number: 90137389

Certification Date: 24-Sep-2016
Expiration Date: 24-Sep-2024

Page 2 of 2

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

15 หมู่ 15 ถนนพหลโยธิน กม. 2/1 หมู่ 14 บางเขน กรุงเทพฯ 10600

โทรศัพท์ (กรุงเทพฯ) 2338-4100 โทรสาร (กรุงเทพฯ) 2338-4101

โทรสาร (กรุงเทพฯ) 2338-4101 โทรสาร (กรุงเทพฯ) 2338-4101

โทรสาร (กรุงเทพฯ) 2338-4101 โทรสาร (กรุงเทพฯ) 2338-4101

Linde (Thailand) Public Company Limited

15 หมู่ 15 ถนนพหลโยธิน กม. 2/1 หมู่ 14 บางเขน กรุงเทพฯ 10600

โทรศัพท์ (กรุงเทพฯ) 2338-4100 โทรสาร (กรุงเทพฯ) 2338-4101

โทรสาร (กรุงเทพฯ) 2338-4101 โทรสาร (กรุงเทพฯ) 2338-4101

โทรสาร (กรุงเทพฯ) 2338-4101 โทรสาร (กรุงเทพฯ) 2338-4101



CONSOLE CONTROL UNIT CALIBRATION TEST REPORT

Barometric Pressure (mmHg) : 754.7

Relative Humidity (%) : 55.0

Temperature (°C) : 27.2

Reference Dry Gas Meter Data

Reference Dry Gas Meter ID : BKK_FS1122

Serial No. : A2003240

Correction Factor (Y) : 0.9824

Next Calibration Date : 7-Nov-24

Calibration of Date : 9-Jan-24

Next Cal. Date : 9-Jul-24

Console Control Meter Data

Calibration No. : C-090124-BKK_FS518

Dry Gas Meter ID : BKK_FS0518

Serial No. : 1500025

Model No. : XC-572-V

ΔH (mmHg)	Θ (mmHg)	Reference Dry Gas Meter Calibration				Console Control Dry Gas Meter				Dry Gas Meter Correction Factor (Y)	Avg. Im Factor (Y)	Avg. ΔH
		Final	Initial	Total	Tr (°C)	Final	Initial	Total	Tr (°C)			
15	11.67	150.00	0.00	150.00	30.0	150.00	0.00	150.00	30.0	0.9771	41.9903	41.9718
25	9.00	150.00	0.00	150.00	31.0	150.00	0.00	150.00	30.0	0.9781	41.8807	41.8607
50	6.36	150.00	0.00	150.00	31.0	150.00	0.00	150.00	30.0	0.9806	41.8126	41.8126
80	3.02	150.00	0.00	150.00	31.0	150.00	0.00	150.00	29.0	0.9802	41.8173	41.8173
120	4.11	150.00	0.00	150.00	30.0	150.00	0.00	150.00	28.0	0.9803	41.9905	41.9905

Ratio of reading of reference to dry gas meter: tolerance for individual values ± 0.02 from average

ΔH: Office pressure differential that equates to 21.24 in. of air at 25°C and 760 mm of mercury. mmHg tolerance for individual values ± 5.08 from average

Procedure: 40 CFR 60.41 APP. 1, SEC. 5.3.6.7

Calibrated by: Sakit Phaisanphit

(Mr. Sakit Phaisanphit)

RYG Field Service Specialist (4)

Approved by:

Nattapon Jangwong

(Mr. Nattapon Jangwong)

RYG Field Service Specialist (1)

FORM NO. 1-001 RYGMCH-02.7 ISSUE DATE: 16 Jun 22



Stopwatch Calibration Test Report

Calibration Date : 9 Jan 24

Next Cal. Date : 9 Jul 24

Barometric Pressure (mmHg) : 754.7

Temperature (°C) : 27.2

Relative Humidity (%) : 55.0

Reference Stopwatch Data

Stopwatch ID No. : E18061
Model : F808
Serial No. : -
Calibration Date : 8 Sep 20
Certificate No. : E-2009018

Console Control Meter Data

Dry Gas Meter No. : BKK_FS518
Model : XC-572-V
Serial No. : 1504025

Run No.	Time Actual (m:ss.ms)	Time Reading (m:ss)	Diff. (ms)	Diff. (min)
1	5:00:03	5:00	3	0.00005
2	5:00:09	5:00	9	0.00013
3	5:00:09	5:00	9	0.00015
4	5:00:11	5:00	11	0.00018
5	5:00:05	5:00	5	0.00008
6	5:00:06	5:00	6	0.00010
7	5:00:06	5:00	6	0.00010
8	5:00:08	5:00	8	0.00013
9	5:00:09	5:00	9	0.00015
10	5:00:07	5:00	7	0.00012
Average			0.00012	
SD			0.00004	

Calibrate by:

Sakit Phaisanphit

Approved by:

Nattapon Jangwong

Mr. Sakit Phaisanphit

Mr. Nattapon Jangwong

RYG Field Service Scientist (4)

RYG Field Service Specialist (1)



DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date : 9 Jan 24		Ambient Temperature (°C) 27.2			
Calibration sheet No. : C-090124-BKK_FS0519		Relative Humidity (%) : 55			
Digital Temperature ID BKK_FS0519		Reference Temperature ID RYG_FS0681			
Serial No. : 1504025		Serial No. : 201090014918			
Model : XC-572-V		Model : Digicon-CC-VT-MS			
Next Calibrate		13 Nov 24			
Location	Reference Temperature °C	Digital Temperature °C	Error °C	MPE	Pass / Fail
Stack	0	0	0	±3	Pass
	25	25	0	±3	Pass
	50	50	0	±3	Pass
	100	100	0	±3	Pass
	150	150	0	±3	Pass
Probe	200	200	0	±3	Pass
	250	250	0	±3	Pass
	300	300	0	±3	Pass
	500	500	0	±3	Pass
	100	100	0	±3	Pass
Oven	120	120	0	±3	Pass
	140	140	0	±3	Pass
	100	100	0	±3	Pass
Filter	120	120	0	±3	Pass
	140	140	0	±3	Pass
	100	100	0	±3	Pass
Exit	0	0	0	±3	Pass
	10	10	0	±3	Pass
	20	20	0	±3	Pass
Meter	0	0	0	±3	Pass
	25	25	0	±3	Pass
	50	50	0	±3	Pass
AUX	0	0	0	±3	Pass
	25	25	0	±3	Pass
	50	50	0	±3	Pass

MPE : (Maximum permissible error of measurement) ค่าความคลาดเคลื่อนสูงสุดในการวัด

Calibrated by :

Sakit Phaisanphit

Approved by:

Nattapon Jangwong

Mr. Sakit Phaisanphit

Mr. Nattapon Jangwong

RYG Field Service Scientist (4)

RYG Field Service Specialist (1)

FORM NO. F-06-027 REVISION NO. 2 ISSUE DATE: 9 Feb 23



PROBE NOZZLE DIAMETER CALIBRATION DATA SHEET

Calibration Date: 9 Jan 24 Nozzle Set ID: BKK_FS0524
Calibration Sheet No.: C-090124-BKK_FS0524 Vernier Caliper ID: BKK_FS1123

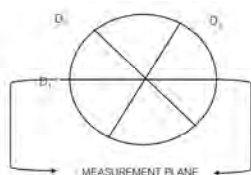
Nozzle ID #	Nozzle Diameter (cm.)			FR - Lo ΔD	$(D_1 + D_2 + D_3) / 3$ D_{avg}
	D_1	D_2	D_3		
1	0.318	0.318	0.318	0.000	0.318
2	0.472	0.474	0.475	0.003	0.474
3	0.632	0.635	0.634	0.003	0.634
4	0.792	0.792	0.792	0.000	0.792
5	0.952	0.952	0.952	0.000	0.952
6	1.091	1.110	1.092	0.019	1.098
7	1.256	1.262	1.262	0.006	1.260
8	1.601	1.598	1.600	0.003	1.600

Where:

D_1, D_2, D_3 = Three different nozzle diameters at 60 degrees to each other, each measured the nearest 0.025 mm.

ΔD = Maximum distance between any two diameters must be ≤ 0.100 mm.

D_{avg} = $(D_1 + D_2 + D_3) / 3$



Calibrated by: Saksit Phaisanphit

(Mr. Saksit Phaisanphit)
RYG Field Service Scientist (4)

Approved by: Natthapol Jengwareewong

(Mr. Natthapol Jengwareewong)
RYG Field Service Specialist (1)

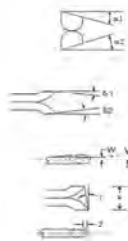
FORM NO. 06-24 REVISION NO.: 0 ISSUE DATE: 25/12/23



Type S Pitot Tube Calibration

Date Calibration: 9-Jan-24
Pitot ID: BKK_FS0523
Pitot SN: -

Due Date: 9-Jul-24
Inclinometer ID: BKK_FS1131
Vernier ID: RYG_FS0539



Parameter	Value	Allowable Range	Check
$\alpha 1$	-0.2	$-10^\circ < \alpha 1 < +10^\circ$	OK
$\alpha 2$	2.4	$-10^\circ < \alpha 2 < +10^\circ$	OK
$\beta 1$	-1.2	$-5^\circ < \beta 1 < +5^\circ$	OK
$\beta 2$	-1.6	$-5^\circ < \beta 2 < +5^\circ$	OK
γ	-1.1	-	-
θ	0.2	-	-
$Z = A \tan \gamma$	-0.018	$Z \leq 0.125"$	OK
$W = A \tan \theta$	0.003	$W \leq 0.031"$	OK
Dt	0.308	0.188" to 0.375"	OK
A/2Dt	1.494	$1.05 \leq PA/Dt \leq 1.5$	OK
A	0.92	$2.1Dt \leq A \leq 3Dt$	OK

Certify that pitot tube/probe meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube certification fact of 0.84. See 40 CFR Pt. 60, App. A, EPA Method 2.

Calibrated by: Saksit Phaisanphit
(Mr. Saksit Phaisanphit)
RYG Field Services Scientist (4)

Approved By: Natthapol Jengwareewong
(Mr. Natthapol Jengwareewong)
RYG Field Services Specialist (1)

FORM NO. 06-24 REVISION NO.: 0 ISSUE DATE: 25/12/23



Calibration Certificate



Certificate No: G 670260
Date of issue: 25-Apr-24

Instrument description: Flue Gas Analyzer
Instrument model: Testo 350 New
Control unit serial no.: 03580162/1121
Instrument serial no.: 62581049/1121
ID no. or control no.: RYG_FS0564
Manufacturer: Testo SE & Co. KGaA
Probe description: -
Probe model: -
Probe serial no.: -
Customer name: ALS LABORATORY GROUP (THAILAND) CO., LTD.
Customer address: 104 Phatthanarakon 40, Phatthanarakon Road, Khwaeng Phatthanarakon, Khet Suan Lueang, Bangkok, 10250 Thailand.

Total pages of certificate: 3 Pages
Receiving no.: L-241468
Receiving date: 11-Apr-24
Parameter of calibration: Gas Calibration (Oxygen 2.50, 10.04, 21.02 % Vol; Carbon Monoxide 80.14, 302.1, 1003 ppm; Nitrogen Dioxide 30.34, 80.96, 201.9 ppm; Nitric Oxide 30.01, 151.5, 322.5 ppm; Sulfur Dioxide 50.36, 100.8, 600.8 ppm)

Condition of UUC: Used
Ambient condition: All of the Measurement were carried out the stabilized laboratory
Temperature: $23 \pm 5^\circ\text{C}$
Humidity: $55 \pm 15\% \text{RH}$

Calibration place: 17/121 Soi Nginnwongwan 47 Yaek 48, Toongsonghong, Laksi, Bangkok 10210 THAILAND

Calibration procedure no.: This instrument was calibrated by comparison with Standard gas mixture according to calibration Work Instruction no. WI-CL-28-C

The calibration certificate expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.
This certificate is applied only to item under test Environmental condition.
This Calibration Certificate may not be reproduced other than in full except with the permission of the issuing laboratory.
Calibration certificates without signature and seal not valid and The results relate only to the items tested/calibrated.
This calibration certificate documents are traceability to national standards, which realize measurement according to the International System of Units (SI).

Date of calibration: 24-Apr-24

Kummetrak
Mr. Kwanchai Khamdoun
Calibration Technician

Wuttan
Mr. Nongluck Wongsettee
Technical Manager



Calibration Certificate



Certificate No.: G 670260

Standard References (Table 1)

Standard	Certificate No.	Vendor	Due date
Oxygen (O ₂) 2.50 % Vol	2412/23	Linde	27-Aug-27
Oxygen (O ₂) 10.04 % Vol	CG-0153-21	Nim	18-Nov-26
Oxygen (O ₂) 21.02 % Vol	CG-0041-22	Nim	10-Feb-27
Carbon monoxide (CO) 80.14 ppm	CG-0040-22	Nim	14-Feb-27
Carbon monoxide (CO) 302 ppm	1915/23	Linde	16-Jun-25
Carbon monoxide (CO) 1003 ppm	2384/23	Linde	10-Sep-25
Nitrogen Dioxide (NO ₂) 30.34 ppm	2703/22	Linde	22-Aug-24
Nitrogen Dioxide (NO ₂) 81.32 ppm	3546/23	Linde	14-Jan-26
Nitrogen Dioxide (NO ₂) 201.9 ppm	1975/23	Linde	17-Jul-25
Nitric Oxide (NO) 30.01 ppm	CG-0014-23	Nim	19-Pet-23
Nitric Oxide (NO) 151.5 ppm	0161/23	Linde	22-Jan-25
Nitric Oxide (NO) 322.5 ppm	1974/23	Linde	17-Jul-25
Sulfur Dioxide (SO ₂) 50.36 ppm	2004/23	Linde	17-Jul-25
Sulfur Dioxide (SO ₂) 100.8 ppm	3507/22	Linde	09-Nov-24
Sulfur Dioxide (SO ₂) 600.8 ppm	2003/23	Linde	17-Jul-25

Measured room conditions

Temperature: 22.6 °C Humidity: 64.3 %RH Pressure: 1006.6 mbar

Calibration conditions

Gas Temperature: 24 °C Flow rate: 1,200 ml/min Gas pressure: 1019.2 mbar

Calibration Results (Before adjustment) (Table 2)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (+)
O ₂ (%Vol)	2.50	2.44	-0.06	0.15
O ₂ (%Vol)	10.04	9.92	-0.12	0.20
O ₂ (%Vol)	21.02	21.12	0.10	0.30
CO (ppm)	80.14	80	-0.14	3.0
CO (ppm)	302	301	-1	6.0
CO (ppm)	1003	1001	-2	12
NO ₂ (ppm)	30.34	22.8	-7.54	8.0
NO ₂ (ppm)	81.32	73.4	-7.92	8.0
NO ₂ (ppm)	201.9	191.5	-10.4	12
NO (ppm)	30.01	28	-2.01	8.0
NO (ppm)	151.5	147	-4.5	8.0
NO (ppm)	322.5	208	-114.5	12
SO ₂ (ppm)	50.36	52	1.64	6.0
SO ₂ (ppm)	100.8	101	0.2	6.0
SO ₂ (ppm)	600.8	599	-1.8	13



Calibration Results (After adjustment) (Table 3)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O2 (%Vol)	2.50	2.44	-0.06	0.15
O2 (%Vol)	10.04	9.92	-0.12	0.26
O2 (%Vol)	21.02	21.12	0.10	0.30
CO (ppm)	80.14	80	-0.14	3.0
CO (ppm)	302	301	-1	6.0
CO (ppm)	1003	1001	-2	12
NO2 (ppm)	20.34	27.6	-2.74	8.0
NO2 (ppm)	63.32	60.2	-1.12	8.0
NO2 (ppm)	201.9	201.1	-0.8	12
NO (ppm)	30.01	31	0.99	6.0
NO (ppm)	151.5	153	1.5	8.0
NO (ppm)	322.5	324	1.5	12
SO2 (ppm)	50.36	52	1.64	6.0
SO2 (ppm)	100.8	101	0.2	6.0
SO2 (ppm)	699.8	699	-1.8	12

Remark : 1 cmol/mol = 1 %vol, 1 µmol/mol = 1 ppm

End of Report

HMIC-09-C Rev3

170031013

Issued (Item 23/02/18)

Entech Industrial Solution Co., Ltd.
17/121 Soi Ngamwongwan 47, Yakh 48, Toongsothong, Lakul Bangkok 10210 THAILAND Tel: 0-2779-8888 Calibration@entech.co.th
Fax: 0-10653503591 www.entech.co.th



ROTA METER CALIBRATION RESULT APRIL 2024

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R ²)
BKK_FS0585	23 Apr 24	$Y = 1.0322x + 2.25$	0.9997
BKK_FS0587	23 Apr 24	$Y = 1.0111x + 16.357$	0.9994
BKK_FS0592	23 Apr 24	$Y = 1.001x + 14.551$	1.0000
BKK_FS0594	23 Apr 24	$Y = 1.0048x + 4.9762$	1.0000
BKK_FS1004	01 Apr 24	$Y = 0.9826x + 12.32$	0.9998
BKK_FS1005	01 Apr 24	$Y = 1.0183x + 0.0633$	0.9998
BKK_FS1006	01 Apr 24	$Y = 1.1534x - 3.3241$	0.9989
BKK_FS1007	23 Apr 24	$Y = 1.1084x + 2.9017$	0.9994
BKK_FS1008	06 May 24	$Y = 1.1347x + 2.1915$	0.9996
BKK_FS1011	07 May 24	$Y = 1.3995x - 7.1671$	0.9994
BKK_FS1012	07 May 24	$Y = 1.0488x - 26.533$	0.9998
BKK_FS1013	07 May 24	$Y = 1.0255x - 57.741$	1.0000
BKK_FS1017	04 Apr 24	$Y = 1.0213x + 0.1156$	1.0000
BKK_FS1018	04 Apr 24	$Y = 1.0007x + 1.3933$	0.9999
BKK_FS1019	04 Apr 24	$Y = 1.0038x - 1.3381$	1.0000
BKK_FS1020	04 Apr 24	$Y = 1.003x + 5.7656$	1.0000
BKK_FS1021	04 Apr 24	$Y = 1.0096x - 25.605$	0.9926
BKK_FS1022	04 Apr 24	$Y = 1.0937x - 103.66$	0.9980
BKK_FS1023	07 May 24	$Y = 1.1613x - 2.675$	1.0000
BKK_FS1024	07 May 24	$Y = 1.0157x - 4.3362$	1.0000
BKK_FS1025	07 May 24	$Y = 1.0018x - 4.6236$	0.9999
BKK_FS1026	19 Jan 24	$Y = 0.9618x + 1.9626$	0.9999
BKK_FS1027	19 Jan 24	$Y = 1.0065x - 4.3786$	1.0000
BKK_FS1028	19 Jan 24	$Y = 1.0184x - 37.308$	0.9997
BKK_FS1029	19 Jan 24	$Y = 0.9809x + 2.7925$	0.9977
BKK_FS1030	19 Jan 24	$Y = 0.996x - 1.3286$	1.0000
BKK_FS1031	19 Jan 24	$Y = 1.015x - 27.236$	0.9997
BKK_FS1039	01 Apr 24	$Y = 0.9909x + 11.357$	0.9991
BKK_FS1040	01 Apr 24	$Y = 1.0121x - 19.203$	0.9996
BKK_FS1041	01 Apr 24	$Y = 1.0170x + 1.4013$	0.9996
BKK_FS1042	01 Apr 24	$Y = 0.9927x + 10.76$	0.9995
BKK_FS1043	01 Apr 24	$Y = 0.9965x + 13.696$	1.0000
BKK_FS1044	01 Apr 24	$Y = 1.1159x - 0.9354$	0.9978
PHK_FS0027	06 May 24	$Y = 1.1281x + 0.4949$	0.9997
PHK_FS0028	06 May 24	$Y = 1.0332x - 1.8233$	0.9999
PHK_FS0029	06 May 24	$Y = 1.001x + 10.848$	1.0000
RYG_FS0197	01 Apr 24	$Y = 1.0045x + 10.275$	1.0000
RYG_FS0198	01 Apr 24	$Y = 1.0061x + 0.715$	0.9999
RYG_FS0199	01 Apr 24	$Y = 0.976x + 3.1497$	0.9998

Page 1 of 2

ALS Laboratory Group



ROTA METER CALIBRATION RESULT APRIL 2024

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R ²)
RYG_FS0654	01 Apr 24	$Y = 1.0354x + 0.3361$	0.9998
RYG_FS0655	01 Apr 24	$Y = 0.978x + 13.603$	0.9991
RYG_FS0656	01 Apr 24	$Y = 1.0035x + 6.879$	0.9999
RYG_FS0657	01 Apr 24	$Y = 1.0233x + 0.8908$	0.9982
RYG_FS0658	01 Apr 24	$Y = 0.9905x + 9.8867$	0.9996
RYG_FS0659	01 Apr 24	$Y = 0.9994x + 13.924$	1.0000
SGK_FS0135	23 Apr 24	$Y = 1.0117x + 4.8833$	1.0000
SGK_FS0136	23 Apr 24	$Y = 1.0134x + 3.6467$	1.0000
SGK_FS0138	04 Apr 24	$Y = 1.0449x - 0.3684$	0.9988
SGK_FS0139	04 Apr 24	$Y = 1.0086x + 3.1267$	0.9988
SGK_FS0140	04 Apr 24	$Y = 1.0029x + 7.5181$	1.0000
SGK_FS0141	23 Apr 24	$Y = 1.1129x - 0.0619$	0.9997
SGK_FS0142	23 Apr 24	$Y = 1.0136x + 2.4267$	0.9999
SGK_FS0143	23 Apr 24	$Y = 1.0036x + 8.3162$	1.0000

Review By : Wichan Choonharat
(Mr. Wichan Choonharat)
Enviro Field Services Manager

Approved By : [Signature]
(Mr Sarayuth Jittrantont)
Assistant General Manager



ARCHEMICA

Certificate of Calibration

HPLC_U-3000 ID#690 (BKK_FL0034)

This certificate is to verify that instrument below are calibrated
by Archemica Lab Co., Ltd.

DGP-3600SD	S/N : 8107412
WPS-3000TSL	S/N : 8107446
TCC-3000SD	S/N : 6006552
DAD-3000	S/N : 8107298

For

ALS Laboratory Group (Thailand) Co., Ltd

Operator Signature: [Signature]

(Mr. Supanut Phunpatum)

Test Engineer

Date: 16-17/Jun/2024

REVIEW BY: Ponty Bani

APPROVED BY: S. Cha

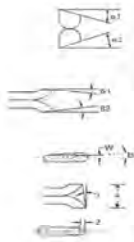
NEXT CAL DATE: 16-Jan-25



Type S Pitot Tube Calibration

Date Calibration 9-Jan-24
Pitot ID BKK_FS0522
Pitot SN

Due Date 9-Jul-24
Inclinometer ID BKK_FS1131
Vernier ID RYG_FS0539



Parameter	Value	Allowable Range	Check
α_1	-1.8	$-10^\circ < \alpha_1 < +10^\circ$	OK
α_2	-1.4	$-10^\circ < \alpha_2 < +10^\circ$	OK
β_1	-1.7	$-5^\circ < \beta_1 < +5^\circ$	OK
β_2	-2	$-5^\circ < \beta_2 < +5^\circ$	OK
γ	-1.3	-	-
θ	-0.4	-	-
$Z = A \tan \gamma$	-0.021	$Z \leq 0.125''$	OK
$W = A \tan \theta$	-0.006	$W \leq 0.031''$	OK
Dt	0.330	0.188" to 0.375"	OK
A/2Dt	1.394	$1.05 \leq A/2Dt \leq 1.5$	OK
A	0.52	$2.1Dt \leq A \leq 3Dt$	OK

Certify that pitot tube/porbe meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube certification fact of 0.84. See 40 CFR Pt. 60, App. A, EPA Method 2.

Calibrated by: Saksit Phaisanphut
(Mr. Saksit Phaisanphut)
RYG Field Services Scientist (4)

Approved By: Natthapol Jengwareewong
(Mr. Natthapol Jengwareewong)
RYG Field Services Specialist (1)

FORM NO.: F-06-124 REVISION NO.: 0 ISSUE DATE: 25/12/23

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-5, e-mail: service.thailand@sartorius.com



SARTORIUS

NSC-TIS-17525
CALIBRATION 0426

Certificate of Calibration

REVIEW BY: Y. L. A.
APPROVED BY: Y. L. A.
NEXT CAL. DATE: 30/11/24

Model Number: SECURA224-1S Certificate No.: 23BCI0468
Description: Analytical Balance Issued Date: Friday, December 01, 2023
Serial Number: 0038304165 Reference No.: 223958
ID No.: BKK_EN0309
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. Chonchai Inthana
Calibration Date: Thursday, November 30, 2023
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 Conditions:
Temperature: 21.1 °C ± 5.0 °C
Humidity: 58.0 % RH ± 10.0 % RH
Pressure: ±

Reasons for calibration:

☐ New Installation ☐ Service / Reassess ☒ In calibration/ 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
YC5011-522-00	Sartorius weight set 1mg - 5000g E2 YC5011-522-00	TCS	M2308197S	23-Aug-2025
MHB-382SD	Humidity/Balometer/Temp. Lution MHB-382SD	DKSH	C19231845	23-Aug-2024

This certificate relates and apply this equipment only.
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.

Chonchai Inthana

Mr. Chonchai Inthana (Technical Manager)



SOP FM 33 03 February 2022

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-5 Fax: +66 2643 8367, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

Model Number: SECURA224-1S Certificate No.: 23BCI0468
Description: Analytical Balance Issued Date: Friday, December 01, 2023
Serial Number: 0038304165 Reference No.: 223958
ID No.: BKK_EN0309
Manufacturer: Sartorius Page No.: 2 of 2

Calibration Results : Without Adjustment

Repeatability

The repeatability is the ability of a weighing instrument to display nearly identical results under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express repeatability quantitatively.

Nominal Value : (Low Load)	20.0000	199.9999
20 g	20.0000	200.0000
Tolerance	19.9999	200.0000
0.0001 g	19.9999	199.9999
	20.0000	200.0000
Nominal Value : (High Load)	200.0000	199.9999
200 g	19.9999	200.0000
Tolerance	19.9999	199.9999
0.0001 g	20.0000	199.9999
	20.0000	199.9999
	20.0000	200.0000
Standard Deviation	0.00005	0.00005

Eccentricity (Off-center loading error)

The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to GIML R18).

Nominal value:	100 g
Tolerance	0.0004 g
Difference	
1	-
2	0.0000
3	0.0000
4	-0.0001
5	-0.0001
6	-

Linearity

The linearity, also called linearity error. Describes the deviation of the characteristic curve of a weighing instrument from the linear slope.

Tolerance 0.0002 g

Nominal Value (g)	Conventional Mass Value (g)	Displayed Value (g)	Deviation (g)	Uncertainty (g)
0.01	0.0100	0.0100	0.0000	0.00014
0.05	0.0500	0.0500	0.0000	0.00014
0.1	0.1000	0.1000	0.0000	0.00014
0.5	0.5000	0.5000	0.0000	0.00014
1	1.0000	1.0000	0.0000	0.00014
2	2.0000	2.0000	0.0000	0.00014
5	5.0000	5.0000	0.0000	0.00014
10	10.0000	10.0000	0.0000	0.00014
20	20.0000	20.0000	0.0000	0.00014
200	200.0000	200.0000	0.0000	0.00029

End of Report

SOP FM 33 03 February 2022.

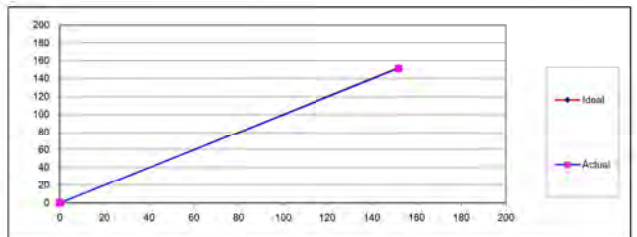


CALIBRATION REPORT

Calibration Date: 3-Jan-24 Equipment ID: BKK_FS0758
Equipment Name: FID Analyzer Manufacturer: Baseline Moun
Model: 9000H Serial No.: 0315EF0047
Std. Gas Conc.(ppm): 152 Cylinder No.: D878173
Certified Date: 27-Jun-18 Expired Date: 27-Jun-26

CALIBRATION RESULTS

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
SPAN	152.00	151.20	-0.80	-0.53
AVERAGE (%)				-0.21



Calibrated By

Approved By

Mr. Apisit Singha

(Mr. Apisit Singha)
Field Environmental Scientist (4)

Mr. Sarayuth Jitranont

(Mr. Sarayuth Jitranont)
Assistant General Manager

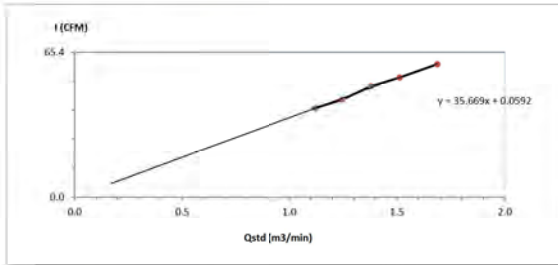
ALS Laboratory Group



High Volume Air Sampler Calibration Worksheet

Project Site : BASF (Thai) Limited Barometric Pressure (mm Hg) : 753.4
Calibrate Location : บ้านสวนเกษตรกรรม Temperature (°C) : 29.8
Calibrate Date : 15-Jun-24 High Volume ID : RYG_FS0177
Calibration Sheet No. : C-150624-RYG_FS0177 High Volume Model : TE-5170D
Calibrator ID : RYG_FS0205 High Volume S/N : 4803
Calibrator Model : TE-5028A Calibrator Slope : 1.52567
Calibrator S/N : 1166 Calibrator Intercept : -0.03613

Test No.	Delta H ₂ O (inch)	Q _{as} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.8	1.1194	40	Slope : 35.6693 Intercept : 0.0592 Correlation Coefficient : 0.9981
2	3.5	1.2473	44	
3	4.3	1.3786	50	
4	5.2	1.5124	54	
5	6.5	1.6867	60	



Calibrated by :
(Mr. Anuwat Tema)
Field Scientist (1)

Approved by :
(Mr. Noppong Juntarupan)
Enviro Field Coordinator Scientist (3)

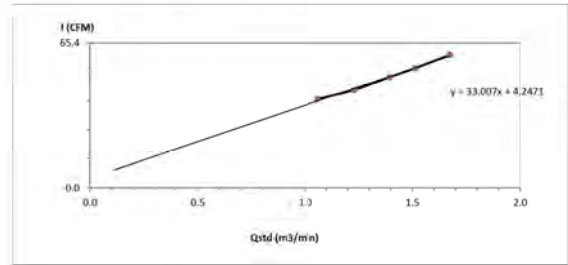
FORM NO.: F-06-073 REVISION NO.: 2 ISSUE DATE: 20/11/23



High Volume Air Sampler Calibration Worksheet

Project Site : BASF (Thai) Limited Barometric Pressure (mm Hg) : 753.4
Calibrate Location : บ้านสวนเกษตรกรรม Temperature (°C) : 29.8
Calibrate Date : 15-Jun-24 High Volume ID : RYG_FS0178
Calibration Sheet No. : C-150624-RYG_FS0178 High Volume Model : TE-5170D
Calibrator ID : RYG_FS0205 High Volume S/N : 4804
Calibrator Model : TE-5028A Calibrator Slope : 1.52567
Calibrator S/N : 1166 Calibrator Intercept : -0.03613

Test No.	Delta H ₂ O (inch)	Q _{as} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.5	1.0598	40	Slope : 33.0073 Intercept : 4.2471 Correlation Coefficient : 0.9967
2	3.4	1.2299	44	
3	4.4	1.3941	50	
4	5.2	1.5124	54	
5	6.4	1.6798	60	



Calibrated by :
(Mr. Anuwat Tema)
Field Scientist (1)

Approved by :
(Mr. Noppong Juntarupan)
Enviro Field Coordinator Scientist (3)

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

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-6, e-mail: service.thailand@sartorius.com



SARTORIUS

Certificate of Calibration

Model Number : LA130S-F Certificate No. : 24BCI0068
Description : Analytical Balance Issued Date : Friday, February 23, 2024
Serial Number : 25409664 Reference No. : 229196
ID No. : RYG_EN0001
Manufacturer : Sartorius Page No. : 1 of 2

Customer Name : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)
616/10 Moo 5 T.Maenam Khu, A.Pluak Daeng, Rayong 21140, Thailand

Calibrated Place : ALS Laboratory Group (Thailand) Co., Ltd. (Balance Room)
616/10 Moo 5 T.Maenam Khu, A.Pluak Daeng, Rayong 21140, Thailand.

Calibrated By : Mr.Chonchai Inthana Calibration Procedure No. : This calibration was conducted by
Calibration Date : Thursday, February 22, 2024 Using in-house calibration procedure number (WI-003)
Based on UKAS LAB 14 : 2019

Metrological data : Ambients Conditions:
Capacity : 150 g Readability : 0.0001 g Temperature : 23.6 °C ± 5.0 °C
Humidity : 54.0 % RH ± 10.0 % RH
Pressure : ±

Reasons for calibration : ☐ New Installation ☐ Service / Repaired ☒ Re-calibration / Maintenance
Equipment Condition : ☒ Good Operate ☐ Fair

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 1mg - 5000g E2 YCS011-522-00	TCS	M2308197S	23-Aug-2025
MHB-382SD	Humidity/Balometer/Temp Lutron MHB-382SD	DKSH	C1923184S	23-Aug-2024

This certificate relate and apply this equipment only.
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.

Mr.chonchai Inthana(Technical Manager)



SOP FM 33 03 February 2022

Sartorius (Thailand) Co., Ltd.

129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-6 Fax: +66 2643-8367, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

Model Number : LA130S-F Certificate No. : 24BCI0068
Description : Analytical Balance Issued Date : Friday, February 23, 2024
Serial Number : 25409664 Reference No. : 229196
ID No. : RYG_EN0001
Manufacturer : Sartorius Page No. : 2 of 2

Calibration Results : Without Adjustment

Repeatability	Eccentricity (Off-center loading error)
The reproducibility is the ability of a weighing instrument to display nearly identical readings under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.	The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).
Nominal Value : (Low Load) 10 g Tolerance 0.0001 g	Nominal value : 50 g Tolerance 0.0004 g
Nominal Value : (High Load) 100 g Tolerance 0.0001 g	
Standard Deviation 0.00005 0.00008	

Linearity

The linearity, also called linearity error. Describes the deviation of the characteristic curve of a weighing instrument from the linear slope.

Tolerance		0.0002 g		
Nominal Value	Conventional Mass Value	Displayed Value	Deviation	Uncertainty
(g)	(g)	(g)	(g)	(g)
0.01	0.0100	0.0100	0.0000	0.00020
0.05	0.0500	0.0500	0.0000	0.00021
0.1	0.1000	0.1000	0.0000	0.00021
0.5	0.5000	0.5000	0.0000	0.00021
1	1.0000	1.0000	0.0000	0.00021
2	2.0000	2.0000	0.0000	0.00021
5	5.0000	5.0000	0.0000	0.00021
10	10.0000	10.0001	0.0001	0.00024
20	20.0000	20.0001	0.0001	0.00021
100	100.0000	99.9999	-0.0001	0.00024

End of Report.

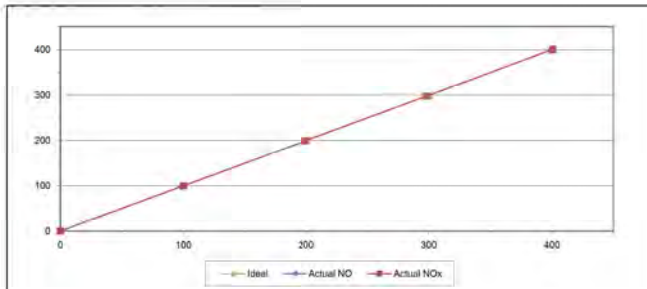
SOP FM 33 03 February 2022



MULTIPOINT CALIBRATION REPORT

Calibration Date	4-Jan-24	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	T2T8YRL	Equipment ID	RYG_FS0457
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	99.30	-1.70	-1.70	100.20	0.20	0.20
2	200.00	198.40	-1.60	-0.80	199.80	-0.20	-0.10
3	300.00	297.90	-2.10	-0.70	298.50	-1.50	-0.50
4	400.00	398.60	-1.40	-0.35	400.80	0.80	0.20
AVERAGE (%)				-0.69			-0.02



Calibrated By

(Mr.Jirawut Sakarn)
Field Environmental Scientist (3)

Approved By

(Mr.Sarayuth Jitranont)
Assistant General Manager

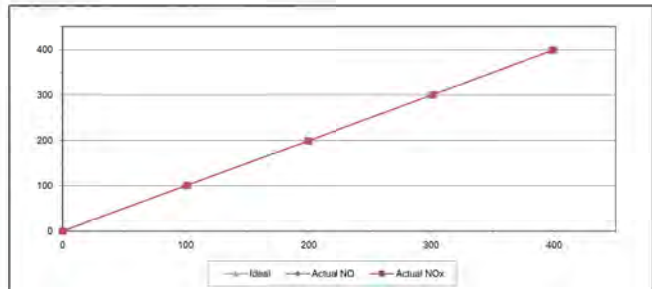
ALS Laboratory Group
FORM NO. : F 06-056 REVISION NO. : ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	4-Jan-24	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	NV0ER3YH	Equipment ID	RYG_FS0459
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	0.05	0.05	0.05	0.10	0.10	0.10
1	100.00	99.50	-0.50	-0.50	101.20	1.20	1.20
2	200.00	198.70	-1.30	-0.65	199.70	-0.30	-0.15
3	300.00	301.10	1.10	0.37	301.50	1.50	0.50
4	400.00	400.30	0.30	0.08	398.80	-1.20	-0.30
AVERAGE (%)				-0.13			0.27



Calibrated By

(Mr.Jirawut Sakarn)
Field Environmental Scientist (3)

Approved By

(Mr.Sarayuth Jitranont)
Assistant General Manager

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

SITHIPORN ASSOCIATES CO., LTD. CALIBRATION LABORATORY

451-453/1 Sithiporn Road, Bangkhunruang, Bangkok, 10700 Thailand
Tel : +66 2433 8331 Email : calibration@sithiporn.com

SITHIPORN
ASSOCIATES



Cert. No. : ACC24008
Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-75
Serial No.: 35002736
ID No.: RYG_FS0496

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 JANUARY 2024
Calibration Date : 26 JANUARY 2024
Date of Issue : 29 JANUARY 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.

SITHIPORN ASSOCIATES CO., LTD. CALIBRATION LABORATORY

451-453/1 Sithiporn Road, Bangkhunruang, Bangkok, 10700 Thailand
Tel : +66 2433 8331 Email : calibration@sithiporn.com

SITHIPORN
ASSOCIATES



Cert. No. : ACC24008
Job No. : VC67AC0058
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	EELBP 30/0266	13-FEB-24
Digital Multimeter	33461A	MY53220076	EELBP 30/0267	13-FEB-24
Digital Multimeter	33461A	MY60024273	EELBP 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-42KAJ	34560495	AA-3002-23	14-FEB-24
Audio Analyzer	AVR-3360A	V744B0609	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).

(Thanakul Petchurai)

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangkok, 10700 Thailand
Tel: +66 2433 8331 Email: calibration@sithiporn.com



Cert. No. : ACC24008
Job No. : VC67AC0058
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	93.98	-0.02	0.14	0.49

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Acceptance limit (%)
1000	1000.0	0.0	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Acceptance limit (%)
0.83	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

T. Petchum

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangkok, 10700 Thailand
Tel: +66 2433 8331 Email: calibration@sithiporn.com



Cert. No. : ACL24075
Pages : 1 of 8

Calibration Certificate

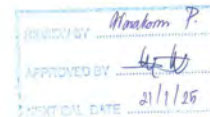
Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No. : 01222716 / 143832 / 22763
ID No. : RYG_FS0020

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 : 11 JANUARY 2024
Calibration Date : 22-24 JANUARY 2024
Date of Issue : 24 JANUARY 2024



Calibrated by : Nathakorn Pisutpaimit

Approved by :

T. Petchum
(Thanakul Petchumai)

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Cert. No. : ACL24075
Job No. : VC67AC0054
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	3321CA	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	34461A	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-42EAI	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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Cert. No. : ACL24075
Job No. : VC67AC0054
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	-	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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Cert. No. : ACL24075
Job No. : VC67AC0054
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.4

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

Frequency Weighting	Measured value (dB)
A - weight	11.6
C - weight	17.7
Flat	23.6

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)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.5	0.5	0.5	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	-0.7	-0.6	-0.6	±5.0

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Cert. No. : ACL24075
Job No. : VC67AC0054
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	±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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Job No. : VC67AC0054
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	53.9	-0.1	± 1.1
49.0	49.0	0.0	± 1.1
44.0	43.9	-0.1	± 1.1
39.0	38.9	-0.1	± 1.1
34.0	33.9	-0.1	± 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	24.9	-0.1	± 1.1

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Job No. : VC67AC0054
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	±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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.4	135.3	-1.1	±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

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Job No. : VC67AC0054
Pages : 8 of 8

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

T. Petchurai

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Cert. No. : ACL24094
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No. : 01222723 / 143841 / 22770
ID No. : RYG_FS0022

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 JANUARY 2024
Calibration Date : 25-26 JANUARY 2024
Date of Issue : 29 JANUARY 2024

REVIEW BY : *Nathakorn P.*
APPROVED BY : *T. Petchurai*
NEXT CAL. DATE : 24/1/25

Calibrated by : Nathakorn Pisutpaian

Approved by : *T. Petchurai*
(Thanakul Petchurai)

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Cert. No. : ACL24094
Job No. : VC67AC0058
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	34461A	MY60024273	EEL-BP 31/0266	14-FEB-24
Programmable Attenuator	MAT-070	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).

T. Petchurai

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Cert. No. : ACL24094
Job No. : VC67AC0058
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	-	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. Petchurai

Cert. No. : ACL24094
Job No. : VC67AC0058
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.9K)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.8

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

Frequency Weighting	Measured value (dB)
A - weight	12.0
C - weight	18.4
Flat	24.1

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	0.4	0.4	0.4	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	0.7	0.8	0.7	±5.0

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Cert. No. : ACL24094
Job No. : VC67AC0058
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	±2.0
125	0.0	0.1	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. : ACL24094
Job No. : VC67AC0058
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	29.0	0.0	± 1.1
28.0	28.1	0.1	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.2	0.2	± 1.1
25.0	25.1	0.1	± 1.1

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Cert. No. : ACL24094
Job No. : VC67AC0058
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	±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
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

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	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	132.9	-0.1	±2.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

T. Petch

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Cert. No. : ACL24094
Job No. : VC67AC0058
Pages : 8 of 8

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.8	89.6	-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

T. Petchur

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Tel. +66 2433 8331 Email : calibration@sithiporn.com



Cert. No. : ACL24071
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No. : 01222724 / 143486 / 22620
ID No. : RYG_ES0073

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 : 11 JANUARY 2024
Calibration Date : 22-24 JANUARY 2024
Date of Issue : 24 JANUARY 2024



Calibrated by : Nathakorn Pisutpaieam

Approved by : *T. Petchur*
(Thanakul Petchurai)

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SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/ Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiporn.com



Cert. No. : ACL24071
Job No. : VC67AC0054
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	3321GA	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	34461A	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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Cert. No. : ACL24071
Job No. : VC67AC0054
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	-	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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Cert. No. : ACL24071
Job No. : VC67AC0054
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	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	Measured value (dB)
A - weight	14.8
C - weight	20.6
Flat	26.4

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	0.0	0.0	0.0	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	1.4	1.5	1.5	±5.0

7. Reten.

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Cert. No. : ACL24071
Job No. : VC67AC0054
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	-0.1	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

7. Reten.

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Job No. : VC67AC0054
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	53.9	-0.1	± 1.1
49.0	48.9	-0.1	± 1.1
44.0	43.9	-0.1	± 1.1
39.0	38.9	-0.1	± 1.1
34.0	33.9	-0.1	± 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	25.8	-0.2	± 1.1
25.0	24.9	-0.1	± 1.1

7. Reten.

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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	±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	128.1	0.1	±1.0

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	133.0	133.0	0.0	±3.0
One	136.4	135.9	-0.5	±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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Cert. No. : ACL24071
Job No. : VC67AC0054
Pages : 8 of 8

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	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. Petchur

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Cert. No. : ACL24090
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00233183 / 144835 / 23230
ID No.: RYG_FS0024

Condition As Found : GOOD

Customer : A.L.S. 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 JANUARY 2024
Calibration Date : 25-26 JANUARY 2024
Date of Issue : 29 JANUARY 2024

REVIEW BY : Nathakorn P.
APPROVED BY : T. Petchur
EFFECTIVE DATE : 24/1/25

Calibrated by : Nathakorn Pisutpaibun

Approved by : T. Petchur
(Thanakul Petchurai)

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Cert. No. : ACL24090
Job No. : VC67AC0058
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	EP-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	34461A	MY60024273	EEL-BP 31/0266	14-FEB-24
Programmable Attenuator	MAT-1070	62100114	EF-0011-23	08-FEB-24
Condenser Microphone	4183	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KAJ	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).

T. Petchur

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Cert. No. : ACL24090
Job No. : VC67AC0058
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	-	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. Petchur

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.9S)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
18.3

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

Frequency Weighting	Measured value (dB)
A - weight	14.2
C - weight	20.0
Flat	25.6

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)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	0.3	0.3	0.3	±5.0

7. Petch.

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	0.0	±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

7. Petch.

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	74.1	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	54.0	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	30.1	0.1	± 1.1
29.0	29.2	0.2	± 1.1
28.0	28.3	0.3	± 1.1
27.0	27.3	0.3	± 1.1
26.0	26.4	0.4	± 1.1
25.0	25.4	0.4	± 1.1

7. Petch.

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
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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (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	133.0	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

7. Petch.

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Cert. No. : ACL24090
Job No. : VC67AC0058
Pages : 8 of 8

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	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Weighting				
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. Petchur

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

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Cert. No. : ACC23029
Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-74
Serial No. : 34178123
ID No. : RYG_FS0215

REVIEW BY: *Nathakorn P.*
APPROVED BY: *T. Petchur*
NEXT CAL DATE: 20/9/24

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 : 07 SEPTEMBER 2023
Calibration Date : 20 SEPTEMBER 2023
Date of Issue : 20 SEPTEMBER 2023

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchur
(Thanakul Petchurai)

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QF-TS12-04-04-020664

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Continuation of Calibration Certificate

Cert. No. : ACC23029
Job No. : VC66AC0100
Pages : 2 of 3

Calibration Procedure : CP-AC-03

Calibration Method :

This equipment was calibrated by based 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	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-42KAJ	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).

T. Petchur

QF-TS12-04-04-020664

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Continuation of Calibration Certificate

Cert. No. : ACC23029
Job No. : VC66AC0100
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	94.1	0.10	0.14	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Acceptance limit (%)
1000	1001.5	0.1	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Acceptance limit (%)
1.70	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

QF-TS12-04-04-020664

T. Petchur

Cert. No. : ACL24091
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-34
Serial No. : 00233184 / 144837 / 23232
ID No. : RYG_FS0025

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 JANUARY 2024
Calibration Date : 25-26 JANUARY 2024
Date of Issue : 29 JANUARY 2024

Calibrated by : Nethakorn Pisutpaisan

Approved by : *T. Petchurai*
(Thanakul Petchurai)

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other than in full, except with the prior written approval of the head of Calibration Laboratory.

Cert. No. : ACL24091
Job No. : VC67AC0058
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	34461A	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-42KAI	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).

Cert. No. : ACL24091
Job No. : VC67AC0058
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	-	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

Cert. No. : ACL24091
Job No. : VC67AC0058
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	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 (dB)	Measured value (dB)
A - weight	10.8
C - weight	17.3
Flat	23.0

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	-0.3	-0.3	-0.3	± 5.0

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Cert. No. : ACL24091
Job No. : VC67AC0058
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	-0.1	0.0	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	±3.0

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
Loq	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. : ACL24091
Job No. : VC67AC0058
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	28.1	0.1	± 1.1
27.0	27.0	0.0	± 1.1
26.0	26.1	0.1	± 1.1
25.0	25.1	0.1	± 1.1

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Job No. : VC67AC0058
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	94.1	0.1	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, T _b (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
	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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.4	135.6	-0.8	±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

T. Petch

Cert. No. : ACL24092
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00734220 / 145286 / 34371
ID No.: RYG_FS0026

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 JANUARY 2024
Calibration Date : 25-26 JANUARY 2024
Date of Issue : 29 JANUARY 2024

Calibrated by : Nathakorn Pisunpaisan

Approved by : *J. Petchum*
(Thanakul Petchumai)

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Cert. No. : ACL24092
Job No. : VC67AC0058
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	34461A	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).

Cert. No. : ACL24092
Job No. : VC67AC0058
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	-	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

Cert. No. : ACL24092
Job No. : VC67AC0058
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
16.3

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

Frequency Weighting	Measured value (dB)
A-weight	13.4
C-weight	19.5
Flat	25.4

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	0.3	0.3	0.3	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	2.3	2.3	2.3	±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	0.0	0.0	±2.0
125	0.0	0.1	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
Eq	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. : ACL24092
Job No. : VC67AC0058
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	29.9	-0.1	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.1	0.1	± 1.1
25.0	25.1	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	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
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

10. Peak C' sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.4	135.6	-0.8	±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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Cert. No. : ACL24092
Job No. : VC67AC0058
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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	89.7	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

T. Petch...

Cert. No. : ACL24076
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00734221 / 157777 / 22653
ID No.: RYG_FS0027

Condition As Found : GOOD

Customer : A/S LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWAEANG 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 : 11 JANUARY 2024
Calibration Date : 22-24 JANUARY 2024
Date of Issue : 24 JANUARY 2024



Calibrated by : Nathakorn Pisitpaisan

Approved by : *T. Petchurai*
(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.

Cert. No. : ACL24076
Job No. : VC67AC0054
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	ET-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	FEL-BP 30/0266	13-FEB-24
Digital Multimeter	34461A	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).

*T. Petchurai*Cert. No. : ACL24076
Job No. : VC67AC0054
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	-	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. Petchurai*Cert. No. : ACL24076
Job No. : VC67AC0054
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.4

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	18.9
Flat	24.7

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	0.3	0.3	0.3	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-0.5	-0.4	-0.4	±5.0

T. Petchurai

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangkok, 10700 Thailand
Tel : +66 2433 8331 Email : calibration@sithiphorn.com



Cert. No. : ACL24076
Job No. : VC67AC0054
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	-0.1	-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	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

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangkok, 10700 Thailand
Tel : +66 2433 8331 Email : calibration@sithiphorn.com



Cert. No. : ACL24076
Job No. : VC67AC0054
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	137.1	0.1	± 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	129.1	0.1	± 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	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	24.9	-0.1	± 1.1

T. Petch

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangkok, 10700 Thailand
Tel : +66 2433 8331 Email : calibration@sithiphorn.com



Cert. No. : ACL24076
Job No. : VC67AC0054
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	±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
SEL	0.25	1	99.0	98.8	-0.2	1.5 ; -5.0
	2	8	108.0	107.9	-0.1	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 _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.4	136.0	-0.4	±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

T. Petch

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangkok, 10700 Thailand
Tel : +66 2433 8331 Email : calibration@sithiphorn.com



Cert. No. : ACL24076
Job No. : VC67AC0054
Pages : 8 of 8

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

T. Petch

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00734223 / 169439 / 72460
ID No.: RYG_FS0029

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 : 15 JUNE 2023
Calibration Date : 20-22 JUNE 2023
Date of Issue : 23 JUNE 2023

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchu
(Thanakul Petchumai)

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other than in full, except with the prior written approval of the head of Calibration Laboratory.

QF-TS12-04-04-020664

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based 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	MY43720104	EEL_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	MAT-1070	62100114	EF-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KAI	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).

QF-TS12-04-04-020664

T. Petchu

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.1	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

Note : Pass/Fail evaluation for each parameter,
will be considered together from the acceptance limit and the Maximum-permitted uncertainty of measurement.

QF-TS12-04-04-020664

T. Petchu

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)
14.3

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

Frequency Weighting	Measured value (dB)
A - weight	10.8
C - weight	17.0
Flat	22.8

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	-2.1	-2.1	-2.1	±5.0

QF-TS12-04-04-020664

T. Petchu

Cert. No. : ACL23196
Job No. : VC66AC0066
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)			Acceptance Limits
	Flat	C-weight	A-weight	
63	-0.1	-0.1	-0.1	±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

QP-TS12-04-04-020064

T. Petch

Cert. No. : ACL23196
Job No. : VC66AC0066
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

QP-TS12-04-04-020064

T. Petch

Cert. No. : ACL23196
Job No. : VC66AC0066
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	±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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (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	133.0	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

QP-TS12-04-04-020064

T. Petch

Cert. No. : ACL23196
Job No. : VC66AC0066
Pages : 8 of 8

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

QP-TS12-04-04-020064

T. Petch

Cert. No. : ACL24093
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No. : 00734225 / 145272 / 34370
ID No. : RYG_FS0030

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 JANUARY 2024
Calibration Date : 25/26 JANUARY 2024
Date of Issue : 29 JANUARY 2024

Calibrated by : Nattakorn Pimpaisan

Approved by :

T. Petchurai
(Thanakul Petchurai)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced
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Cert. No. : ACL24093
Job No. : VC67AC0058
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	34461A	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-42KAi	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).

Cert. No. : ACL24093
Job No. : VC67AC0058
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	-	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

Cert. No. : ACL24093
Job No. : VC67AC0058
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
21.4

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

Frequency Weighting	Measured value (dB)
A - weight	11.6
C - weight	17.9
Flat	23.6

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)			
	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	-1.1	-0.9	-0.9	±5.0

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/ Sirinthorn Road, Bangbunru, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiporn.com



Cert. No. : ACL24093
Job No. : VC67AC0058
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	-0.1	0.0	0.0	±2.0
125	0.0	0.1	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

Signature

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Cert. No. : ACL24093
Job No. : VC67AC0058
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	53.9	-0.1	± 1.1
49.0	49.0	0.0	± 1.1
44.0	43.9	-0.1	± 1.1
39.0	38.9	-0.1	± 1.1
34.0	33.9	-0.1	± 1.1
30.0	29.9	-0.1	± 1.1
29.0	28.9	-0.1	± 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

Signature

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Cert. No. : ACL24093
Job No. : VC67AC0058
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	±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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (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	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

Signature

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Cert. No. : ACL24093
Job No. : VC67AC0058
Pages : 8 of 8

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	±0.3

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

Signature

Cert. No. : ACL23249
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00734218 / 146937 / 34368
ID No.: RYG_FS0031

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 : 13 JULY 2023
Calibration Date : 10 AUGUST 2023
Date of Issue : 11 AUGUST 2023

REVIEW BY : *Nathakorn P.*
APPROVED BY : *T. Petchurai*
NEXT CAL. DATE : 10/5/24

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchurai
(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.

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23249
Job No. : VC66AC0085
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based 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	34461A	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-42KAI	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).

QF-TS12-04-04-020664

T. Petchurai

Continuation of Calibration Certificate

Cert. No. : ACL23249
Job No. : VC66AC0085
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Pass	Fail	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

Note : Pass/Fail evaluation for each parameter, will be considered together from the acceptance limit and the Maximum-permitted uncertainty of measurement.

QF-TS12-04-04-020664

T. Petchurai

Continuation of Calibration Certificate

Cert. No. : ACL23249
Job No. : VC66AC0085
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
23.3

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

Frequency Weighting	Measured value (dB)
A - weight	14.8
C - weight	19.7
Flat	25.7

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)			Acceptance Limits
	Flat	C-weight	A-weight	
125	0.7	0.8	0.8	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	0.2	0.3	0.3	± 5.0

QF-TS12-04-04-020664

T. Petchurai

Continuation of Calibration Certificate

Cert. No. : ACL23249
Job No. : VC66AC0085
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	-0.1	-0.1	±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

QF-TS12-04-04-020664

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL23249
Job No. : VC66AC0085
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	53.9	-0.1	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	38.9	-0.1	± 1.1
34.0	34.0	0.0	± 1.1
30.0	29.9	-0.1	± 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

QF-TS12-04-04-020664

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL23249
Job No. : VC66AC0085
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	±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	128.1	0.1	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±3.0
One	136.4	135.3	-1.1	±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

QF-TS12-04-04-020664

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL23249
Job No. : VC66AC0085
Pages : 8 of 8

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

QF-TS12-04-04-020664

T. Petch



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0292

MTC No. EEL. BP. 83/0267

CALIBRATION CERTIFICATE

Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Phatthanakan 40, Phatthanakan Rd., Kluwaeng Phatthanakan, Khet Suan Luang, Bangkok, 10250.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre,
Sri 1C, Bangpoo Industrial Estate, Sakhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Calibrator

Manufacturer : Rion

Model : NC-74

Serial No. : 34178121 (ID: RYG_FS0213)

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

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

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

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

5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.

6. Audio Analyzer Keithley 2015-P S/N4106495.

7. Condenser Microphone B&K 4180 S/N 2889871.

Ambient Environment

Temperature : (23 ± 3) °C

Relative Humidity : (50 ± 15) %

Ambient Pressure : (101.325 ± 1.500) kPa

Calibration Procedure: CP-102-04 based on IEC 60942:2003; The sound pressure level generated by sound calibrator under test shall be measured by standard microphone using an insert voltage technique.

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

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

Date of Receipt : 19 Feb. 2024

Date of Calibration : 28 Feb. 2024

1/2

The results relate only to the items tested/calibrated or value assigned.

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

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(66) 08 1889 4027

FIABLMTC.002 Rev.5



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0292

MTC No. EEL. BP. 83/0267

The reported expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.Nominal Output of Unit Under Test = 94 dB re 20 μ Pa at 1000 HzAcoustic Output in dB re 20 μ Pa, Corrected to Reference Conditions: 101.325 kPa, 23.0 °C and 50 %RH.

1. Sound Pressure Level

Standard Microphone	Measured Sound Pressure	Deviated value	Uncertainty	Tolerance limit
Type	Level (dB)	(dB)	(dB)	IEC60942:2003 Class 1
1/2 inch Brüel&Kjaer 4180	94.01	0.01	± 0.10	± 0.40 dB

2. Frequency

Standard Microphone	Measured Frequency	Deviated value	Uncertainty	Tolerance limit
Type	(Hz)	(Hz)	(Hz)	IEC60942:2003 Class 1
1/2 inch Brüel&Kjaer 4180	1003.1	3.1	± 1.5	± 1.0%

3. Total Distortion

Standard Microphone	Measured Total Distortion	Uncertainty	Tolerance limit
Type	(%)	(%)	IEC60942:2003 Class 1
1/2 inch Brüel&Kjaer 4180	1.80	± 0.50	± 3.0%

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was included: a level of 0.16 dB from manual.

Calibrated by :
(Mr. Weerachai Deechaiyae)Approved by :
(Mr. Prayate Khuyapa)

Director

Electrical and Electronic Standards Laboratory

Date of Calibration : 28 Feb. 2024

Industrial Metrology and Testing Service Centre

Date of Issue : 29 Feb. 2024

Ref : 2011267021900719001

End of Certificate

3/2

The results relate only to the items tested/calibrated or value assigned.

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SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY481-451/1 Srinthorn Road, Bangburu, Bangkok, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiporn.comCert. No. : ACL24027
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER

Manufacturer : RION

Model : NL-42 / Microphone UC-52 / Preamplifier NH-24

Serial No. : 00472126 / 158778 / 88180

ID No. : RYG_FS0301

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KLUWAENG 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 : 12 JANUARY 2024

Date of Issue : 16 JANUARY 2024

Calibrated by : Nattakorn Pisutpaisan

Approved by :
(Thanakul Petchurai)

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Job No. : VC67AC0044
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	34461A	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-42KAI	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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Cert. No. : ACL24027
Job No. : VC67AC0044
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	-	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

Z. Retin

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Cert. No. : ACL24027
Job No. : VC67AC0044
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
18.8

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

Frequency Weighting	Measured value (dB)
A - weight	12.0
C - weight	18.4
Flat	24.2

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	0.7	0.8	0.9	±1.5
1000	-0.2	-0.2	-0.2	±1.0
8000	-2.5	-2.5	-2.5	±5.0

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Cert. No. : ACL24027
Job No. : VC67AC0044
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	-0.1	0.0	-0.1	±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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Cert. No. : ACL24027
Job No. : VC67AC0044
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	89.1	0.1	± 1.1
84.0	84.1	0.1	± 1.1
79.0	79.1	0.1	± 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	29.1	0.1	± 1.1
28.0	28.1	0.1	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.1	0.1	± 1.1
25.0	25.1	0.1	± 1.1

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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	±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

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	133.0	133.0	0.0	±3.0
One	136.4	135.3	-1.1	±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

T. Petchurai

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CALIBRATION LABORATORY

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Cert. No. : ACL24027
Job No. : VC67AC0044
Pages : 8 of 8

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.7	89.6	-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

T. Petchurai

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Cert. No. : ACL23247
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00472127 / 169440 / 72461
ID No.: RYG_FS0302

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 : 13 JULY 2023
Calibration Date : 10 AUGUST 2023
Date of Issue : 11 AUGUST 2023

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchurai
(Thanakul Petchurai)

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Continuation of Calibration Certificate

Cert. No. : ACL23247
Job No. : VC66AC0085
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based 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	EE-0009-23	07-FEB-24
Waveform Generator	33511B	MY52302742	EE-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	EE-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KAI	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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Continuation of Calibration Certificate

Cert. No. : ACL23247
Job No. : VC66AC0085
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Pass	Fail	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

Note : Pass/Fail evaluation for each parameter, will be considered together from the acceptance limit and the Maximum-permitted uncertainty of measurement.

QF-TS12-04-04-020664

7. Petch

Continuation of Calibration Certificate

Cert. No. : ACL23247
Job No. : VC66AC0085
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
18.0

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	20.3
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)			Acceptance Limits
	Flat	C-weight	A-weight	
125	-0.1	0.1	0.1	± 1.5
1000	-0.1	-0.1	0.0	± 1.0
8000	-0.4	-0.3	-0.3	±5.0

QF-TS12-04-04-020664

7. Petch

Continuation of Calibration Certificate

Cert. No. : ACL23247
Job No. : VC66AC0085
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)			Acceptance Limits
	Flat	C-weight	A-weight	
63	0.0	0.0	-0.1	±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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Continuation of Calibration Certificate

Cert. No. : ACL23247
Job No. : VC66AC0085
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	84.1	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	59.0	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	28.1	0.1	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.2	0.2	± 1.1
25.0	25.1	0.1	± 1.1

QF-TS12-04-04-020664

7. Petch

Continuation of Calibration Certificate

Cert. No. : ACL33247
Job No. : VC66AC0085
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	±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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (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

QF-TS12-04-04-020664

7. Peter

Continuation of Calibration Certificate

Cert. No. : ACL33247
Job No. : VC66AC0085
Pages : 8 of 8

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle	0.1	±1.5
89.6	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

QF-TS12-04-04-020664

7. Peter



THAILAND INSTITUTE OF SCIENCE AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0232

MTC No. EEL- BP. 172/0167

CALIBRATION CERTIFICATE

Submitted by : A.L.S. 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 1C, Bangpoo Industrial Estate, Sukhumvit Rd., A.Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Level Meter

Manufacturer : Rion

Model : NL-42

Serial No. : 00296515 (ID: RYG_FS0432)

Microphone : Type UC-52 No.179119

Preamplifier : Type NH-24 No.87526

Standards used :

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

Ambient Environment

Temperature : (23 ± 3) °C

Relative Humidity : (50 ± 15) %

Ambient Pressure : (101.325 ± 1.5) kPa

REVIEW BY: *Worawan P.*
APPROVED BY: *[Signature]*
NEXT CAL. DATE: 21/2/25

Date of Receipt : 24 Jan. 2024

Date of Calibration : 22-28 Feb. 2024

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THAILAND INSTITUTE OF SCIENCE AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0232

MTC No. EEL- BP. 172/0167

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 values only.

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

Date of Calibration : 22-28 Feb. 2024

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0232

MTC No. EEL-BP. 172.0167

1. Absolute Sensitivity

Reference Acoustic Signal (dB)	Measured value (dB)		Deviation value (dB)	Acceptance limit Class 2 (±dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
	Before adjust	After adjust				
113.96	114.1	113.9	-0.1	1.0	0.30	N/A

Note: The external calibration adjustment was firstly performed. The internal calibration adjustment was then completed at the display of 123.6 dB.

2. Self-generated noise

2.1 Normal test

Measured value (dB)	Uncertainty (±dB)	Maximum-permitted uncertainty of measurement (±dB)
19.1	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	11.9	0.10	N/A
C-Weight	17.4	0.10	N/A
Flat	23.2	0.10	N/A

Date of Calibration : 22-28 Feb. 2024

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0232

MTC No. EEL-BP. 172.0167

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	0.1	0.2	0.2	1.5	0.45	0.6
1 000	-0.1	-0.1	-0.1	1.0	0.45	0.6
8 000	0.0	0.0	-0.1	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	0.0	0.0	2.0	0.20	0.6
4 000	0.0	0.0	0.0	3.0	0.20	0.6
8 000	0.0	0.0	0.0	5.0	0.20	0.7

Date of Calibration : 22-28 Feb. 2024

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Request No. 21-67/0232

MTC No. EEL-BP. 172.0167

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
Leq	94.0	0.0	0.1	0.20	0.2

Date of Calibration : 22-28 Feb. 2024

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Request No. 21-67/0232

MTC No. EEL-BP. 172.0167

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	129.1	0.1	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

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Request No. 21-67/0232

MTC No. EEL BP. 172/0167

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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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0232

MTC No. EEL BP. 172/0167

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	Toneburst	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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Request No. 21-67/0232

MTC No. EEL BP. 172/0167

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. Prawate Kluyapa)
Director
Electrical and Electronic Standards Laboratory
Industrial Metrology and Testing Service Centre
Ref: 2011267012400347002

Date of Calibration : 22-28 Feb. 2024
Date of Issue : 29 Feb. 2024

End of Certificate

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CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 15 December 2023

CERTIFICATE NUMBER 205046

REVIEW BY
APPROVED BY
TEST DATE 14/12/24
By:

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2
Approved signatory
N.Smith
Electronically signed:

doseBadge Reader : IEC 60942:2003

Instrument information

Manufacturer: Cirrus Research plc

Notes:

Model: RC-110A

Serial number: 75998

Class: 2

Test summary

Date of calibration: 15 December 2023

The doseBadge reader detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

The doseBadge Reader has been shown to conform to the Class 2 requirements for periodic testing, described in Annex B of IEC 60942:2003 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

However, as public evidence was not available, from a testing organisation responsible for pattern approval, to demonstrate that the model of doseBadge Reader conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, no general statement or conclusion can be made about conformance of the doseBadge Reader to the requirements of IEC 60942:2003.

Notes:

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

CERTIFICATE OF CALIBRATION

Certificate Number:
205046
Page 2 of 2

Environmental conditions

The following conditions were recorded at the time of the test:

Before Pressure: 102.46 kPa Temperature: 23.4 °C Humidity: 34 %
After Pressure: 102.46 kPa Temperature: 23.4 °C Humidity: 35 %

Test equipment

Equipment	Manufacturer	Model	Serial number
Distortion Meter	Keithley	2015	0994818
Acoustic Calibrator	Bruel and Kjaer	4231	2610257
Environmental Monitor	Comet	T7510	21962628

Initial Acoustic Results

	Expected	Sample 1	Sample 2	Sample 3	Average	Deviation	Tolerance	Uncertainty
Level (dB)	114.00	114.17	114.16	114.17	114.17	0.17	±0.75	0.11 dB
Distortion (%)	< 4.00	0.28	0.25	0.23	0.25	0.25	+4.00	0.13 %
Frequency (Hz)	1000.0	1004.0	1004.0	1004.0	1004.0	4.0	±20.0	0.1 Hz

The measured quantities or deviations (as applicable), extended by the expanded combined uncertainty of measurement, must not exceed the corresponding tolerance.

Adjusted Acoustic Results

	Expected	Sample 1	Sample 2	Sample 3	Average	Deviation	Tolerance	Uncertainty
Level (dB)	114.00	114.02	114.01	114.01	114.01	0.01	±0.75	0.11 dB
Distortion (%)	< 4.00	0.23	0.26	0.25	0.25	0.25	+4.00	0.13 %
Frequency (Hz)	1000.0	1004.1	1004.0	1004.0	1004.0	4.0	±20.0	0.1 Hz

Functionality Results

Function	Result
Keypad	Pass
Battery Power	Pass
Display	Pass
Communication	Pass
2 way IR link	Pass
Clock	Pass

End of results

CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 07 May 2024

CERTIFICATE NUMBER 213804

REVIEW BY *Random P*
APPROVED BY *fb*
NEXT CAL DATE 7/6/24

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2
Approved signatory
M. Berry
Electronically signed:
M. BERRY

Sound Calibrator : IEC 60942:2017

Instrument information

Manufacturer: Cirrus Research plc

Notes:

Model: CR 516

Serial number: 100249

Class: 2

Test summary

Date of calibration: 07 May 2024

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942:2017 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

The sound calibrator has been shown to conform to the Class 2 requirements for periodic testing, described in Annex B of IEC 60942:2017 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

However, as public evidence was not available, from a testing organisation responsible for pattern approval, to demonstrate that the model of sound calibrator conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2017, no general statement or conclusion can be made about conformance of the sound calibrator to the requirements of IEC 60942:2017.

Notes:

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

CERTIFICATE OF CALIBRATION

Certificate Number:
213804
Page 2 of 2

Environmental conditions

The following conditions were recorded at the time of the test:

Pressure: 101.76 kPa
Temperature: 21.7 °C
Humidity: 45.5 %

Test equipment

Equipment	Manufacturer	Model	Serial number
Distortion Meter	Keithley	2015	0838263
Acoustic Calibrator	Bruel and Kjaer	4231	2610257
Environmental Monitor	Comet	T7510	21962628

Results

	Expected	Sample 1	Sample 2	Sample 3	Average	Deviation	Acceptance limit	Uncertainty
Level (dB)	94.00	93.98	93.98	94.00	93.99	-0.01	±0.40	0.11 dB
Distortion (%)	< 4.00	0.24	0.35	0.64	0.41	0.41	+3.00	0.13 %
Frequency (Hz)	1000.0	1000.0	1000.6	999.8	1000.1	0.1	±1.7	0.1 Hz
Level (dB)	114.00	113.89	113.90	113.90	113.90	-0.10	±0.40	0.11 dB
Distortion (%)	< 4.00	1.01	1.01	0.94	0.98	0.98	+3.00	0.13 %
Frequency (Hz)	1000.0	1000.3	1000.3	1000.3	1000.3	0.3	±1.7	0.1 Hz

End of results


MesaLabs


NVLAP Lab Code 200661-0
Calibration

Calibration Certificate

Certificate No. 551422

Sold To:

Product 200-510M Delvinder 510 Medium Flow

Serial No. 208345

Cal. Date 18-Aug-2023

All calibrations are performed in accordance with ISO 17025 at Mesa Laboratories, Inc., 12100 W. 6th Ave, Lakewood, CO 80228, an ISO 17025:2017 accredited laboratory through NVLAP. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

As Received Calibration Data

Technician	Aaron Schwartz		Lab. Pressure	620.1 mmHg
			Lab. Temperature	23.5 °C
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Received
4523.09 ccm	4519.02 ccm	0.09%	1.00%	In Tolerance
999.43 ccm	999.31 ccm	0.01%	1.00%	In Tolerance
245.22 ccm	245.88 ccm	-0.27%	1.00%	In Tolerance

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	205307	25-May-2023	25-May-2024

REVIEW BY *Random P*
APPROVED BY *fb*
NEXT CAL DATE 18/8/24

As Shipped Calibration Data

Certificate No	Technician	Lab. Pressure	Lab. Temperature	616.6 mmHg	24.2 °C
551422	Xiem Ly				
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Shipped	
4516.61 ccm	4515.56 ccm	0.02%	1.00%	In Tolerance	
1900.87 ccm	1900.87 ccm	0.02%	1.00%	In Tolerance	
249.84 ccm	249.93 ccm	-0.04%	1.00%	In Tolerance	

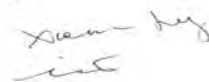
Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	100439	14-Sep-2022	14-Sep-2023

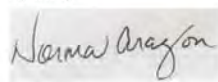
Calibration Notes

The expanded uncertainty of flow has a coverage factor of $k = 2$ for a confidence interval of approximately 95%.
Flow testing is in accordance with our test number MP-00672 with an expanded uncertainty of 0.27% using high-purity nitrogen or filtered laboratory air.
Traceability to the International System of Units (SI) is verified by accreditation to ISO/IEC 17025 by NVLAP under NVLAP Code 200661-0.

Technician Notes:

By: 

Xiem Ly
Production Technician II

Approved By: 

Norma Aragon
QC Inspector

Mesa Laboratories, Inc. certifies that the above instrument meets or exceeds published specifications, and that the calibration results in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Calibration results are in compliance with ISO/IEC 17025:2017. Calibration process has a Test Uncertainty Ratio (TUR) of 4:1 or greater. Any Pass/Fail determination is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only.

Calibration Certificate

Certificate No. 561587
Product 200-510L Defender S10 Low Flow
Serial No. 130026
Cal. Date 25-Sep-2023

Sold To:

All calibrations are performed in accordance with ISO 17025 at Mesa Laboratories, Inc., 12100 W. 6th Ave, Lakewood, CO 80228, an ISO 17025:2017 accredited laboratory through NVLAP. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

As Received Calibration Data

Technician	Aaron Schwartz	Lab. Pressure	Lab. Temperature	516.1 mmHg	24 °C
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Received	
0 ccm	456.41 ccm	-100.0%	1.00%	Out of Tolerance	
0 ccm	101.19 ccm	-100.0%	1.00%	Out of Tolerance	
0 ccm	30.36 ccm	-100.0%	1.00%	Out of Tolerance	

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_10	103743	25-Jan-2023	25-Jan-2024



As Shipped Calibration Data

Certificate No	Technician	Lab. Pressure	Lab. Temperature	622.2 mmHg	23.6 °C
561587	Aaron Schwartz				
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Shipped	
449.75 ccm	450.46 ccm	-0.16%	1.00%	In Tolerance	
100.86 ccm	100.82 ccm	0.14%	1.00%	In Tolerance	
30.63 ccm	30.36 ccm	0.62%	1.00%	In Tolerance	

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_10	103743	25-Jan-2023	25-Jan-2024

Calibration Notes

The expanded uncertainty of flow has a coverage factor of $k = 2$ for a confidence interval of approximately 95%.
Flow testing is in accordance with our test number MP-00672 with an expanded uncertainty of 0.27% using high-purity nitrogen or filtered laboratory air.
Traceability to the International System of Units (SI) is verified by accreditation to ISO/IEC 17025 by NVLAP under NVLAP Code 200661-0.

Technician Notes:

By: 

Aaron Schwartz
Assembler I

Approved By: 

David Thomas
Quality Engineer

Mesa Laboratories, Inc. certifies that the above instrument meets or exceeds published specifications, and that the calibration results in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Calibration results are in compliance with ISO/IEC 17025:2017. Calibration process has a Test Uncertainty Ratio (TUR) of 4:1 or greater. Any Pass/Fail determination is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only.

Calibration Certificate

Certificate No. 561588
Product 200-510M Defender 510 Medium Flow
Serial No. 151114
Cal. Date 30-Sep-2023

Sold To:

All calibrations are performed in accordance with ISO 17025 at Mesa Laboratories, Inc., 12100 W. 6th Ave, Lakewood, CO 80228, an ISO 17025:2017 accredited laboratory through NVLAP. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

As Received Calibration Data

Technician	Xiem Ly	Lab. Pressure	Lab. Temperature	616.6 mmHg	25.8 °C
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Received	
0 ccm	4499.86 ccm	-100.0%	1.00%	Out of Tolerance	
0 ccm	997.38 ccm	-100.0%	1.00%	Out of Tolerance	
0 ccm	250.32 ccm	-100.0%	1.00%	Out of Tolerance	

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	117991	16-Aug-2023	16-Aug-2024





As Shipped Calibration Data

Certificate No	561588	Lab. Pressure	616.2 mmHg
Technician	Xiem Ly	Lab. Temperature	26.1 °C
Instrument Reading	4496.74 ccm	Allowable Deviation	1.00%
Lab Standard Reading	4494.43 ccm	As Shipped	In Tolerance
Deviation	0.05%	In Tolerance	In Tolerance
997.03 ccm	997.16 ccm	In Tolerance	In Tolerance
249.84 ccm	250.5 ccm		

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	117991	05-Dec-2022	05-Dec-2023

Calibration Notes

The expanded uncertainty of flow has a coverage factor of $k = 2$ for a confidence interval of approximately 95%. Flow testing is in accordance with our test number MP-00672 with an expanded uncertainty of 0.27% using high-purity nitrogen or filtered laboratory air.

Traceability to the International System of Units (SI) is verified by accreditation to ISO/IEC 17025 by NVLAP under NVLAP Code 206661-0.

Technician Notes:

By:

Xiem Ly

Xiem Ly
Production Technician II

Approved By:

Norma Aragon

Norma Aragon
QC Inspector

2 of 2

Mesa Laboratories Inc. 12100 W. 6th Ave, Lakewood, CO 80226 USA
(303) 987-8000 www.mesalabs.com Symbol "MLAB" on the NASDAQ

FM-00228 Rev. B

Certificate of Calibration

Certificate No : 24-AFM-018 Rev.1

Request No : Req-2024-0043

Customer

Name : ALS Laboratory Group Thailand Co., Ltd.
Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Sun Luang, Bangkok
10250

Unit Under Calibration Details

Measurement Item : Air Flow Meter
Manufacturer : Bios
Model : Defender 510-L
Serial Number : 206895
ID : BKK_FS1346
Sensor Model :
Sensor Serial Number :
Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$
Humidity : $55\% \text{RH} \pm 20\% \text{RH}$
Barometric Pressure : $1013 \text{ hPa} \pm 10 \text{ hPa}$
Received Date : 3 January 2024
Calibration Date : 29 January 2024

Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	12 July 2024
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	12 July 2024
Temperature meter	GT 11	08000057	Qreborn	27 February 2024
Pressure meter	CPG2400	41000KDU/651882	TPA	9 November 2024

Traceability :

This Certificate is traceable to SI Unit through Sensidyne A2LA Accreditation No. 3943.01

Note :

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

This Certificate was issued to replace to Calibration Certificate No. 24-AFM-018

Calibration By :

Mr. Noppadol Luangart
Service Calibration Engineer

Approved By :

Mr. Paci Mathavorn
Calibration Engineer Supervisor

Issue Date : 1 February 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.

FM-708-AFM-01 Rev.01 Issue date 25/01/24

Certificate No : 24-AFM-018 Rev.1

Request No : Req-2024-0043

Result of Calibration : Without Adjustment

Temperature	Pressure	STD	UUC	Error	Uncertainty
(°C)	(kPa)	(ml/min)	(ml/min)	(ml/min)	(ml/min)
25.00	101.66	20	20.148	0.1	1.3
25.00	101.67	100	99.409	-0.6	2.8
24.90	101.63	199	197.46	-1.5	5.6
25.00	101.61	300	298.15	-1.8	8.4
24.90	101.60	399	400.13	1	11
24.90	101.59	480	478.02	-2.0	6.8

Note

STD : Standard UUC : Unit Under Calibration
- UUC Reference Condition : At atmospheric pressure and room temperature condition
- Flow Rate was corrected for non-standard operating condition by using equation :

$$Q_{\text{meas}} = Q_{\text{ref}} \times \frac{P_{\text{ref}}}{P_{\text{meas}}} \times \frac{T_{\text{meas}}}{T_{\text{ref}}}$$

where Q = Flow Rate P = Absolute Pressure T = Absolute Temperature
Meas = Measurement Condition ref = Standard Condition

* Indicates non accredited

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.

FM-708-AFM-01 Rev.01 Issue date 25/01/24

Certificate of Calibration

Certificate No : 24-AFM-013

Request No : Req-2024-0243

Customer

Name : ALS Laboratory Group Thailand Co., Ltd.
Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Sun Luang, Bangkok
10250

Unit Under Calibration Details

Measurement Item : Primary Flow Calibrator
Manufacturer : Bios
Model : Defender C10-L
Serial Number : 130027
ID : RYG_FS0208
Sensor Model :
Sensor Serial Number :
Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$
Humidity : $55\% \text{RH} \pm 20\% \text{RH}$
Barometric Pressure : $1013 \text{ hPa} \pm 10 \text{ hPa}$
Received Date : 31 January 2024
Calibration Date : 13 February 2024

Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	12 July 2024
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	12 July 2024
Temperature meter	GT 11	08000057	Qreborn	27 February 2024
Pressure meter	CPG2400	41000KDU/651882	TPA	9 November 2024

Traceability :

This Certificate is traceable to SI Unit through Sensidyne A2LA Accreditation No. 3943.01

Note :

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

Calibration By :

Mr. Noppadol Luangart
Service Calibration Engineer

Approved By :

Mr. Paci Mathavorn
Calibration Engineer Supervisor

Issue Date : 13 February 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.

FM-708-AFM-01 Rev.01 Issue date 25/01/24

Certificate No : 24-AFM-033
Request No : Req-2024-0241

Result of Calibration : Without Adjustment

Temperature (°C)	Pressure (kPa)	STD (cc/min)	UUC (cc/min)	Error (cc/min)	Uncertainty (cc/min)
24.50	101.26	20	19.965	0.0	1.1
24.20	101.25	101	100.50	-0.5	2.8
24.00	101.31	200	199.13	-0.9	5.6
23.90	101.42	301	303.56	2.6	8.4
24.10	101.41	401	404.57	4	11
24.10	101.49	480	483.81	3.8	7.0

Note STD : Standard UUC : Unit Under Calibration
- UUC Reference Condition : At atmospheric pressure and room temperature condition
- Flow Rate was corrected for non-standard operating condition by using equation :

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P_{meas}} \times \frac{T_{meas}}{T_{ref}}$$

where Q = Flow Rate P = Absolute Pressure T = Absolute Temperature
Meas = Measurement Condition ref = Standard Condition

* Indicates non accredited

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.
FM-708-AFM-01 Rev.01 Issue date 25/01/24

Certificate of Calibration

Certificate No : 24-AFM-032
Request No : Req-2024-0240

Customer
Name : ALS Laboratory Group Thailand Co., Ltd.
Address : 104 Soi Phantakan 40, Phantakan Road, Suan Luang, Bangkok
10250

Unit Under Calibration Details

Measurement Item : Primary Flow Calibrator
Manufacturer : Bios
Model : Defender 510-M Sensor Model :
Serial Number : 129958 Sensor Serial Number :
ID : RYG_FS0209
Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : 23.0 °C ± 0.1 °C
Humidity : 55 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 31 January 2024
Calibration Date : 13 February 2024

Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	12 July 2024
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	12 July 2024
Temperature meter	GT 11	08000057	Qreborn	27 February 2024
Pressure meter	CPG2400	41000KDU/651882	TPA	9 November 2024

Traceability :

This Certificate is traceable to SI Unit through Sensidyne A2LA Accreditation No. 3943.01

Note :

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor k = 2, providing a level of confidence approximately 95 %.

Calibration By : 
Mr. Noppadon Luangrat
Service Calibration Engineer

Approved By : 
Mr. Paet Mathavorn
Calibration Engineer Supervisor
Issue Date : 13 February 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.
FM-708-AFM-01 Rev.01 Issue date 25/01/24

Certificate No : 24-AFM-032
Request No : Req-2024-0240

Result of Calibration : Without Adjustment

Temperature (°C)	Pressure (kPa)	STD (cc/min)	UUC (cc/min)	Error (cc/min)	Uncertainty (cc/min)
23.80	101.89	95	100.13	5.1	2.8
23.90	101.71	501	513.93	12.9	7.2
24.18	101.62	1006	1019.3	13	14
24.00	101.81	1997	2023.0	26	29
24.10	101.87	2999	3035.5	37	45
24.60	102.00	3944	3991.8	48	59
24.60	102.08	4739	4790.5	52	72

Note STD : Standard UUC : Unit Under Calibration
- UUC Reference Condition : At atmospheric pressure and room temperature condition
- Flow Rate was corrected for non-standard operating condition by using equation :

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P_{meas}} \times \frac{T_{meas}}{T_{ref}}$$

where Q = Flow Rate P = Absolute Pressure T = Absolute Temperature
Meas = Measurement Condition ref = Standard Condition

* Indicates non accredited

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.
FM-708-AFM-01 Rev.01 Issue date 25/01/24

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-0, e-mail: service.thailand@sartorius.com




HSC-TIS-TIS 17025
CALIBRATION 0426

SARTORIUS

Certificate of Calibration

REVIEW BY : 
APPROVED BY : 
NEXT CAL. DATE : 09 Jan 2025

Model Number : MSE125P-100-DU Certificate No. : 24BC0071
Description : Semi-micro Balance Issued Date : Friday, February 23, 2024
Serial Number : 0033108993 Reference No. : 229196
ID No. : RYG_EN0004
Manufacturer : Sartorius Page No. : 1 of 3

Customer Name : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)
616/10 Moo 5 T.Maenam Khu, A.Pluak Daeng, Rayong 21140, Thailand.

Calibrated Place : ALS Laboratory Group (Thailand) Co., Ltd. (Balance Room)
616/10 Moo 5 T.Maenam Khu, A.Pluak Daeng, Rayong 21140, Thailand.

Calibrated By : Mr. Chonchal Inthana
Calibration Date : Thursday, February 22, 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 : 60 / 120 g Readability : 0.00001 / 0.0001 g
Temperature : 24.0 °C ± 5.0 °C
Humidity : 60.0 % RH ± 10.0 % RH
Pressure : ±
Reasons for calibration
☒ New Installation ☐ Service / Repair ☒ Re-calibration / Maintenance
Equipment Condition : ☒ Good Operate ☐ Fair

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.

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 5000g E2,YCS011-522-00	TCS	M2308197S	23-Aug-2025
MHB-362SD	Humidity/Barometer/Temp Lutron MHB-362SD	DKSH	C19231845	23-Aug-2024

This certificate relate and apply this equipment only.
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.


Mr. Chonchal Inthana (Technical Manager)

SOP FM 33 03 February 2022



Certificate of Calibration

Model Number: MSE125P-100-DU Certificate No.: 24BCI0071
Description: Semi-micro Balance Issued Date: Friday, February 23, 2024
Serial Number: 0033108993 Reference No.: 229196
ID No.: RYG_EN0004
Manufacturer: Sartorius Page No.: 2 of 3

Calibration Results : Without Adjustment

Repeatability		Eccentricity (Off-center loading error)	
The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.		The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).	
Nominal Value : (Low Load)	5.00003	Nominal value :	50 g
5 g	5.00001	Tolerance	0.00015 g
Tolerance	0.000015 g	Difference	
Nominal Value : (High Load)	50.00003	1	
50 g	50.00001	2	
Tolerance	0.000015 g	3	
Standard Deviation	0.000008	4	
	0.000005	5	
		6	

Linearity				
The linearity, also called linearity error. Describes the deviation of the characteristic curve of a weighing instrument from the linear slope.				
Tolerance	0.00004 g			
Nominal Value	Conventional Mass Value	Displayed Value	Deviation	Uncertainty
(g)	(g)	(g)	(g)	(g)
0.1	0.01000	0.01000	0.00000	0.000024
0.1	0.10000	0.10000	0.00000	0.000025
1	1.00000	1.00000	0.00000	0.000027
2	2.00002	2.00002	0.00000	0.000028
5	5.00002	5.00003	0.00001	0.000031
10	10.00002	10.00004	0.00002	0.000036
20	20.00002	20.00002	0.00000	0.000049
30	30.00004	30.00003	-0.00001	0.000089
40	40.00005	40.00003	-0.00002	0.000089
50	50.00002	50.00001	-0.00001	0.000089

SOP FM 33 03 February 2022

Certificate of Calibration

Model Number: MSE125P-100-DU Certificate No.: 24BCI0071
Description: Semi-micro Balance Issued Date: Friday, February 23, 2024
Serial Number: 0033108993 Reference No.: 229196
ID No.: RYG_EN0004
Manufacturer: Sartorius Page No.: 3 of 3

Calibration Results : Without Adjustment

Repeatability		Eccentricity (Off-center loading error)	
The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.		The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).	
Nominal Value : (Low Load)	100.0000	Nominal value :	50 g
100 g	100.0000	Tolerance	0.00015 g
Tolerance	0.000015 g	Difference	
Nominal Value : (High Load)	100.0000	1	
100 g	100.0000	2	
Tolerance	0.000015 g	3	
Standard Deviation	0.00003	4	
		5	
		6	

Linearity				
The linearity, also called linearity error. Describes the deviation of the characteristic curve of a weighing instrument from the linear slope.				
Tolerance	0.0001 g			
Nominal Value	Conventional Mass Value	Displayed Value	Deviation	Uncertainty
(g)	(g)	(g)	(g)	(g)
65	65.0000	65.0000	0.0000	0.00015
70	70.0000	70.0000	0.0000	0.00015
75	75.0001	75.0000	-0.0001	0.00015
80	80.0001	80.0000	-0.0001	0.00016
85	85.0001	85.0001	0.0000	0.00018
90	90.0001	90.0001	0.0000	0.00017
95	95.0001	95.0001	0.0000	0.00019
100	100.0000	100.0000	0.0000	0.00024
110	110.0000	110.0000	0.0000	0.00026
120	120.0000	120.0000	0.0000	0.00026

End of Report.

SOP FM 33 03 February 2022

Certificate of System Qualification

GC-DQ

System ID: CN11461066
Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.
Organization Location: 104 Soi 40 Phatthanakar Rd, Khweng Suan Luang, Khet Suan Luang, Bangkok 10250

Date: April 21, 2023 3:28:38 PM
EQP Name: AgilentRecommended
EQP Revision: GC.02.52
Overall Qualification Status: Pass

CDS Logon Verification - GC

Logon: Saenguthai Tarak

Overall CDS Logon Verification - GC Test Status

Pass

System Inspection and Basic Safety and Operation

Name: 7890

Setpoint Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status

Pass

Inlet Pressure Decay

Name: 7890

Front SSL

Setpoint Status: Pass

Pressure: 25.0 psi

Pressure Change: -0.1 psi /5 minutes

Agilent Recommended: >= -2.0 and <= 0.5

Date: April 21, 2023 3:28:38 PM
System ID: CN11461066

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name: 7890

Front SSL

Setpoint Status: Pass

Setpoint Actual

Inlet Pressure: 25.0 psi 25.2 psi

Accuracy: 0.2 psi

Agilent Recommended: <= 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Decay

Name: 7890

Back SSL

Setpoint Status: Pass

Pressure: 25.0 psi

Pressure Change: 0.0 psi /5 minutes

Agilent Recommended: >= -2.0 and <= 0.5

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name: 7890

Back SSL

Date: April 21, 2023 3:28:38 PM
System ID: CN11461066

Setpoint Status: **Pass**

Setpoint: **25.0** psi Actual: **24.8** psi

Inlet Pressure: **25.0** psi

Accuracy: **0.2** psi

Agilent Recommended: **<= 1.2**

Overall Inlet Pressure Accuracy Test Status

Pass

Detector Flow Accuracy

Name: **7890**

Front FID

Setpoint Status: **Pass**

Flow Type: **Fuel**

Setpoint: **30.0** mL/min Measured Flow: **28.9** mL/min

Accuracy: **1.1** mL/min

Agilent Recommended: **<= 10.0** % setpoint (**3.0** mL/min)

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

Setpoint Status: **Pass**

Flow Type: **Oxidizer**

Setpoint: **400.0** mL/min Measured Flow: **400** mL/min

Accuracy: **0.0** mL/min

Agilent Recommended: **<= 10.0** % setpoint (**40.0** mL/min)

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

Setpoint Status: **Pass**

Flow Type: **Makeup**

Setpoint: **25.0** mL/min Measured Flow: **24.9** mL/min

Accuracy: **0.1** mL/min

Agilent Recommended: **<= 10.0** % setpoint (**2.5** mL/min)

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

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Overall Detector Flow Accuracy Test Status

Pass

Detector Flow Accuracy

Name: **7890**

Back FID

Setpoint Status: **Pass**

Flow Type: **Fuel**

Setpoint: **30.0** mL/min Measured Flow: **30.7** mL/min

Accuracy: **0.7** mL/min

Agilent Recommended: **<= 10.0** % setpoint (**3.0** mL/min)

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

Setpoint Status: **Pass**

Flow Type: **Oxidizer**

Setpoint: **400.0** mL/min Measured Flow: **399** mL/min

Accuracy: **1.0** mL/min

Agilent Recommended: **<= 10.0** % setpoint (**40.0** mL/min)

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

Setpoint Status: **Pass**

Flow Type: **Makeup**

Setpoint: **25.0** mL/min Measured Flow: **24.6** mL/min

Accuracy: **0.4** mL/min

Agilent Recommended: **<= 10.0** % setpoint (**2.5** mL/min)

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

Overall Detector Flow Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: **7890**

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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Setpoint Status: **Pass**

Zone: **Oven**

Setpoint/Actual: **230.0** / **230.6** °C

Temperature: **230.0** °C

Accuracy: **0.6** °C

Agilent Recommended: **>= -1.0** % setpoint in K (**-5.0** °C)
<= 1.0 % setpoint in K (**5.0** °C)

Setpoint Status: **Pass**

Zone: **Oven**

Setpoint/Actual: **100.0** / **100.9** °C

Temperature: **100.0** °C

Accuracy: **0.9** °C

Agilent Recommended: **>= -1.0** % setpoint in K (**-3.7** °C)
<= 1.0 % setpoint in K (**3.7** °C)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: **7890**

Setpoint Status: **Pass**

Setpoint/Average: **100.0** / **100.8633** °C

Temperature: **100.0** °C

Stability: **0.1** °C

Agilent Recommended: **<= 0.5**

Overall GC Oven Temperature Stability Test Status

Pass

Scouting Run

Tested Combination1: Front SSL / Front FID

Injection Tower

Name: **7893A**

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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Setpoint Status: **Completed**

Injection Volume on Column: **1.0** µL

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination1: Front SSL / Front FID

Name: **7890**

Setpoint Status: **Pass**

Base Signal: **22.7** pA

ASTM Noise: **0.06** pA

Drift: **0.05** pA/hr

Agilent Recommended: **<= 0.10** pA **<= 2.50** pA/hr

Status: **Pass** **Pass**

Overall Noise and Drift Test Status

Pass

Injection Precision

Tested Combination1: Front SSL / Front FID

Name: **7893A**

Setpoint Status: **Pass**

Injection Volume on Column: **1.0** µL

Area RSD: **0.32** %

Retention Time RSD: **0.67** %

Agilent Recommended: **<= 3.00** % **<= 1.00** %

Overall Injection Precision Test Status

Pass

Signal to Noise

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System ID: CN11461066

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Tested Combination1 Front SSL / Front FID
Injection Tower
Name: 7890
Setpoint Status: Pass
Signal to Noise: 721755
Agilent Recommended: >= 300000

Overall Signal to Noise Test Status

Pass

Scouting Run

Tested Combination2 Back SSL / Back FID
Injection Tower
Name: 7693A
Setpoint Status: Completed
Injection Volume on Column: 1.0 µL
Overall Scouting Run Status
Completed

Noise and Drift

Tested Combination2 Back SSL / Back FID
Name: 7890
Setpoint Status: Pass
Base Signal: 22.6 pA
ASTM Noise pA 0.07
Agilent Recommended: <= 0.10
Status: Pass
Drift pA/Hr 0.09
Agilent Recommended: <= 2.50
Status: Pass

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System ID: CN11461066

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Overall Noise and Drift Test Status

Pass

Injection Precision

Tested Combination2 Back SSL / Back FID
Name: 7693A
Setpoint Status: Pass
Injection Volume on Column: 1.0 µL
Area RSD: 1.28 %
Agilent Recommended: <= 3.00
Retention Time RSD: 0.83 %
Agilent Recommended: <= 1.00

Overall Injection Precision Test Status

Pass

Signal to Noise

Tested Combination2 Back SSL / Back FID
Injection Tower
Name: 7890
Setpoint Status: Pass
Signal to Noise: 2404398
Agilent Recommended: >= 300000

Overall Signal to Noise Test Status

Pass

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Instrument Details

Purpose

This section describes the as found system configuration.

Details

System

System ID CN11461066
Manufacturer Agilent Technologies
Name 7890
Flow Data Input Manual Data
Temperature Data Input Manual Data or Other Data Logging

Tested Combination1

Injection Technique Injection Tower
Sampler Identifier Sampler 2
Inlet Front
Detector Front
LTM Included? No

Tested Combination2

Injection Technique Injection Tower
Sampler Identifier Sampler 3
Inlet Back
Detector Back
LTM Included? No

Sampler 1

Manufacturer Agilent Technologies
Type Tray
Name 7693A
Model Number G4514A
Serial Number CN15380030
Firmware Revision A.11.01
Vial Heater Not installed

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Sampler 2

Manufacturer Agilent Technologies
Type Injection Tower
Name 7693A
Model Number G4513A
Serial Number CN16280128
Firmware Revision A.10.09
Usage Sample Injection
Location Front
Syringe Volume (µL) 10

Sampler 3

Manufacturer Agilent Technologies
Type Injection Tower
Name 7693A
Model Number G4513A
Serial Number CN10340103
Firmware Revision A.10.09
Usage Sample Injection
Location Back
Syringe Volume (µL) 10

Mainframe 1

Manufacturer Agilent Technologies
Name 7890
Model Number G3440A
Serial Number CN11461066
Firmware Revision Version 4.27
Oven Type Standard

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Inlet 1	
Manufacturer	Agilent Technologies
Name	7890
Type	SSL
Location	Front
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes
Inlet 2	
Manufacturer	Agilent Technologies
Name	7890
Type	SSL
Location	Back
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes
Detector 1	
Manufacturer	Agilent Technologies
Name	7890
Type	FID
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Front
Makeup Gas	Nitrogen
Detector 2	
Manufacturer	Agilent Technologies
Name	7890
Type	FID
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Back
Makeup Gas	Nitrogen

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Electronic Signature

Purpose

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Details

Full Name of Signer: Saenguthai Tarak
Logged On User Name: saenguthai.tarak@non.agilent.com
Signature Creation Date: April 21, 2023
Reason for Signature: Executed protocol and published this original version of document

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User Name: saenguthai.tarak System ID: CN11461066
Hostname: LAPTOP-CQ39KGMV Print Date: April 21, 2023 3:26:40 PM

GC-4_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:21:36 AM	Audit	SessionCreated	Session	None
April 21, 2023 11:21:36 AM	Start	Configuration	Session	None
April 21, 2023 11:21:36 AM	Audit	Enrollment	Licensing	User is Nonpaying and does not require an unlock code
April 21, 2023 11:22:04 AM	Audit	ExpLoaded	Session	EQP details for primary technique [GC] - File path: [ProtocolPacks\Go\Configure\lone02.52\GC.02.52.eeq], EQP File Name: [GC.02.52.eeq], EQP Name: [AgilentRecommended], Photo of Revision: [GC.02.52]
April 21, 2023 11:22:06 AM	End	Configuration	Session	None
April 21, 2023 11:22:14 AM	Start	Qualification	Session	OQ
April 21, 2023 11:22:14 AM	Start	Execution	CDS Logon Verification - GC :	None - Qualitative test
April 21, 2023 11:23:14 AM	End	Execution	CDS Logon Verification - GC :	Run Count : 1 - Qualitative test
April 21, 2023 11:23:16 AM	Start	Execution	System Inspection and Basic Safety and Operation - 7890 -	None Qualitative Test - No setpoints associated
April 21, 2023 11:23:35 AM	End	Execution	System Inspection and Basic Safety and Operation - 7890 -	Run Count : 1 Qualitative Test - No setpoints associated
April 21, 2023 11:23:37 AM	Start	Execution	Inlet Pressure Decay - Front	None SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi

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System ID: CN11461066

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User Name: saenguthai.tarak System ID: CN11461066
Hostname: LAPTOP-CQ39KGMV Print Date: April 21, 2023 3:26:40 PM

GC-4_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:24:01 AM	End	Execution	Inlet Pressure Decay - Front	Run Count : 1 SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi
April 21, 2023 11:24:04 AM	Start	Execution	Inlet Pressure Accuracy - Front	None SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi
April 21, 2023 11:24:09 AM	End	Execution	Inlet Pressure Accuracy - Front	Run Count : 1 SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi
April 21, 2023 11:24:11 AM	Start	Execution	Inlet Pressure Decay - Back	None SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi
April 21, 2023 11:24:43 AM	End	Execution	Inlet Pressure Decay - Back	Run Count : 1 SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi
April 21, 2023 11:24:45 AM	Start	Execution	Inlet Pressure Accuracy - Back	None SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi
April 21, 2023 11:24:51 AM	End	Execution	Inlet Pressure Accuracy - Back	Run Count : 1 SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi
April 21, 2023 11:24:53 AM	Start	Execution	Detector Flow Accuracy - Front	None FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint
April 21, 2023 11:25:20 AM	Audit	Date	Detector Flow Accuracy - Front	Manual Date Entry FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint
April 21, 2023 11:25:25 AM	End	Execution	Detector Flow Accuracy - Front	Run Count : 1 FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint

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System ID: CN11461066

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User Name: saenguthal.arak
Hostname: LAPTOP-CQ3SKOMVSystem ID: CN11461066
Print Date: April 21, 2023 3:26:40 PM

GC-6_BKX_ENH127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:25:26 AM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:25:40 AM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:25:42 AM	End	Execution	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:25:44 AM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:26:01 AM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:26:04 AM	End	Execution	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:26:08 AM	Start	Execution	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:26:19 AM	Audit	Data	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:26:22 AM	End	Execution	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:26:24 AM	Start	Execution	Detector Flow Accuracy - Back FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:26:38 AM	Audit	Data	Detector Flow Accuracy - Back FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry

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User Name: saenguthal.arak
Hostname: LAPTOP-CQ3SKOMVSystem ID: CN11461066
Print Date: April 21, 2023 3:26:40 PM

GC-6_BKX_ENH127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:26:43 AM	End	Execution	Detector Flow Accuracy - Back FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:26:45 AM	Start	Execution	Detector Flow Accuracy - Back FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:27:01 AM	Audit	Data	Detector Flow Accuracy - Back FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:27:06 AM	End	Execution	Detector Flow Accuracy - Back FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:27:07 AM	Start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 21, 2023 11:27:33 AM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
April 21, 2023 11:27:35 AM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
April 21, 2023 11:27:37 AM	Start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 21, 2023 11:27:54 AM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry

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System ID: CN11461066

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User Name: saenguthal.arak
Hostname: LAPTOP-CQ3SKOMVSystem ID: CN11461066
Print Date: April 21, 2023 3:26:40 PM

GC-6_BKX_ENH127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:27:57 AM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
April 21, 2023 11:27:59 AM	Start	Execution	GC Oven Temperature Stability - 7890 - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None
April 21, 2023 11:28:07 AM	Audit	Data	GC Oven Temperature Stability - 7890 - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
April 21, 2023 11:28:10 AM	End	Execution	GC Oven Temperature Stability - 7890 - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Run Count : 1
April 21, 2023 11:28:12 AM	Start	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	None
April 21, 2023 11:30:27 AM	Audit	Data	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	Data file Path : C:\Users\Public\Documents\hemStation3\Data\GC-6_ALS_2023-04-20\GC-6_2023-04-20_14-36-08F_S001.D\FID1A.ch
April 21, 2023 11:31:04 AM	End	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	Run Count : 1
April 21, 2023 11:31:07 AM	Start	Execution	Noise and Drift - Front FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/hour	None

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System ID: CN11461066

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User Name: saenguthal.arak
Hostname: LAPTOP-CQ3SKOMVSystem ID: CN11461066
Print Date: April 21, 2023 3:26:40 PM

GC-6_BKX_ENH127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:31:43 AM	Audit	Data	Noise and Drift - Front FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/hour	Data file Path : C:\Users\Public\Documents\hemStation3\Data\GC-6_ALS_2023-04-20\GC-6_2023-04-20_14-36-08F_S001.D\FID1A.ch
April 21, 2023 11:32:00 AM	End	Execution	Noise and Drift - Front FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/hour	Run Count : 1
April 21, 2023 11:32:03 AM	Start	Execution	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	None
April 21, 2023 11:32:23 AM	Start	Execution	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	None
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data file Path : C:\Users\Public\Documents\hemStation3\Data\GC-6_ALS_2023-04-20\GC-6_2023-04-20_14-36-08F_S001.D\FID1A.ch
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data file Path : C:\Users\Public\Documents\hemStation3\Data\GC-6_ALS_2023-04-20\GC-6_2023-04-20_14-36-08F_S001.D\FID1A.ch

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Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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User Name: ssegunthai.sarak
Hostname: LAPTOP-Q23SKQWV

System ID: CN11461066
Print Date: April 21, 2023 3:26:40 PM

GC-6_BKK_EN0127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data files Path : C:\Users\Public\Documents\G hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023-2023-04-20 14-36-08\FID1-015F.D\FID 1A.ch
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data files Path : C:\Users\Public\Documents\G hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023-2023-04-20 14-36-08\FID1-015F.D\FID 1A.ch
April 21, 2023 11:33:59 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data files Path : C:\Users\Public\Documents\G hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023-2023-04-20 14-36-08\FID1-015F.D\FID 1A.ch
April 21, 2023 11:33:59 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data files Path : C:\Users\Public\Documents\G hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023-2023-04-20 14-36-08\FID1-015F.D\FID 1A.ch
April 21, 2023 11:35:00 AM	End	Execution	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Run Count : 1
April 21, 2023 11:35:04 AM	Start	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID - Detector FID - L: >= 300000	None

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Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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User Name: ssegunthai.sarak
Hostname: LAPTOP-Q23SKQWV

System ID: CN11461066
Print Date: April 21, 2023 3:26:40 PM

GC-6_BKK_EN0127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:35:28 AM	Audit	Data	Signal to Noise - Injection Tower, Front SSL, Front FID - Detector FID - L: >= 300000	Data files Path : C:\Users\Public\Documents\G hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023-2023-04-20 14-36-08\FID1.D\FID1A.ch
April 21, 2023 11:36:00 AM	End	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID - Detector FID - L: >= 300000	Run Count : 1
April 21, 2023 11:36:03 AM	Start	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID - Part of System Preparation - No limits associated	None
April 21, 2023 11:36:36 AM	Audit	Data	GC Scouting Run - Injection Tower, Back SSL, Back FID - Part of System Preparation - No limits associated	Data files Path : C:\Users\Public\Documents\G hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023-2023-04-20 14-36-08\FID1.D\FID1B.ch
April 21, 2023 11:37:30 AM	End	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID - Part of System Preparation - No limits associated	Run Count : 1
April 21, 2023 11:37:32 AM	Start	Execution	Noise and Drift - Back FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pAhour	None

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Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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User Name: ssegunthai.sarak
Hostname: LAPTOP-Q23SKQWV

System ID: CN11461066
Print Date: April 21, 2023 3:26:40 PM

GC-6_BKK_EN0127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:38:06 AM	Audit	Data	Noise and Drift - Back FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pAhour	Data files Path : C:\Users\Public\Documents\G hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023-2023-04-20 14-36-08\FID1-0058.D\FID 2B.ch
April 21, 2023 11:38:23 AM	End	Execution	Noise and Drift - Back FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pAhour	Run Count : 1
April 21, 2023 11:38:32 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	None
April 21, 2023 11:38:51 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	None
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data files Path : C:\Users\Public\Documents\G hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023_Pne 2023-04-21 10-37-32\FID11-0058.D\FID 2B.ch
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data files Path : C:\Users\Public\Documents\G hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023_Pne 2023-04-21 10-37-32\FID11-0058.D\FID 2B.ch

Page 9 / 11

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

Page 21 / 23

User Name: ssegunthai.sarak
Hostname: LAPTOP-Q23SKQWV

System ID: CN11461066
Print Date: April 21, 2023 3:26:40 PM

GC-6_BKK_EN0127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data files Path : C:\Users\Public\Documents\G hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023_Pne 2023-04-21 10-37-32\FID11-0058.D\FID 2B.ch
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data files Path : C:\Users\Public\Documents\G hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023_Pne 2023-04-21 10-37-32\FID11-0058.D\FID 2B.ch
April 21, 2023 11:40:21 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data files Path : C:\Users\Public\Documents\G hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023_Pne 2023-04-21 10-37-32\FID11-0058.D\FID 2B.ch
April 21, 2023 11:40:21 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Data files Path : C:\Users\Public\Documents\G hemStation\3>Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023_Pne 2023-04-21 10-37-32\FID11-0058.D\FID 2B.ch
April 21, 2023 11:41:29 AM	End	Execution	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Run Count : 1
April 21, 2023 11:41:33 AM	Start	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L: >= 300000	None

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Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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User Name: xiangzhuo.jiang
Host Name: LAPTOP-CQ35K0MVSystem ID: CN11461066
Print Date: April 21, 2023 3:26:40 PM

GC-4_BKK_EN0127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:42:22 AM	Audit	Data	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L: >= 300000	Data file Path: C:\Users\Public\Documents\hemdapsong\user\GC-4_ALS_2023-04-20\GC-4_2023-04-20 14-36-08\SN_Back\FID028.ch
April 21, 2023 11:42:50 AM	End	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L: >= 300000	Run Count: 1
April 21, 2023 11:42:53 AM	End	Qualification	Session	OQ
April 21, 2023 11:42:53 AM	Start	Reporting	Session	None
April 21, 2023 12:01:47 PM	Audit	AcqClosed	Session	None
April 21, 2023 3:16:07 PM	Audit	AcqRestarted	Session	None
April 21, 2023 3:16:10 PM	Audit	SessionReloaded	Session	None
April 21, 2023 3:16:31 PM	Start	Qualification	Session	OQ
April 21, 2023 3:20:39 PM	Audit	AcqRestarted	Session	None
April 21, 2023 3:21:00 PM	Audit	SessionReloaded	Session	None
April 21, 2023 3:21:07 PM	Start	Qualification	Session	OQ
April 21, 2023 3:25:45 PM	Audit	Reporting	Session	Report Generated: Certificate

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Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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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 FAX: 0-2719-9484Cert.No.: 23TW168
Page.: 1 of 2

Certificate of Testing

Equipment : DO Meter
Manufacturer : YSI
Model : 50C0-115V
Serial No. : 15E102796
ID No. : RYG_EN0032
Received Date : 21 July 2023
Test Date : 24 July 2023
Reference : 23C7-0713DSC-1
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.
Rayong Branch
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng,
Rayong 21140, Thailand

Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method

Tested by : Walalak Sirithean

Approved by :
Approved Signatory

() Malee Butkruea
(✓) Saitip Meangmai
() Warakorn Lemgagtraiul

Issue Date : 26 July 2023

B 0320211

Cert.No.: 23TW168
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :

This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1) Durette	-	130BU10	23CG1172	22 Mar 2025
2) Balance	1126143764	140RC004	22MM50	20 Sep 2023

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: 15E100464

Titration Method (Azide Modification Method)	DO Meter Reading	Standard Deviation
(mg/L)	(mg/L)	(mg/L)
8.18	8.17	0.0055

This report was certified only for the instrument we tested. It is allowable to use for study the system efficiency. The environmental impact control and present to organization it may concerned intend to use for advertising and referral purpose is prohibited. This report may not be reproduced other in full, without written approval of the laboratory

-000-

a 1172155

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: 0-2719-9484Cert. No.: 23LM125
Page.: 1 of 2

Certificate of Calibration

Equipment : DO Meter with Sensor
Manufacturer : YSI
Model : 5000-115V
Serial No. : 15E102796
ID No. : RYG_EN0032
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.
Rayong Branch
616/10 Moo 5 T. Maenam Khu, A. Pluakdaeng,
Rayong 21140 Thailand

Location : TPA On Site Calibration Laboratory

Received Order : 25 July 2023
Calibrated Date : 27 July 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Preecha Hlahib

Approved by :
Approved Signatory

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

Issue Date : 31 July 2023

The Uncertainties are for a confidence probability of approximately 95%

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

A 0053616



Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2307-0713DSC-2

Cert. No.: 23LM125
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	2211285	TPA	21 Oct 2023

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: 1228475367

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
20.00	100	20.011	19.91	-0.101	0.15	2.00

UUC* : Unit Under Calibration

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

-o0o-

a 1159515



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/44 PATTANAKARN ROAD 50/18, SUANLUANG, SEANLUANG BANGKOK, 10250
TEL. 0-2717-3000-29 FAX. 0-219-9481



Cert. No.: 231M962
Page : 1 of 3

Certificate of Calibration

Equipment : Low Temp. Incubator

Manufacturer : Memmert

Model : IPP750

Serial No. : V818.0084

ID No. : RYG_EN0154

Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.
(Rayong Branch)
616/10 Moo 5 T: Maenam Khu,
A. Phuakdaeng, Rayong 21140 Thailand

Location : BOD Room

Received Order : 29 May 2023

Calibration Date : 29 May 2023

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Man Pattanapongpaiboon

Approved by :
Approved Signatory

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

Issue Date : 7 June 2023

The Uncertainties are for a confidence probability of approximately 95%

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

A 0054967



Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2305-0898OC-2

Cert. No.: 23TM962
Page : 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY57013711	22LM93	02 Jul 2023

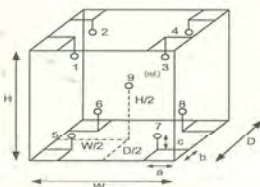
2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



Probe Installation Details :

Dimension of Chamber :	
a = 10 cm	D = 0.60 m
b = 10 cm	W = 1.0 m
c = 10 cm	H = 1.2 m
	Capacity = 0.75 m ³

Environment during calibration	
	Beginning
Temp. (°C)	23
REL.Humid. (%)	54
AC Supply (Volt)	223

Position :	Ref. Std. ID No.:
1	18-18RTD-01
2	18-18RTD-02
3	18-18RTD-03
4	18-18RTD-04
5	18-18RTD-05
6	18-18RTD-10
7	18-18RTD-07
8	22-18RTD-08
9 (ref.)	18-18RTD-09

a 1165130



Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2305-0898OC-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 23TM962
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	20.0	0.019	0.72	1.0	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
20.0	19.547	19.780	19.487	19.529	19.408	20.139	20.112	20.406	20.116	0.30

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was induced stability and excluded uniformity.

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

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a 1165129



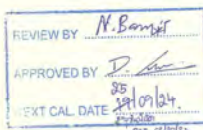
TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
334/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL: 0-2737-3099-29 FAX: 0-2719-4488



Cert.No.: 23CG3704
Page: 1 of 2

Certificate of Calibration

Equipment : Burette
Capacity : 50 mL
Serial No. :
ID. No. : RYG_EN0216
Manufacturer : Witeg
Made in : Germany
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
Rayong Branch
010/10 Moo 5, T.Maenam Khu
A.Pluakdaeng, Rayong 21140 Thailand
Ambient Temperature : (20 ± 2.5) °C
Relative Humidity : (50 ± 10) %
Barometric Pressure : 756 mmHg
Calibration Procedure : ASTM E 542 - 01
Calibrated by : Srisuda Khamtha
Approved by :
() Ponpan Paipim
() Srisuda Khamtha
() Sa-ngeunkam Wongsa
Issue Date : 28 September 2023



The Uncertainties are for a confidence probability of approximately 95%
This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0058881



Equipment : Burette
Received Date : 19 September 2023
Condition As-Received : Used Item
Calibration Date : 25 September 2023
Reference : 2309-0635DSC-31

Cert.No.: 23CG3704
Page: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :
- | Instruments | Model | Serial No. | ID. No. | Certificate No. | Traceability | Due date |
|----------------------|---------|------------|----------|-----------------|--------------|--------------|
| 1) Balance | MS204TS | C226356983 | 140RC010 | TH2068-012 | METTLER | 29 Sep 2023 |
| 2) Thermo-Hygrograph | THDX-CE | 00016540 | 140EC001 | 23H1275 | TPA | 09 June 2024 |
| 3) Thermometer | - | 1594582 | 140EC010 | 23I158 | TPA | 12 Feb 2024 |
- This certification is traceable to SI Unit
2. The certificate is valid only to the item calibrated on date and place of calibration.
3. True value is converted to true volume at the standard temperature of 20 °C

Calibration result :

Nominal capacity (mL)	Reading (mL)	Uncertainty (± mL)	k Factor
10	10.0224	0.0082	2.00
20	20.0064	0.0085	2.00
30	29.9931	0.0089	2.00
40	39.9910	0.0094	2.00
50	49.9806	0.010	2.00

Remark mL = cm³

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 %.

-ofo-

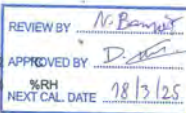
Suh.

a 1182477



Certificate of Calibration

Equipment : SPECTROPHOTOMETER
Model : DR6000
Serial No. (or ID.): 1627845 (RYG_EN0037)
Manufacturer : HACH
Condition : In Condition
Customer : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5 T.Maenam Khu,
A.Pluakdaeng, Rayong 21140, Thailand.
Environment Condition : Temperature 23.9 °C ± 0.2
Humidity 65.3 %RH ± 1.4
Calibration Place : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch) (Wet Chemistry)
616/10 Moo 5 T.Maenam Khu,
A.Pluakdaeng, Rayong 21140, Thailand.
Calibration By : Mr.Nattapat Rungrueang
Calibration Date : 18 September 2023
The Method used : In house method, CAL-WI-24, base on ASTM E 275-08 and ASTM E 387-04
Traceability : This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Starna Scientific Limited.
The standard for Wavelength Certificate No. 111583 and 111584
The standard for Photometric Certificate No. 9114984 and 111588
The standard for Stray light Certificate No. 111586 and 111585
The standard for Spectral resolution Certificate No. 111587



(Mr. Nattapat Rungrueang)
Person in charge

(Mr. Nitinun Srihawan)
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to International or national standard or other recognized national standard laboratories.
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 presented in accordance with the guide to expression of Uncertainty in Measurement (GUM).
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.
DKSH Technology Limited
2533 หมู่ 5 ถนนพหลโยธิน แขวงสามเสน กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangkok, Thailand 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

Delivering Growth - in Asia and Beyond.

CAL-FM-C06-15: 12 Sep 2022



Certificate No.: C08230441 Page 2 of 3

Calibration Results: Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 2 nm and UUC at 2 nm

Standard Wavelength	Unit Under Calibration	Correction	Uncertainty
418.61	418.3	0.31	0.13
536.66	536.6	0.06	0.13
637.88	638.3	-0.32	0.13
748.48	748.7	-0.22	0.13
807.03	807.4	-0.37	0.13

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.2930	0.289	0.0040	0.0045
	0.5168	0.519	-0.0022	0.0045
	1.0298	1.029	0.0008	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.2867	0.283	0.0037	0.0045
	0.5073	0.509	-0.0017	0.0045
	1.0083	1.007	0.0013	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.2516	0.250	0.0016	0.0045
	0.4695	0.462	-0.0025	0.0045
	0.9334	0.933	0.0004	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.2461	0.245	0.0011	0.0045
	0.4652	0.468	-0.0008	0.0045
	0.9468	0.946	0.0008	0.0045
580 nm	0.0000	0.000	0.0000	0.0045
	0.2594	0.259	0.0004	0.0045
	0.5040	0.505	-0.0010	0.0045
	1.0032	1.002	0.0012	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.2576	0.257	0.0009	0.0045
	0.4971	0.497	0.0001	0.0045
	0.9720	0.971	0.0010	0.0045

DKSH Technology Limited
2533 หมู่ 5 ถนนพหลโยธิน แขวงสามเสน กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangkok, Thailand 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

Delivering Growth - in Asia and Beyond.

CAL-FM-C06-15: 12 Sep 2022

Calibration Results:

Without Adjustment

Photometric Accuracy (Absorbance)				
Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
235 nm	0.0000	0.000	0.0000	0.0080
	0.7355	0.737	-0.0015	0.0080
257 nm	0.0000	0.000	0.0000	0.0080
	0.8574	0.857	0.0004	0.0080
313 nm	0.0000	0.000	0.0000	0.0080
	0.2864	0.290	-0.0036	0.0080
350 nm	0.0000	0.000	0.0000	0.0080
	0.6374	0.637	0.0004	0.0080
Stray light *				
Standard: cut-off	UUC: Wavelength (nm)	UUC: Transmission (%T)	Absorbance (A)	
260.82 +/- 0.11 nm	260.8	1.3	1.886	
391.44 +/- 0.11 nm	391.4	1.3	1.886	
Spectral Resolution *				
Nominal Concentration 0.02 % v/v	Peak	Trough	Ratio	SBW
Standard Wavelength (nm)	268.66	268.69	1.38	2.00
UUC: Wavelength (nm)	268.2	266.1		
Std Absorbance (A)	0.4566	0.2780		
Absorbance (A)	0.413	0.300		

* Calibration Marked * Not TISI Accredited * In this Certificate have been included for completeness.

The End of Certificate

บริษัท ดีเคเอส อีเซีย จำกัด
DKSH Technology Limited
2533 ซอยสุขุมวิท ราชประสงค์/ซอย กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangkok, Phrasathung, Bangkok 10260
Phone: +66 2039 1000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

Delivering Growth - In Asia and Beyond.

CAL-FM-C06-15: 12 Sep 2022

ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: WO-00005382

ชนิดเครื่องมือ: SPECTROPHOTOMETER

รุ่น: DR6000

หมายเลขเครื่อง: 1627845

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
18 Sep 2023			18 Sep 2023		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
☒	☐	1. ความสมบูรณ์เครื่อง	☒	☐	
☒	☐	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	☒	☐	
☒	☐	3. สวิตช์ ปิด – เปิด เครื่อง (On-Off Switch)	☒	☐	
☒	☐	4. ปุ่มกด (Keypad)	☒	☐	
☒	☐	5. หน้าจอ (Display, Screen Contrast)	☒	☐	
		Spectrophotometer			
☐	☐	6. แรงดันไฟฟ้า (Battery Backup) >= 2.5 VDC	☐	☐	
☐	☐	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	☐	☐	
☒	☐	8. ความยาวคลื่น (Wavelength Check)	☒	☐	*
☒	☐	9. แหล่งกำเนิดแสง (UV < 3,000 hour)	☒	☐	9.2 Hours
☒	☐	10. แหล่งกำเนิดแสง (Visible < 5,000 hour)	☒	☐	741.5 Hours
☒	☐	11. ช่องวัดหลายตัวอย่าง (Carousel Module)	☒	☐	
		pH Meter and Conductivity Meter			
☐	☐	12. ขั้วไฟฟ้า (Electrode and Connection Cable)	☐	☐	
☐	☐	13. ระดับสารละลายใน Electrode (Level KCl)	☐	☐	
☐	☐	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	☐	☐	
☐	☐	15. ขาจับขั้วไฟฟ้า (Stand)	☐	☐	
		Turbidimeter			
☐	☐	16. ค่าความขุ่นที่ค่าสุด (No Sample)	☐	☐	
☐	☐	17. ระดับการส่องสว่างของแสง (>= 2.5 ไม่น้อย 3.0)	☐	☐	
		Automatic titrator			
☐	☐	18. สภาพ Piston Burettes	☐	☐	
☐	☐	19. Function Rinsing and Dosing	☐	☐	
☐	☐	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	☐	☐	

เพิ่มคลื่นช่วงใหม่: *658.1nm=658.1nm

*486.0nm=485.5nm

Mr.Nattapat Rungruang
Service Engineer

บริษัท ดีเคเอส อีเซีย จำกัด
DKSH Technology Limited
2533 ซอยสุขุมวิท ราชประสงค์/ซอย กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangkok, Phrasathung, Bangkok 10260
Phone: +66 2039 1000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

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CAL-FM-R31-03: 20 Jul 2022

Sartorius (Thailand) Co., Ltd.

129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-6, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

REVIEW BY: *Prasit*
APPROVED BY: *D. D.*
NEXT CAL. DATE: 02/02/2025

Model Number: MSE224S-100-DU
Description: Analytical Balance
Serial Number: 0026207038
ID No.: RYG_EN0002
Manufacturer: Sartorius

Certificate No.: 248C0069
Issued Date: Friday, February 23, 2024
Reference No.: 229196
Page No.: 1 of 2

Customer Name: ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)
616/10 Moo 5 T.Maenam Khu, A.Pluek Daeng, Rayong 21140, Thailand.Calibrated Place: ALS Laboratory Group (Thailand) Co., Ltd.(Balance Room)
616/10 Moo 5 T.Maenam Khu, A.Pluek daeng, Rayong 21140, Thailand.Calibrated By: Mr.Chonchai Inthana
Calibration Date: Thursday, February 22, 2024Metrological data:
Capacity: 220 g Readability: 0.0001 g
Temperature: 24.2 °C ± 5.0 °C
Humidity: 57.0 % RH ± 10.0 % RH
Pressure: ±Reasons for calibration
☐ New Installation ☐ Service / Repaired ☒ Re-calibration / Maintenance
Equipment Condition: ☒ Good Operate ☐ Fair

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 1mg - 5000g E2.YCS011-522-00	TCS	M2308197S	23-Aug-2025
MHB-382SD	Humidity/Barometer/Temp. Lutron MHB-382SD	DKSH	C19231845	23-Aug-2024

This certificate relate and apply this equipment only.
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.

Mr.chonchai Inthana(Technical Manager)



SOP FM 33 03 February 2022

Sartorius (Thailand) Co., Ltd.

129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-6 Fax: +66 2643-8367, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

Model Number: MSE224S-100-DU
Description: Analytical Balance
Serial Number: 0026207038
ID No.: RYG_EN0002
Manufacturer: Sartorius

Certificate No.: 248C0069
Issued Date: Friday, February 23, 2024
Reference No.: 229196
Page No.: 2 of 2

Calibration Results : Without Adjustment

Repeatability		Eccentricity (Off-center loading error)	
The repeatability is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.		The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/2 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R116).	
Nominal Value : (Low Load)	20.0000	199.9995	Nominal value : 100 g
20 g	20.0000	200.0000	Tolerance 0.0004 g
Tolerance	0.0001 g	0.0000	
Nominal Value : (High Load)	200 g	200.0000	
200 g	200.0000	200.0000	
Tolerance	0.0001 g	0.0000	
Standard Deviation	0.00007	0.00006	

Linearity

The linearity, also called linearity error. Describes the deviation of the characteristic curve of a weighing instrument from the linear slope.

Nominal Value	Conventional Mass Value	Displayed Value	Deviation	Uncertainty
(g)	(g)	(g)	(g)	(g)
0.01	0.0100	0.0100	0.0000	0.00018
0.05	0.0500	0.0500	0.0000	0.00018
0.1	0.1000	0.1000	0.0000	0.00018
0.5	0.5000	0.5000	0.0000	0.00018
1	1.0000	1.0000	0.0000	0.00018
5	5.0000	5.0000	0.0000	0.00018
10	10.0000	10.0000	0.0000	0.00018
20	20.0000	20.0000	0.0000	0.00024
50	50.0000	49.9999	-0.0001	0.00019
100	100.0000	100.0000	0.0000	0.00023
200	200.0000	199.9999	-0.0001	0.00032

End of Report.

SOP FM 33 03 February 2022



Certificate of Calibration

Cert. No.: 24TM634
Page : 1 of 3

Equipment : Hot Air Oven

Manufacturer : Memmert

Model : UF 110

Serial No. : B423.0853

ID No. : RYG_EN0213

Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5 T. Maenam Khu,
A. Pluakdaeng,
Rayong 21140 Thailand

Location : Oven Room

Received Order : 21 March 2024

Calibration Date : 21 - 22 March 2024

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Man Pattanapongpaiboon

Approved by :

() Pomthippa Tameyakul

() Unnopphol Harachai

(✓) Suwit Imjai

Issue Date : 23 March 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 : Hot Air Oven
Condition As-Received : Used Item
Reference : 2403-0563OC-3

Cert. No.: 24TM634
Page : 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY57013711	23LM115	TPA	11 Jul 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)

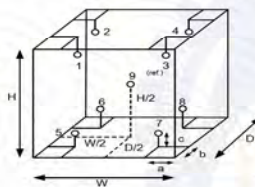
Result of Calibration :-

(*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	27	27
REL.Humid. (%)	59	59
AC Supply (Volt)	224	223



Probe Installation Details : Dimension of Chamber :
a = 5.0 cm D = 0.40 m
b = 5.0 cm W = 0.56 m
c = 5.0 cm H = 0.48 m
Capacity = 0.11 m³

Ref. Std. ID No.: @ Calibration Point		
Position :	(180) °C	(104) °C
1	18-18TC-01	18-18RTD-01
2	18-18TC-02	18-18RTD-02
3	18-18TC-03	18-18RTD-03
4	18-18TC-04	18-18RTD-04
5	18-18TC-05	18-18RTD-05
6	18-18TC-06	23-18RTD-06
7	18-18TC-07	18-18RTD-07
8	18-18TC-08	22-18RTD-08
9 (ref.)	18-18TC-09	18-18RTD-09



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2403-0563OC-3
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 24TM634
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
104.0	104.0	104.0	0.065	0.52	0.90	2
180.0	180.0	180.0	0.20	1.2	2.0	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
104.0	104.169	103.506	103.898	103.712	103.772	103.730	104.289	103.805	103.798	0.42
180.0	180.701	179.239	179.935	179.999	180.127	180.138	180.895	179.313	180.211	1.1

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity.

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

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Certificate of Calibration

Cert. No.: 24TM635
Page : 1 of 3

Equipment : Water Bath

Manufacturer : Memmert

Model : WNB22

Serial No. : L513.0648

ID No. : RYG_EN0061

Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5, T. Maenam Khu,
A. Pluakdaeng,
Rayong 21140, Thailand

Location : Wet Chemistry Lab

Received Order : 21 March 2024

Calibration Date : 21 March 2024

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Man Pattanapongpaiboon

Approved by :

() Pomthippa Tameyakul

() Unnopphol Harachai

(✓) Suwit Imjai

Issue Date : 23 March 2024

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2403-0563OC-4
Procedure Used :-

Cert. No.: 24TM635
Page : 2 of 3

Calibration were conducted using in-house calibration procedure CP-OT04 Based on ASTM E715 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument Serial No. Cert. No. Traceable Due Date
1) Data Acquisition MY57013711 23LM115 TPA 11 Jul 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.

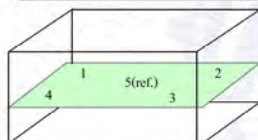
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Heat transfer medium used : Water

	Environmental		AC Voltage Supply
	(°C)	(%R.H.)	(Volt)
Beginning of Calibration	25	55	222
Finished of Calibration	25	57	223



Front

Position :	Ref. Std. ID No.:
1	4803988-001
2	4803988-002
3	4803988-003
4	4803988-004
5(ref.)	4803988-005



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2403-0563OC-4
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source

Cert. No.: 24TM635
Page : 3 of 3

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)					Uncertainty (± °C)
			1	2	3	4	5 (ref.)	
85.0	85.0	85.0	84.428	84.424	84.489	84.507	84.477	0.18

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Coverage Factor k
85.0	0.19	0.11	2

Average* : The average of 30 values in each position.

Uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity.

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

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SUR 18, SIUANLUANG, SIUANLUANG BANGKOK 10250
TEL: 0-2717-3000-29 FAX: 0-2719-9464



Cert.No.: 23CH1085
Page.: 1 of 2

Certificate of Calibration

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : Seven2Go S2
Serial No. : C232588424
ID No. : RYG_FS0605
Condition As-Received : Used Item
Received Date : 01 September 2023
Calibration Date : 04 September 2023
Reference : 2309-0010DSC-1
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. Rayong Branch
616/10 Moo 5, T.Maenam Khu,
A.Pluakdaeng, Rayong 21140, Thailand
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In - house method :
- CP-CH5 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)
Calibrated by : Warakorn Lemgagrakul
Approved by : Saitthip Meangmal
() Warakorn Lemgagrakul
() Ponpan Palpim
Issue Date : 7 September 2023

REVIEW BY : P.Huaya Th.
APPROVED BY : Saitthip Meangmal
NEXT CAL DATE : 04/09/24

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

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Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0058056



Cert. No.: 23CH1085
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: 43160066 130RC092 23E1284 09 Apr 2024

This certification is traceable to the International System of Unit maintained through:-
- Technology Promotion Association (Thailand-Japan)

2. Certified Reference Materials : 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	863832	28 Dec 2024
pH 6.986	CPA chem	863833	28 Dec 2023
pH 10.010	CPA chem	863835	28 Dec 2023

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

Calibration Results

Function : mV Measurement

Performing standard curve by Fluke at pH (4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (± mV)	Coverage factor k
			mV	pH		
pH Meter S/N.: C232588424	4.00	177.48	178	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.: 2465869	4.008	4.01	185	0.0085	2.05
	6.986	6.96	12	0.0099	2.00
	10.010	10.01	-165	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-

Saitthip

a 1178953



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2719-3000-29 FAX. 0-2719-9484



Cert. No.: 23LM153
Page.: 1 of 2

Certificate of Calibration

Equipment : pH Meter with Sensor
Manufacturer : Mettler Toledo
Model : Seven2GO S2
Serial No. : C232588424
ID No. : RYG_FS0605
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.
Rayong Branch
616/10 Moo 5 T. Maenam Khu, A. Pluakdaeng,
Rayong 21140 Thailand
Location : TPA On Site Calibration Laboratory
Received Order : 01 September 2023
Calibrated Date : 05 September 2023
Ambient Temperature : $(26 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$
AC Line Voltage : $(220 \pm 22) \text{ V}$
Calibrated by : Kunchit Promprat
Approved by :
() Pornthippa Tameyakul
() Ponpan Palpim
(x) Suwit Imjai
Issue Date : 6 September 2023

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

A 0058111



Equipment : pH Meter with Sensor
Condition As-Received : Used Item
Reference : 2309-0010DSC-2
Procedure Used :-

Cert. No.: 23LM153
Page.: 2 of 2

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	A7B843	23124	TPA	04 Jan 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.: 2465869

Calibration Point ($^{\circ}\text{C}$)	Immersion Depth (mm)	Standard Temperature ($^{\circ}\text{C}$)	UUC* Reading ($^{\circ}\text{C}$)	Error ($^{\circ}\text{C}$)	Uncertainty ($\pm$ $^{\circ}\text{C}$)	Coverage Factor K
25.0	120	25.003	25.3	0.297	0.16	2.00
30.0	120	30.003	30.3	0.297	0.16	2.00
40.0	120	40.004	40.4	0.396	0.16	2.00
50.0	120	50.003	50.4	0.397	0.16	2.00

UUC* : Unit Under Calibration

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

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2719-3000-29 FAX. 0-2719-9484



Cert. No.: 24TM632
Page : 1 of 3

Certificate of Calibration

Equipment : Hot Air Oven
Manufacturer : Memmert
Model : UFE 500
Serial No. : GS11.1572
ID No. : RYG_EN0010
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)
616/10 Moo 5 T. Maenam Khu, A. Pluakdaeng,
Rayong 21140 Thailand
Location : Oven Room
Received Order : 21 March 2024
Calibration Date : 21 March 2024
Ambient Temperature : $(26 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$
Calibrated by : Man Pattanapongpalboon
Approved by :
() Pornthippa Tameyakul
() Unnophol Harachai
(x) Suwit Imjai
Issue Date : 22 March 2024

REVIEW BY *Thanitak*
APPROVED BY *Dhumb*
NEXT CAL DATE: 21/09/25

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.



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2403-0563OC-1
Procedure Used :-

Cert. No.: 24TM632
Page : 2 of 3

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY57013711	23LM11G	TPA	11 Jul 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)

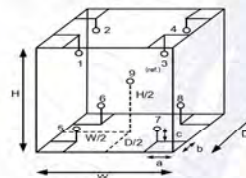
Result of Calibration :-

(*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. ($^{\circ}\text{C}$)	27	27
REL.Humid. (%)	57	59
AC Supply (Volt)	222	224



Probe Installation Details : Dimension of Chamber :
a = 5.0 cm D = 0.40 m
b = 5.0 cm W = 0.56 m
c = 5.0 cm H = 0.48 m
Capacity = 0.11 m^3

Ref. Std. ID No.: @ Calibration Point		
Position :	(180) $^{\circ}\text{C}$	(104) $^{\circ}\text{C}$
1	18-18TC-01	18-18RTD-01
2	18-18TC-02	18-18RTD-02
3	18-18TC-03	18-18RTD-03
4	18-18TC-04	18-18RTD-04
5	18-18TC-05	18-18RTD-05
6	18-18TC-06	23-18RTD-06
7	18-18TC-07	18-18RTD-07
8	18-18TC-08	22-18RTD-08
9 (ref.)	18-18TC-09	18-18RTD-09



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2403-0563OC-1
Result of Calibration :- (°) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 24TM632
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
104.0	104.0	104.0	0.051	0.59	0.62	2
180.0	180.0	180.0	0.15	1.3	1.7	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (±°C)
	Position									
	1	2	3	4	5	6	7	8	9 (ref.)	
104.0	103.921	103.786	103.757	103.759	103.950	103.817	104.213	103.672	103.673	0.42
180.0	179.614	179.270	179.145	179.599	180.001	180.423	180.293	180.629	179.429	1.1

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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Certificate of Calibration

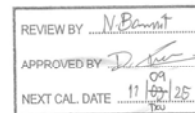
Represent to Certificate of Calibration No. C29240007

Equipment: Block Digestion Unit
Model: KT-20s
Serial No. (or ID.): 5720210009/5770200073
Manufacturer: Gerhardt
Condition: In Condition

Certificate No.: C29240011
Issued Date: 22 March 2024
Job No.: WO-00020429
Page: 1 of 4
Digestion Block: 20 holes.

Customer: ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5 T.Maenam Khu, A.Pluakdaeng, Rayong 21140, Thailand.

Environment Condition: Temperature: 25 °C ± 0.7 °C
Humidity: 54 %RH ± 4.1 %RH
Voltage: 225 VAC ± 1.7 VAC



Calibration Place: ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
(Wet Chemistry Lab)
616/10 Moo 5 T.Maenam Khu, A.Pluakdaeng, Rayong 21140, Thailand.

Calibration By: Mr. Thanathorn Phunook

Calibration Date: 11 March 2024

The Method used: In house method, base on by comparison with standard

Traceability: This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through N.M. Technical Center Laboratory (NTL)
Certificate No.: TC22/0080

(Mr. Thanathorn Phunook)
Person in charge

(Mr. Udon Srichana)
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

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).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

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CAL-FM-C29-07: 20 Jul 2022

Certificate No.: C29240011

Page: 2 of 4

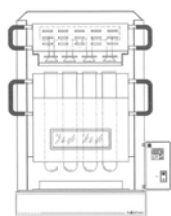
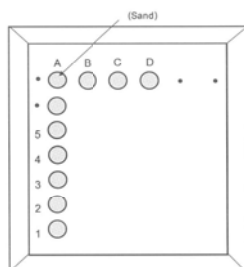


Fig. 1.: Front view



Location of standard

Fig. 2.: Digestion block

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the Digestion block.

Measured Temperature: The average reading of working standard at any positions or location.

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CAL-FM-C29-07: 20 Jul 2022

Certificate No.: C29240011

Page: 3 of 4

Calibration Results:

Pre Calibration

Locations	Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
A1	380	380	380	401.5	21.5	1.5
A2				401.2	21.2	1.5
A3				399.1	19.1	1.5
A4				397.8	17.8	1.5
A5				395.1	15.1	1.5
B1				396.6	16.6	1.5
B2				396.1	16.1	1.5
B3				392.9	12.9	1.5
B4				391.6	11.6	1.5
B5				390.7	10.7	1.5
C1				395.3	15.3	1.5
C2				395.6	15.6	1.5
C3				392.8	12.8	1.5
C4				391.7	11.7	1.5
C5				390.3	10.3	1.5
D1				397.6	17.6	1.5
D2				396.6	16.6	1.5
D3				395.0	15.0	1.5
D4				394.2	14.2	1.5
D5				393.6	13.6	1.5

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Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

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CAL-FM-C29-07: 20 Jul 2022

Calibration Results:
Without adjustment

Locations	Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
A1	380	365	365	382.5	17.5	1.5
A2				382.4	17.4	1.5
A3				382.1	17.1	1.5
A4				379.7	14.7	1.5
A5				378.3	13.3	1.5
B1				380.1	15.1	1.5
B2				380.1	15.1	1.5
B3				378.5	13.5	1.5
B4				378.3	13.3	1.5
B6				379.1	14.1	1.5
C1				380.1	15.1	1.5
C2				380.1	15.1	1.5
C3				378.9	13.9	1.5
C4				378.2	13.2	1.5
C5				377.3	12.3	1.5
D1				380.5	15.5	1.5
D2				380.6	15.6	1.5
D3				378.1	13.1	1.5
D4				378.7	13.7	1.5
D5				377.7	12.7	1.5

The End of Certificate

ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: WO-00020429

ชนิดเครื่องมือ: Block Digestion Unit

รุ่น: KT-20s

หมายเลขเครื่อง: 5720210009/5770200073

ตรวจสอบ (รับ)	รายการตรวจเช็ค	ตรวจสอบ (ส่ง)	หมายเหตุ
11 Mar 2024		11 Mar 2024	
ปกติ	ไม่ปกติ	ปกติ	ไม่ปกติ
General			
☒	☐ 1. สายไฟ	☒	☐
☒	☐ 2. การทำงาน Main Switch	☒	☐
☒	☐ 3. การทำงาน Selector Key	☒	☐
☒	☐ 4. การแสดงผล Display	☒	☐
☒	☐ 5. สภาพ Hole	☒	☐
☐	☐ 6. สภาพฝาปิด	☐	☒ ไม่มี
☒	☐ 7. สภาพตัวเครื่อง	☒	☐
☒	☐ 8. สภาวะแวดล้อม ณ สถานที่ตั้งเครื่อง	☒	☐

ข้อเสนอแนะ :

Mr. Thanathorn Phunook
Service Engineer

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/8 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10260
TEL: 0-2717-3000-29 FAX: 0-2719-9484

Cert.No.: 24CH96
Page.: 1 of 3

Certificate of Calibration

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : SevenCompact S220
Serial No. : C104059460
ID No. : RYG_EN0183
Condition As-Received: Used Item
Received Date : 18 January 2024
Calibration Date : 19 January 2024
Reference : 2401-0579DSC-2
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)
616/10 Moo 5, T.Maenam Khu,
A.Pluakdaeng, Rayong 21140, Thailand
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In - house method :
- CP-CH5 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)
- CP-CH8 by comparison with temperature standard

Calibrated by : Warakorn Lemgagrakul

Approved by :
Approved Signatory(✓) Saitip Meangmai
() Warakorn Lemgagrakul
() Ponpan Paipim

Issue Date : 24 January 2024

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

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Cert.No.: 24CH96
Page.: 2 of 3

Condition of this calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	23E2802	27 Aug 2024
2) Ref. Standard Thermometer	4982054	110RC044	23I908	26 July 2024

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

- Technology Promotion Association (Thailand-Japan)

2. Certified Reference Materials : 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	940102	27 Nov 2025
pH 6.986	CPA chem	940104	02 Nov 2024
pH 9.997	CPA chem	940106	02 Nov 2024

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

Calibration Results

Function : mV Measurement

Performing standard curve by Fluke at pH (4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
			mV	pH		
pH Meter S/N: C104059460	4.000	177.48	177.4	4.000	0.058	2.00
	7.000	0.00	0.0	7.000	0.058	2.00
	10.000	-177.48	-177.5	10.000	0.058	2.00

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Cert.No.: 24CH96
Page.: 3 of 3

Calibration Results

Function: pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4.01, 7.00, 10.01)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement ($\pm$)	Coverage factor k
pH Electrode S/N.: 3225367	4.008	4.013	176.0	0.0054	2.07
	6.986	6.983	2.2	0.0084	2.00
	9.997	9.996	-174.1	0.0065	2.00

Function: Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model: InLab®Expert Pro-ISM

- Serial No.: 3225367

Dimension of probe

- Length: 120 mm

- Diameter: 12 mm

- Immersion Depth: 100 mm

Calibration Point ($^{\circ}\text{C}$)	Standard Temperature ($^{\circ}\text{C}$)	UUC* Reading ($^{\circ}\text{C}$)	Error ($^{\circ}\text{C}$)	Uncertainty of measurement ($\pm$ $^{\circ}\text{C}$)	Coverage factor k
25.0	25.001	25.2	0.199	0.13	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 %.

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Santhip

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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5344 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484



Certificate of Calibration

Certificate No.: 24E289
Page: 1 of 2

Equipment: pH Meter

Manufacturer: Mettler Toledo

Model: SevenCompact S220

Serial No.: C104059460

ID No.: RYG_EN0183

Condition As-Received: Used Item

Received Date: 18 January 2024

Calibration Date: 23 January 2024

Reference: 2401-0579DSC

Ambient Temperature: (23 ± 2) $^{\circ}\text{C}$

Relative Humidity: (50 ± 10) %

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Submitted by: ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)

616/10 Moo 5, T.Maenam Khu, A Phukdaeng,
Rayong 21140, Thailand

Procedure used: Calibration were conducted using calibration procedure No. CP-E17 According to EURAMET cg-15.

Condition of this result of calibration

1. Reference standards Instruments:

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Multi-Product Calibrator	5508A	6315011	EZU2300035	29 May 2024

2. This result of calibration was made on request at the point specified by customer.

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

4. This Certification is traceable to the International System of Unit maintained through:-

-NA Caltechologies Co., Ltd., ANAB Accredited No. Calibration AC-2658

Calibrated by: Wutcharaporn Wongchulkrane

Issue Date: 24 January 2024

Approved Signatory:

[] Phallinee Prabpaipal
[x] Nuntawat Khamchai
[] Pongsagorn Boonyaporn

B 0333296



Cert. No.: 24E289
Page.: 2 of 2

Result of calibration:- (*) Without adjustment () After adjustment

Function: DC voltage measurement

Range:

2000 mV

Standard Value (mV)	UUC* Reading (mV)	Error (mV)	Uncertainty ($\pm$ μV)
-200.0000	-200.0	0.0	68
-150.0000	-150.0	0.0	65
-100.0000	-100.0	0.0	63
-50.0000	-50.0	0.0	61
0.0000	0.0	0.0	58
50.0000	50.0	0.0	61
100.0000	99.9	-0.1	63
150.0000	149.9	-0.1	65
200.0000	199.9	-0.1	68

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

UUC* = Unit Under Calibration.

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ภาคผนวก ก

สำเนาหนังสืออนุญาตขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน



ที่ อก ๐๓๑๐(๑)/ ๑๖๑๖๘

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๐ พฤศจิกายน ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๔ สิงหาคม ๒๕๖๖

- สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ แผ่น
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐
ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด
ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ ๑๘๑ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูล
หรือวัสดุที่ไม่ใช่แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กันยายน ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ
กรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายศิระ จันทรเจ็ด)

นักวิทยาศาสตร์เชี่ยวชาญ รักษาการแทน
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ๑ ๖ ๑ ๖ ๘ ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

- | | |
|--------------------------------|----------------------------|
| ๑) นางสาวยุพาพร จันทร์เปล่ง | ทะเบียนเลขที่ ว-๒๐๔-ค-๐๐๐๑ |
| ๒) นางสาวชนันย์ โกมารกุล ณ นคร | ทะเบียนเลขที่ ว-๒๐๔-ค-๐๐๐๒ |
| ๓) นายศรายุทธ จิตรานนท์ | ทะเบียนเลขที่ ว-๒๐๔-ค-๐๐๐๓ |
| ๔) นางสาวกนกกร เอนก | ทะเบียนเลขที่ ว-๒๐๔-ค-๐๐๐๔ |
| ๕) นายสุริยา สอนแก้ว | ทะเบียนเลขที่ ว-๒๐๔-ค-๐๐๐๕ |
| ๖) นายวิชาญ ชุณหะวัณ | ทะเบียนเลขที่ ว-๒๐๔-ค-๐๐๐๖ |

3/11/16

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ว-๒๐๔

ที่ ออก ๐๓๑๐(๑)/ ๑๖๑๖๘

ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๘๑ ราย

๑) นายกาจบัณฑิต กิตติศุภวณิชช์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๑
๒) นายภัทรพล สว่างใจธรรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๒
๓) นายณราธิป เทือกชัยคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๓
๔) นายศิริโชค พงษ์ประสม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๔
๕) นายณัฐวุฒิ ดั่งแพง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๕
๖) นางสาวจินดา โชกุลธรรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๖
๗) นางสาวสาวิตรี น้อยเสงี่ยม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๗
๘) นางสาวชนัญญาญจน์ อิ่มชม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๘
๙) นางสาวนรินทร์ สายเส็ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๙
๑๐) นางสาวนันทวดี สมบูรณ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๐
๑๑) นางสาวศรัณยา เฉลิมธำรงค์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๑
๑๒) นางสาวธัญญธร มงคลจิรวุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๒
๑๓) นางสาวศิริลักษณ์ บุณนาค	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๓
๑๔) นายณพพงศ์ จันททรัพย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๔
๑๕) นายนรเศรษฐ์ โกมลย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๕
๑๖) นายธันวา จริยา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๖
๑๗) นางสาวเกศรินทร์ แก้วมัน	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๗
๑๘) นางสาวสุวิมล ชัยเรืองวุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๘
๑๙) นางสาวสุชาดา ธรรมถาวร	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๑๙
๒๐) นางสาวเปมิกา ชัยเดชธนกุล	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๐
๒๑) นางสาวศศิธร หมอสวัสดิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๑
๒๒) นางสาวเสาวลักษณ์ ภู่นภาอำพร	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๒
๒๓) นายอภิสิทธิ์ สิงหา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๓
๒๔) นายศักดิ์สิทธิ์ ไพศาลพิสุทธิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๔
๒๕) ว่าที่ร้อยตรีหญิง พรรณิภา ขำเจริญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๕
๒๖) นางจิตดา คำภูแก้ว	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๖
๒๗) นางสาวอรรวรรณ รักยง	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๗
๒๘) นางสาวนพรัตน์ แยมกรานต์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๘
๒๙) นายจุลเดช วารินทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๒๙
๓๐) นางสาวดาญรัตน์ ร้องคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๐
๓๑) นายพรมมี ศรีปัดเนตร	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๑
๓๒) นายอุทิศ อุ๋นสิม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๒
๓๓) ว่าที่ร้อยตรี เฉลิมเกียรติ อมรศรีเสริม	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๓
๓๔) นางสาววริยา สร้างนา	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๔
๓๕) นายอนุพงศ์ รัตนศรีประเสริฐ	ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๕



๓๖) นางสาวจุฑารัตน์...

๓๖) นางสาวจุฑารัตน์ โอนสันเทียะ
๓๗) นางสาวจารุวรรณ พิมพ์ภักฤติยา
๓๘) นางสาวปรามค์ทิพย์ กิจไพศาลศักดิ์
๓๙) นางสาวเตือนใจ ทางกลาง
๔๐) นางสาวจิราพร ศิริเวช
๔๑) นายวรากร ผุ้รักษ์
๔๒) นายทง วิริยะสทกิจ
๔๓) นายธนิต เจนจบ
๔๔) นายคณิศร ข้าเพชร
๔๕) นายภูวิช พรหมสะอาด
๔๖) นายธนเดช โภคาพิพัฒน์
๔๗) นายชวฤทธิ์ วงษ์จันทร์
๔๘) นายอาทิตย์ ศรีแสน
๔๙) นายเจษดินทร์ คงศักดิ์ไทย
๕๐) นายจรัส บุญยั้ง
๕๑) นายธนาณัติ เอนก
๕๒) นายอภิวัฒน์ ทุมหนู
๕๓) นางสาวสุภาขวัญ มาก
๕๔) นางสาวทัตพร ขวาลสมบูรณ์
๕๕) นางสาวธิดิมา บุญเพ็ง
๕๖) นางสาวภาณุมาศ นามวัฒน์
๕๗) นางสาวอุไรรัตน์ ทังสร้างแป้น
๕๘) นายธีรวัฒน์ ปวงสุข
๕๙) นายอิทธิพล ยะโส
๖๐) นายประพจน์ วรรณชูชัย
๖๑) นายชยธร พวงทิพย์
๖๒) นางสาวกนกวรรณ จันทบาล
๖๓) นายสิทธิโชค ธงเงิน
๖๔) นางศิวารวรรณ ใจบุญ
๖๕) นางสาวพรรณธิดา พุ่มคง
๖๖) นายนวกัทธ ศรีวิริยะ
๖๗) นายสุวิชา ทองอ่อน
๖๘) นายวิญญู บุญตะนัย
๖๙) นายสมบูรณ์ บุตรจันทร์
๗๐) นายวิรัตน์ ไชยนะรา
๗๑) นายณฤเบศน์ เพิ่มพูน
๗๒) นายจิรณัฐ ขาวละออ
๗๓) นายอัสนี นามบุรี
๗๔) นายอัครเวศ จ่อสาว

ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๓๖
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ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๗๔

31/10/2564

๗๕) นายประเสริฐ...

๗๕) นายประเสริฐ สุระขันธ
๗๖) นายบุญกุล จันทร์เนียม
๗๗) นายพิรพงษ์ ทองคุณปรีดา
๗๘) นายนฤพล ทองนุช
๗๙) นายอนุวัฒน์ ม่วงแพ
๘๐) นายเจตศรวุฒิ ปัตตะมะ
๘๑) นายกฤษณะ สายวรรณ
๘๒) นายพิชัย บุญยงค์
๘๓) นายภานุพงศ์ โหมวงศ์
๘๔) นายสามารถ คุ่มปลี
๘๕) นายสัญญาชัย โกศรีนาม
๘๖) นายณัฐวุฒิ ศรีประเสริฐ
๘๗) นายขวลิธ นาคพนม
๘๘) นายพงศธร ชัยทิพย์
๘๙) นายสิทธิโชค ทาสีดา
๙๐) นายธนากร อินสุตา
๙๑) นางสาววรรณิษา ขาติวันชัย
๙๒) นางสาวพิมพ์ตะวัน มินากุล
๙๓) นางสาวเพชรรัตน์ สิงห์สมบูรณ์
๙๔) นางสาวชฎานิน พรหมจันทร์
๙๕) นายกীরติ ทวีราช
๙๖) นายจักริน หมั่นวิชา
๙๗) นายฉัตรชัย สุขเปีย
๙๘) นายณรนนท์ ต๊ะทองคำ
๙๙) นายดุลยพล สนนอก
๑๐๐) นายทักษ์ดนัย อุบลศรี
๑๐๑) นายธนศร นามะกุลณา
๑๐๒) นายธิตีพงศ์ บัวแดง
๑๐๓) นายนนทชัย อุปลัมภ
๑๐๔) นายรัฐพล คุณสุทธิ
๑๐๕) นายนันท์วัฒน์ สาริน
๑๐๖) นายปิยะนัฐ พลมะศรี
๑๐๗) นายพงศ์สิริ โสมเขียว
๑๐๘) นายพีรพัฒน์ กำคำ
๑๐๙) นายภาณุพงศ์ มานิตย์
๑๑๐) นายมงคล ผลาทิพย์
๑๑๑) นายสิรินนท ทองอ้น
๑๑๒) นายอเนชา ทนสมัย
๑๑๓) นายอดิศักดิ์ ผมไผ

ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๗๕
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ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๑๓

วิบูลย์

๑๑๔) นายอนันต์ชัย...

๑๑๔) นายอนันตชัย วิสุม
๑๑๕) นายวรวิฑูรย์ ดิฉัน
๑๑๖) นายแสงตะวัน นตะสัด
๑๑๗) นายยุทธพงศ์ รัตนะ
๑๑๘) นายชัยวัฒน์ ไชยชนะ
๑๑๙) นายวิศรุต ศรีธรรมมา
๑๒๐) นายพนทกร เผือกผ่อง
๑๒๑) นายกำชัย สุทธะ
๑๒๒) นางสาวณัฐภรณ์ บุญตะนัย
๑๒๓) นางสาวพัชรินทร์ แสนสร้อย
๑๒๔) นายไพโรจน์ เปี่ยมพิมาย
๑๒๕) นางสาวศุภมาศ ทองมาก
๑๒๖) นางสาวลลิตา จิตรสว่าง
๑๒๗) นางสาวขไมพร เสิกภูเขียว
๑๒๘) นางสาวกฤติมาพร คำมีแก่น
๑๒๙) นางสาวสกลรัตน์ ภาควม
๑๓๐) นางสาวไพรินทร์ ศรีรูป
๑๓๑) นางสาวทิพนทร ผุยปัญญา
๑๓๒) นางสาวสาธิตา ปานทอง
๑๓๓) นางสาวอริสา ทองนวล
๑๓๔) นางสาวอรยา คำคล้อง
๑๓๕) นางสาวชุตติภรณ์ สุนทรสนาน
๑๓๖) นางสาวอัญชลี คำจันทร์
๑๓๗) นายบุญฤทธิ์ เอี่ยมเทศ
๑๓๘) นางสาวศุภรดา ปันมยุรา
๑๓๙) นางสาวพาณดี คุณน่าน
๑๔๐) นางสาวจิราเจต พองดา
๑๔๑) นางสาวอารยา มีชัย
๑๔๒) นางสาววิษุตา นาคผจญ
๑๔๓) นางสาวนันทยา จันทะสุน
๑๔๔) นายกิตติพงศ์ แซ่ลี
๑๔๕) นายอนุวัติ ภูถวิล
๑๔๖) นายธีรพล แสงทอง
๑๔๗) นายศักดิ์พิพัฒน์ บุญมัน
๑๔๘) นายฐิติวัตร เอมอุไร
๑๔๙) นายชัยณรงค์ ศรีบุรินทร์
๑๕๐) นางสาวอัจฉราวรรณ สอนสนอง
๑๕๑) นางสาวณัฐพร สิงหา
๑๕๒) นายภิรมเรศ แหยมโต

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31/10/2561

๑๕๓) นางสาวอุบล...

๑๕๓) นางสาวอุบล เด็กศิริ
๑๕๔) นางสาวมโนรัตน์ ทองบุตร
๑๕๕) นายภาคภูมิ แทนไทย
๑๕๖) นางสาวสุภาณัฐ เมล์พ่วง
๑๕๗) นางสาวพรทิศา สาตาชนม์
๑๕๘) นายเอกวิทย์ วันทะนา
๑๕๙) นายไตรมณฑล ทิพย์วรรณ
๑๖๐) นายจิรเมธ ประเสริฐสิริพงศ์
๑๖๑) นายจิรายุส เกษมสุข
๑๖๒) นายจิรศักดิ์ ศรีวิชัย
๑๖๓) นายณัฐกฤษณ์ สะพานแก้ว
๑๖๔) นายบุญศักดิ์ ปะที
๑๖๕) นายปิ่นณวิชัย เสมอทรัพย์
๑๖๖) นายพิษณุพงษ์ ไชยา
๑๖๗) นายภัทรพงษ์ มณฑาทอง
๑๖๘) นายวสันต์ ตรีนกุล
๑๖๙) นายภาณุเดช เพชรอุด
๑๗๐) นายอนุกุล วิลละแสง
๑๗๑) นายภัทรพงษ์ มีสุข
๑๗๒) นางสาวนุชรวี ลีละทีป
๑๗๓) นางสาวสุภาวดี โกศรีนาม
๑๗๔) นางสาวอรณิชา เทียนดำ
๑๗๕) นางสาวพรเพ็ญ ขอบสอน
๑๗๖) นางสาววันวิสา ขอนพิกุล
๑๗๗) นางสาวอรรวรรณ เถาว์ทอง
๑๗๘) นางสาวอัยย์ลิณ เมอร์วินณ์
๑๗๙) นางสาววิสรา คู่ยครอง
๑๘๐) นายวุฒิกร ศิริวรรณ
๑๘๑) นางสาวจรรวรรณ กระจำพันธุ์

ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๕๓
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วิมล

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ๑๖๑๖๘ ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๗๔ รายการ

น้ำเสีย จำนวน 60 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldicarb	High-Performance Liquid Chromatographic Method ^[4]
2	Aldicarb Sulfone	High-Performance Liquid Chromatographic Method ^[4]
3	Aldicarb Sulfoxide	High-Performance Liquid Chromatographic Method ^[4]
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
5	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
6	Barium	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
7	α -BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
8	β -BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
9	δ -BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
10	γ -BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
11	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method ^[4] 2) 5-Day BOD Test, Membrane Electrode Method ^[4]
12	Carbaryl	High-Performance Liquid Chromatographic Method ^[4]
13	Carbofuran	High-Performance Liquid Chromatographic Method ^[4]
14	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
15	Chemical Oxygen Demand	1) Closed Reflux, Colorimetric Method ^[4] 2) Closed Reflux, Titrimetric Method ^[4]
16	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
17	Chromium	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
18	Color	ADMI Weighted-Ordinate Spectrophotometric Method ^[4]

Signature

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
19	Copper	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
20	Cyanide	Distillation, Colorimetric Method ^[4]
21	2,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
22	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
23	2,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
24	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
25	2,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
26	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
27	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
28	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
29	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
30	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
31	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
32	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
33	Formaldehyde	Distillation, Colorimetric Method ^[3]
34	Free Chlorine	1) DPD Ferrous Titrimetric Method ^[4] 2) DPD Colorimetric Method ^[4]
35	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
36	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
37	Hexavalent Chromium	Colorimetric Method ^[4]
38	3-Hydroxycarbofuran	High-Performance Liquid Chromatographic Method ^[4]
39	Lead	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
40	Manganese	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
41	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass spectrometric Method ^[4]
42	Methiocarb	High-Performance Liquid Chromatographic Method ^[4]
43	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
44	Methomyl	High-Performance Liquid Chromatographic Method ^[4]
45	Nickel	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ^[4] 2) Soxhlet Extraction Method ^[4]
47	Oxamyl	High-Performance Liquid Chromatographic Method ^[4]
48	Propoxur	High-Performance Liquid Chromatographic Method ^[4]
49	pH	Electrometric Method ^[4]
50	Phenols	1) Distillation, Chloroform Extraction Method ^[4] 2) Distillation, Direct Photometric Method ^[4]
51	Selenium	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
52	Sulfide	Iodometric Method ^[4]
53	Temperature	Laboratory and Field Methods ^[4]
54	Total Dissolved Solids	Dried at 180 °C ^[4]
55	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ^[4]
56	Total Phosphorous	Digestion, Colorimetric Method ^[4]
57	Total Suspended Solids	Dried from 103-105 °C ^[4]
58	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
59	Trivalent Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ^[4]
60	Zinc	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[4]

วิมล

น้ำใต้ดิน จำนวน 126 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
8	Barium	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
13	Benzoic Acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
15	Benzo[g,h,i]perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ^[4]
35	Chromium (VI)	Colorimetric Method ^[4]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
37	Cyanide	Distillation, Colorimetric Method ^[4]
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
39	DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
40	DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
41	DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
43	Di-n-Butyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
47	3,3-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]

3m2d

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
57	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
58	Diethyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
63	Di-n-octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
69	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
70	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
74	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
75	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]

3m

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
76	γ -HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
81	Lead	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
83	Mercury	1) Digestion, Cold Vapor Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
84	Methanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
86	Methyl bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
87	Methylene chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
90	Methyl tert-butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]

3mml

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB 1242 - PCB 1248 - PCB 1254 - PCB 1260	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
98	pH	Electrometric Method ^[4]
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
100	Phenol	1) Distillation, Chloroform Extraction Method ^[4] 2) Distillation, Direct Photometric Method ^[4] 3) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
102	Selenium	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
103	Silver	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
109	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,25]

สมพงษ์

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

3/11/25

อากาศเสีย (ปล่อยระบาย) จำนวน 28 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
2	Arsenic	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5] 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
3	Beryllium	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5] 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
4	Cadmium	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5] 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
5	Carbon Monoxide	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5] 1) Instrumental Analyzer Method ^[5]
6	Chlorine	2) Sampling Bag Non-Dispersive Infrared Method ^[5] 1) Absorption Sampling, Ion Chromatographic Method ^[5]
7	Chromium	2) Isokinetic Sampling, Ion Chromatographic Method ^[5] 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
8	Cobalt	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5] 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
9	Copper	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5] 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
10	Cresol	Adsorption Sampling, Gas Chromatographic Method ^[5]
11	Dioxins	Isokinetic Sampling ^[5]
12	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Isokinetic Sampling, Ion Chromatographic Method ^[5]
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Isokinetic Sampling, Ion Chromatographic Method ^[5]
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ^[5]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	Lead	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
16	Manganese	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
17	Mercury	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
18	Nickel	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
19	Opacity	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
20	Oxides of Nitrogen	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
21	Selenium	Ringelmann's Method ^[2]
22	Sulfur Dioxide	1) Absorption Sampling, Phenoldisulfonic Acid Method ^[5]
23	Sulfuric Acid	2) Absorption Sampling, Alkaline Permanganate/Colorimetric Method ^[5]
24	Tellurium	3) Instrumental Analyzer Method ^[5]
25	Tin	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
26	Total Suspended Particulate	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
		1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5]
		2) Instrumental Analyzer Method ^[5]
		Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5]
		1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
		2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
		1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
		2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
		1) Isokinetic Sampling, Gravimetric Method ^[5]
		2) Paired Train, Isokinetic Sampling, Gravimetric Method ^[5]

3m7)

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Vanadium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
28	Xylene	Adsorption Sampling, Gas Chromatographic Method ^[5]

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,26]
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,17]
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,17]
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,17]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,17]
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,17]
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,26]
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,17]
9	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method ^[1,6,16,19] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method ^[1,6,17,19] 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^[7,8,16,19] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^[7,8,17,19]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method ^[1,6,19] 2) Alkaline Digestion, Colorimetric Method ^[8,19]
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,17]
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,17]
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,26]
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,26]
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,26]
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26]

2) Soxhlet...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Dieldrin	2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26]
18	Endrin	2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26]
19	Heptachlor	2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26]
20	Lead	2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26] 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]

Signature

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[1,6,20] 2) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^[1,6,30] 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[20] 4) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^[30] 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ^[21]
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic / Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic /Mass Spectrometric Method ^[11,26]
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic / Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic /Mass Spectrometric Method ^[11,26]
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
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 ^[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[11,26]

3mm

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	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method^[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method^[11,26]
29	pH	Electrometric Method ^[23,24]
30	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method^[7,16] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method^[7,17]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
35	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]

สมร

ดิน จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
2	Acetone	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
3	Aldrin	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
4	Anthracene	2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^[13]
5	Antimony	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
6	Arsenic	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
8	Barium	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
9	Benz(a)anthracene	1) Digestion, Inductively Coupled Plasma Method ^[7,16]
10	Benzene	2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
		1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
		2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
		1) Digestion, Inductively Coupled Plasma Method ^[7,16]
		2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
		1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
		2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
		Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	Benzo(b)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
12	Benzo(k)fluoranthene	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
13	Benzoic acid	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
14	Benzo(a)pyrene	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
15	Benzo(g,h,i)perylene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
16	Beryllium	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
17	Bis(2-chloroethyl)ether	1) Digestion, Inductively Coupled Plasma Method ^[7,16]
18	Bis(2-ethylhexyl)phthalate	2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
19	Bromodichloromethane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
20	Bromoform	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
21	Butanol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
22	Butyl Benzyl Phthalate	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
24	Carbazole	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
28	p-Chloroaniline	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
32	2-Chlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ^[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^[7,8,16,19] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^[7,8,17,19]
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^[8,19]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
36	Chrysene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
37	Cyanide	Extraction, Distillation, Colorimetric Method ^[27,28,29]
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
39	DDD	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
40	DDE	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
41	DDT	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
42	Dibenz(a,h)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
43	Di-n-Butyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
47	3,3-Dichlorobenzidine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]

Signature

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
53	2,4-Dichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
58	Diethyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
59	2,4-Dimethylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
60	2,4-Dinitrophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
61	2,4-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
62	2,6-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
63	Di-n-Octyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
67	Fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
68	Fluorene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
70	Heptachlor epoxide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
73	n-Hexane	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25] 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^[13]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
74	α -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
75	β -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
76	γ -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
77	Hexachlorocyclopentadiene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
78	Hexachloroethane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
79	Indeno(1,2,3-cd)pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
80	Isophorone	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
81	Lead	1) Digestion, Inductively Coupled Plasma Method ^[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ^[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[20] 2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry ^[21] 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^[30]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
85	Methoxychlor	2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^[13,25]
86	Methyl Bromide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
87	Methylene Chloride	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
88	2-methylphenol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
89	2-Methylnaphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
90	Methyl tert-Butyl Ether	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
91	Naphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
92	Nickel	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
93	Nitrobenzene	1) Digestion, Inductively Coupled Plasma Method ^[7,16]
94	N-Nitrosodiphenylamine	2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
95	N-Nitrosodi-n-propylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26]
		2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
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',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	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
97	Pentachlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
98	Phenanthrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
99	Phenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
100	Pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
101	Selenium	1) Digestion, Inductively Coupled Plasma Method ^[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
102	Silver	1) Digestion, Inductively Coupled Plasma Method ^[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
103	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
108	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
109	TPH (C _{>8} - C ₁₆)	1) Automate Extraction, Gas Chromatographic Method ^[11,22] 2) Solvent Extraction, Gas Chromatographic Method ^[12,22] 3) Ultrasonic Extraction, Gas Chromatographic Method ^[22,31]
110	TPH (C _{>16} - C ₃₅)	1) Automate Extraction, Gas Chromatographic Method ^[11,22] 2) Solvent Extraction, Gas Chromatographic Method ^[12,22] 3) Ultrasonic Extraction, Gas Chromatographic Method ^[22,31]
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]

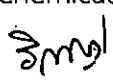
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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
115	2,4,5-Trichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
116	2,4,6-Trichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,26] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,26]
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method ^[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
121	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
122	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
123	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[15,25]
125	Zinc	1) Digestion, Inductively Coupled Plasma Method ^[7,16] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,17]

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ที่ อก ๐๓๑๐(๓)/ ๖๔๗๐

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๘ มิถุนายน ๒๕๖๕

เรื่อง ขันทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๙ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำ
ห้องปฏิบัติการวิเคราะห์ และรายการสารมลพิษที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป
(ประเทศไทย) จำกัด ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่
๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอลวกแดง จังหวัดระยอง โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

- | | | |
|--------------------------|---------------|--------------|
| ๑) นายเดช ช้างชน | ทะเบียนเลขที่ | ว-๓๒๓-ค-๙๔๔๒ |
| ๒) นางวิลาวัลย์ บริรักษ์ | ทะเบียนเลขที่ | ว-๓๒๓-ค-๙๔๔๓ |
| ๓) นายสุพจน์ สลามเต๊ะ | ทะเบียนเลขที่ | ว-๓๒๓-ค-๙๔๔๔ |

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

- | | | |
|---------------------------------|---------------|--------------|
| ๑) นางสาวนฤมล บรรจงกิจ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๔๕ |
| ๒) นางพจนา สีดา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๔๖ |
| ๓) นางสาวธนิดา กุลสุริวงศ์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๔๗ |
| ๔) นายพิทยา ทองแดง | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๔๘ |
| ๕) นางชลธิชา สุนงข | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๔๙ |
| ๖) ว่าที่ ร.ต.รณชัย ม่วงมา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๐ |
| ๗) นายวรารุณ ทัพพา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๑ |
| ๘) นายศักดิ์รินทร์ จรัสกาย | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๒ |
| ๙) นายสุรศักดิ์ สาชิน | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๓ |
| ๑๐) นางสาวเพชรคุณ ภาภูตานนท์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๔ |
| ๑๑) นายสถาพร ถาแก้ว | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๕ |
| ๑๒) นายสุทธิดำรงค์ โชคปิตินันท์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๖ |

๑๓) นายวัลลภ หันไชยเนาว์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๕๗
๑๔) นางสาววนาลี เจริญตระกูล	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๕๘
๑๕) นางสาวนิดา ผดุงจิตต์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๕๙
๑๖) นายธนะสิทธิ์ วงศ์ไชย	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๐
๑๗) นายชัยนุสรณ์ เลิศนันทกุลชัย	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๑
๑๘) นายสัจจา เพ็ชรแสง	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๒
๑๙) นายกันตภณ มณีสัมพันธ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๓
๒๐) นางสาวจันทนีย์ โกเมนชนะ	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๔
๒๑) นายธารินทร์ อ็อกจินดา	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๕
๒๒) นายศุภณัฐ พิสัยพันธ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๖
๒๓) นายศุภชัย วงศ์สุริย์ฉาย	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๗
๒๔) นายปฐมพงศ์ กรสวัสดิ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๘
๒๕) นายไสว ตันโพธิ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๙
๒๖) นางสาวกิตติยา สัญญาอริยาภรณ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๐
๒๗) นางสาวเจษฎาพร ศรีบุญเรือง	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๑
๒๘) นางสาวมธุรินทร์ สิงห์เงา	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๒
๒๙) นางสาวธิดารัตน์ ศิริมั่งคะโร	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๓
๓๐) นายพิพัฒน์ นิภัทร์เศรษฐ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๔
๓๑) นายศิริวิทย์ เรืองสม	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๕
๓๒) นายปารามศ สัตยาคุณ	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๖
๓๓) นายนฤนาท ธรรมสโร	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๗
๓๔) นางสาวศุภรัตน์ โสจันทร์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๘
๓๕) นายพชรกร อินทรเสนา	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๙
๓๖) นายทิวากร เชื้อมาก	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๐
๓๗) นายอนุรักษ์ ทองขจรศักดิ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๑
๓๘) นายอภิชาติ วิชาส	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๒
๓๙) นายจรัสระวี ศรีรักษา	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๓
๔๐) นายประสานมิตร เชื้อนเพชร	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๔
๔๑) นายภาณุวัฒน์ วังบง	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๕
๔๒) นายสันติ ชัยชนะ	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๖
๔๓) นายสิทธิชัย แก้วเกตุ	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๗
๔๔) นายทินกร กุลชาติ	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๘

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๑๔ รายการ
 อากาศเสีย (ปล่องระบาย) จำนวน ๗ รายการ และน้ำใต้ดิน จำนวน ๓ รายการ รวมทั้งสิ้นจำนวน ๒๔ รายการ
 ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้มีอายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นางจินดา เตชะศรีนทร์)

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๒๘ มิ.ย. ๒๕๖๔

กองวิจัยและเตือนภัยมลพิษโรงงาน

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๘๐๕ ๗๒๖๑-๓

ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๓๒๓

ที่ ออก ๐๓๑๐(๓)/

๖๔๗๐

ลงวันที่

๒๘

มิถุนายน

๒๕๖๔

ขอขยาสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ
น้ำเสีย จำนวน 14 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method ^[2] 2) 5-Day BOD Test, Azide Modification Method ^[2]
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method ^[2] 2) Closed Reflux, Colorimetric Method ^[2] 3) Closed Reflux, Titrimetric Method ^[2]
3	Color	ADMI Weighted – Ordinate Spectrophotometric Method ^[2]
4	Cyanide	Distillation, Colorimetric Method ^[2]
5	Formaldehyde	Distillation, Colorimetric Method ^[1]
6	Free Chlorine	DPD-Ferrous Titrimetric Method ^[2]
7	Oil and Grease	Liquid-Liquid Partition-Gravimetric Method ^[2]
8	pH	Electrometric Method ^[2]
9	Phenols	1) Distillation, Chloroform Extraction Method ^[2] 2) Distillation, Direct Photometric Method ^[2]
10	Sulfide	ZnS Precipitation, Iodometric Method ^[2]
11	Temperature	Laboratory and Field Method ^[2]
12	Total Dissolved Solids	Dried at 180 °C ^[2]
13	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ^[2]
14	Total Suspended Solids	Dried at 103-105 °C ^[2]

อากาศเสีย (ปล่อยระบาย) จำนวน 7 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Carbon Monoxide	1) Sampling Bag, Non-Dispersive Infrared Method ^[5] 2) Instrumental Analyzer Method ^[8]
2	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ^[5]
3	Opacity	Ringelmann's Method ^[3,4]
4	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ^[6] 2) Instrumental Analyzer Method ^[9]
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Instrumental Analyzer Method ^[10]

วิภา สัมฤทธิ์ผล

(นางสาววิชุดา สัมฤทธิ์ผล)

ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

Sulfuric Acid...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Sulfuric Acid	Isokinetic Sampling, Barium – Thorin Titrimetric Method ^[6]
7	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ^[7]

น้ำใต้ดิน จำนวน 3 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method ^[2]
2	pH	Electrometric Method ^[2]
3	Phenols	Distillation, Direct Photometric Method ^[2]

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4. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของของหม้อน้ำของโรงงาน.

ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.

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6. United States Environmental Protection. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2019.

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9. United States Environmental Protection Agency. Determination of Oxide of Nitrogen Emissions from Stationary Sources; Instrumental Analyzer Procedure. 40 CFR 60. Appendix A Method 7E, 2019.

10. United States Environmental Protection Agency. Determination of Sulfur Dioxide Emissions from Stationary Sources; Instrumental Analyzer Procedure. 40 CFR 60. Appendix A Method 6C, 2017.

วิภา สัมฤทธิ์ผล

(นางสาววิชุดา สัมฤทธิ์ผล)

ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

สำเนา

ที่ อก ๐๓๒๐/ ๒๐๕๓

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๒ มี.ค. ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนแปลงบุคลากร ของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๔ มีนาคม ๒๕๖๖

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอลำลูกเกด จังหวัดระยอง ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

ก. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ ราย

- | | | |
|------------------------------|---------------|--------------|
| ๑) นางสาวเจษฎาพร ศรีบุญเรือง | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๗๑ |
| ๒) นางสาวมธุรินทร์ สิงห์เงา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๗๒ |
| ๓) นางสาววนิดา ผดุงจิตต์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๙ |
| ๔) นายศุภณัฐ พิสัยพันธ์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๖๖ |
| ๕) นายสิทธิชัย แก้วเกตุ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๘๗ |

ข. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๒ ราย

- | | | |
|------------------------------|---------------|--------------|
| ๑) นายณัฐพงษ์ เพ็งขานา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๑ |
| ๒) นางสาวกัลยวรรณ รักษ์ดี | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๒ |
| ๓) นางสาวจุฑารัตน์ สีทองกลาง | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๓ |
| ๔) นางสาวจิตสุภา ประเทืองสุข | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๔ |
| ๕) นายสรเสริญ ค่อยยกสุข | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๕ |
| ๖) นายณัฐวุฒิ อภมพมราช | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๖ |
| ๗) นายจิตรกร สีวะสา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๗ |
| ๘) นายสิทธิวิชญ์ สุวรรณรัตน์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๘ |
| ๙) นายสิทธิพันธ์ เสนาชีว | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๙ |
| ๑๐) นายอนุเวศน์ เตมา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๑๐ |
| ๑๑) นายสุรวิทย์ นราพงษ์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๑๑ |
| ๑๒) นายอดิศักดิ์ ตะริศุณย์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๑๒ |

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ที่ อก ๐๓๑๐(๓)/๖๔๗๐ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๔ คือในวันที่ ๒๘ มิถุนายน ๒๕๖๗ ทั้งนี้ สามารถยื่นคำขอผ่าน
ระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรมตาม QR Code ท้ายหนังสือนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายทวี อำพาพันธ์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์



ที่ อก ๐๓๒๐/๒๕๖๕๓



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๐ พ.ย. ๒๕๖๕

เรื่อง เปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๕ ตุลาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอปลวกแดง จังหวัดระยอง ขอเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เพิ่มขอบข่ายสารมลพิษที่วิเคราะห์ในน้ำเสีย จำนวน ๑๓ รายการ และน้ำใต้ดิน ๓ รายการ ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชนที่ อก ๐๓๑๐(๓)/๖๔๗๐ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๔ คือในวันที่ ๒๘ มิถุนายน ๒๕๖๗ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายทวี อำพาพันธ์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ว-๓๒๓

ที่ ออก ๐๓๒๐/๑๕๕๓

ลงวันที่

๑๐ พ.ย. ๒๕๖๖

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๖ รายการ
น้ำเสีย จำนวน 13 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method 2) 5-Day BOD Test, Azide Modification Method
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method 2) Closed Reflux, Colorimetric Method 3) Closed Reflux, Titrimetric Method
3	Color	ADMI Weighted-Ordinate Spectrophotometric Method
4	Cyanide	Distillation, Colorimetric Method
5	Free Chlorine	DPD Ferrous Titrimetric Method
6	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method
7	pH	Electrometric Method
8	Phenols	1) Distillation, Chloroform Extraction Method 2) Distillation, Direct Photometric Method
9	Sulfide	ZnS Precipitation, Iodometric Method
10	Temperature	Field Method
11	Total Dissolved Solids	Dried at 180 °C
12	Total Kjeldahl Nitrogen	Semi-Macro Kjeldahl Method
13	Total Suspended Solids	Dried at 103-105 °C

น้ำใต้ดิน จำนวน 3 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method
2	pH	Electrometric Method
3	Phenols	Distillation, Direct Photometric Method

เอกสารอ้างอิง

APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 24th ed. Washington, DC : APHA, 2023



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