

ภาคผนวก ค

ใบรับรองผลการตรวจวิเคราะห์คุณภาพสิ่งแวดล้อม

ภาคผนวก ค-1

คุณภาพอากาศจากแหล่งกำเนิด



Analysis / Test Report

TESTING
No.0042

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2450170
Date Received : May 08, 2024
Date Reported : May 16, 2024
Report Number: 2982639-1

Page 1 of 2

Sample Number 2450170-1
Sampled Date May 08, 2024
Sample Description Emission from Stationary Source
Location Reactor Feed Heater (AF-7) (GPS 47P 0733750, 1404290)
Date Analysis Commenced May 09, 2024
Condition of Sample Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description

Ambient Pressure	757	mmHg	Diameter	1.50	m	Oxygen	5.1	%
Ambient Temperature	33.3	°C	Shape	Circle		Carbon Dioxide	9.0	%
Type of Process	Combustion		Stack Temperature	181	°C	Gas Velocity	4.3	m/s
Type of Fuel	Natural Gas		Moisture	14.52	%	Flow Rate (Actual O2)	15318	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O ₂ at 5.1 % O ₂		Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing										
Carbon Monoxide *	02:55 PM - 03:05 PM	ppm	-	1.0	<1.0	<1.0	690	-	United States Environmental Protection Agency, EPA Method 10	Rayong
Oxides of Nitrogen *	02:45 PM - 15:00 PM	ppm	-	1.06	10.1	11.48	200	47	United States Environmental Protection Agency, EPA Method 7	Rayong
Total Suspended Particulate	02:45 PM - 03:39 PM	mg/m3	-	0.5	<0.5	<0.5	320	50	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline :

Guideline

- 1). 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)
- 2). Emission Air Standard according to EIA study of SSMC-EBSM Plant, Approval Letter No. Tor Sor 1009.9/579 dated January 20, B.E.2555.

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)
ทะเบียนเลขที่ ๖-323-๖-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ ๖-323-๖-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL

S:\Reports\Air Stack_O2_2GL.rpt (9:55AM)



Analysis / Test Report

TESTING
No.0042

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2450170

Date Received : May 08, 2024

Date Reported : May 16, 2024

Report Number: 2982639-1

Page 2 of 2

Sample Number	2450170-1
Sampled Date	May 08, 2024
Sample Description	Emission from Stationary Source
Location	Reactor Feed Heater (AF-7) (GPS 47P 0733750, 1404290)
Date Analysis Commenced	May 09, 2024
Condition of Sample	Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description

Ambient Pressure	757	mmHg	Diameter	1.50	m	Oxygen	5.1	%
Ambient Temperature	33.3	°C	Shape	Circle		Carbon Dioxide	9.0	%
Type of Process	Combustion		Stack Temperature	181	°C	Gas Velocity	4.3	m/s
Type of Fuel	Natural Gas		Moisture	14.52	%	Flow Rate (Actual O2)	15318	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Carbon Monoxide *	02:55 PM - 03:05 PM	g/s	-	-	<0.005	-	-	Calculated	Rayong
Oxides of Nitrogen *	02:45 PM - 15:00 PM	g/s	-	-	0.092	-	0.99	Calculated	Rayong
Total Suspended Particulate*	02:45 PM - 03:39 PM	g/s	-	-	<0.002	-	0.41	Calculated	Rayong

Guideline :

Guideline

- 1).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)
- 2).Emission Air Standard according to EIA study of SSMC-EBSM Plant, Approval Letter No. Tor Sor 1009.9/579 dated January 20, B.E.2555.

Sampled By : Siriwit Ruangsom

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.

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL

S:\Reports_Air Stack_O2_2GL.rpt (9:55AM)



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2450170

Date Received : May 08, 2024

Date Reported : May 16, 2024

Report Number: 2982639-2

Page 1 of 1

Sample Number	2450170-1
Sampled Date	May 08, 2024
Sample Description	Emission from Stationary Source
Location	Reactor Feed Heater (AF-7) (GPS 47P 0733750, 1404290)
Date Analysis Commenced	May 09, 2024
Condition of Sample	Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description

Ambient Pressure	757	mmHg	Diameter	1.50	m	Oxygen	5.1	%
Ambient Temperature	33.3	°C	Shape	Circle		Carbon Dioxide	9.0	%
Type of Process	Combustion		Stack Temperature	181	°C	Gas Velocity	4.3	m/s
Type of Fuel	Natural Gas		Moisture	14.52	%	Flow Rate (Actual O2)	15318	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O ₂	Result at 5.1 % O ₂	Method	Testing Location
Air Testing								
Methane as Propane	02:55 PM - 03:05 PM	ppm	-	0.4	<0.4	<0.4	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong
Non-Methane Hydrocarbon as Propane	02:55 PM - 03:05 PM	ppm	-	0.4	0.8	0.91	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong
Total Hydrocarbon as Propane	02:55 PM - 03:05 PM	ppm	-	0.4	0.8	0.91	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong

Guideline :

Guideline

- 1). 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)
- 2). Emission Air Standard according to EIA study of SSMC-EBSM Plant, Approval Letter No. Tor Sor 1009.9/579 dated January 20, B.E.2555.

Sampled By : Siriwit Ruangsom

Remark :

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

Approved by

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL

S:\Reports\Air Stack_O2_NoGL.rpt (9:55AM)



Analysis / Test Report

TESTING
No.0042

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2450274
Date Received : May 08, 2024
Date Reported : May 16, 2024
Report Number: 2982641-1

Page 1 of 2

Sample Number 2450274-1
Sampled Date May 08, 2024
Sample Description Emission from Stationary Source
Location Fired Heater (AF-9) (GPS 47P 0733750, 1404298)
Date Analysis Commenced May 09, 2024
Condition of Sample Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description

Ambient Pressure	757	mmHg	Diameter	1.60	m	Oxygen	4.4	%
Ambient Temperature	33.3	°C	Shape	Circle		Carbon Dioxide	9.4	%
Type of Process	Combustion		Stack Temperature	208	°C	Gas Velocity	4.8	m/s
Type of Fuel	Natural Gas		Moisture	13.99	%	Flow Rate (Actual O2)	18631	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 % O ₂	Result at 4.4 % O ₂	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing										
Carbon Monoxide *	11:20 AM - 11:30 AM	ppm	-	1.0	<1.0	<1.0	690	-	United States Environmental Protection Agency, EPA Method 10	Rayong
Oxides of Nitrogen *	11:10 AM - 11:25 AM	ppm	-	1.06	14.7	17.45	200	47	United States Environmental Protection Agency, EPA Method 7	Rayong
Total Suspended Particulate	11:12 AM - 12:00 PM	mg/m3	-	0.5	<0.5	<0.5	320	50	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline :

Guideline

- 1).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)
- 2).Emission Air Standard according to EIA study of SSMC-EBSM Plant, Approval Letter No. Tor Sor 1009.9/579 dated January 20, B.E.2555.

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)
ทะเบียนเลขที่ ๖-323-๖-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ ๖-323-๖-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL

S:\Reports_Air Stack_O2_2GL.rpt (10:07AM)



Analysis / Test Report

TESTING
No.0042

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2450274
Date Received : May 08, 2024
Date Reported : May 16, 2024
Report Number: 2982641-1

Page 2 of 2

Sample Number 2450274-1
Sampled Date May 08, 2024
Sample Description Emission from Stationary Source
Location Fired Heater (AF-9) (GPS 47P 0733750, 1404298)
Date Analysis Commenced May 09, 2024
Condition of Sample Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description

Ambient Pressure	757	mmHg	Diameter	1.60	m	Oxygen	4.4	%
Ambient Temperature	33.3	°C	Shape	Circle		Carbon Dioxide	9.4	%
Type of Process	Combustion		Stack Temperature	208	°C	Gas Velocity	4.8	m/s
Type of Fuel	Natural Gas		Moisture	13.99	%	Flow Rate (Actual O2)	18631	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Carbon Monoxide *	11:20 AM - 11:30 AM	g/s	-	-	<0.006	-	-	Calculated	Rayong
Oxides of Nitrogen *	11:10 AM - 11:25 AM	g/s	-	-	0.170	-	1.14	Calculated	Rayong
Total Suspended Particulate *	11:12 AM - 12:00 PM	g/s	-	-	<0.003	-	0.47	Calculated	Rayong

Guideline :

Guideline

- 1). 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)
- 2). Emission Air Standard according to EIA study of SSMC-EBSM Plant, Approval Letter No. Tor Sor 1009.9/579 dated January 20, B.E.2555.

Sampled By : Siriwit Ruangsom

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.

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL

S:\Reports\Air Stack_O2_2GL.rpt (10:07AM)



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2450274

Date Received : May 08, 2024

Date Reported : May 16, 2024

Report Number: 2982641-2

Page 1 of 1

Sample Number	2450274-1
Sampled Date	May 08, 2024
Sample Description	Emission from Stationary Source
Location	Fired Heater (AF-9) (GPS 47P 0733750, 1404298)
Date Analysis Commenced	May 09, 2024
Condition of Sample	Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description

Ambient Pressure	757	mmHg	Diameter	1.60	m	Oxygen	4.4	%
Ambient Temperature	33.3	°C	Shape	Circle		Carbon Dioxide	9.4	%
Type of Process	Combustion		Stack Temperature	208	°C	Gas Velocity	4.8	m/s
Type of Fuel	Natural Gas		Moisture	13.99	%	Flow Rate (Actual O2)	18631	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O ₂	Result at 4.4 % O ₂	Method	Testing Location
Air Testing								
Methane as Propane	11:20 AM - 11:30 AM	ppm	-	0.4	<0.4	<0.4	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong
Non-Methane Hydrocarbon as Propane	11:20 AM - 11:30 AM	ppm	-	0.4	0.5	0.59	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong
Total Hydrocarbon as Propane	11:20 AM - 11:30 AM	ppm	-	0.4	0.5	0.59	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong

Guideline :

Guideline

- 1).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)
- 2).Emission Air Standard according to EIA study of SSMC-EBSM Plant, Approval Letter No. Tor Sor 1009.9/579 dated January 20, B.E.2555.

Sampled By : Siriwit Ruangsom

Remark :

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

Approved by

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL

S:\Reports_Air Stack_O2_NoGL.rpt (10:07AM)



Analysis / Test Report

TESTING
No.0042

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2450275
Date Received : May 09, 2024
Date Reported : May 16, 2024
Report Number: 2982643-1

Page 1 of 2

Sample Number 2450275-1
Sampled Date May 09, 2024
Sample Description Emission from Stationary Source
Location Styrene Furnace (GPS 47P 0733853, 1404279)
Date Analysis Commenced May 10, 2024
Condition of Sample Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description

Ambient Pressure	757	mmHg	Diameter	2.25	m	Oxygen	7.4	%
Ambient Temperature	33.3	°C	Shape	Circle		Carbon Dioxide	7.7	%
Type of Process	Combustion		Stack Temperature	185	°C	Gas Velocity	9.7	m/s
Type of Fuel	Natural Gas		Moisture	16.76	%	Flow Rate (Actual O2)	75198	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result		Guideline (1)	Guideline (2)	Method	Testing Location
					at 7 %O ₂	at 7.4 % O ₂				
Air Testing										
Carbon Monoxide *	10:45 AM - 10:55 AM	ppm	-	1.0	<1.0	<1.0	690	-	United States Environmental Protection Agency, EPA Method 10	Rayong
Oxides of Nitrogen *	10:40 AM - 10:55 AM	ppm	-	1.06	37.2	36.13	200	200	United States Environmental Protection Agency, EPA Method 7	Rayong
Total Suspended Particulate	10:30 AM - 11:12 AM	mg/m3	-	0.5	<0.5	<0.5	320	60	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline :

Guideline

- 1). 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)
- 2). Emission Air Standard according to EIA study of SSMC-EBSM Plant, Approval Letter No. Tor Sor 1009.9/579 dated January 20, B.E.2555.

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)
ทะเบียนเลขที่ 1-323-ก-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ 1-323-ก-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL

S:\Reports\Air Stack_O2_2GL.rpt (10:16AM)



Analysis / Test Report

TESTING
No.0042

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2450275
Date Received : May 09, 2024
Date Reported : May 16, 2024
Report Number: 2982643-1

Page 2 of 2

Sample Number 2450275-1
Sampled Date May 09, 2024
Sample Description Emission from Stationary Source
Location Styrene Furnace (GPS 47P 0733853, 1404279)
Date Analysis Commenced May 10, 2024
Condition of Sample Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description

Ambient Pressure	757	mmHg	Diameter	2.25	m	Oxygen	7.4	%
Ambient Temperature	33.3	°C	Shape	Circle		Carbon Dioxide	7.7	%
Type of Process	Combustion		Stack Temperature	185	°C	Gas Velocity	9.7	m/s
Type of Fuel	Natural Gas		Moisture	16.76	%	Flow Rate (Actual O2)	75198	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Carbon Monoxide *	10:45 AM - 10:55 AM	g/s	-	-	<0.023	-	-	Calculated	Rayong
Oxides of Nitrogen *	10:40 AM - 10:55 AM	g/s	-	-	1.415	-	8.23	Calculated	Rayong
Total Suspended Particulate *	10:30 AM - 11:12 AM	g/s	-	-	<0.010	-	0.92	Calculated	Rayong

Guideline :

- Guideline
1). 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)
2). Emission Air Standard according to EIA study of SSMC-EBSM Plant, Approval Letter No. Tor Sor 1009.9/579 dated January 20, B.E.2555.

Sampled By : Sathapron Thakarw

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.

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)
ทะเบียนเลขที่ ๖-323-๖-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ ๖-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL

S:\Reports_Air Stack_O2_2GL.rpt (10:16AM)



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2450275

Date Received : May 09, 2024

Date Reported : May 16, 2024

Report Number: 2982643-2

Page 1 of 1

Sample Number	2450275-1
Sampled Date	May 09, 2024
Sample Description	Emission from Stationary Source
Location	Styrene Furnace (GPS 47P 0733853, 1404279)
Date Analysis Commenced	May 10, 2024
Condition of Sample	Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description

Ambient Pressure	757	mmHg	Diameter	2.25	m	Oxygen	7.4	%
Ambient Temperature	33.3	°C	Shape	Circle		Carbon Dioxide	7.7	%
Type of Process	Combustion		Stack Temperature	185	°C	Gas Velocity	9.7	m/s
Type of Fuel	Natural Gas		Moisture	16.76	%	Flow Rate (Actual O2)	75198	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O ₂	Result at 7.4 % O ₂	Method	Testing Location
Air Testing								
Methane as Propane	10:45 AM - 10:55 AM	ppm	-	0.4	<0.4	<0.4	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong
Non-Methane Hydrocarbon as Propane	10:45 AM - 10:55 AM	ppm	-	0.4	0.9	0.87	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong
Total Hydrocarbon as Propane	10:45 AM - 10:55 AM	ppm	-	0.4	0.9	0.87	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong

Guideline :

Guideline

- 1).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)
- 2).Emission Air Standard according to EIA study of SSMC-EBSM Plant, Approval Letter No. Tor Sor 1009.9/579 dated January 20, B.E.2555.

Sampled By : Sathapron Thakarw

Remark :

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

Approved by

Thanita K.

Thanita Kulsuriwong

Scientist (4)

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL

S:\Reports_Air Stack_O2_NoGL.rpt (10:16AM)

ภาคผนวก ค-2

คุณภาพอากาศในบรรยากาศ



Analysis / Test Report

TESTING
No.0042

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand
21150

P/O :

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2417712

Date Received : Jun 17, 2024

Date Reported : Jun 20, 2024

Report Number: 2911683-1

Page 1 of 1

Sample Description	Air Quality
Location	บ้านอ่าวประดู่ (โรงพยาบาลส่งเสริมสุขภาพตำบลตากวน) (GPS 47P 0735531, 1402769)
Date Analysis Commenced	Jun 17, 2024
Condition of Sample	Drawn into one glass filter paper (8x10 inch) placed in plastic bag and one quartz filter paper (8x10 inch) placed in plastic bag

Sample Number	Sampled Date	Total Suspended Particulate (mg/m3)	Particulate Matter (PM-10) (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2417712-1	Jun 09 - Jun 10, 2024	0.022	0.008	751	32
2417712-2	Jun 10 - Jun 11, 2024	0.023	0.012	751	29
2417712-3	Jun 11 - Jun 12, 2024	0.023	0.011	751	29
2417712-4	Jun 12 - Jun 13, 2024	0.034	0.017	751	30
2417712-5	Jun 13 - Jun 14, 2024	0.066	0.025	751	31
2417712-6	Jun 14 - Jun 15, 2024	0.032	0.017	751	31
2417712-7	Jun 15 - Jun 16, 2024	0.035	0.016	751	32
Guideline		0.33	0.12	-	-

Reference Method

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

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

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

Sampled By : Chatchai Sukpia

Remark :

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

Approved by

Wilawan Borirak
Manager

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2417706
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number: 2911613-1

Page 1 of 1

Sample Description Air Quality
Location บ้านอ่าวประดู่ (โรงพยาบาลส่งเสริมสุขภาพตำบลตากวน) (GPS 47P 0735531, 1402769)
Parameter Nitrogen dioxide (ppm)
Measurement Date Jun 09, 2024 - Jun 16, 2024
Measurement by Chatchai Sukpia

	2417706-1	2417706-2	2417706-3	2417706-4	2417706-5	2417706-6	2417706-7
Time	Jun 09, 2024	Jun 10, 2024	Jun 11, 2024	Jun 12, 2024	Jun 13, 2024	Jun 14, 2024	Jun 15, 2024
10:00 AM - 11:00 AM	0.008	0.018	0.022	0.006	0.002	0.007	0.014
11:00 PM - 12:00 AM	0.015	0.012	0.044	0.013	0.002	0.006	0.010
12:00 PM - 01:00 PM	0.019	0.012	0.034	0.017	0.002	0.006	0.005
01:00 PM - 02:00 PM	0.017	0.013	0.024	0.014	0.002	0.008	0.005
02:00 PM - 03:00 PM	0.016	0.012	0.021	0.019	0.003	0.010	0.006
03:00 PM - 04:00 PM	0.016	0.022	0.018	0.018	0.006	0.015	0.010
04:00 PM - 05:00 PM	0.009	0.035	0.024	0.008	0.006	0.017	0.019
05:00 PM - 06:00 PM	0.008	0.034	0.033	0.010	0.007	0.018	0.022
06:00 PM - 07:00 PM	0.010	0.031	0.035	0.011	0.004	0.016	0.020
07:00 PM - 08:00 PM	0.011	0.032	0.032	0.008	0.003	0.017	0.016
08:00 PM - 09:00 PM	0.007	0.032	0.027	0.010	0.002	0.010	0.015
09:00 PM - 10:00 PM	0.004	0.024	0.024	0.011	0.001	0.008	0.009
10:00 PM - 11:00 PM	0.002	0.018	0.020	0.012	0.001	0.010	0.012
11:00 PM - 12:00 AM	0.003	0.018	0.025	0.013	<0.001	0.008	0.013
12:00 AM - 01:00 AM	0.002	0.019	0.023	0.010	<0.001	0.008	0.006
01:00 AM - 02:00 AM	0.003	0.021	0.016	0.012	<0.001	0.006	0.006
02:00 AM - 03:00 AM	0.002	0.019	0.013	0.010	0.001	0.008	0.010
03:00 AM - 04:00 AM	0.002	0.015	0.018	0.012	0.002	0.009	0.008
04:00 AM - 05:00 AM	0.003	0.017	0.020	0.013	0.004	0.010	0.009
05:00 AM - 06:00 AM	0.006	0.019	0.021	0.020	0.010	0.009	0.012
06:00 AM - 07:00 AM	0.015	0.022	0.025	0.022	0.005	0.008	0.006
07:00 AM - 08:00 AM	0.015	0.020	0.015	0.017	0.009	0.007	0.005
08:00 AM - 09:00 AM	0.015	0.021	0.006	0.011	0.011	0.007	0.003
09:00 AM - 10:00 AM	0.024	0.017	0.006	0.001	0.012	0.013	0.004
Average	0.010	0.021	0.023	0.012	0.004	0.010	0.010
1hr - Maximum	0.024	0.035	0.044	0.022	0.012	0.018	0.022
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

Lot ID: 2417710

Date Received :Jun 17, 2024

Date Reported :Jun 21, 2024

Report Number :2911620-1

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Page 1 of 2

Sample Number 2417710-1 to 7
Parameter Wind Speed / Wind Direction
Location บ้านสาวประตู่ (โรงพยาบาลส่งเสริมสุขภาพตำบลตากรวน) (GPS 47P 0735531, 1402769)
Sampling Date Jun 09 - Jun 16, 2024
Sampling by Chatchai Sukpia

Time	Jun 09 - Jun 10, 2024		Jun 10 - Jun 11, 2024		Jun 11 - Jun 12, 2024		Jun 12 - Jun 13, 2024		Jun 13 - Jun 14, 2024		Jun 14 - Jun 15, 2024		Jun 15 - Jun 16, 2024	
	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)
10:00 AM - 11:00 AM	2.1	138.0	SE	1.5	181.0	S	0.0	-	1.4	221.0	SW	1.7	270.0	W
11:00 AM - 12:00 PM	2.5	114.0	ESE	4.5	197.0	SSW	1.9	249.0	WSW	0.7	201.0	SSW	1.2	266.0
12:00 PM - 01:00 PM	0.8	168.0	SSE	1.8	195.0	SSW	2.1	216.0	SW	1.6	220.0	SW	1.8	222.0
01:00 PM - 02:00 PM	0.7	261.0	W	3.4	211.0	SSW	1.7	244.0	WSW	0.7	241.0	WSW	1.6	192.0
02:00 PM - 03:00 PM	0.4	256.0	WSW	0.0	-	-	1.9	203.0	SSW	2.3	157.0	SSE	2.0	229.0
03:00 PM - 04:00 PM	1.1	246.0	WSW	1.3	185.0	S	1.9	69.0	ENE	0.4	247.0	WSW	0.7	184.0
04:00 PM - 05:00 PM	0.4	190.0	S	0.4	234.0	SW	4.4	307.0	NW	0.0	-	-	0.7	209.0
05:00 PM - 06:00 PM	0.8	171.0	S	0.0	-	-	0.0	-	-	0.0	-	-	1.1	241.0
06:00 PM - 07:00 PM	1.4	268.0	W	0.0	-	-	0.1	-	-	0.0	-	-	2.2	178.0
07:00 PM - 08:00 PM	2.4	194.0	SSW	0.7	237.0	WSW	0.5	228.0	SW	3.8	253.0	WSW	1.5	230.0
08:00 PM - 09:00 PM	3.1	220.0	SW	0.0	-	-	1.6	272.0	W	0.0	-	-	0.0	-
09:00 PM - 10:00 PM	0.8	30.0	NNE	2.7	253.0	WSW	0.0	-	-	0.0	-	-	0.0	-
10:00 PM - 11:00 PM	1.4	242.0	WSW	0.4	229.0	SW	0.0	-	-	1.2	246.0	WSW	1.2	224.0
11:00 PM - 12:00 AM	0.0	-	-	3.8	230.0	SW	0.0	-	-	2.1	268.0	W	0.7	240.0
12:00 AM - 01:00 AM	1.5	202.0	SSW	1.1	189.0	S	0.0	-	-	0.0	-	-	1.3	290.0
01:00 AM - 02:00 AM	0.0	-	-	1.8	239.0	WSW	0.7	223.0	SW	1.6	273.0	W	2.6	297.0
02:00 AM - 03:00 AM	0.5	198.0	SSW	1.2	164.0	SSE	0.8	209.0	SSW	0.0	-	-	0.8	230.0
03:00 AM - 04:00 AM	2.1	258.0	WSW	0.7	160.0	SSE	0.0	-	-	0.0	-	-	1.6	268.0
04:00 AM - 05:00 AM	0.0	-	-	2.4	160.0	SSE	0.4	209.0	SSW	0.3	254.0	WSW	0.0	-
05:00 AM - 06:00 AM	1.5	192.0	SSW	0.9	210.0	SSW	0.9	178.0	S	0.8	104.0	ESE	0.0	-
06:00 AM - 07:00 AM	4.3	220.0	SW	0.0	-	-	0.0	-	-	0.6	306.0	NW	0.0	-
07:00 AM - 08:00 AM	2.5	158.0	SSE	2.9	213.0	SSW	2.1	240.0	WSW	2.0	231.0	SW	0.3	215.0
08:00 AM - 09:00 AM	0.5	172.0	S	1.2	188.0	S	1.7	224.0	SW	0.6	246.0	WSW	1.2	183.0
09:00 AM - 10:00 AM	1.5	132.0	SE	3.5	191.0	S	2.8	251.0	WSW	3.1	212.0	SSW	1.4	185.0

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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

Approved by

Sarayuth Jittrantont
Assistant General Manager



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2417710

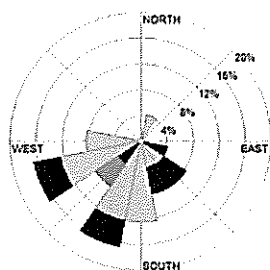
Date Received : Jun 17, 2024

Date Reported : Jun 21, 2024

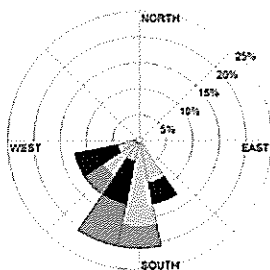
Report Number : 2911620-1

Page 2 of 2

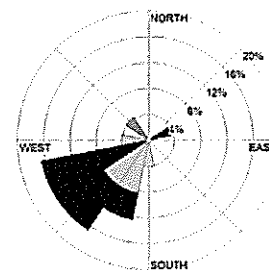
Wind Rose



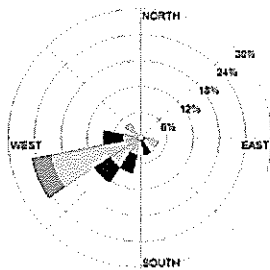
Date : Jun 09-10, 2024



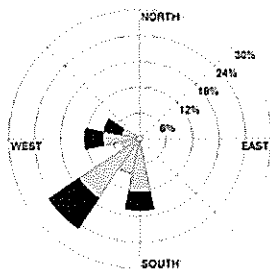
Date : Jun 10-11, 2024



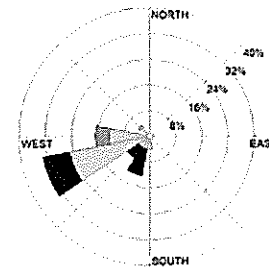
Date : Jun 11-12, 2024



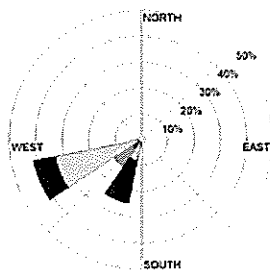
Date : Jun 12-13, 2024



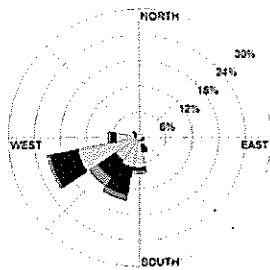
Date : Jun 13-14, 2024



Date : Jun 14-15, 2024



Date : Jun 15-16, 2024



Date : Jun 09-16, 2024

WS (m/s)	%
≥ 10.0	0.00
8.0-10.0	0.00
5.5-8.0	0.00
3.3-5.5	5.95
1.7-3.3	23.81
0.3-1.7	45.83
Calms	24.40

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

Approved by

Sarayuth Jittrantont
Assistant General Manager



Analysis / Test Report

TESTING
No.0042

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand
21150

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2417746

Date Received : Jun 17, 2024

Date Reported : Jun 20, 2024

Report Number: 2911687-1

Page 1 of 1

Sample Description	Air Quality				
Location	บ้านนาตาพูด (GPS 47P 0735346, 1406705)				
Date Analysis Commenced	Jun 17, 2024				
Condition of Sample	Drawn into one glass filter paper (8x10 inch) placed in plastic bag and one quartz filter paper (8x10 inch) placed in plastic bag				
Sample Number	Sampled Date	Total Suspended Particulate (mg/m3)	Particulate Matter (PM-10) (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2417746-1	Jun 09 - Jun 10, 2024	0.025	0.009	751	31
2417746-2	Jun 10 - Jun 11, 2024	0.028	0.009	751	31
2417746-3	Jun 11 - Jun 12, 2024	0.020	0.010	751	31
2417746-4	Jun 12 - Jun 13, 2024	0.030	0.014	751	31
2417746-5	Jun 13 - Jun 14, 2024	0.020	0.017	751	32
2417746-6	Jun 14 - Jun 15, 2024	0.039	0.017	751	32
2417746-7	Jun 15 - Jun 16, 2024	0.055	0.019	751	32
Guideline		0.33	0.12	-	-

Reference Method

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

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

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

Sampled By : Chatchai Sukpia

Remark :

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

Approved by

Wilawan Borirak
Manager

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2417709
Date Received : Jun 18, 2024
Date Reported : Jun 24, 2024
Report Number: 2911617-1

Page 1 of 1

Sample Description Air Quality
Location บ้านนาบตาพุด (GPS 47P 0735346, 1406705)
Parameter Nitrogen dioxide (ppm)
Measurement Date Jun 09, 2024 - Jun 16, 2024
Measurement by Chatchai Sukpia

	2417709-1	2417709-2	2417709-3	2417709-4	2417709-5	2417709-6	2417709-7
Time	Jun 09, 2024	Jun 10, 2024	Jun 11, 2024	Jun 12, 2024	Jun 13, 2024	Jun 14, 2024	Jun 15, 2024
11:00 AM - 12:00 PM	0.021	0.009	0.012	0.008	0.007	0.007	0.008
12:00 PM - 01:00 PM	0.016	0.008	0.008	0.006	0.006	0.005	0.007
01:00 PM - 02:00 PM	0.012	0.008	0.007	0.007	0.006	0.004	0.003
02:00 PM - 03:00 PM	0.008	0.010	0.007	0.007	0.007	0.005	0.002
03:00 PM - 04:00 PM	0.009	0.008	0.008	0.009	0.006	0.005	0.002
04:00 PM - 05:00 PM	0.005	0.008	0.007	0.010	0.009	0.008	0.004
05:00 PM - 06:00 PM	0.004	0.007	0.007	0.012	0.010	0.010	0.006
06:00 PM - 07:00 PM	0.006	0.008	0.010	0.015	0.012	0.018	0.006
07:00 PM - 08:00 PM	0.010	0.011	0.012	0.013	0.018	0.020	0.008
08:00 PM - 09:00 PM	0.012	0.019	0.018	0.018	0.022	0.020	0.003
09:00 PM - 10:00 PM	0.013	0.020	0.023	0.012	0.021	0.018	0.002
10:00 PM - 11:00 PM	0.010	0.015	0.019	0.009	0.016	0.017	0.002
11:00 PM - 12:00 AM	0.009	0.009	0.014	0.014	0.011	0.019	0.002
12:00 AM - 01:00 AM	0.009	0.011	0.011	0.012	0.008	0.014	0.002
01:00 AM - 02:00 AM	0.011	0.010	0.010	0.012	0.007	0.014	0.002
02:00 AM - 03:00 AM	0.011	0.011	0.014	0.013	0.015	0.007	0.002
03:00 AM - 04:00 AM	0.011	0.010	0.007	0.013	0.010	0.012	0.002
04:00 AM - 05:00 AM	0.007	0.006	0.015	0.015	0.008	0.006	0.003
05:00 AM - 06:00 AM	0.008	0.011	0.010	0.014	0.005	0.004	0.002
06:00 AM - 07:00 AM	0.007	0.014	0.009	0.013	0.013	0.002	0.002
07:00 AM - 08:00 AM	0.008	0.018	0.014	0.012	0.010	0.004	0.002
08:00 AM - 09:00 AM	0.011	0.016	0.011	0.014	0.011	0.005	0.003
09:00 AM - 10:00 AM	0.011	0.012	0.012	0.015	0.013	0.007	0.003
10:00 AM - 11:00 AM	0.013	0.015	0.012	0.013	0.010	0.009	0.006
Average	0.010	0.011	0.012	0.012	0.011	0.010	0.004
1hr - Maximum	0.021	0.020	0.023	0.018	0.022	0.020	0.008
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

Orawan R.

Orawan Rakyong
Scientist (3)

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

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

Lot ID: 2417711

Date Received :Jun 17, 2024

Date Reported :Jun 21, 2024

Report Number :2911663-1

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Page 1 of 2

Sample Number 2417711-1 to 7
Parameter Wind Speed / Wind Direction
Location บ้านนาบตาพุด (GPS 47P 0735346, 1406705)
Sampling Date Jun 09 - Jun 16, 2024
Sampling by Chatchai Sukpia

Time	Jun 09 - Jun 10, 2024			Jun 10 - Jun 11, 2024			Jun 11 - Jun 12, 2024			Jun 12 - Jun 13, 2024			Jun 13 - Jun 14, 2024			Jun 14 - Jun 15, 2024			Jun 15 - Jun 16, 2024		
	WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)	
11:00 AM - 12:00 PM	1.4	207.0	SSW	1.1	311.0	NW	0.6	287.0	WNW	0.5	307.0	NW	1.3	263.0	W	2.2	282.0	WNW	2.2	261.0	W
12:00 PM - 01:00 PM	1.6	257.0	WSW	2.7	252.0	WSW	1.1	279.0	W	1.5	265.0	W	2.8	260.0	W	1.3	291.0	WNW	1.8	239.0	WSW
01:00 PM - 02:00 PM	1.7	284.0	WNW	2.9	241.0	WSW	2.2	249.0	WSW	1.0	281.0	W	1.5	332.0	NNW	1.6	242.0	WSW	4.2	272.0	W
02:00 PM - 03:00 PM	2.1	286.0	WNW	1.8	237.0	WSW	2.1	297.0	WNW	1.1	284.0	WNW	1.5	309.0	NW	3.8	220.0	SW	1.2	316.0	NW
03:00 PM - 04:00 PM	0.8	46.0	NE	1.6	280.0	W	1.1	274.0	W	1.0	326.0	NW	3.4	276.0	W	1.4	256.0	WSW	2.6	287.0	WNW
04:00 PM - 05:00 PM	1.3	338.0	NNW	1.0	310.0	NW	1.4	249.0	WSW	1.2	294.0	WNW	0.7	293.0	WNW	1.1	300.0	WNW	0.9	275.0	W
05:00 PM - 06:00 PM	0.6	202.0	SSW	1.9	280.0	W	0.4	301.0	WNW	0.5	285.0	WNW	0.5	297.0	WNW	0.7	283.0	WNW	0.9	257.0	WSW
06:00 PM - 07:00 PM	2.5	316.0	NW	1.5	294.0	WNW	0.7	68.0	ENE	0.8	284.0	WNW	0.4	314.0	NW	0.6	290.0	WNW	0.4	226.0	SW
07:00 PM - 08:00 PM	2.1	332.0	NNW	1.1	270.0	W	0.0	-	-	0.7	307.0	NW	0.8	286.0	WNW	0.5	300.0	WNW	0.3	294.0	WNW
08:00 PM - 09:00 PM	1.1	301.0	WNW	1.3	276.0	W	2.3	234.0	SW	0.7	278.0	W	2.7	294.0	WNW	0.0	-	-	1.7	263.0	W
09:00 PM - 10:00 PM	0.9	299.0	WNW	0.6	289.0	WNW	1.2	238.0	WSW	0.3	284.0	WNW	0.5	255.0	WSW	1.1	309.0	NW	1.0	315.0	NW
10:00 PM - 11:00 PM	1.0	315.0	NW	1.6	279.0	W	0.5	291.0	WNW	1.6	275.0	W	1.9	230.0	SW	2.5	276.0	W	0.9	281.0	W
11:00 PM - 12:00 AM	2.1	256.0	WSW	1.6	343.0	NNW	0.0	-	-	0.8	297.0	WNW	1.1	318.0	NW	0.4	300.0	WNW	1.0	310.0	NW
12:00 AM - 01:00 AM	2.4	288.0	WNW	1.9	327.0	NNW	0.0	-	-	1.0	304.0	NW	0.7	286.0	WNW	0.6	310.0	NW	0.5	283.0	WNW
01:00 AM - 02:00 AM	1.6	294.0	WNW	1.0	320.0	NW	1.7	318.0	NW	0.5	281.0	W	0.0	-	-	0.5	298.0	WNW	0.4	292.0	WNW
02:00 AM - 03:00 AM	1.5	291.0	WNW	0.8	226.0	SW	0.0	-	-	0.8	296.0	WNW	0.8	359.0	N	0.8	309.0	NW	0.5	65.0	ENE
03:00 AM - 04:00 AM	4.4	300.0	WNW	1.6	265.0	W	0.5	287.0	WNW	0.5	318.0	NW	0.7	283.0	WNW	1.7	77.0	ENE	0.8	37.0	NE
04:00 AM - 05:00 AM	1.0	273.0	W	2.8	345.0	NNW	0.0	-	-	0.1	-	-	0.5	320.0	NW	1.1	289.0	WNW	2.2	23.0	NNE
05:00 AM - 06:00 AM	1.4	243.0	WSW	1.4	230.0	SW	3.5	331.0	NNW	0.3	276.0	W	0.0	-	-	0.5	301.0	WNW	1.0	316.0	NW
06:00 AM - 07:00 AM	0.9	317.0	NW	0.9	294.0	WNW	1.5	283.0	WNW	1.4	272.0	W	1.0	289.0	WNW	1.3	48.0	NE	0.6	327.0	NNW
07:00 AM - 08:00 AM	1.1	288.0	WNW	0.8	258.0	WSW	0.8	270.0	W	1.6	322.0	NW	1.2	275.0	W	0.5	299.0	WNW	0.9	231.0	SW
08:00 AM - 09:00 AM	2.5	280.0	W	1.6	287.0	WNW	0.7	301.0	WNW	0.9	301.0	WNW	0.8	287.0	WNW	0.7	300.0	WNW	2.6	20.0	NNE
09:00 AM - 10:00 AM	1.7	304.0	NW	1.6	254.0	WSW	0.9	298.0	WNW	0.8	290.0	WNW	0.6	274.0	W	1.0	244.0	WSW	1.2	38.0	NE
10:00 AM - 11:00 AM	4.0	237.0	WSW	2.8	247.0	WSW	1.6	239.0	WSW	1.5	280.0	W	1.6	277.0	W	1.2	268.0	W	2.2	46.0	NE

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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

Approved by

Sarayuth Jittrantont
Assistant General Manager



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

Lot ID: 2417711
Date Received : Jun 17, 2024
Date Reported : Jun 21, 2024
Report Number : 2911663-1

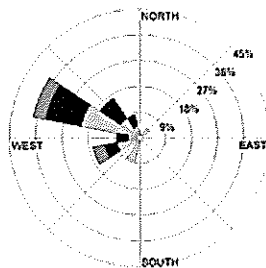
P/O : 4515759206

Project Name : Environmental Quality Monitoring

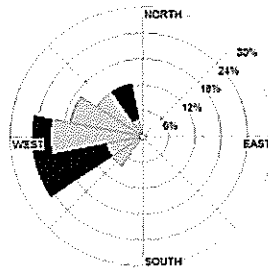
Project Location : Map Ta Phut_EBSM (SSMC)

Page 2 of 2

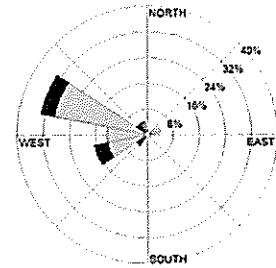
Wind Rose



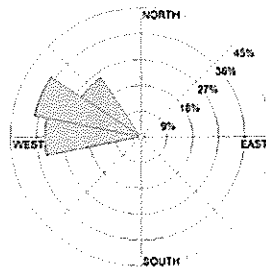
Date : Jun 09-10, 2024



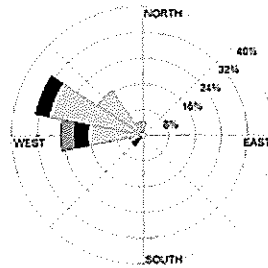
Date : Jun 10-11, 2024



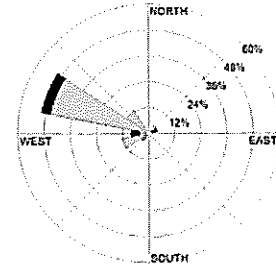
Date : Jun 11-12, 2024



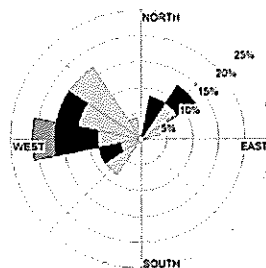
Date : Jun 12-13, 2024



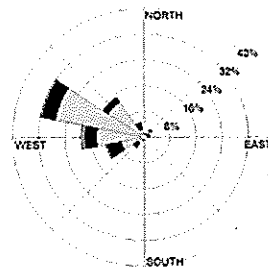
Date : Jun 13-14, 2024



Date : Jun 14-15, 2024



Date : Jun 15-16, 2024



Date : Jun 09-16, 2024

WS (m/s)	%
> 10.0	0.00
8.0-10.0	0.00
5.5-8.0	0.00
3.3-5.5	3.57
1.7-3.3	19.05
0.3-1.7	72.02
Calms	5.36

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

Approved by

Sarayuth Jittrantont
Assistant General Manager

ภาคผนวก ค-3

คุณภาพน้ำ



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O :

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0042

Lot ID: 23146703

Date Received : Jan 10, 2024

Date Reported : Jan 18, 2024

Report Number : 2872765-1

Page 1 of 2

Sample Number	23146703-1						
Sampled Date	Jan 10, 2024 9:55 AM						
Sample Description	Wastewater						
Location	AZ-1						
Date Analysis Commenced	Jan 10, 2024						
Condition of Sample	Contained in two amber glass bottles, four glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	29	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	15	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	14	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.3	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	-	-	32.7	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	896	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banphit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O :

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0042

Lot ID: 23146703

Date Received : Jan 10, 2024

Date Reported : Jan 18, 2024

Report Number : 2872765-1

Page 2 of 2

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

Sampling By : Sansoen Khuiyoksui ทะเบียนเลขที่ ว-323-จ-0005 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-8592

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

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O :

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0009

Lot ID: 23146703

Date Received : Jan 10, 2024

Date Reported : Jan 18, 2024

Report Number : 2872765-2

Page 1 of 3

Sample Number	23146703-1
Sampled Date	Jan 10, 2024 9:55 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Jan 11, 2024
Condition of Sample	Contained in two amber glass bottles, four glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
1,1,1-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,1,2-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,1-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,2-Dichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,3-Dichloropropane *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Benzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Carbontetrachloride	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
cis-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Ethylbenzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

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

Suwimon C.

Suwimon Chairuangwut
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O :
Project Name : Water Testing
Project Location : Map Ta Phut_EBSM (SSMC)

TESTING
No.0009
Lot ID: 23146703
Date Received : Jan 10, 2024
Date Reported : Jan 18, 2024
Report Number : 2872765-2

Page 2 of 3

Sample Number 23146703-1
Sampled Date Jan 10, 2024 9:55 AM
Sample Description Wastewater
Location AZ-1
Date Analysis Commenced Jan 11, 2024
Condition of Sample Contained in two amber glass bottles, four glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Hexachlorobutadiene *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Methyl Chloride *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Methylene Chloride (Dichloromethane)	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Tetrachloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Toluene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Total Xylene	ug/L	1.5	5	<5	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
trans-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Trichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

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

Suwimon C.

Suwimon Chairuangwut
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-102/ EMAIL

S:\Reports\ALL_GL.rpt (5:50PM)



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O :

Project Name : Water Testing

Project Location : Map Ta Phut_EBSM (SSMC)

TESTING

No.0009

Lot ID: 23146703

Date Received : Jan 10, 2024

Date Reported : Jan 18, 2024

Report Number : 2872765-2

Page 3 of 3

Sample Number	23146703-1						
Sampled Date	Jan 10, 2024 9:55 AM						
Sample Description	Wastewater						
Location	AZ-1						
Date Analysis Commenced	Jan 11, 2024						
Condition of Sample	Contained in two amber glass bottles, four glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Vinyl chloride (Chloroethylene)	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	13.2	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Sansoen Khuiyoksui , Thanasoun Namakunna

Remark :

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

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

Suwimon C.

Suwimon Chairuangwut
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 23147858

Date Received : Feb 07, 2024
Date Reported : Feb 15, 2024
Report Number : 2873649-1

Page 1 of 2

Sample Number	23147858-1						
Sampled Date	Feb 07, 2024 10:50 AM						
Sample Description	Wastewater						
Location	AZ-1						
Date Analysis Commenced	Feb 07, 2024						
Condition of Sample	Contained in four glass vials, one amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	37	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	24	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	23	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.2	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	-	-	35.2	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	764	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ ๖-323-๖-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 23147858
Date Received : Feb 07, 2024
Date Reported : Feb 15, 2024
Report Number : 2873649-1

Page 2 of 2

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

Sampling By : Wanlop Hunchainaow ทะเบียนเลขที่ ว-323-จ-9457 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-จ-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location : Map Ta Phut_EBSM (SSMC)

TESTING

No.0009

Lot ID: 23147858

Date Received : Feb 07, 2024

Date Reported : Feb 15, 2024

Report Number : 2873649-2

Page 1 of 3

Sample Number	23147858-1
Sampled Date	Feb 07, 2024 10:50 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Feb 08, 2024
Condition of Sample	Contained in four glass vials, one amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
1,1,1-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,1,2-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,1-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,2-Dichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,3-Dichloropropane *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Benzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Carbontetrachloride	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
cis-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Ethylbenzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

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

Siriluk P.

Siriluk Puengpang
Section Head

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-102/ EMAIL

S:\Reports_All_GL.rpt (2:02PM)



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

TESTING
No.0009
Lot ID: 23147858
Date Received : Feb 07, 2024
Date Reported : Feb 15, 2024
Report Number : 2873649-2

Page 2 of 3

Sample Number	23147858-1						
Sampled Date	Feb 07, 2024 10:50 AM						
Sample Description	Wastewater						
Location	AZ-1						
Date Analysis Commenced	Feb 08, 2024						
Condition of Sample	Contained in four glass vials, one amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Hexachlorobutadiene *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Methyl Chloride *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Methylene Chloride (Dichloromethane)	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Tetrachloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Toluene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Total Xylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
trans-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Trichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

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

Siriluk P.

Siriluk Puengpang
Section Head

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location : Map Ta Phut_EBSM (SSMC)

TESTING
No.0009
Lot ID: 23147858
Date Received : Feb 07, 2024
Date Reported : Feb 15, 2024
Report Number : 2873649-2

Page 3 of 3

Sample Number	23147858-1						
Sampled Date	Feb 07, 2024 10:50 AM						
Sample Description	Wastewater						
Location	AZ-1						
Date Analysis Commenced	Feb 08, 2024						
Condition of Sample	Contained in four glass vials, one amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Vinyl chloride (Chloroethylene)	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	13.4	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

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.

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

Siriluk P.

Siriluk Puengpang
Section Head

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-102/ EMAIL

S:\Reports\All_GL.rpt (2:02PM)



Analysis / Test Report

TESTING

No.0042

Lot ID: 244503

Date Received : Mar 06, 2024

Date Reported : Mar 14, 2024

Report Number : 2884609-1

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

Page 1 of 2

Page 1 of 1

Sample Number	244503-1						
Sampled Date	Mar 06, 2024 10:30 AM						
Sample Description	Wastewater						
Location	AZ-1						
Date Analysis Commenced	Mar 06, 2024						
Condition of Sample	Contained in four amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	30	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	21	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	18	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.3	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	-	-	34.3	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	896	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0042

Lot ID: 244503

Date Received : Mar 06, 2024

Date Reported : Mar 14, 2024

Report Number : 2884609-1

Page 2 of 2

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

Sampling By : Wanlop Hunchainaow ทะเบียนเลขที่ ว-323-จ-9457 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

TESTING
No.0009
Lot ID: 244503
Date Received : Mar 06, 2024
Date Reported : Mar 14, 2024
Report Number : 2884609-2

Page 1 of 3

Sample Number	244503-1
Sampled Date	Mar 06, 2024 10:30 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Mar 07, 2024
Condition of Sample	Contained in four amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
1,1,1-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,1,2-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,1-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,2-Dichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,3-Dichloropropane *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Benzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Carbontetrachloride	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
cis-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Ethylbenzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

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

Suwimon C.

Suwimon Chairuangwut
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0009

Lot ID: 244503

Date Received : Mar 06, 2024

Date Reported : Mar 14, 2024

Report Number : 2884609-2

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location : Map Ta Phut_EBSM (SSMC)

Page 2 of 3

Sample Number	244503-1
Sampled Date	Mar 06, 2024 10:30 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Mar 07, 2024
Condition of Sample	Contained in four amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Hexachlorobutadiene *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Methyl Chloride *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Methylene Chloride (Dichloromethane)	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Tetrachloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Toluene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Total Xylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
trans-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Trichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

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

Suwimon C.

Suwimon Chairuangwut
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

LIFE SCIENCES

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-102/ EMAIL

S:\Reports\All_GL.rpt (10:50AM)



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0009

Lot ID: 244503

Date Received : Mar 06, 2024

Date Reported : Mar 14, 2024

Report Number : 2884609-2

Page 3 of 3

Page 3 of 3

Sample Number	244503-1						
Sampled Date	Mar 06, 2024 10:30 AM						
Sample Description	Wastewater						
Location	AZ-1						
Date Analysis Commenced	Mar 07, 2024						
Condition of Sample	Contained in four amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Vinyl chloride (Chloroethylene)	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	14.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

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.

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

Suwimon C.

Suwimon Chairuangwut
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING

No.0042

Lot ID: 2429378

Date Received : Apr 03, 2024

Date Reported : Apr 11, 2024

Report Number : 2937266-1

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location : Map Ta Phut_EBSM (SSMC)

Page 1 of 2

Sample Number	2429378-1						
Sampled Date	Apr 03, 2024 10:30 AM						
Sample Description	Wastewater						
Location	AZ-1						
Date Analysis Commenced	Apr 03, 2024						
Condition of Sample	Contained in four glass vials, two amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	41	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	17	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	16	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	36.4	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	972	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

LIFE SCIENCES

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0042

Lot ID: 2429378

Date Received : Apr 03, 2024

Date Reported : Apr 11, 2024

Report Number : 2937266-1

Page 2 of 2

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

Sampling By : Wanlop Hunchainaow ทะเบียนเลขที่ ว-323-จ-9457 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING

No.0009

Lot ID: 2429378

Date Received : Apr 03, 2024

Date Reported : Apr 11, 2024

Report Number : 2937266-2

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location : Map Ta Phut_EBSM (SSMC)

Page 1 of 3

Sample Number	2429378-1
Sampled Date	Apr 03, 2024 10:30 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Apr 04, 2024
Condition of Sample	Contained in four glass vials, two amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
1,1,1-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,1,2-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,1-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,2-Dichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,3-Dichloropropane *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Benzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Carbontetrachloride	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
cis-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Ethylbenzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

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

Siriluk P.

Siriluk Bunnak
Section Head

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-102/ EMAIL

S:\Reports\All_GL.rpt (4:50PM)



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

TESTING
No.0009
Lot ID: 2429378
Date Received : Apr 03, 2024
Date Reported : Apr 11, 2024
Report Number : 2937266-2

Page 2 of 3

Sample Number 2429378-1
Sampled Date Apr 03, 2024 10:30 AM
Sample Description Wastewater
Location AZ-1
Date Analysis Commenced Apr 04, 2024
Condition of Sample Contained in four glass vials, two amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Hexachlorobutadiene *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Methyl Chloride *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Methylene Chloride (Dichloromethane)	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Tetrachloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Toluene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Total Xylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
trans-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Trichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

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

Siriluk P.

Siriluk Bunnak
Section Head

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0009

Lot ID: 2429378

Date Received : Apr 03, 2024

Date Reported : Apr 11, 2024

Report Number : 2937266-2

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

Page 3 of 3

Sample Number	2429378-1						
Sampled Date	Apr 03, 2024 10:30 AM						
Sample Description	Wastewater						
Location	AZ-1						
Date Analysis Commenced	Apr 04, 2024						
Condition of Sample	Contained in four glass vials, two amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Vinyl chloride (Chloroethylene)	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	16.2	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

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.

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

Siriluk P.

Siriluk Bunnak
Section Head

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-102/ EMAIL

S:\Reports\All_GL.rpt (4:50PM)



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0042

Lot ID: 2442691

Date Received : May 02, 2024

Date Reported : May 10, 2024

Report Number : 2967704-1

Page 1 of 2

Page 2 of 3

Sample Number	2442691-1						
Sampled Date	May 02, 2024 9:55 AM						
Sample Description	Wastewater						
Location	AZ-1						
Date Analysis Commenced	May 02, 2024						
Condition of Sample	Contained in two amber glass bottles, four glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	30	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	10	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	9	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	37.3	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	1036	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-ก-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ก-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING

No.0042

Lot ID: 2442691

Date Received : May 02, 2024

Date Reported : May 10, 2024

Report Number : 2967704-1

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location : Map Ta Phut_EBSM (SSMC)

Page 2 of 2

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

Sampling By : Surawit Narapong ทะเบียนเลขที่ ว-323-จ-0011 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0009

Lot ID: 2442691

Date Received : May 02, 2024

Date Reported : May 10, 2024

Report Number : 2967704-2

Page 1 of 3

Sample Number	2442691-1
Sampled Date	May 02, 2024 9:55 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	May 03, 2024
Condition of Sample	Contained in two amber glass bottles, four glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
1,1,1-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,1,2-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,1-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,2-Dichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,3-Dichloropropane *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Benzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Carbontetrachloride	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
cis-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Ethylbenzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

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

Siriluk P.

Siriluk Bunnak
Section Head

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-102/ EMAIL

S:\Reports\Alt_GL.rpt (3:22PM)



Analysis / Test Report

TESTING

No.0009

Lot ID: 2442691

Date Received : May 02, 2024

Date Reported : May 10, 2024

Report Number : 2967704-2

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location : Map Ta Phut_EBSM (SSMC)

Page 2 of 3

Sample Number	2442691-1
Sampled Date	May 02, 2024 9:55 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	May 03, 2024
Condition of Sample	Contained in two amber glass bottles, four glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Hexachlorobutadiene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Methyl Chloride *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Methylene Chloride (Dichloromethane)	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Tetrachloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Toluene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Total Xylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
trans-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Trichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

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

Siriluk P.

Siriluk Bunnak
Section Head

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

LIFE SCIENCES

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-102/ EMAIL

S:\Reports_All_GL.rpt (3:22PM)



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

TESTING
No.0009
Lot ID: 2442691
Date Received : May 02, 2024
Date Reported : May 10, 2024
Report Number : 2967704-2

Page 3 of 3

Sample Number 2442691-1
Sampled Date May 02, 2024 9:55 AM
Sample Description Wastewater
Location AZ-1
Date Analysis Commenced May 03, 2024
Condition of Sample Contained in two amber glass bottles, four glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Vinyl chloride (Chloroethylene)	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	14.9	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Surawit Narapong , Thanasoun Namakunna

Remark :

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

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

Siriluk P.

Siriluk Bunnak
Section Head

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING

No.0042

Lot ID: 2455643

Date Received : Jun 05, 2024

Date Reported : Jun 13, 2024

Report Number : 2994630-1

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

Page 1 of 2

Sample Number	2455643-1						
Sampled Date	Jun 05, 2024 11:00 AM						
Sample Description	Wastewater						
Location	AZ-1						
Date Analysis Commenced	Jun 05, 2024						
Condition of Sample	Contained in two amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	43	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	21	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	19	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	36.4	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	760	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ๖-323-๔-9447

Approved by

D. Changchon.

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ๖-323-๔-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0042

Lot ID: 2455643

Date Received : Jun 05, 2024

Date Reported : Jun 13, 2024

Report Number : 2994630-1

Page 2 of 2

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

Sampling By : Wanlop Hunchainaow ทะเบียนเลขที่ ว-323-จ-9457 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

Remark :

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

Technical Management

Thanita K.

Thanita Kulsuriwong

Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-จ-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A, Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0009

Lot ID: 2455643

Date Received : Jun 05, 2024

Date Reported : Jun 13, 2024

Report Number : 2994630-2

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

Page 1 of 3

Sample Number	2455643-1
Sampled Date	Jun 05, 2024 11:00 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Jun 06, 2024
Condition of Sample	Contained in two amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
1,1,1-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,1,2-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,1-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,2-Dichloroethane	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
1,3-Dichloropropane *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Benzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Carbontetrachloride	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
cis-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Ethylbenzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

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

Suwimon C.

Suwimon Chairuangwut
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-102/ EMAIL

S:\Reports\All_GL.rpt (12:49PM)



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

TESTING
No.0009
Lot ID: 2455643
Date Received : Jun 05, 2024
Date Reported : Jun 13, 2024
Report Number : 2994630-2

Page 2 of 3

Sample Number 2455643-1
Sampled Date Jun 05, 2024 11:00 AM
Sample Description Wastewater
Location AZ-1
Date Analysis Commenced Jun 06, 2024
Condition of Sample Contained in two amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Hexachlorobutadiene *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Methyl Chloride *	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Methylene Chloride (Dichloromethane)	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Tetrachloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Toluene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Total Xylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
trans-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Trichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok

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

Suwimon C.

Suwimon Chairuangwut
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING

No.0009

Lot ID: 2455643

Date Received : Jun 05, 2024

Date Reported : Jun 13, 2024

Report Number : 2994630-2

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

Page 3 of 3

Sample Number	2455643-1
Sampled Date	Jun 05, 2024 11:00 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Jun 06, 2024
Condition of Sample	Contained in two amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Vinyl chloride (Chloroethylene)	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	17.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

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.

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

Suwimon C.

Suwimon Chairuangwut
Scientist (3)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-102/ EMAIL

S:\Reports\AIL_GL.rpt (12:49PM)



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

TESTING
No.0042
Lot ID: 23146704
Date Received : Jan 10, 2024
Date Reported : Jun 25, 2024
Report Number : 2872796-1 C6-2

Page 1 of 2

Sample Number	23146704-1						
Sampled Date	Jan 10, 2024 10:15 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Jan 10, 2024						
Condition of Sample	Contained in two amber glass bottles, six glass vials and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	31	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	16	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	13	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.3	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	-	-	32.9	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	952	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banphit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Chumon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-จ-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0042

Lot ID: 23146704

Date Received : Jan 10, 2024

Date Reported : Jun 25, 2024

Report Number : 2872796-1 C6-2

Page 2 of 2

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

Sampled By : Sansoen Khuiyoksui ทะเบียนเลขที่ ว-323-จ-0005 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

TESTING
No.0009
Lot ID: 23146704
Date Received : Jan 10, 2024
Date Reported : Jun 25, 2024
Report Number : 2872796-3 C6-2

Page 1 of 1

Sample Number	23146704-1						
Sampled Date	Jan 10, 2024 10:15 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Jan 11, 2024						
Condition of Sample	Contained in two amber glass bottles, six glass vials and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Benzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Styrene	ug/L	1.5	5	<5	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	12.7	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampled By : Sansoen Khuiyoksui , Thanasoun Namakunna

Remark :

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

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

Sawitree N.

Sawitree Noisangiam
Manager

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location : Map Ta Phut_EBSM (SSMC)

TESTING
No.0042
Lot ID: 23147860
Date Received : Feb 07, 2024
Date Reported : Jun 25, 2024
Report Number : 2873655-1 C6-2

Page 1 of 2

Sample Number	23147860-1						
Sampled Date	Feb 07, 2024 10:38 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Feb 07, 2024						
Condition of Sample	Contained in six glass vials, two amber glass bottles and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	34	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	24	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	23	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.9	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	32.3	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	776	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	6	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0042

Lot ID: 23147860

Date Received : Feb 07, 2024

Date Reported : Jun 25, 2024

Report Number : 2873655-1 C6-2

Page 2 of 2

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

Sampled By : Wanlop Hunchainaow ทะเบียนเลขที่ ว-323-จ-9457 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-จ-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

TESTING
No.0009
Lot ID: 23147860
Date Received : Feb 07, 2024
Date Reported : Jun 25, 2024
Report Number : 2873655-3 C6-2

Page 1 of 1

Sample Number	23147860-1						
Sampled Date	Feb 07, 2024 10:38 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Feb 08, 2024						
Condition of Sample	Contained in six glass vials, two amber glass bottles and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Benzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	9.96	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

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.

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

Siriluk P.

Siriluk Bunnak
Section Head

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-102/ EMAIL



Analysis / Test Report

TESTING

No.0042

Lot ID: 244504

Date Received : Mar 06, 2024

Date Reported : Jun 25, 2024

Report Number : 2884612-1 C6-2

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

Page 1 of 2

Sample Number	244504-1
Sampled Date	Mar 06, 2024 10:12 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	Mar 06, 2024
Condition of Sample	Contained in six glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	28	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	17	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	17	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.2	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	-	-	33.4	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	848	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING

No.0042

Lot ID: 244504

Date Received : Mar 06, 2024

Date Reported : Jun 25, 2024

Report Number : 2884612-1 C6-2

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

Page 2 of 2

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

Sampled By : Wanlop Hunchainaow ทะเบียนเลขที่ ว-323-จ-9457 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0009

Lot ID: 244504

Date Received : Mar 06, 2024

Date Reported : Jun 25, 2024

Report Number : 2884612-3 C6-2

Page 1 of 1

Page 4 of 6

Sample Number	244504-1						
Sampled Date	Mar 06, 2024 10:12 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Mar 07, 2024						
Condition of Sample	Contained in six glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Benzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard		Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	13.5	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampled By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

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.

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

Nanthawadee Somboon
Specialist 2

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Lot ID: 2429380

Date Received : Apr 03, 2024

Date Reported : Jun 25, 2024

Report Number : 2937271-1 C6-2

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

Page 1 of 2

Sample Number	2429380-1						
Sampled Date	Apr 03, 2024 10:14 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Apr 03, 2024						
Condition of Sample	Contained in six glass vials, one amber glass bottle and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	34	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	15	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	14	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	6.6	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	-	-	34.0	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	872	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-จ-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

LIFE SCIENCES

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0042

Lot ID: 2429380

Date Received : Apr 03, 2024

Date Reported : Jun 25, 2024

Report Number : 2937271-1 C6-2

Page 2 of 2

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

Sampled By : Wanlop Hunchainaow ทะเบียนเลขที่ ว-323-จ-9457 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING

No.0009

Lot ID: 2429380

Date Received : Apr 03, 2024

Date Reported : Jun 25, 2024

Report Number : 2937271-3 C6-2

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

Page 1 of 1

Sample Number	2429380-1						
Sampled Date	Apr 03, 2024 10:14 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Apr 04, 2024						
Condition of Sample	Contained in six glass vials, one amber glass bottle and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Benzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	11.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampled By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

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.

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

Sawitree N.

Sawitree Noisangiam
Manager

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-102/ EMAIL



Analysis / Test Report

TESTING

No.0042

Lot ID: 2442696

Date Received : May 02, 2024

Date Reported : Jun 25, 2024

Report Number : 2967712-1 C6-2

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

Page 1 of 2

Page 2 of 3

Sample Number	2442696-1						
Sampled Date	May 02, 2024 9:48 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	May 02, 2024						
Condition of Sample	Contained in two amber glass bottles, six glass vials and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	13	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	10	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.2	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	-	-	34.3	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	824	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556

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

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0042

Lot ID: 2442696

Date Received : May 02, 2024

Date Reported : Jun 25, 2024

Report Number : 2967712-1 C6-2

Page 2 of 2

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

Note : Raw data of COD value (Refer to Lot ID 2442696-1) is 21.8 mg/L

Sampled By : Surawit Narapong ทะเบียนเลขที่ ว-323-จ-0011 , Thanasoun Namakunna ทะเบียนเลขที่ ว-204-จ-0101

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

TESTING
No.0009
Lot ID: 2442696
Date Received : May 02, 2024
Date Reported : Jun 25, 2024
Report Number : 2967712-3 C6-2

Page 1 of 1

Sample Number	2442696-1						
Sampled Date	May 02, 2024 9:48 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	May 03, 2024						
Condition of Sample	Contained in two amber glass bottles, six glass vials and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Benzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	12.7	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Note : Raw data of COD value (Refer to Lot ID 2442696-1) is 21.8 mg/L

Sampled By : Surawit Narapong , Thanasoun Namakunna

Remark :

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

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

Sawitree N.

Sawitree Noisangiam
Manager

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING

No.0042

Lot ID: 2455651

Date Received : Jun 05, 2024

Date Reported : Jun 25, 2024

Report Number : 2994634-1 C6-2

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

Page 1 of 2

Sample Number	2455651-1						
Sampled Date	Jun 05, 2024 10:54 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Jun 05, 2024						
Condition of Sample	Contained in two amber glass bottles, six glass vials and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	39	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	21	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	18	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	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 *	Degree C	-	-	35.0	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	752	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Chumson.

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

TESTING

No.0042

Lot ID: 2455651

Date Received : Jun 05, 2024

Date Reported : Jun 25, 2024

Report Number : 2994634-1 C6-2

Page 2 of 2

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

Sampled By : Wanlop Hunchainaow ทะเบียนเลขที่ ว-323-จ-9457 , Pattapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

Remark :

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-จ-9442

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.

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING

No.0009

Lot ID: 2455651

Date Received : Jun 05, 2024

Date Reported : Jun 25, 2024

Report Number : 2994634-3 C6-2

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_EBSM (SSMC)

Page 1 of 1

Sample Number	2455651-1						
Sampled Date	Jun 05, 2024 10:54 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Jun 06, 2024						
Condition of Sample	Contained in two amber glass bottles, six glass vials and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Benzene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 6200 B	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	16.9	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampled By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

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.

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

Siriluk P.

Siriluk Bunnak
Section Head

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-102/ EMAIL

ภาคผนวก ค-4

ระดับเสียงโดยทั่วไป



Analysis / Test Report

TESTING
No.0042

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2417796

Date Received : Jun 10, 2024
Date Reported : Jun 14, 2024
Report Number: 3024241-1

Page 1 of 1

Sample Number 2417796-1
Parameter Noise (Leq 24 hrs.)
Location บริเวณริมรั้วโครงการฝั่งตะวันออก (GPS 47P 0734116, 1404381)
Measurement Date Jun 04 - Jun 05, 2024
Measurement by Jittakorn Sriwasa
Sound Level meter Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	68.6	82.8	67.9
10:00 AM - 11:00 AM	67.6	78.5	67.0
11:00 AM - 12:00 PM	67.0	75.1	66.5
12:00 PM - 01:00 PM	66.4	70.1	65.9
01:00 PM - 02:00 PM	66.8	73.2	66.2
02:00 PM - 03:00 PM	67.2	86.2	66.6
03:00 PM - 04:00 PM	67.6	76.5	67.0
04:00 PM - 05:00 PM	67.2	70.6	66.6
05:00 PM - 06:00 PM	67.6	76.3	67.1
06:00 PM - 07:00 PM	67.9	73.6	67.5
07:00 PM - 08:00 PM	68.2	71.4	67.7
08:00 PM - 09:00 PM	68.3	70.3	67.9
09:00 PM - 10:00 PM	68.2	71.1	67.8
10:00 PM - 11:00 PM	68.3	71.1	67.8
11:00 PM - 12:00 AM	68.2	76.7	67.8
12:00 AM - 01:00 AM	68.6	79.2	68.0
01:00 AM - 02:00 AM	69.5	82.1	69.0
02:00 AM - 03:00 AM	69.6	74.1	69.1
03:00 AM - 04:00 AM	69.4	72.4	68.9
04:00 AM - 05:00 AM	69.3	72.8	68.8
05:00 AM - 06:00 AM	69.2	81.4	68.7
06:00 AM - 07:00 AM	68.5	73.1	68.0
07:00 AM - 08:00 AM	68.7	71.7	68.2
08:00 AM - 09:00 AM	68.5	76.8	68.0

Leq Average 24 hrs. (dB(A)) 68.3
Lmax (dB(A)) 86.2
L90 (dB(A)) 67.8
Ldn (dB(A)) 75.3
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report



TESTING
No.0042

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2417796
Date Received : Jun 10, 2024
Date Reported : Jun 14, 2024
Report Number: 3024242-1

Page 1 of 1

Sample Number 2417796-2
Parameter Noise (Leq 24 hrs.)
Location บริเวณริมรั้วโครงการฝั่งตะวันออก (GPS 47P 0734116, 1404381)
Measurement Date Jun 05 - Jun 06, 2024
Measurement by Jittakorn Sriwasa
Sound Level meter Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	68.2	78.2	67.6
10:00 AM - 11:00 AM	68.5	83.7	67.6
11:00 AM - 12:00 PM	67.9	75.2	67.3
12:00 PM - 01:00 PM	67.6	77.9	67.1
01:00 PM - 02:00 PM	67.7	75.0	67.2
02:00 PM - 03:00 PM	68.4	81.0	67.7
03:00 PM - 04:00 PM	68.1	76.1	67.6
04:00 PM - 05:00 PM	67.6	86.7	66.9
05:00 PM - 06:00 PM	67.9	74.7	67.4
06:00 PM - 07:00 PM	68.0	75.3	67.5
07:00 PM - 08:00 PM	68.0	70.7	67.5
08:00 PM - 09:00 PM	68.5	71.7	68.1
09:00 PM - 10:00 PM	68.6	73.6	68.2
10:00 PM - 11:00 PM	68.7	76.1	68.1
11:00 PM - 12:00 AM	68.4	74.9	67.8
12:00 AM - 01:00 AM	68.7	75.9	68.1
01:00 AM - 02:00 AM	68.6	73.6	68.0
02:00 AM - 03:00 AM	68.6	73.5	68.0
03:00 AM - 04:00 AM	68.5	73.7	67.9
04:00 AM - 05:00 AM	68.9	73.3	68.2
05:00 AM - 06:00 AM	69.0	73.6	68.4
06:00 AM - 07:00 AM	68.7	73.4	68.1
07:00 AM - 08:00 AM	68.5	73.0	67.9
08:00 AM - 09:00 AM	67.9	73.0	67.3

Leq Average 24 hrs. (dB(A)) 68.3
Lmax (dB(A)) 86.7
L90 (dB(A)) 67.7
Ldn (dB(A)) 75.0
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2417796

Date Received : Jun 10, 2024

Date Reported : Jun 14, 2024

Report Number: 3024243-1

Page 1 of 1

Sample Number 2417796-3
Parameter Noise (Leq 24 hrs.)
Location บริเวณริมรั้วโครงการฝั่งตะวันออก (GPS 47P 0734116, 1404381)
Measurement Date Jun 06 - Jun 07, 2024
Measurement by Jittakorn Sriwasa
Sound Level meter Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	68.3	72.8	67.8
10:00 AM - 11:00 AM	68.1	75.0	67.5
11:00 AM - 12:00 PM	67.3	72.6	66.8
12:00 PM - 01:00 PM	66.9	70.8	66.4
01:00 PM - 02:00 PM	67.6	79.7	67.0
02:00 PM - 03:00 PM	68.4	79.9	67.8
03:00 PM - 04:00 PM	68.7	73.6	68.1
04:00 PM - 05:00 PM	68.4	72.5	67.8
05:00 PM - 06:00 PM	68.0	82.0	67.4
06:00 PM - 07:00 PM	68.0	73.3	67.5
07:00 PM - 08:00 PM	67.9	72.1	67.4
08:00 PM - 09:00 PM	68.2	71.4	67.8
09:00 PM - 10:00 PM	68.3	71.9	67.9
10:00 PM - 11:00 PM	68.6	74.5	68.0
11:00 PM - 12:00 AM	68.4	74.1	67.8
12:00 AM - 01:00 AM	68.7	73.7	68.0
01:00 AM - 02:00 AM	68.7	73.7	68.0
02:00 AM - 03:00 AM	69.3	74.6	68.7
03:00 AM - 04:00 AM	69.0	73.9	68.4
04:00 AM - 05:00 AM	69.1	73.8	68.5
05:00 AM - 06:00 AM	68.8	73.4	68.1
06:00 AM - 07:00 AM	68.8	73.7	68.2
07:00 AM - 08:00 AM	68.5	75.5	67.8
08:00 AM - 09:00 AM	68.2	73.3	67.6

Leq Average 24 hrs. (dB(A)) 68.4
Lmax (dB(A)) 82.0
L90 (dB(A)) 67.8
Ldn (dB(A)) 75.1
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

ภาคผนวก ค-5

ระดับเสียงในสถานประกอบการ



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2417794

Date Received : Mar 06, 2024

Date Reported : Mar 12, 2024

Report Number: 2933500-1

Page 1 of 1

Sample Number 2417794-1
Parameter Noise (Leq 8 hrs.)
Location AT-3
Measurement Date Mar 04, 2024
Measurement by Kantaphon Maneesampan

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:33 AM - 10:33 AM	78.0	83.6	77.8
10:33 AM - 11:33 AM	82.2	101.9	77.7
11:33 AM - 12:33 PM	77.9	78.6	77.7
12:33 PM - 01:33 PM	77.8	78.4	77.7
01:33 PM - 02:33 PM	77.7	78.3	77.5
02:33 PM - 03:33 PM	77.7	82.2	77.5
03:33 PM - 04:33 PM	77.8	84.9	77.5
04:33 PM - 05:33 PM	77.8	89.3	77.6

Leq Average 8 hrs. (dB(A))

78.7

Lmax (dB(A))

101.9

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย

ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2417794

Date Received : Mar 06, 2024

Date Reported : Mar 12, 2024

Report Number: 2933501-1

Page 1 of 1

Sample Number 2417794-2
Parameter Noise (Leq 8 hrs.)
Location FT-2
Measurement Date Mar 04, 2024
Measurement by Kantaphon Maneesampan

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:26 AM - 10:26 AM	83.7	90.8	82.1
10:26 AM - 11:26 AM	84.0	92.4	82.2
11:26 AM - 12:26 PM	84.1	93.1	82.2
12:26 PM - 01:26 PM	84.2	93.8	82.2
01:26 PM - 02:26 PM	84.0	91.9	82.2
02:26 PM - 03:26 PM	83.7	91.7	82.2
03:26 PM - 04:26 PM	83.8	96.2	82.4
04:26 PM - 05:26 PM	83.7	90.8	82.4

Leq Average 8 hrs. (dB(A))

83.9

Lmax (dB(A))

96.2

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย

ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2443255

Date Received : Jun 04, 2024

Date Reported : Jun 07, 2024

Report Number: 3016858-1

Page 1 of 1

Sample Number 2443255-1
Parameter Noise (Leq 8 hrs.)
Location AT-3
Measurement Date Jun 04, 2024
Measurement by Jittakorn Sriwasa

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	78.3	84.4	78.1
10:00 AM - 11:00 AM	78.3	79.8	78.0
11:00 AM - 12:00 PM	78.2	79.6	77.9
12:00 PM - 01:00 PM	78.3	85.6	77.9
01:00 PM - 02:00 PM	78.3	79.5	78.0
02:00 PM - 03:00 PM	78.4	89.9	78.1
03:00 PM - 04:00 PM	78.3	79.5	78.0
04:00 PM - 05:00 PM	78.3	79.4	78.1

Leq Average 8 hrs. (dB(A))

78.3

Lmax (dB(A))

89.9

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัย

ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2443255

Date Received : Jun 04, 2024

Date Reported : Jun 07, 2024

Report Number: 3016859-1

Page 1 of 1

Sample Number 2443255-2
Parameter Noise (Leq 8 hrs.)
Location FT-2
Measurement Date Jun 04, 2024
Measurement by Jittakorn Sriwasa

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	83.3	88.0	82.4
10:00 AM - 11:00 AM	83.1	88.6	82.2
11:00 AM - 12:00 PM	83.0	87.0	82.1
12:00 PM - 01:00 PM	83.3	87.1	82.2
01:00 PM - 02:00 PM	83.5	88.0	82.4
02:00 PM - 03:00 PM	83.4	92.0	82.3
03:00 PM - 04:00 PM	83.3	87.7	82.3
04:00 PM - 05:00 PM	83.0	86.4	82.2

Leq Average 8 hrs. (dB(A))

83.2

Lmax (dB(A))

92.0

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย

ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

ADDRESS 616/10 Moo 5 T. Maenam Khu A, Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

ภาคผนวก ค-6

คุณภาพอากาศในสถานประกอบการ



Analysis / Test Report

TESTING
No.0009

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand
21150
P/O : 4515759206
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2417790

Date Received : Mar 06, 2024
Date Reported : Mar 14, 2024
Report Number : 2911741-1

Page 1 of 3

Sample Number 2417790-1
Sampled Date Mar 04, 2024
Sample Description Air Quality
Location FT-3/CT-3
Date Analysis Commenced Mar 07, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 758 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Styrene *	09:30 AM - 11:30 AM	ppm	-	0.05	<0.05	100	In - house method : STM 04-032 based on NIOSH Manual of Analytical Methods, 4th ed., NMAM, method 1501, issue 3, 2003 (Include sampling)	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 : Sathapron Thakarw

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.

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

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

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

LIFE SCIENCES

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL



Analysis / Test Report

TESTING
No.0009

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand
21150

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2417790

Date Received : Mar 06, 2024

Date Reported : Mar 14, 2024

Report Number : 2911741-1

Page 2 of 3

Sample Number 2417790-2
Sampled Date Mar 04, 2024
Sample Description Air Quality
Location AT-3
Date Analysis Commenced Mar 07, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 758 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Benzene	09:25 AM - 11:25 AM	ppm	-	0.06	<0.06	1	In - house method : STM 04-032 based on NIOSH Manual of Analytical Methods, 4th ed., NMAM, method 1501, issue 3, 2003 (Include sampling)	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 : Sathaporn Thakarw

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.

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

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

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL



Analysis / Test Report

TESTING
No.0009

Client : Siam Styrene Monomer Co., Ltd.

8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand
21150

P/O : 4515759206

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2417790

Date Received : Mar 06, 2024

Date Reported : Mar 14, 2024

Report Number : 2911741-1

Page 3 of 3

Sample Number 2417790-3
Sampled Date Mar 04, 2024
Sample Description Air Quality
Location AT-4/AT-5
Date Analysis Commenced Mar 07, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 758 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Ethylbenzene *	09:20 AM - 11:20 AM	ppm	-	0.05	<0.05	100	In - house method : STM 04-032 based on NIOSH Manual of Analytical Methods, 4th ed., NMAM, method 1501, issue 3, 2003 (Include sampling)	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 : Sathapron Thakarw

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.

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

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

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL



Analysis / Test Report

TESTING
No.0009

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand
21150
P/O : 4515759206
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2443253

Date Received : Jun 04, 2024
Date Reported : Jun 11, 2024
Report Number : 2968870-1

Page 1 of 3

Sample Number 2443253-1
Sampled Date Jun 04, 2024
Sample Description Air Quality
Location FT-3/CT-3
Date Analysis Commenced Jun 05, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 757 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Styrene *	09:10 AM - 11:10 AM	ppm	-	0.05	<0.05	100	In - house method : STM 04-032 based on NIOSH Manual of Analytical Methods, 4th ed., NMAM, method 1501, issue 3, 2003 (Include sampling)	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 : Sittipan Sanachiw

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.

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

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

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

LIFE SCIENCES

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL



Analysis / Test Report

TESTING
No.0009

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand
21150
P/O : 4515759206
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2443253

Date Received : Jun 04, 2024
Date Reported : Jun 11, 2024
Report Number : 2968870-1

Page 2 of 3

Sample Number 2443253-2
Sampled Date Jun 04, 2024
Sample Description Air Quality
Location AT-3
Date Analysis Commenced Jun 05, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 757 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Benzene	09:10 AM - 11:10 AM	ppm	-	0.02	<0.02	1	In - house method : STM 04-032 based on NIOSH Manual of Analytical Methods, 4th ed., NMAM, method 1501, issue 3, 2003 (Include sampling)	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 : Sittipan Sanachiw

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.

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

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

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL



Analysis / Test Report

TESTING
No.0009

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand
21150
P/O : 4515759206
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2443253

Date Received : Jun 04, 2024

Date Reported : Jun 11, 2024

Report Number : 2968870-1

Page 3 of 3

Sample Number 2443253-3
Sampled Date Jun 04, 2024
Sample Description Air Quality
Location AT-4/AT-5
Date Analysis Commenced Jun 05, 2024
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 757 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Ethylbenzene	09:10 AM - 11:10 AM	ppm	-	0.05	<0.05	100	In - house method : STM 04-032 based on NIOSH Manual of Analytical Methods, 4th ed., NMAM, method 1501, issue 3, 2003 (Include sampling)	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 : Sittipan Sanachiw

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.

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

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

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

LIFE SCIENCES

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

6506-83/ EMAIL

ภาคผนวก ง

ใบรับรองการสอบเทียบเครื่องมือ



right solutions.
right partner.

รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Stack	Total Suspended Particulate	Console Control Unit	BKK_FS0518	9-Jan-24	9-Jul-24	6
Stack	Total Suspended Particulate	Console Control Unit	BKK_FS0527	31-Jan-24	30-Jul-24	6
Stack	Total Suspended Particulate	Pitot Tube	BKK_FS0523	9-Jan-24	9-Jul-24	6
Stack	Total Suspended Particulate	Pitot Tube	BKK_FS0531	31-Jan-24	31-Jul-24	6
Stack	Total Suspended Particulate	Flue gas Analyzer	RYG_FS0464	8-Mar-24	7-Mar-25	12
Stack	Total Suspended Particulate	Flue gas Analyzer	RYG_FS0563	26-Jan-24	25-Jan-25	12
Stack	Total Suspended Particulate	Digital Balance	RYG_EN0003	22-Feb-24	22-Feb-25	12
Stack	Total Hydrocarbon as Propane	Console Control Unit	BKK_FS0518	9-Jan-24	9-Jul-24	6
Stack	Total Hydrocarbon as Propane	Console Control Unit	BKK_FS0527	31-Jan-24	30-Jul-24	6
Stack	Total Hydrocarbon as Propane	Pitot Tube	BKK_FS0523	9-Jan-24	9-Jul-24	6
Stack	Total Hydrocarbon as Propane	Pitot Tube	BKK_FS0531	31-Jan-24	31-Jul-24	6
Stack	Total Hydrocarbon as Propane	Flue gas Analyzer	RYG_FS0464	8-Mar-24	7-Mar-25	12
Stack	Total Hydrocarbon as Propane	Flue gas Analyzer	RYG_FS0563	26-Jan-24	25-Jan-25	12
Stack	Total Hydrocarbon as Propane	Total Hydrocarbon Analyzer	RYG_EN0038	10-Aug-23	10-Aug-24	12
Stack	Total Hydrocarbon as Propane	FID Analyzer	BKK_FS0758	3-Jan-24	3-Jul-24	6
Stack	Oxides of Nitrogen	Console Control Unit	BKK_FS0518	9-Jan-24	9-Jul-24	6
Stack	Oxides of Nitrogen	Console Control Unit	BKK_FS0527	31-Jan-24	30-Jul-24	6
Stack	Oxides of Nitrogen	Pitot Tube	BKK_FS0523	9-Jan-24	9-Jul-24	6
Stack	Oxides of Nitrogen	Pitot Tube	BKK_FS0531	31-Jan-24	31-Jul-24	6
Stack	Oxides of Nitrogen	Flue gas Analyzer	RYG_FS0464	8-Mar-24	7-Mar-25	12
Stack	Oxides of Nitrogen	Flue gas Analyzer	RYG_FS0563	26-Jan-24	25-Jan-25	12
Stack	Oxides of Nitrogen	Vacuum Gauge	BKK_FS0481	14-Feb-23	14-Aug-24	18
Stack	Oxides of Nitrogen	Vacuum Gauge	RYG_FS0332	30-Mar-23	30-Sep-24	18
Stack	Oxides of Nitrogen	SPECTROPHOTOMETER	RYG_EN0179	18-Sep-23	18-Mar-25	18
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0183	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0295	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	Digital Balance	RYG_EN0001	22-Feb-24	22-Feb-25	12
Ambient	Total Suspended Particulate	High Volume	RYG_FS0395	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0662	-	-	On site Calibration
Ambient	Total Suspended Particulate	Digital Balance	RYG_EN0001	22-Feb-24	22-Feb-25	12
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0455	4-Jan-24	4-Jul-24	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0264	4-Jan-24	4-Jul-24	6
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0329	18-Aug-23	18-Feb-25	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0089	19-Jan-23	19-Jul-24	18
Noise	Leq 24 hrs	Sound Calibrator	RYG_FS0215	20-Sep-23	20-Sep-24	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0020	22-Jan-24	21-Jan-25	12
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0215	20-Sep-23	20-Sep-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0623	22-Jan-24	21-Jan-25	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0624	22-Jan-24	21-Jan-25	12
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0215	20-Sep-23	20-Sep-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0618	12-Jan-24	11-Jan-25	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0617	12-Jan-24	11-Jan-25	12
Workplace	Benzene	DRYCAL FLOWMETER	BKK_FS1347	18-Aug-23	18-Aug-24	12
Workplace	Benzene	Field Rotameter	RYG_FS0658	1-Apr-24	1-Jul-24	3
Workplace	Benzene	GC-MSD	BKK_EN0119	18-Apr-23	18-Oct-24	18
Workplace	Ethyl Benzene	DRYCAL FLOWMETER	BKK_FS1347	18-Aug-23	18-Aug-24	12
Workplace	Ethyl Benzene	Field Rotameter	RYG_FS0658	1-Apr-24	1-Jul-24	3
Workplace	Ethyl Benzene	GC-MSD	BKK_EN0119	18-Apr-23	18-Oct-24	18



right solutions.
right partner.

รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Workplace	Styrene	DRYCAL FLOWMETER	BKK_FS1347	18-Aug-23	18-Aug-24	12
Workplace	Styrene	Field Rotameter	RYG_FS0658	1-Apr-24	1-Jul-24	3
Workplace	Styrene	GC-MSD	BKK_EN0119	18-Apr-23	18-Oct-24	18
Rayong Lab	Temperature	pH meter	RYG_FS0606	4-Sep-23	4-Sep-24	12
Rayong Lab	Total Dissolved Solids 180°C	Electronic Balance	RYG_EN0002	22-Feb-24	22-Feb-25	12
Rayong Lab	Total Dissolved Solids 180°C	Hot Air Oven	RYG_EN0010	21-Mar-24	21-Sep-25	18
Rayong Lab	Total Suspended Solids	Electronic Balance	RYG_EN0002	22-Feb-24	22-Feb-25	12
Rayong Lab	Total Suspended Solids	Hot Air Oven	RYG_EN0010	21-Mar-24	21-Sep-25	18
Rayong Lab	pH at 25 °C	pH Meter	RYG_EN0152	14-Dec-23	14-Dec-24	12
Rayong Lab	Oil & Grease	Electronic Balance	RYG_EN0002	22-Feb-24	22-Feb-25	12
Rayong Lab	Oil & Grease	Hot Air Oven	RYG_EN0213	21-Mar-24	21-Mar-25	12
Rayong Lab	Oil & Grease	Water Bath	RYG_EN0061	21-Mar-24	21-Sep-25	18
Rayong Lab	BOD	DO meter with Sensor	RYG_EN0032	24-Jul-23	24-Jan-25	18
Rayong Lab	BOD	Incubator	RYG_EN0154	29-May-23	29-Nov-23	18
Rayong Lab	COD	Spectrophotometer	RYG_EN0037	18-Sep-23	18-Mar-25	18
Water Lab	Total Organic carbon	TOC Analyzer	BKK_EN0066	10-Nov-23	10-Nov-24	12

CONSOLE CONTROL UNIT CALIBRATION TEST REPORT



Calibration of Date 0-Jan-24
Next Cal. Date 9-Jul-24

Barometric Pressure (mmHg) 754.7
Relative Humidity (%) 55.0
Temperature (C°) 27.2

Console Control Meter Data

Calibration No. C-250124-BKK_FS518
Dry Gas Meter ID BKK_FS518
Serial No. 1504025
Model No. XC-572-V

Reference Dry Gas Meter Data

Reference Dry Gas Meter ID BKK_FS1122
Serial No. A2003240
Correction Factor (%) 0.9824
Next Calibration Date 7-Nov-24

ΔH (mm H ₂ O)	φ	Reference Dry Gas Meter Calibration					Console Control Drygas Meter						Dry Gas Meter Correction Factor (%)	Orifice Calibration Factor ΔH _{FS}
		V ₁ (liters)			T ₁ (°C)	V ₂ (liters)			T ₂ (°C)	T ₃ (°C)	Avg. T ₃ (°C)			
		Final	Initial	Total		Final	Initial	Total						
15	11.67	150.00	0.00	150.00	30.6	551664.6	551514.0	150.00	30.0	30.0	30.0	0.9773	41.9562	
25	0.00	150.00	0.00	150.00	31.0	551664.6	551609.0	149.00	30.0	30.0	30.0	0.9781	41.8547	
50	6.35	150.00	0.00	150.00	31.0	552544.6	552395.0	148.00	30.0	30.0	30.0	0.9803	41.8126	
80	5.02	150.00	0.00	150.00	31.0	552195.2	552045.0	148.00	29.0	29.0	29.0	0.9802	41.8173	
120	4.11	150.00	0.00	150.00	30.0	552315.6	552220.0	147.00	28.0	28.0	28.0	0.9829	41.8005	
Avg.													0.9799	41.8718

Note: Ratio of reading of reference to dry gas meter. Tolerance for individual values ± 0.02 from average.

ΔH_{FS}: Orifice pressure differential that equates to 21.24 in. of air @ 25 C and 750 mm of mercury - mmH₂O. Tolerance for individual values ± 0.09 from average.

Procedure: 40 CFR 60 APP A METH 502.5.3.6.7

Calibrated by: Saksit Phaisanphusit
(Mr. Saksit Phaisanphusit)
RYG Field Service Scientist (4)

Approved by: Nattapol Jengwareewong
(Mr. Nattapol Jengwareewong)
RYG Field Service Specialist
(Mr. Nattapol Jengwareewong)
RYG Field Service Specialist (4)

Stopwatch ID No. : E18061

Dry Gas Meter No. BKK_FS518

Model : F808

Model : XC-572-V

Serial No. : -

Serial No. : 1504025

Calibration Date : 8 Sep 20

Certificate No. : E-2009018

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	8	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: Saksit Phaisanphusit

Mr. Saksit Phaisanphusit

RYG Field Service Scientist (4)

Approved by: Nattapol Jengwareewong

Mr. Nattapol Jengwareewong

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
	200	200	0	±3	Pass
	250	250	0	±3	Pass
Probe	300	300	0	±3	Pass
	500	500	0	±3	Pass
	100	100	0	±3	Pass
	120	120	0	±3	Pass
	140	140	0	±3	Pass
	100	100	0	±3	Pass
	120	120	0	±3	Pass
Oven	140	140	0	±3	Pass
	100	100	0	±3	Pass
	120	120	0	±3	Pass
Filter	140	140	0	±3	Pass
	100	100	0	±3	Pass
	120	120	0	±3	Pass
Exit	140	140	0	±3	Pass
	0	0	0	±3	Pass
	10	10	0	±3	Pass
Meter	20	20	0	±3	Pass
	0	0	0	±3	Pass
	25	25	0	±3	Pass
AUX	50	50	0	±3	Pass
	0	0	0	±3	Pass
	25	25	0	±3	Pass
	50	50	0	±3	Pass

MPE : (Maximum permissible error of measurement) ค่าความผิดพลาดสูงสุดของผลการวัด

Calibrated by : Saksit Phaisanphisit
Mr. Saksit Phaisanphisit
RYG Field Service Scientist (4)

Approved by : Nattaporn Jengwareewong
Mr. Nattaporn Jengwareewong
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.)			Hi - Lo	(D ₁ + D ₂ + D ₃) / 3
	D ₁	D ₂	D ₃	ΔD	D _{avg}
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 :

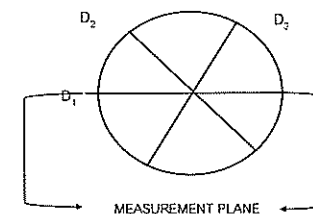
D₁, D₂, D₃ = Three different nozzle diameters at 60 degrees to

each other, each measured the nearest 0.025 mm.

ΔD = Maximum distance between any two diameters,

must be ≤ 0.100 mm.

D_{avg} = (D₁ + D₂ + D₃) / 3



Calibrated by : Saksit Phaisanphisit
(Mr. Saksit Phaisanphisit)
RYG Field Service Scientist (4)

Approved by : Nattaporn Jengwareewong
(Mr. Nattaporn Jengwareewong)
RYG Field Service Specialist (1)

FORM NO. F-06-027 REVISION NO. 2 ISSUE DATE 9 Feb 23

CONSOLE CONTROL UNIT CALIBRATION TEST REPORT



Calibration of Date 31-Jan-24
Next Cal. Date 30-Jul-24

Barometric Pressure (mmHg) 754
Relative Humidity (%) 53.0
Temperature (C°) 27.0

Console Control Meter Data

Calibration No. C-310124-BKK_FS0527
Dry Gas Meter ID BKK_FS0527
Serial No. 1508053
Model No. XC-5/2-V

Reference Dry Gas Meter Data

Reference Dry Gas Meter ID BKK_0529
Serial No. 1637009
Correction Factor (%) 1.0000
Next Calibration Date 9-Jun-24

ΔH (mm.H ₂ O)	Φ Minutes	Reference Dry Gas Meter Calibration					Console Control, Drygas Meter							Dry Gas Meter Correction Factor (%)	Office Calibration Factor ΔH ₀
		V ₀ (liters)			T ₀ °C	V ₁ (Liters)			T ₁ °C	T ₂ °C	Avg.T ₁ °C				
		Final	Initial	Total		Final	Initial	Total							
15	11.82	150.00	0.00	150.00	31.0	602227.0	602082.0	145.00	30.0	30.0	30.0	1.0206	41.9111		
25	0.01	150.00	0.00	150.00	31.0	602106.6	602241.0	145.00	30.0	30.0	30.0	1.0243	41.9561		
50	0.35	150.00	0.00	150.00	31.0	602039.0	602394.0	145.00	31.0	31.0	31.0	1.0209	41.9155		
60	0.04	150.00	0.00	150.00	31.0	602098.8	602551.0	145.00	31.0	31.0	31.0	1.0208	41.9127		
120	4.12	150.00	0.00	150.00	31.0	602361.2	602115.0	145.00	31.0	31.0	31.0	1.0141	42.0111		
Avg.												1.0237	41.9018		

Ratio of reading of reference to dry gas meter, tolerance for individual values ± 0.02 from average.

ΔH₀ Office pressure differential that equates to 21.24 in. of air @ 25 C and 760 mm of mercury. mmH₂O tolerance for individual values ± 0.08 from average.

Procedure: 40 CFP 60 APP A.METH. SEC 5.3 & 7

Calibrated by: Saksit Phaisanphut
(Mr. Saksit Phaisanphut)
RYG Field Services Scientist(4)

Approved by: Natthapol Jengwareewong
(Mr.Natthapol Jengwareewong)
RYG Field Services Specialist(1)
(Mr.Natthapol Jengwareewong)

Stopwatch ID No. : RYG_FS0540

Model : F808

Serial No. : E18061

Calibration Date : 9 Dec 22

Certificate No. : E-2009018

Dry Gas Meter No. : BKK_FS0527

Model : XC-5/2-V

Serial No. : 1508053

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	8	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 : Saksit Phaisanphut

Mr. Saksit Phaisanphut

RYG Field Service Scientist (4)

Approved by : Natthapol Jengwareewong

Mr.Natthapol Jengwareewong

RYG Field Service Specialist (1)



DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date :	31 Jan 24	Ambient Temperature (°C)	27
Calibration sheet No. :	C-310124-BKK_FS0527	Relative Humidity (%) :	53
Digital Temperature ID :	BKK_FS0527	Reference Temperature ID	BKK_FS1144
Serial No. :		Serial No. :	201090006013
Model :	XC-572-V	Model :	Digicon-CC-VT-MS
		Next Calibrate :	14 Aug 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
	200	200	0	±3	Pass
	250	250	0	±3	Pass
	300	300	0	±3	Pass
Probe	500	501	1	±3	Pass
	100	101	1	±3	Pass
	120	121	1	±3	Pass
	140	141	1	±3	Pass
Oven	100	101	-	±3	-
	120	121	-	±3	-
	140	142	-	±3	-
Filter	100	102	2	±3	Pass
	120	121	1	±3	Pass
	140	141	1	±3	Pass
Exit	0	1	1	±3	Pass
	10	9	-1	±3	Pass
	20	20	0	±3	Pass
Meter	0	-1	-1	±3	Pass
	25	24	-1	±3	Pass
	50	48	-2	±3	Pass
AUX	0	-1	-1	±3	Pass
	25	25	0	±3	Pass
	50	50	0	±3	Pass

MPE : (Maximum permissible error of measurement) ค่าความคลาดเคลื่อนสูงสุดของการวัด

Calibrated by : Saksit Phaisanphisut

Mr. Saksit Phaisanphisut
RYG Field Services Scientist (4)

Approved by : Nattapon Jengwareewong

(Mr. Nattapon Jengwareewong)
RYG Field Services Specialist (1)

FORM NO. 2 06-027 REVISION NO. 2 ISSUE DATE: 16/2/23



PROBE NOZZLE DIAMETER CALIBRATION DATA SHEET

Calibration Date	31 Jan 24	Nozzle Set ID. :	BKK_FS0533
Calibration Sheet No. :	C-310124-BKK_FS0533	Vernier Caliper ID.:	BKK_FS1123

Nozzle ID #	Nozzle Diameter (cm.)			Hi - Lo ΔD	$(D_1 + D_2 + D_3) / 3$ D_{avg}
	D_1	D_2	D_3		
1	0.316	0.318	0.316	0.002	0.317
2	0.480	0.475	0.474	0.006	0.476
3	0.635	0.635	0.635	0.000	0.635
4	0.791	0.792	0.791	0.001	0.791
5	0.950	0.952	0.951	0.002	0.951
6	1.088	1.080	1.089	0.009	1.086
7	1.270	1.270	1.270	0.000	1.270
8	1.598	1.600	1.598	0.002	1.599

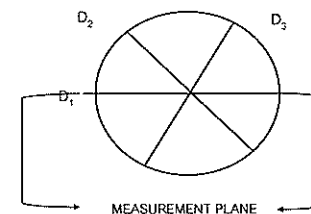
Where :

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 Phaisanphisut

(Mr. Saksit Phaisanphisut)
Field Scientist (4)

Approved by : Nattapon Jengwareewong

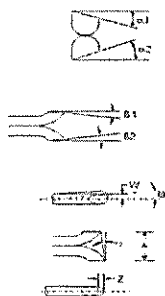
(Mr. Nattapon Jengwareewong)
Field Specialist (1)

FORM NO. 2 06-027 REVISION NO. 2 ISSUE DATE: 16/2/23



Type S Pitot Tube Calibration

Date Calibration 9-Jan-24 Due Date 9-Jul-24
Pitot ID BKK_FS0523 Inclinator ID BKK_FS1131
Pitot SN - Vernier ID RYG_FS0539



Parameter	Value	Allowable Range	Check
α_1	-0.2	$-10^\circ < \alpha_1 < +10^\circ$	OK
α_2	2.4	$-10^\circ < \alpha_2 < +10^\circ$	OK
β_1	-1.2	$-5^\circ < \beta_1 < +5^\circ$	OK
β_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/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.

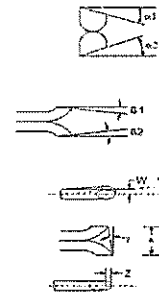
Calibrated by : Saksit Phaisanphisit
(Mr. Saksit Phaisanphisit)
RYG Field Services Scientist (4)

Approved By : Natthapol Jiengwareewong
(Mr. Natthapol Jiengwareewong)
RYG Field Services Specialist (1)



Type S Pitot Tube Calibration

Date Calibration 31-Jan-24 Due Date 31-Jul-24
Pitot ID BKK_FS0531 Inclinator ID BKK_FS1131
Pitot SN - Vernier ID RYG_FS0539



Parameter	Value	Allowable Range	Check
α_1	0.6	$-10^\circ < \alpha_1 < +10^\circ$	OK
α_2	1.4	$-10^\circ < \alpha_2 < +10^\circ$	OK
β_1	-2.3	$-5^\circ < \beta_1 < +5^\circ$	OK
β_2	-0.5	$-5^\circ < \beta_2 < +5^\circ$	OK
γ	-1.1	-	-
θ	1.3	-	-
$Z = A \tan \gamma$	-0.017	$Z \leq 0.125"$	OK
$W = A \tan \theta$	0.020	$W \leq 0.031"$	OK
Dt	0.311	0.188" to 0.375"	OK
A/2Dt	1.415	$1.05 \leq PA/Dt \leq 1.5$	OK
A	0.88	$2.1Dt \leq A \leq 3Dt$	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 Phaisanphisit
(Mr. Saksit Phaisanphisit)
RYG Field Services Scientist (4)

Approved By : Natthapol Jiengwareewong
(Mr. Natthapol Jiengwareewong)
RYG Field Services Specialist (1)

Certificate No: G 670176

Date of issue : 08-Mar-24

Instrument description : Flue Gas Analyzer

Instrument model : Testo 350 New

Control unit serial no. : 03401649/1119

Instrument serial no. : 62087344/1119

ID no. or control no. : RYG_F50464

Manufacturer : Testo SE & Co. KGaA

Probe description : -

Probe model : -

Probe serial no. : -

Customer name : ALS LABORATORY GROUP (THAILAND) CO.,LTD.

Customer address : 104 Phatthanakan 40, Phatthanakan Road, Khwaeng Phatthanakan,
Khet Suan Luang, Bangkok, 10250 Thailand

Total pages of certificate : 3 Pages

Receiving no. : L-240885

Receiving date. : 04-Mar-24

Parameter of calibration : Gas Calibration(Oxygen 2.50,10.04,21.02 %vol, Carbon Monoxide 80.14,302,1003 ppm,
Nitrogen Dioxide 30.34,81.32, 201.9 ppm, Nitric Oxide 30.01, 151.5, 322.5 ppm,
Sulphur 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 ± 5 °C

Humidity : 55 ± 15 %RH

Calibration place : 17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Lakse, Bangkok 10210

Calibration procedure no.: This instrument was calibrated by comparison with Standard gas mixture according
to calibration Work Instruction no. WL-CL-28-C

The calibration certificate expanded uncertainty of measurement is stated as the standard uncertainty of measurand
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 : 08-Mar-24

Kwanchai K.

Mr. Kwanchai Khamdang
Calibration Technician

D. Wuttan

Mrs. Nongluck Wongsettee
Technical Manager

Certificate No.: G 670176

Standard References (Table 1)

Standard	Certificate No.	Vendor	Due date
Oxygen (O2) 2.50 % Vol	2412/23	Linde	27-Aug-27
Oxygen (O2) 10.04 % Vol	CG-0153-21	Nimt	18-Nov-26
Oxygen (O2) 21.02 % Vol	CG-0041-22	Nimt	10-Feb-27
Carbon monoxide (CO) 80.14 ppm	CG-0040-22	Nimt	14-Feb-27
Carbon monoxide (CO) 302 ppm	1915/23	Linde	16-Jun-25
Carbon monoxide (CO) 1003 ppm	2594/23	Linde	10-Sep-25
Nitrogen Dioxide (NO2) 30.34 ppm	2703/22	Linde	22-Aug-24
Nitrogen Dioxide (NO2) 81.32 ppm	3546/23	Linde	14-Jan-26
Nitrogen Dioxide (NO2) 201.9 ppm	1975/23	Linde	17-Jul-25
Nitric Oxide (NO) 30.01 ppm	CG-0014-23	Nimt	19-Feb-25
Nitric Oxide (NO) 151.5 ppm	0161/23	Linde	22-Jan-25
Nitric Oxide (NO) 322.5 ppm	1974/23	Linde	17-Jul-25
Sulphur Dioxide (SO2) 50.36 ppm	2004/23	Linde	17-Jul-25
Sulphur Dioxide (SO2) 100.8 ppm	3507/22	Linde	09-Nov-24
Sulphur Dioxide (SO2) 600.8 ppm	2003/23	Linde	17-Jul-25

Measured room conditions

Temperature : 23.6 °C Humidity : 65.2 %RH Pressure : 1011.2 mbar

Calibration conditions

Gas Temperature : 23 °C Flow rate : 1,300 ml/min Gas pressure : 1017.1 mbar

Calibration Results (Before adjustment) (Table 2)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O2 (%Vol)	2.50	2.45	-0.05	0.15
O2 (%Vol)	10.04	9.93	-0.11	0.20
O2 (%Vol)	21.02	21.10	0.08	0.30
CO (ppm)	80.14	81	0.86	3.0
CO (ppm)	302	305	3	6.0
CO (ppm)	1003	1009	6	12
NO2 (ppm)	30.34	24.2	-6.14	8.0
NO2 (ppm)	81.32	76.9	-4.42	8.0
NO2 (ppm)	201.9	188.7	-13.2	12
NO (ppm)	30.01	27	-3.01	8.0
NO (ppm)	151.5	144	-7.5	8.0
NO (ppm)	322.5	304	-18.5	12
SO2 (ppm)	50.36	50	-0.36	6.0
SO2 (ppm)	100.8	98	-2.8	6.0
SO2 (ppm)	600.8	597	-3.8	13

Calibration Results (After adjustment) (Table 3)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O ₂ (%Vol)	2.500	2.45	-0.05	0.15
O ₂ (%Vol)	10.04	9.93	-0.11	0.20
O ₂ (%Vol)	21.02	21.10	0.08	0.30
CO (ppm)	80.14	81	0.86	3.0
CO (ppm)	302	305	3	6.0
CO (ppm)	1003	1009	6	12
NO ₂ (ppm)	30.34	29.5	-0.84	8.0
NO ₂ (ppm)	81.32	82.4	1.08	8.0
NO ₂ (ppm)	201.9	202.4	0.5	12
NO (ppm)	30.01	29	-1.01	8.0
NO (ppm)	151.5	152	0.5	8.0
NO (ppm)	322.5	321	-1.5	12
SO ₂ (ppm)	50.36	50	-0.36	6.0
SO ₂ (ppm)	100.8	98	-2.8	6.0
SO ₂ (ppm)	600.8	597	-3.8	13

Remark : 1 cmol/mol = 1 %vol. 1 µmol/mol = 1 ppm.

End of Report

Instrument description : Flue Gas Analyzer
Instrument model : Testo 350 New
Control unit serial no. : 03580098/1121
Instrument serial no. : 62965047/1121
ID no. or control no. : RYG_F50563
Manufacturer : Testo SE & Co. KGaA
Probe description : -
Probe model : -
Probe serial no. : -
Customer name : ALS LABORATORY GROUP (THAILAND) CO., LTD.
Customer address : 104 Phatthanalan 40, Phatthanalan Road, Khwaeng Phatthanalan, Khet Suan Luang
Bangkok, 10250 Thailand
Total pages of certificate : 2 Pages
Receiving no. : L-240266
Receiving date. : 24-Jan-24
Parameter of calibration : Gas Calibration(Oxygen 2.50,10.04,21.02 %vol, Carbon Monoxide 80.14,302,1003 ppm,
Nitrogen Dioxide 30.34,80.96, 201.9 ppm, Nitric Oxide 30.01, 151.5, 322.5 ppm,
Sulphur 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 ± 5 °C
Humidity : 55 ± 15 %RH
Calibration place : 17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Laksi, Bangkok 10210
Calibration procedure no. : This instrument was calibrated by comparison with Standard gas mixture according
to calibration Work Instruction no. WI-CL-28-C

REVIEW BY *Handwritten Signature*
APPROVED BY *Handwritten Signature*
NEXT CAL DATE *25/1/26*

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 : 26-Jan-24

Handwritten Signature
Mr. Kivandhai Khamdoung
Calibration Technician

Handwritten Signature
Mrs. Nongluck Wongsettee
Technical Manager



Certificate No.: G 670052

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	Nimt	18-Nov-26
Oxygen (O ₂) 21.02 % Vol	CG-0041-22	Nimt	10-Feb-27
Carbon monoxide (CO) 80.14 ppm	CG-0040-22	Nimt	14-Feb-27
Carbon monoxide (CO) 302 ppm	1915/23	Linde	16-Jun-25
Carbon monoxide (CO) 1003 ppm	2584/23	Linde	10-Sep-25
Nitrogen Dioxide (NO ₂) 30.34 ppm	2703/22	Linde	22-Aug-24
Nitrogen Dioxide (NO ₂) 80.96 ppm	3240/21	Linde	26-Jun-24
Nitrogen Dioxide (NO ₂) 201.9 ppm	1975/23	Unde	17-Jul-25
Nitric Oxide (NO) 30.01 ppm	CG-0014-23	Nimt	19-Feb-25
Nitric Oxide (NO) 151.5 ppm	0161/23	Linde	22-Jan-25
Nitric Oxide (NO) 322.5 ppm	1974/23	Unde	17-Jul-25
Sulphur Dioxide (SO ₂) 50.36 ppm	2004/23	Linde	17-Jul-25
Sulphur Dioxide (SO ₂) 100.8 ppm	3507/22	Linde	09-Nov-24
Sulphur Dioxide (SO ₂) 600.8 ppm	2003/23	Unde	17-Jul-25

Measured room conditions

Temperature : 23.2 °C Humidity : 60.5 %RH Pressure : 1013.4 mbar

Calibration conditions

Gas Temperature : 23 °C Flow rate : 1,200 ml/min Gas pressure : 1017.1 mbar

Calibration Results (Without adjustment) (Table 2)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O ₂ (%Vol)	2.50	2.46	-0.04	0.15
O ₂ (%Vol)	10.04	9.93	-0.11	0.20
O ₂ (%Vol)	21.02	21.09	0.07	0.30
CO (ppm)	80.14	80	-0.14	3.0
CO (ppm)	302	302	0	6.0
CO (ppm)	1003	1005	2	12
NO ₂ (ppm)	30.34	30.1	-0.24	8.0
NO ₂ (ppm)	80.96	81.2	0.24	8.0
NO ₂ (ppm)	201.9	200.8	-1.1	12
NO (ppm)	30.01	31	0.99	8.0
NO (ppm)	151.5	152	0.5	8.0
NO (ppm)	322.5	321	-1.5	12
SO ₂ (ppm)	50.36	52	1.64	6.0
SO ₂ (ppm)	100.8	102	1.2	6.0
SO ₂ (ppm)	600.8	603	2.2	13

Remark : 1 cmol/mol = 1 %vol, 1 µmol/mol = 1 ppm.

End of Report

Sartorius (Thailand) Co., Ltd.

128 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel. +66 2643 8361-6, e-mail: service.thailand@sartorius.com



NSC-TIS-TIS 17025
CALIBRATION 0426

SARTORIUS

Certificate of Calibration

REVIEW BY Thawit

APPROVED BY [Signature]

NEXT CAL DATE 02/02/2025

Model Number : MSU224S-100-DU

Certificate No. : 24BCI0073

Description : Analytical Balance

Issued Date : Friday, February 23, 2024

Serial Number : 0031709552

Reference No. : 229196

ID No. : RYG EN0003

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 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 : 220 g Readability : 0.0001 g

Ambients Conditions:

Temperature : 23.7 °C ± 5.0 °C

Humidity : 62.0 % 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 expended 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.

[Signature]

Mr.chonchai Inthana(Technical Manager)

SOP FM 33 03 February 2022

S
T
A
M
P


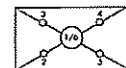


Certificate of Calibration

Model Number : MSU224S-100-DU Certificate No. : 24BCI0073
Description : Analytical Balance Issued Date : Friday, February 23, 2024
Serial Number : 0031709552 Reference No. : 228196
ID No. : RYG_EN0003
Manufacturer : Sartorius Page No. : 2 of 2

Calibration Results : Without Adjustment

Repeatability		
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.		
Nominal Value : (Low Load)	20.0000	200.0001
20 g	20.0000	200.0000
Tolerance	0.0001 g	200.0001
	20.0000	200.0001
	20.0000	200.0001
	20.0000	200.0001
Nominal Value : (High Load)	20.0000	200.0001
200 g	19.9999	200.0001
Tolerance	0.0001 g	200.0000
	20.0000	200.0000
	20.0000	200.0001
	20.0000	200.0001
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 OIML R76).		
Nominal value :	100	g
Tolerance	0.0004	g
		
		
		Difference
1	-	
2	0.0000	
3	-0.0001	
4	0.0000	
5	0.0001	
6	-	

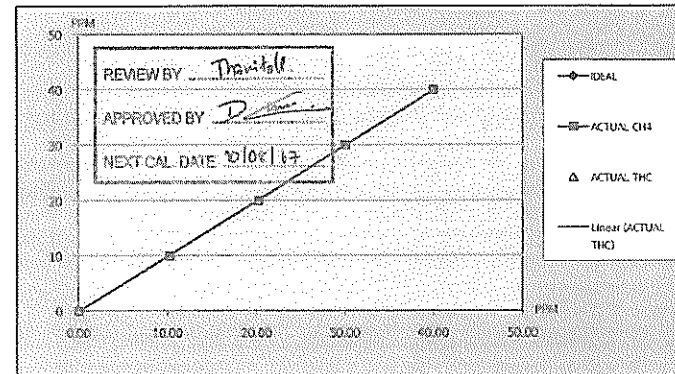
Linearity				
The linearity, also called linearity error. Describes the deviation of the characteristic curve of a weighing instrument from the linear slope.				
Tolerance	0.0002 g			
Nominal Value (g)	Conventional Mass Value (g)	Displayed Value (g)	Deviation (g)	Uncertainty (g)
0.01	0.0100	0.0100	0.0000	0.00013
0.1	0.1000	0.1000	0.0000	0.00013
0.5	0.5000	0.5000	0.0000	0.00013
1	1.0000	1.0000	0.0000	0.00013
5	5.0000	5.0000	0.0000	0.00013
10	10.0000	10.0000	0.0000	0.00013
20	20.0000	20.0000	0.0000	0.00013
50	50.0000	50.0000	0.0000	0.00024
100	100.0000	99.9999	-0.0001	0.00018
200	200.0000	199.9999	-0.0001	0.00029

End of Report.

CUSTOMER NAME : ALS Laboratory Group (Thailand) Co., Ltd. (บริษัท แอลเอส แล็บราทอรี กรุ๊ป (ประเทศไทย) จำกัด)			
EQUIPMENT NAME : THC Analyzer			
MANUFACTURER : HORIBA		MODEL : APHA-370	SERIAL NO : U430GTHB
STANDARD GAS CONCENTRATION (PPM) (CH4) : 506.1 PPM			CYLINDER NO : CC734373
CYLINDER PRESSURE (psig) : 1,600 PSI			CERTIFIED DATE : 12/05/2020
CERTIFIED BY : AIRGAS			EXPIRED DATE : 12/05/2028

TEST RESULTS

POINT NO	TEST RESULTS						
	IDEAL	ACTUAL CH4	ERROR CH4	%ERROR CH4	ACTUAL THC	ERROR THC	%ERROR THC
ZERO	0.00	0.00	0.00	-	0.00	0.00	-
1	10.00	10.21	0.21	2.10	10.18	0.18	1.80
2	20.00	20.30	0.30	1.50	20.23	0.23	1.15
3	30.00	30.10	0.10	0.33	30.19	0.19	0.63
4	40.00	40.00	0.00	0.00	40.00	0.00	0.00
AVERAGE (%)				0.98	0.90		



CALIBRATED BY : ปิยนันท์ นิลมา DATE : 10/2/26
CHECKED BY : อลิษา หงษ์ DATE : 10/03/26
J NAC
JANITTE ASSOCIATES CO., LTD.



CHECK LIST

CUSTOMER NAME	: ALS Laboratory Group (Thailand) Co., Ltd. (บริษัท เอลส์แลบ กรุ๊ป (ประเทศไทย) จำกัด)		
EQUIPMENT NAME	: THC Analyzer		
MANUFACTURER	: HORIBA	MODEL : APHA-370	SERIAL NO. : U430GTH-B

TEST VALUES				
NO.	THC Analyzer (APHA - 370)	UNIT	BEFORE	AFTER
1	Signal (CH4)	mV	64.20	35.60
2	Signal (THC)	mV	68.10	44.70
3	Detector	Temp °C , Standard Value : Ambient temp (5°C to 15°C)	47.40	47.90
		Pressure kPa , Standard Value : (Ambient/1013x100-20)±4kPa	69.70	69.80
4	Ambient	kPa current atmospheric pressure	100.70	100.80
5	Purifier	°C , Standard Value : 390 °C to 430 °C	419.70	419.60
		kPa , Normal value : 8 kPa to 25 kPa	9.80	9.70
6	NMHC	°C , Standard Value : 230 °C to 260 °C	241.20	245.20
7	DC 24 V	V , Standard Value : 24 V ± 0.5 V	23.90	23.90
8	DC 5 V	V , Standard Value : 5 V ± 0.5 V	5.00	5.00
9	Bypass (Optional)	L/min, Normal value : 0.9 L/min ± 0.3 L/min	-	-
10	Over Flow (Optional)	L/min, Standard Value : 0.8 L/min or More	-	-
11	CH4 Sampling Reading	PPM	5.32	2.13
12	NMHC Sampling Reading	PPM	0.11	0.45
13	THC Sampling Reading	PPM	5.43	2.60
14	Zero Gas CH4/THC	PPM	0.17/0.17	0.00/0.00
15	Span Gas	PPM	54.63/55.20	40.03/40.00
G	Gas H2	20 PSI	20	20

Remark : Reference EX-EN-017-56 , Ambient HC Monitor APHA-370 Operation Manual Page #81

Remark : (Ambient temperature = 5°C to 40°C)

อาการที่ตรวจพบ

- Service Maintenance

รายละเอียดการดำเนินการ

เปลี่ยน Filter 52 mm. , ว่า Calibration Zero/Span , Multipoint

ผลการดำเนินการ

- เียบร้อม เครื่องหาสารตกค้าง-เน้นการตรวจวัดให้ตามปกติ

CALIBRATED BY : *ศิริวิมล งามจิตต์*

CHECKED BY : *วอลเลก งามจิตต์*



DATE : 10/8/66

DATE : 10/8/66

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : กรุณานำใบฝ่ายบริการหลังการขาย , โทร 02-868-0812 # 15-16 , E-Mail : Engineer@iranatee.com
เลขที่ 63/14-15,67/35-36 ซอยเพชรเกษม 7,7/1 ถนนเพชรเกษม แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600 โทร 02-868-0812-13 โทรสาร 02-868-1889

FO-EN-207 R00/01-08-13

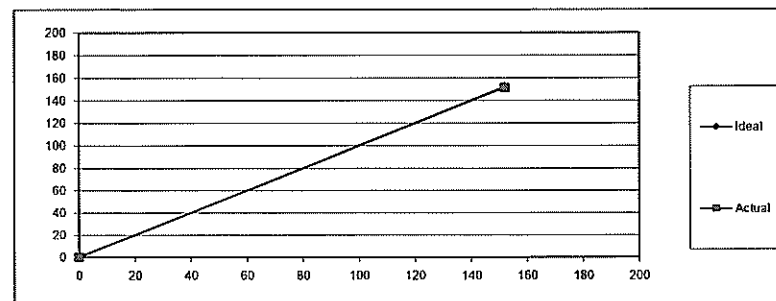


CALIBRATION REPORT

Calibration Date	3-Jan-24	Equipment ID	BKK_FS0758
Equipment Name	FID Analyzer	Manufacturer	Baseline Mocon
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

Mr. Apisit Singha

(Mr.Apisit Singha)
Field Environmental Scientist (4)

Approved By

Mr. Sarayuth Jitranont

(Mr.Sarayuth Jitranont)
Assistant General Manager

ALS Laboratory Group



CALIBRATION LABORATORY Co., LTD.

2/10-11, 14 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10233
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : VACUUM GAUGE
MANUFACTURER : DWYER
MODEL / TYPE : DPGA-00
SERIAL NO. : DVG07[BKK_FS0481]
CLID. NO. : 212300279
JOB CONTROL NO. : 230211016391

CUSTOMER : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN RD.,
KHWANG PHATTHANAKAN, KHET SUAN LUANG, BANGKOK 10250, THAILAND

DATE OF RECEIVED : 11 February 2023

DATE OF ISSUED : 16 February 2023

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Sittipong Pimdee
Calibration Engineer

Approved By : Mongkol Yotsontorn
Authorized Signatory
16 February 2023



This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q23016391

F3-011-04/01-12

page 1 of 3



CALIBRATION LABORATORY Co., LTD.

2/10-11, 14 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com



REPORT OF CALIBRATION

FOR

NOMENCLATURE : VACUUM GAUGE
MANUFACTURER : DWYER
MODEL / TYPE : DPGA-00
SERIAL NO. : DVG07[BKK_FS0481]
DATE OF CALIBRATION : 14 February 2023

ENVIRONMENT CONDITIONS :

Temperature : $(23 \pm 2) ^\circ\text{C}$

Relative Humidity : $(55 \pm 10) \% \text{RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPPP-05 according to DKD-R 6-1 as calibration guidelines.

The calibration was performed by direct measurement with Document Process Calibrator and Pressure Module which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Document Process Calibrator, Fluke Model 744 S/N. 9226007 with Pressure Module Model 700PV4 S/N. 19298401.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand). Certificate No. MP-0195-22, Due Date 18 November 2023.

UNCERTAINTY :

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of $k = 2$. It has been evaluated according to the "Calibration of Pressure Gauges (DKD-R 6-1)" which provides a level of confidence approximately 95%.

Certificate No. Q23016391

F3-011-04/01-12

page 2 of 3





CALIBRATION LABORATORY Co., LTD.

2/10-11, 11, 55 Soi Prasert Manukit 29 Yeak 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.ccl-laboratory.com E-mail: sales@ccl-laboratory.com



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The DUC was exercised by applying a known pressure from its zero to full scale 1 times. Then 2 series of known gauge pressure were applied. The STD reading were recorded and the means value were reported in the table below

CALIBRATION DATA

CORRECTION OF PRESSURE

DUC Test point (inHg)	STD Reading (inHg)		Correction (inHg)	
	Up	Down	Up	Down
0.00	0.000	0.000	0.000	0.000
-10.00	-9.973	-9.976	+0.027	+0.024
-20.00	-19.961	-19.963	+0.039	+0.037
-26.00	-25.957	-25.959	+0.043	+0.041
-27.00	-26.954	-26.956	+0.046	+0.044
-28.00	-27.951	-27.951	+0.049	+0.049

Uncertainty of measurement ± 0.007 inHg

Transmitting fluid : Air.

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 008 Page 36 of 54

This report is valid for the above stated instrument/s only.

End of Certificate

Certificate No. Q23016391

F3-011-04/01-12

page 3 of 3



CALIBRATION LABORATORY Co., LTD.

2/10-11, 11, 55 Soi Prasert Manukit 29 Yeak 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.ccl-laboratory.com E-mail: sales@ccl-laboratory.com



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : VACUUM GAUGE
MANUFACTURER : QUALITYWELL
MODEL / TYPE : N/A
SERIAL NO. : VG01[RYG_FS0332]
CLID. NO. : 212300695
JOB CONTROL NO. : 230329034806

REVIEW BY *Maroon P*
APPROVED BY *h/t*
NEXT CAL DATE *30/9/24*

CUSTOMER : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN RD.,
KHWAENG PHATTHANAKAN, KHET SUAN LUANG, BANGKOK 10250, THAILAND

DATE OF RECEIVED : 29 March 2023

DATE OF ISSUED : 31 March 2023

Report of calibration screening must not be taken in part. Except complete. Without the approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Sittipong Pimdee
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory
31 March 2023



This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q23034806

F3-011-04/01-12

page 1 of 3





CALIBRATION LABORATORY Co., LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel: 02-579-0553-4 Fax: 02-579-2572 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



REPORT OF CALIBRATION

FOR

NOMENCLATURE : VACUUM GAUGE
MANUFACTURER : QUALITYWELL
MODEL / TYPE : N/A
SERIAL NO. : VG01IRYG_FS0332
DATE OF CALIBRATION : 30 March 2023

ENVIRONMENT CONDITIONS :

Temperature : $(23 \pm 2) ^\circ\text{C}$

Relative Humidity : $(55 \pm 10) \% \text{RH}$

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPPP-05 according to DKD-R 6-1 as calibration guidelines.

The calibration was performed by direct measurement with Document Process Calibrator and Pressure Module which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Document Process Calibrator, Fluke Model 741B S/N. 8295020 with Pressure Module Model 700PD5 S/N. 89404505

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand).

Certificate No. MP-0035-23, Due Date 02 February 2024.

UNCERTAINTY :

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of $k = 2$. It has been evaluated according to the "Calibration of Pressure Gauges (DKD-R 6-1)" which provides a level of confidence approximately 95%.

Certificate No. Q23034806

F3-011-04/01-12

page 2 of 3



CALIBRATION LABORATORY Co., LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel: 02-579-0553-4 Fax: 02-579-2572 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

The DUC was exercised by applying a known pressure from its zero to full scale 1 times. Then 2 series of known gauge pressure were applied. The STD reading were recorded and the means value were reported in the table below.

CALIBRATION DATA

CORRECTION OF PRESSURE

DUC Test point (inHg)	STD Reading (inHg)		Correction (inHg)	
	Up	Down	Up	Down
-10.0	-9.75	-9.76	+0.25	+0.24
-20.0	-19.90	-19.91	+0.10	+0.09
-26.0	-26.02	-26.03	-0.02	-0.03
-27.0	-27.04	-27.05	-0.04	-0.05
-28.0	-28.05	-28.05	-0.05	-0.05

Uncertainty of measurement = 0.06 inHg

Transmitting fluid : Air.

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 008 Page 36 of 54

This report is valid for the above stated instrument/s only.

End of Certificate

Certificate No. Q23034806

F3-011-04/01-12

page 3 of 3





Certificate of Calibration



Equipment: SPECTROPHOTOMETER
Model: DR3900
Serial No. (or ID.): 2021761 (RYG_EN0179)
Manufacturer: HACH
Condition: In Condition

Certificate No.: C06230442
Issued Date: 22 September 2023
Job No.: WO-00005382
Page: 1 of 3

Customer: ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)
616/10 Moo 5 T.Maenam Khu,
A.Pluakdaeng, Rayong 21140, Thailand.

Environment Condition: Temperature 24.1 °C ± 0.1 °C
Humidity 61.6 %RH ± 1.6 %RH

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 Stama Scientific Limited.

The standard for Wavelength Certificate No. 111583 and 111584

The standard for Photometric Certificate No. 9114984

The standard for Stray light Certificate No. 111585

(Mr. Nattapat Rungrueang)
Person in charge

(Mr. Nitnun 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 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.

บริษัท ดีเคเอส อีเซีย จำกัด
DKSH Technology Limited
2533 สุขุมวิท ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangkok, Phra Prathung, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/calibration-thailand

Delivering Growth - in Asia and Beyond.

CAL-FM-C06-16: 12 Sep 2022



Certificate No.: C06230442 Page 2 of 3

Calibration Results:

Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 5 nm and UUC at 5 nm				
Standard Wavelength	Unit Under Calibration	Correction	Uncertainty	
418.40	418	0.40	0.59	
537.00	536	1.00	0.58	
638.00	638	0.00	0.59	
747.61	748	-0.39	0.59	
807.04	807	0.04	0.59	

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	0.517	-0.0002	0.0045
	1.0288	1.026	0.0038	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.2867	0.281	0.0057	0.0045
	0.5073	0.506	0.0013	0.0045
	1.0083	1.003	0.0053	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.2516	0.249	0.0026	0.0045
	0.4595	0.461	-0.0015	0.0045
	0.9334	0.933	0.0004	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.2461	0.244	0.0021	0.0045
	0.4652	0.466	-0.0008	0.0045
	0.9468	0.945	0.0018	0.0045
590 nm	0.0000	0.000	0.0000	0.0045
	0.2694	0.267	0.0024	0.0045
	0.5040	0.504	0.0000	0.0045
	1.0032	1.000	0.0032	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.2579	0.256	0.0019	0.0045
	0.4971	0.497	0.0001	0.0045
	0.9720	0.970	0.0020	0.0045

บริษัท ดีเคเอส อีเซีย จำกัด
DKSH Technology Limited
2533 สุขุมวิท ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangkok, Phra Prathung, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/calibration-thailand

Delivering Growth - in Asia and Beyond.

CAL-FM-C06-16: 12 Sep 2022



Certificate No.: C06230442 Page 3 of 3

Calibration Results:
Without Adjustment

Stray light *	UUC: Wavelength (nm)	UUC: Transmission (%T)	Absorbance (A)
Standard: cut-off			
391.44 +/- 0.11 nm	391	3.6	1.444

* Calibration Marked "Not TISI Accredited" in this Certificate have been included for completeness.

The End of Certificate

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10250
2533 Sukhumvit Road, Bangkok, Phra Khanong, Bangkok 10250
Phone: +66 2639 7000 Email: info.dksh.com@dksh.com Website: www.dksh.com/thailand-branch

Delivering Growth - in Asia and Beyond.

CAL-FM-C06-15: 12 Sep 2022



ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: WO-00005382

ชนิดเครื่องมือ: SPECTROPHOTOMETER รุ่น: DR3900

หมายเลขเครื่อง: 2021761

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
18 Sep 2023			18 Sep 2023		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิตช์ ปิด - เปิด เครื่อง (On-Off Switch)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Spectrophotometer			
<input type="checkbox"/>	<input type="checkbox"/>	6. แรงดันไฟฟ้า (Battery Backup) >= 2.5 VDC	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. ความยาวคลื่น (Wavelength Check)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	807nm=807.3nm
<input type="checkbox"/>	<input type="checkbox"/>	9. แหล่งกำเนิดแสง (UV < 3,000 hour)	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. แหล่งกำเนิดแสง (Visible < 5,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	11. ช่องใส่หลายตัวอย่าง (Carousel Module)	<input type="checkbox"/>	<input type="checkbox"/>	
		pH Meter and Conductivity Meter			
<input type="checkbox"/>	<input type="checkbox"/>	12. อิเล็กโทรด (Electrode and Connection Cable)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	13. ระดับสารละลายใน Electrode (Level KCl)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	15. ขาตั้งอิเล็กโทรด (Stand)	<input type="checkbox"/>	<input type="checkbox"/>	
		Turbidimeter			
<input type="checkbox"/>	<input type="checkbox"/>	16. ค่าความขุ่นที่ต่ำสุด (No Sample)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	17. ระดับการส่องสว่างของแสง (>= 2.5 ไม่น้อย 3.0)	<input type="checkbox"/>	<input type="checkbox"/>	
		Automatic Titrator			
<input type="checkbox"/>	<input type="checkbox"/>	18. สภาพ Piston Burettes	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	19. Function Rinsing and Dosing	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	<input type="checkbox"/>	<input type="checkbox"/>	

เห็นด้วยและแนะนำ :

Mr.Nattapat Rungrueang
Service Engineer

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10250
2533 Sukhumvit Road, Bangkok, Phra Khanong, Bangkok 10250
Phone: +66 2639 7000 Email: info.dksh.com@dksh.com Website: www.dksh.com/thailand-branch

Delivering Growth - in Asia and Beyond.

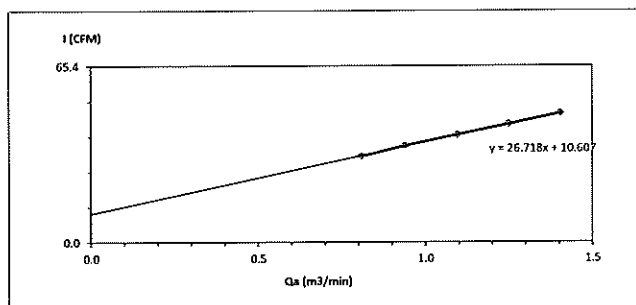
CAL-FM-R31-03: 20 Jul 2022



High Volume Air Sampler Calibration Worksheet

Project Site : Siam Styrene Monomer Co., Ltd. Barometric Pressure (mm Hg) : 751
 Calibrate Location : บริเวณลานประตู (โรงพ่นบาลส่งเสริม Temperature (°C) : 31
สุขภาพผ่านลดทอน)
 Calibrate Date : 9-Jun-24 High Volume ID : RYG_FS0183
 Calibration Sheet No. : C-090624-RYG_FS0183 High Volume Model : TE-5009X
 Calibrator ID : RYG_FS0205 High Volume S/N : 4791
 Calibrator Model : TE-5028A Calibrator Slope : 0.95561
 Calibrator S/N : 1166 Calibrator Intercept : -0.02266

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I: Chart (CFM)	Linear Regression
1	1.4	0.810	32	Slope: 26.7183 Intercept: 10.6066 Correlation Coefficient: 0.9995
2	1.9	0.940	36	
3	2.6	1.096	40	
4	3.4	1.250	44	
5	4.3	1.403	48	



Calibrated by : จตุรชัย
 (Mr. Chatchai Sukpia)
 Field Scientist(1)

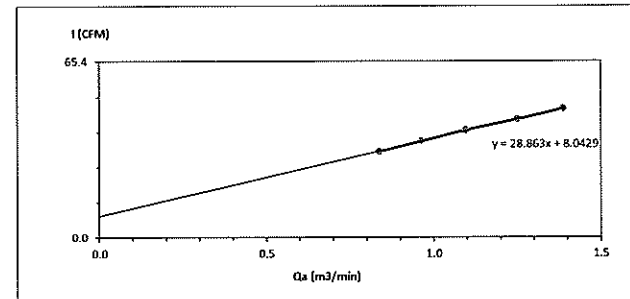
Approved by : น. นพปง จันทรูปาน
 (Mr. Noppong Jantarupan)
 Enviro Field Coordinator Scientist (3)



High Volume Air Sampler Calibration Worksheet

Project Site : Siam Styrene Monomer Co., Ltd. Barometric Pressure (mm Hg) : 751
 Calibrate Location : บ้านนาบตาพุด Temperature (°C) : 31
 Calibrate Date : 9-Jun-24 High Volume ID : RYG_FS0295
 Calibration Sheet No. : C-090624-RYG_FS0295 High Volume Model : TE-5009X
 Calibrator ID : RYG_FS0205 High Volume S/N : 5502
 Calibrator Model : TE-5028A Calibrator Slope : 0.95561
 Calibrator S/N : 1166 Calibrator Intercept : -0.02266

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I: Chart (CFM)	Linear Regression
1	1.5	0.838	32	Slope: 28.8633 Intercept: 8.0429 Correlation Coefficient: 0.9994
2	2.0	0.961	36	
3	2.6	1.096	40	
4	3.4	1.250	44	
5	4.2	1.387	48	



Calibrated by : จตุรชัย
 (Mr. Chatchai Sukpia)
 Field Scientist(1)

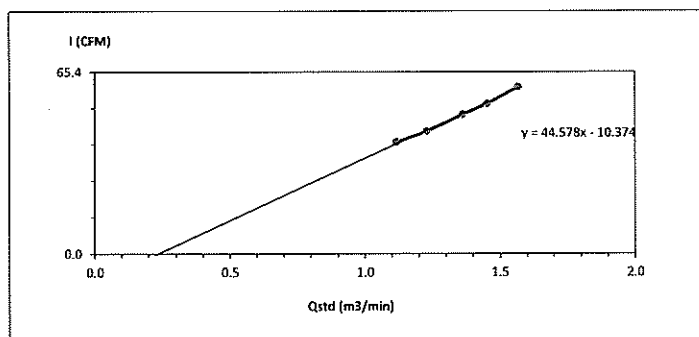
Approved by : น. นพปง จันทรูปาน
 (Mr. Noppong Jantarupan)
 Enviro Field Coordinator Scientist (3)



High Volume Air Sampler Calibration Worksheet

Project Site : Siam Styrene Monomer Co. Ltd. Barometric Pressure (mm Hg) : 757
 Calibrate Location : บ้านนาปรัง (โรงพยาบาลส่งเสริมสุขภาพตำบลนาปรัง) Temperature (°C) : 32
 Calibrate Date : 9-Jun-24 High Volume ID : RYG_FS0395
 Calibration Sheet No. : C-090624-RYG_FS0395 High Volume Model : TE-5170D
 Calibrator ID : RYG_FS0205 High Volume S/N : 5692
 Calibrator Model : TE-5028A Calibrator Slope : 1.52567
 Calibrator S/N : 1166 Calibrator Intercept : -0.03613

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I : Chart (CFM)	Linear Regression
1	2.8	1.1181	40	Slope : 44.5782 Intercept : -10.3737 Correlation Coefficient : 0.9980
2	3.4	1.2284	44	
3	4.2	1.3613	50	
4	4.8	1.4528	54	
5	5.6	1.5663	60	



Calibrated by จตุรัสชัย
 (Mr.Chatchai Sukpia)
 Field Scientist(1)

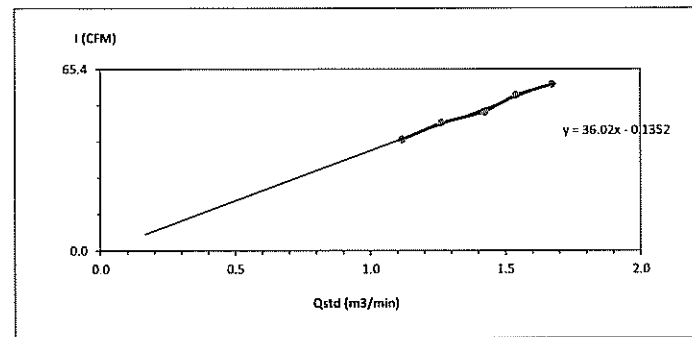
Approved by น. นพปง จันตารูปาน
 (Mr. Noppong Jantarupan)
 Enviro Field Coordinator Scientist (3)



High Volume Air Sampler Calibration Worksheet

Project Site : Siam Styrene Monomer Co., Ltd. Barometric Pressure (mm Hg) : 754.6
 Calibrate Location : บ้านนาปรัง Temperature (°C) : 31
 Calibrate Date : 8-Jun-24 High Volume ID : RYG_FS0662
 Calibration Sheet No. : C-080624-RYG_FS0662 High Volume Model : TE-5009X
 Calibrator ID : RYG_FS0205 High Volume S/N : 6259
 Calibrator Model : TE-5028A Calibrator Slope : 1.52567
 Calibrator S/N : 1166 Calibrator Intercept : -0.03613

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I : Chart (CFM)	Linear Regression
1	2.8	1.1182	40	Slope : 36.0195 Intercept : -0.1352 Correlation Coefficient : 0.9956
2	3.6	1.2630	46	
3	4.6	1.4230	50	
4	5.4	1.5388	56	
5	6.4	1.6720	60	



Calibrated by จตุรัสชัย
 (Mr.Chatchai Sukpia)
 Field Scientist(1)

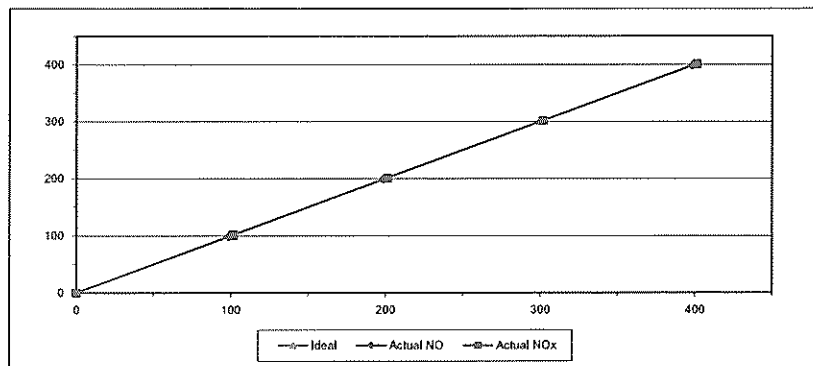
Approved by น. นพปง จันตารูปาน
 (Mr. Noppong Jantarupan)
 Enviro Field Coordinator Scientist (3)



MULTIPOINT CALIBRATION REPORT

Calibration Date 4-Jan-24 Equipment Name NOx Analyzer
Manufacturer HORIBA Model APNA-370
Serial No. ALP0V0WY Equipment ID RYG_FS0455
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	98.60	-1.40	-1.40	101.60	1.60	1.60
2	200.00	198.80	-1.20	-0.60	201.20	1.20	0.60
3	300.00	301.00	1.00	0.33	301.80	1.80	0.60
4	400.00	398.50	-1.50	-0.38	401.30	1.30	0.33
AVERAGE (%)				-0.39			0.64



Calibrated By

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

Approved By

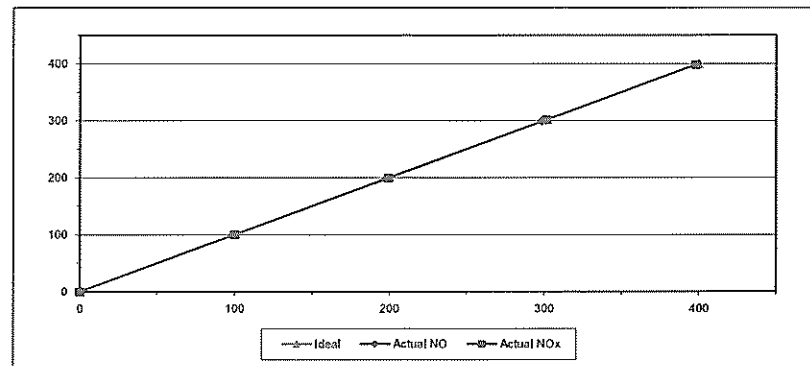
(Mr. Sarayuth Jitranont)
Assistant General Manager



MULTIPOINT CALIBRATION REPORT

Calibration Date 4-Jan-24 Equipment Name NOx Analyzer
Manufacturer HORIBA Model APNA-370
Serial No. 8G314J3K Equipment ID RYG_FS0264
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	99.20	-0.80	-0.80	100.10	0.10	0.10
2	200.00	198.50	-1.50	-0.75	199.30	-0.70	-0.35
3	300.00	298.60	-1.40	-0.47	301.50	1.50	0.50
4	400.00	398.20	-1.80	-0.45	398.00	-2.00	-0.50
AVERAGE (%)				-0.48			-0.03



Calibrated By

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

Approved By

(Mr. Sarayuth Jitranont)
Assistant General Manager

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Cup anemometer
MANUFACTURER : Novalyx
MODEL/TYPE : Sensor: WS-01F
Data logger: 200-WS-25UB
SERIAL NUMBER : Sensor: WSD-AS190
Data logger: AS190
ID NUMBER : RYG_F50329
CONDITION AS-RECEIVED : Used item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand.

RECEIVED DATE : 11 Aug 2023
MEASUREMENT DATE : 18 Aug 2023
ISSUE DATE : 21 Aug 2023

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follows:

Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH
Atmospheric Pressure : 1010 ± 10 hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITIONS : Wind tunnel cross-section area¹ 900 cm²
Win direction frontal area² 100 cm²
Diameter of mounting pipe³ - mm
Blockage ratio of test object⁴ 0.111 [-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (24.3) °C, (43.1) %RH and (1005.59) hPa.

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:
☒ Mr. Soravik Thachalad
☐ Miss Jittaporn Jiratsornphol



Approved Signatory:

Mr. Porinya Booncharoen
Calibration Department Manager

Remarks:

- ¹ Nozzle cross-section area of the wind tunnel
- ² Projected cross-section area of the tested object include mounting pipe
- ³ Diameter of mounting pipe
- ⁴ Ratio "to"

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

Certificate Number

CWS-003-66

Page 2 of 2 Pages

MEASUREMENT RESULTS⁵

The cup anemometer, Unit Under Calibration (UUC) was exercise at 10 m/s for 5 minutes prior to calibration being performed. The standard air velocity 0.5 m/s to 5 m/s was calculated by a standard air velocity transducer and above 5 m/s to 30 m/s was calculated by a pitot tube with precision differential pressure meter which was installed 40 mm and 300 mm respectively away from wind tunnel nozzle, UUC was installed at center of the test section. The calibration was carried out under both rising and falling air velocity in the range of 1 m/s to 16 m/s at calibration interval of 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

V _{std} (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	V _{uuc} (m/s)	Error (m/s)	U (k=2) (m/s)
1.032	24.10	24.30	0.9	-0.1	0.31
2.095	24.54	24.30	1.9	-0.2	0.31
3.006	24.08	24.30	2.9	-0.1	0.31
4.220	24.04	24.30	4.0	-0.2	0.31
5.00	23.78	24.30	4.9	-0.1	0.31
5.97	23.82	24.30	5.9	-0.1	0.31
7.01	23.78	24.30	6.9	-0.1	0.31
8.13	24.00	24.30	8.0	-0.1	0.31
9.07	23.82	24.30	9.0	-0.1	0.31
10.07	23.90	24.30	9.9	-0.1	0.31
11.13	23.84	24.30	11.1	0.0	0.31
12.13	23.80	24.30	12.0	-0.1	0.31
13.19	23.82	24.30	13.2	0.0	0.31
14.24	23.74	24.30	14.1	-0.1	0.31
15.20	23.80	24.30	15.2	0.0	0.33
16.26	23.74	24.30	16.1	-0.2	0.31

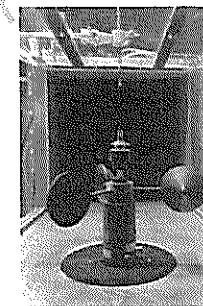
Remark:

⁵ Calibration results only count for the tested circumstances and environmental conditions during which calibration took place

⁶ Velocity of standard

⁷ Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP



Calibration set-up of the cup anemometer calibration in the wind tunnel of Jiranatee Associates Co., Ltd. The cup anemometer shown may differ from the calibrated one. Remark: The proportion of the set-up is not true to scale due to imaging geometry.





JIRANATEE ASSOCIATES CO., LTD.

Jiranatee Associates Co., Ltd.
61/24-15, 67/35-35
Petchkasom 7/11, Rd. Wattanasri, Bangkok 10500 (Thailand)
Tel: +662 6889112
Mobile: +662 6399453
E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

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

Air speed measurement laboratory
Calibration services department.

Certificate Number

CWD-003-66

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Wind Direction Sensor
MANUFACTURER : Novallux
MODEL/TYPE : Sensor: WS-02F
Data logger: 200-WS-251B
SERIAL NUMBER : Sensor: WSD-AS150
Data logger: AS150
ID NUMBER : RYG_P50329
CONDITION AS-RECEIVED : Used item
CUSTOMER : AIS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand.

RECEIVED DATE : 11 Aug 2023
MEASUREMENT DATE : 18 Aug 2023
ISSUE DATE : 21 Aug 2023

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH
Atmospheric Pressure : 1010 ± 10 hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITION : Wind tunnel cross-section area¹ 900 cm²
Win direction frontal area² 129 cm²
Diameter of mounting pipe³ - mm
Blockage ratio of test object⁴ 0.143 [-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (23.9) °C, (44.8) %RH and (1009.2) hPa.

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:
☒ Mr. Sorawit Thaisitad
☐ Miss Jitraporn Lertrachomphol



Approved signature:

Mr. Porinya Sooncharoen
Calibration Department Manager

Remarks:

- ¹ Nozzle cross-section area of the wind tunnel
- ² Projected cross-section area of the tested object include mounting pipe
- ³ Diameter of mounting pipe
- ⁴ Ratio "to"

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

Certificate Number

CWD-003-66

Page 2 of 2 Pages

MEASUREMENT RESULTS¹

The wind direction sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 45° intervals in clockwise and counterclockwise directions after offset adjustment has been made. The flow speed of wind tunnel (usually 5 m/s) is kept constant while the sensor is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.

Air speed	D ₁₀₀ ²	D ₁₀₀ ²	Error	U (k=2)
m/s	Degree (°)	Degree (°)	Degree (°)	Degree (°)
	45.000	41	-4	1.0
	90.000	87	-3	1.0
	135.001	132	-3	1.0
5.00	180.000	178	-2	1.0
	225.000	226	1	1.0
	270.000	272	2	1.0
	315.000	319	4	1.0
	360.000	359	-1	1.0

Remarks:

¹ Calibration results only count for the tested circumstances and environmental conditions during which calibration took place.

² Direction of standard

³ Direction of Unit Under Calibration

End of Certificate of Calibration





JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd
63/14-15, 67/15-16
Petchkasem 1,7/1, Rd. Watthana, Bangkok
Bangkok 10600 (Thailand)
Tel: +66(0)8680812
Mobile: +66(0)9999453
E-mail: jiranatee@jiranatee.com
Web site: www.jiranatee.com

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

Air speed measurement laboratory
Calibration services department.

RECEIVED BY *Manakorn P.*
19/7/24

Certificate Number

CL-011-66

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Wind Direction Sensor
MANUFACTURER : Novallux
MODEL/TYPE : Sensor: WS-02F
Data logger: 200-WS-25DL
SERIAL NUMBER : Sensor: -
Data logger: A4987
ID NUMBER : RYG_FSO089
CONDITION AS-RECEIVED : Used item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand.

RECEIVED DATE : 16 Jan 2023
MEASUREMENT DATE : 19 Jan 2023
ISSUE DATE : 20 Jan 2023

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follows:

Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH
Atmospheric Pressure : 1010.1 hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITION : Wind tunnel cross-section area¹ 900 cm²
Win direction frontal area² 129 cm²
Diameter of mounting pipe³ - mm
Blockage ratio of test object⁴ 0.143 [-]

Preconditioning : 24 hours at ambient conditions.

Measurement Condition : The average values during measurement are (24.1)°C, (54.3) %RH and (1015.2) hPa.

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:
☒ Mr. Sorawit Thaisri
☐ Miss Jitraporn Lertnerphol

Approved signatory: *Mr. Parinya Booncharoen*
Mr. Parinya Booncharoen
Calibration Department Manager

Remarks:
¹ Nozzle cross-section area of the wind tunnel
² Projected cross-section area of the tested object include mounting pipe
³ Diameter of mounting pipe
⁴ Ratio "a" to "b"

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

Certificate Number

CL-011-66

Page 2 of 2 Pages

MEASUREMENT RESULTS⁵

The wind direct on sensor was calibrated against standard rotary encoder by comparison method. During calibration, the measurement was carried out at 45° intervals in clockwise and counterclockwise directions after offset adjustment has been made. The flow speed of wind tunnel (usually 5 m/s) is kept constant while the sensor is rotated around its vertical axis. The results of calibration and associated measurement uncertainties are reported in the table below.

Air speed	D _{rot}	D _{unc}	Error	U (k=2)
m/s	Degree (°)	Degree (°)	Degree (°)	Degree (°)
5.03	0.000	0	0	0.58
	45.000	41	-4	0.68
	90.000	88	-2	0.74
	135.000	133	-2	0.58
	180.000	180	0	0.74
	225.000	228	3	0.74
	270.000	273	3	0.68
	315.000	316	1	0.74

Remarks:

⁵ Calibration results only count for the tested circumstances and environmental conditions during which calibration took place

⁶ Direction of standard

⁷ Direction of Unit Under Calibration

End of Certificate of Calibration



JIRANATEE ASSOCIATES CO., LTD.

Jiranatee Associates Co., Ltd.
62/14-15, 67/35-36
Petchkasem 7, 7/1, Rd. Watthana, Bangkok 10330
Bangkok 10330 (Thailand)
Tel: +6620820312
Mobile: +66853959453
E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
MSC-TIS-115 17025
CALIBRATION 0367

Air speed measurement laboratory
Calibration services department

Certificate Number

CL-011-65

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Cup anemometer
MANUFACTURER : Novolynt
MODEL/TYPE : Sensor: WS-02F
Data logger: ZDO-WS-25DL
SERIAL NUMBER : Sensor: -
Data logger: A4387
ID NUMBER : RTG_F500B9
CONDITION AS-RECEIVED : Used item
CUSTOMER : ALS laboratory group (Thailand) co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand.

RECEIVED DATE : 16 Jan 2023
MEASUREMENT DATE : 18 Jan 2023
ISSUE DATE : 10 Jan 2023

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow:
Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH
Atmospheric Pressure : 1010 ± 10 hPa

PLACE OF CALIBRATION : Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITIONS : Wind tunnel cross-section area: 900 cm²
Win direction frontal area: 100 cm²
Diameter of mounting pipe: - mm
Blockage ratio of test object¹: 0.111 [-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (23.5) °C, (52.8) %RH and (1014.1) hPa.

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

Calibrated by:
☒ Mr. Sorawat Thachan
☐ Miss Jittirattorn Jiratsornphol

Approved signatory:
Mr. Paimya Booncharoen
Calibration Department Manager

Footnote:
¹ Nominal cross-section area of the wind tunnel
² Projected cross-section area of the tested object include mounting pipe
³ Diameter of mounting pipe
⁴ Ratio ² to ¹

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

Certificate Number

CL-011-65

Page 2 of 2 Pages

MEASUREMENT RESULTS¹

The cup anemometer, Unit Under Calibration (UUC) was exercise at 10 m/s for 5 minutes prior to calibration being performed. The standard air velocity 0.5 m/s to 5 m/s was calculated by a standard air velocity transducer and above 5 m/s to 30 m/s was calculated by a pitot tube with precision differential pressure meter which was installed 40 mm and 300 mm respectively away from wind tunnel nozzle. UUC was installed at center of the test section. The calibration was carried out under both rising and falling air velocity in the range of 1 m/s to 16 m/s at calibration interval of 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below

V_{ref} ² (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	V_{unc} ² (m/s)	Error (m/s)	U (k=2) (m/s)
0.983	23.50	23.45	0.8	-0.2	0.17
2.035	23.44	23.45	1.9	-0.1	0.16
3.049	23.50	23.45	2.9	-0.2	0.19
4.136	23.50	23.45	3.9	-0.2	0.20
5.01	23.40	23.45	4.9	-0.1	0.18
6.00	23.50	23.45	5.9	-0.1	0.19
7.07	23.40	23.45	7.0	-0.1	0.19
8.18	23.50	23.45	8.0	-0.2	0.19
9.10	23.26	23.45	9.0	-0.1	0.20
10.09	23.44	23.45	9.9	-0.1	0.21
11.15	23.30	23.45	11.0	-0.1	0.21
12.14	23.42	23.45	12.0	-0.1	0.25
13.20	23.22	23.45	13.1	-0.1	0.26
14.25	23.34	23.45	14.1	-0.1	0.24
15.24	23.24	23.45	15.0	-0.3	0.26
16.31	23.24	23.45	16.1	-0.2	0.24

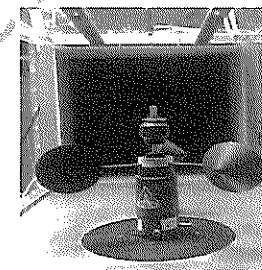
Remark:

¹ Calibration results only count for the tested circumstances and environmental conditions during which calibration took place

² Velocity of standard

³ Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP



Calibration set-up of the cup anemometer calibration in the wind tunnel of Jiranatee Associates Co., Ltd. The cup anemometer shown may differ from the calibrated one. Remark: The proportion of the set-up is not true to scale due to imaging geometry.

End of Certificate of Calibration

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

451-451/1 Sirinthorn Rd.,Bangbunru, Bangplud Bangkok 10700 THAILAND.
Tel.0-2435-8800 Fax.0-2433-1679 e-mail:cal-center@sithiporn.com http://www.sithiporn.com

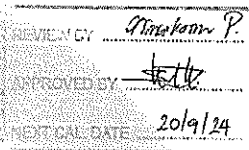


Cert. No. : ACC23029

Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-74
Serial No.: 34178123
ID No.: RYG_FS0215



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 Pisulpaisan

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.

QF-TS12-04-04-020664

SITHIPORN / SITHIPORN ASSOCIATES CO.,LTD. associates CALIBRATION LABORATORY

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-42KAI	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).

QF-TS12-04-04-020664

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

451-451/1 Sirinthon Road, Bangbaunru, 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,
KHWANG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 11 JANUARY 2024
Calibration Date : 22-24 JANUARY 2024
Date of Issue : 24 JANUARY 2024

Calibrated by : Nathakorn Pisutpaisan

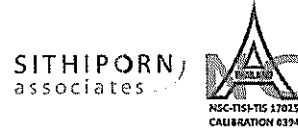
Approved by :

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.

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
 Tel. +66 2433 8331 Email : calibration@sithiporn.com



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	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).

7. Petch

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
 Tel. +66 2433 8331 Email : calibration@sithiporn.com



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

7. Petch

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



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

T. Retun

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



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

T. Retun

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN,
associates.



Cert. No. : ACL24075
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

7. Return

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN,
associates.



Cert. No. : ACL24075
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

7. Return

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24075
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

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24078
Pages : 1 of 8

Calibration Certificate

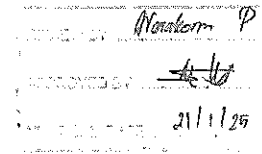
Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No.: 00920832 / 22192 / 22221
ID No.: RYG_FS0623

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWANG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 11 JANUARY 2024
Calibration Date : 22- 24 JANUARY 2024
Date of Issue : 24 JANUARY 2024



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.

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24078
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	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-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. Retan

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24078
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	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

T. Retan

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24078
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)	94.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.1

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

Frequency Weighting	Measured value (dB)
A - weight	8.7
C - weight	13.4
Flat	19.1

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	0.2	0.2	0.2	± 1.0
1000	0.2	0.2	0.2	± 0.7
8000	0.2	0.3	0.3	+ 1.5, - 2.5

7. Peter

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24078
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	±1.0
125	0.0	0.1	0.0	±1.0
250	0.1	0.1	0.0	±1.0
500	0.0	0.1	0.0	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.1	0.1	+ 1.5, - 2.5
16000	0.0	-1.2	-1.1	+ 2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.1

7. Peter

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel: +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24078
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	±0.8
136.0	136.1	0.1	±0.8
135.0	135.1	0.1	±0.8
134.0	134.1	0.1	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.0	0.0	±0.8
30.0	30.0	0.0	±0.8
29.0	29.0	0.0	±0.8
28.0	28.0	0.0	±0.8
27.0	27.0	0.0	±0.8
26.0	26.0	0.0	±0.8
25.0	25.0	0.0	±0.8

7. Peter

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel: +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24078
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	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0; -3.0
	2	8	117.0	116.9	-0.1	1.0; -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	107.9	-0.1	1.0; -3.0
	200	800	127.6	127.5	-0.1	±0.5
SEL	0.25	1	99.0	98.8	-0.2	1.0; -3.0
	2	8	108.0	107.9	-0.1	1.0; -1.5
	200	800	128.0	128.0	0.0	±0.5

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±2.0
One	136.4	135.4	-1.0	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±1.0
Positive half cycle	135.4	135.1	-0.3	±1.0
Negative half cycle	135.4	135.1	-0.3	±1.0

7. Peter

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangaumnru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24078
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		
89.5	89.7	0.2	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.1

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

End of Calibration Certificate

T. Petchurai

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangaumnru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24079
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No.: 00920833 / 22193 / 22222
ID No.: RYG_FS0624

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 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.

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel +66 2433 8331 Email : calibration@sithiporn.com



Cert. No. : ACL24079
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	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).

T. Retan

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiporn.com



Cert. No. : ACL24079
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	0.3	1.0
5. Frequency and time weightings at 1 kHz	0.2	0.2
6. Long - term stability	0.1	0.1
7. Level linearity on the reference level range	0.2	0.3
8. Level linearity including the level range control	0.2	0.3
9. Tone burst response	0.2	0.3
10. Peak C sound level	0.2	0.35
11. Overload indication	0.2	0.25
12. High level stability	0.1	0.1

T. Retan

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24079
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)	94.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.1

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

Frequency Weighting	Measured value (dB)
A - weight	8.7
C - weight	13.4
Flat	19.0

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	0.2	0.2	0.2	± 1.0
1000	0.2	0.2	0.2	± 0.7
8000	0.3	0.5	0.4	+ 1.5, - 2.5

F. Petch

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24079
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	0.0	±1.0
125	0.0	0.0	0.0	±1.0
250	0.0	0.0	0.0	±1.0
500	0.0	0.0	0.0	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.1	0.1	+ 1.5, - 2.5
16000	0.0	-1.2	-1.2	+ 2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.2
C - weight	94.0	94.0	0.0	± 0.2
Flat	94.0	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

Frequency Weighting	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	94.0	0.0	± 0.1
Slow	94.0	94.0	0.0	± 0.1
Leq	94.0	94.0	0.0	± 0.1

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.1

F. Petch

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24079
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	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.0	0.0	±0.8
30.0	30.0	0.0	±0.8
29.0	29.0	0.0	±0.8
28.0	28.0	0.0	±0.8
27.0	27.0	0.0	±0.8
26.0	26.1	0.1	±0.8
25.0	25.0	0.0	±0.8

7. Peter

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24079
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	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 ; -3.0
	2	8	117.0	117.0	0.0	1.0 ; -1.5
	200	800	134.0	134.0	0.0	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 ; -3.0
	200	800	127.6	127.6	0.0	±0.5
SEL	0.25	1	99.0	98.9	-0.1	1.0 ; -3.0
	2	8	108.0	108.0	0.0	1.0 ; -1.5
	200	800	128.0	128.0	0.0	±0.5

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	±2.0
One	136.4	135.7	-0.7	±2.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±1.0
Positive half cycle	135.4	135.2	-0.2	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

7. Peter

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplue, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24079
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	±0.1

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

End of Calibration Certificate

T. Petchurai

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplue, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24034
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00623393 / 198640 / 26421
ID No.: RYG_FS0618

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWAEANG PHATTIANAKAN, 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 : 05 JANUARY 2024
Calibration Date : 12-15 JANUARY 2024
Date of Issue : 16 JANUARY 2024

REVIEW BY	<i>Naykorn P</i>
APPROVED BY	<i>[Signature]</i>
PRINT DATE	11/1/25

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.

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Srinthorn Road, Bangbunru, Bangpuad, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com



Cert. No. : ACL24034
Job No. : VC67AC0052
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-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. Pich

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Srinthorn Road, Bangbunru, Bangpuad, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com



Cert. No. : ACL24034
Job No. : VC67AC0052
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. Pich

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24034
Job No. : VC67AC0052
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	Measured value (dB)
A - weight	10.8
C - weight	17.4
Flat	23.3

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	-0.3	-0.2	-0.2	±5.0

7. Peter

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24034
Job No. : VC67AC0052
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	0.0	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	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. Peter

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24034
Job No. : VC67AC0052
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	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	28.0	0.0	± 1.1
27.0	27.0	0.0	± 1.1
26.0	26.1	0.1	± 1.1
25.0	24.9	-0.1	± 1.1

F. Petch.

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24034
Job No. : VC67AC0052
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	128.1	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	135.5	-0.9	±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

F. Petch.

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Srinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel: +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24034
Job No. : VC67AC0052
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. Petchur

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Srinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel: +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24033
Pages : 1 of 8

Calibration Certificate

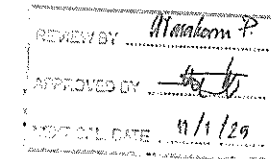
Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A / Microphone UC-52 / Preamplifier NH-24
Serial No.: 00623392 / 198639 / 26420
ID No.: RYG_FS0617

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN 40, PHATTHANAKAN ROAD,
KHWANG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 05 JANUARY 2024
Calibration Date : 12-15 JANUARY 2024
Date of Issue : 16 JANUARY 2024



Calibrated by : Nathakorn Pisutpaisan

Approved by : *T. Petchur*
(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

451-451/1 Sinnthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24033
Job No. : VC67AC0052
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).

7. Pich

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunru, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24033
Job No. : VC67AC0052
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

7. Pich

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunmu, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24033
Job No. : VC67AC0052
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)
14.8

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	20.6
Flat	26.1

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	0.1	0.1	0.1	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	1.2	1.3	1.3	±5.0

T. Petch.

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Road, Bangbunmu, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24033
Job No. : VC67AC0052
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	0.0	±2.0
125	0.0	0.1	0.1	±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	94.1	0.1	± 0.3

T. Petch.

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthon Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24033
Job No. : VC67AC0052
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	28.0	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

G. Petch

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthon Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24033
Job No. : VC67AC0052
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	108.0	0.0	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	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, Lepeak (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

G. Petch

**SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY**

451-451/1 Srinthorn Road, Bangbunru, Bangplud, Bangkok, 10700 Thailand
Tel: +66 2433 8331 Email: calibration@sithiporn.com

SITHIPORN
associates



Cert. No. : ACL24033
Job No. : VC67AC0052
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	89.7	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

Certificate No. 551422
Product 200-S10M Defender 510 Medium Flow
Serial No. 208345
Cal. Date 18-Aug-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 620.1 mmHg
Lab. Temperature 23.5 °C

Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Received
4523.09 ccm	4519.02 ccm	0.08%	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 *Handwritten Signature*
APPROVED BY *Handwritten Signature*
NEXT CAL DATE 12/1/24

Mesa Laboratories Inc. 12100 W. 6th Ave, Lakewood, CO 80228 USA
(303) 987-6000 www.mesalabs.com Symbol "MLAB" on the NASDAQ



As Shipped Calibration Data

Certificate No	551422	Lab. Pressure	618.8 mmHg	
Technician	Xiem Ly	Lab. Temperature	24.2 °C	
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Shipped
4516.61 ccm	4515.56 ccm	0.02%	1.00%	In Tolerance
1000.87 ccm	1000.67 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

Xiem Ly
Production Technician II

Approved By:

Norma Aragon

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. Calibrations 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 510 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		616.1 mmHg	
		Lab. Temperature		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

REVIEW BY *Norma Aragon*
APPROVED BY *Xiem Ly*
NEXT CAL DATE *30/01/24*



As Shipped Calibration Data

Certificate No	561587	Lab. Pressure	622.2 mmHg	
Technician	Aaron Schwartz	Lab. Temperature	23.6 °C	
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Shipped
449.75 ccm	450.46 ccm	-0.16%	1.00%	In Tolerance
100.96 ccm	100.82 ccm	0.14%	1.00%	In Tolerance
30.63 ccm	30.38 ccm	0.82%	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:

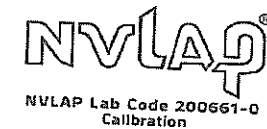
By:

Approved By:

Aaron Schwartz
Assembler I

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. Calibrations 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	616.8 mmHg	
			Lab. Temperature	25.8 °C	
Instrument Reading	Lab Standard Reading	Deviation		Allowable Deviation	As Received
0 ccm	4499.85 ccm	-100.0%		1.00%	Out of Tolerance
0 ccm	597.38 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

REVIEW BY	<i>Honkum P</i>
APPROVED BY	<i>[Signature]</i>
NEXT CAL. DATE	30/9/24



As Shipped Calibration Data

Certificate No	561588	Lab. Pressure	616.2 mmHg	
Technician	Xiem Ly	Lab. Temperature	26.1 °C	
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Shipped
4486.74 ccm	4494.43 ccm	0.05%	1.00%	In Tolerance
997.03 ccm	997.16 ccm	-0.01%	1.00%	In Tolerance
249.84 ccm	250.5 ccm	-0.26%	1.00%	In Tolerance

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 200661-0.

Technician Notes:

By:

Xiem Ly

Xiem Ly
Production Technician II

Approved By:

Norma Aragon

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.

Mesa Laboratories Inc. 12100 W. 6th Ave. Lakewood, CO 80228 USA
(303) 987-8000 www.mesalabs.com Symbol "MLAB" on the NASDAQ

INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
719 NIGOO 13, SOI NONTAKORN 11 TAMBON BANG KATO,
AMPHOE BANG PHUET SAMUT PRAKAN PROVINCE 10530 THAILAND
TEL: (669) 2116-5800-1 FAX: (669) 2116-7140



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 Phantananakan 40, Phantananakan Road, Suan Luang, Bangkok
10250

Unit Under Calibration Details

Measurement Item : Air Flow Meter

Manufacturer : Bios

Model : Defender 510-L

Serial Number : 206895

ID : BKK_FS1346

Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : 23 °C ± 3 °C

Humidity : 55 %RH ± 20 %RH

Barometric Pressure : 1013 hPa ± 10 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	Orcorn	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 : *MC*
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : *Mr. P*
Mr. Paet 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.



Certificate No : 24-AFM-018 Rev.1

Request No : Req-2024-0043

Result of Calibration : Without Adjustment

Temperature (°C)	Pressure (kPa)	STD (ml/min)	ULC (ml/min)	Error (ml/min)	Uncertainty (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	400	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 :

$$Q_{meas} = Q_{ref} \times \frac{P_{ref}}{P_{meas}} \times \frac{T_{meas}}{T_{ref}}$$

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-703-AFM-01 Rev.01 Issue date 25/01/24



Certificate of Calibration

Customer

Certificate No : 24-AFM-033

Name : ALS Laboratory Group Thailand Co., Ltd.

Request No : Req-2024-0241

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok
10250

Unit Under Calibration Details

Measurement Item : Primary Flow Calibrator

Manufacturer : Bios

Model : Defender S10-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 °C ± 3 °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	Qrebon	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. Neppakorn Luangrat
Service Calibration Engineer

Approved By : Mr. Paich Mahavom
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-703-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	1.3
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 Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok
10250

Unit Under Calibration Details

Measurement Item : Primary Flow Calibrator

Manufacturer : Bios

Model : Defender 510-M

Serial Number : 129958

ID : RYG_FS0209

Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : 23 °C ± 3 °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 J Low flow	18501010006	Sensidyne	12 July 2024
Air Flow Meter	Gilibrator J Standard flow	19031011003	Sensidyne	12 July 2024
Temperature meter	GT 11	08000057	Oreborn	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 Luangam
Service Calibration Engineer

Approved By : Mr. Paet Matthavom
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



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_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_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 = 1.0176x + 1.4813	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
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



ROTA METER CALIBRATION RESULT APRIL 2024

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R ²)
SGK_FS0138	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 Jitranont)

Assistant General Manager

© 2022 by Agilent Technologies

Agilent CrossLab Compliance Services

Certificate of System Qualification

GC-OQ + GCMS-OQ

REVIEW BY	<u>Suchada T.</u>
APPROVED BY	<u>Timothy M.</u>
NEXT CAL. DATE	<u>18 Oct 24</u>

System ID:

GM-2

Organization Name:

ALS Laboratory Group (Thailand) Co., Ltd.

Organization Location:

104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250

Date:

April 18, 2023 3:15:25 PM

EQP Name:

AgilentRecommended, AgilentRecommended

EQP Revision:

GC.02.51, GCMS.02.51

Overall Qualification 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 Accuracy

Name:

7890

Front

MMI

Setpoint Status:

Pass

Setpoint Actual
Inlet Pressure: 25.0 psi 25.0 psi

Accuracy:

0.0 psi

Agilent Recommended:

<= 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name:

7890

Date:

April 18, 2023 3:15:25 PM

System ID:

GM-2

Setpoint Status: Pass
 Zone: Oven
 Setpoint/Actual
 Temperature: 230.0 230.1 °C
 Accuracy: 0.1 °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
 Temperature: 100.0 100.4 °C
 Accuracy: 0.4 °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: 7690
 Setpoint Status: Pass
 Setpoint/Average
 Temperature: 100.0 100.4 °C
 Stability: 0.0 °C
 Agilent Recommended: <= 0.5

Overall GC Oven Temperature Stability Test Status

Pass

Log Amp

Tested Combination1 Front MMI / External SQ
 Name: 5975C Inert XL with TAD
 Setpoint Status: Pass

Date: April 18, 2023 3:15:25 PM
 System ID: GM-2

Overall Log Amp Test Status

Pass

RFPA

Tested Combination1 Front MMI / External SQ
 Name: 5975C Inert XL with TAD
 Setpoint Status: Pass
 Amu: 1050 m/z Drift After Five Minutes: 4 mV RFPA Voltage: 441 mV
 Agilent Recommended: >= -100 and <= 100 <= 1100

Overall RFPA Test Status

Pass

Tune EI

Tested Combination1 Front MMI / External SQ
 Name: 5975C Inert XL with TAD
 Setpoint Status: Pass
 Filament: 1
 Setpoint Status: Pass
 Filament: 2

Overall Tune EI Test Status

Pass

Scouting Run

Tested Combination1 Front MMI / External SQ
 Name: 7693A
 Source: EI - Inert

Date: April 18, 2023 3:15:25 PM
 System ID: GM-2

Setpoint Status:

Completed

Injection Volume on Column:

1.0 μ L

Overall Scouting Run Status

Completed

Signal to Noise EI

Tested Combination1

Front

MMI

/ External

SQ

Name:

5875C Inert XL with TAD

Source:

EI - Inert

Filament:

1

Setpoint Status:

Pass

Signal to Noise:

456

Agilent Recommended:

 \geq 320

Source:

EI - Inert

Filament:

2

Setpoint Status:

Pass

Signal to Noise:

2034

Agilent Recommended:

 \geq 320

Overall Signal to Noise EI Test Status

Pass

Injection Precision

Tested Combination1

Front

MMI

/ External

SQ

Name:

7693A

Source:

EI - Inert

Setpoint Status:

Pass

Injection Volume on Column:

1.0 μ L

Area RSD:

1.66

%

Retention Time RSD:

0.04

%

Agilent Recommended:

 \leq 5.00 \leq 1.00

Overall Injection Precision Test Status

Pass

Date: April 18, 2023 3:15:25 PM
System ID: GM-2

Page 4 / 16

Mass Ratio Precision

Tested Combination1

Front

MMI

/ External

SQ

Name:

Injection Tower

Source:

7693A

Setpoint Status:

EI - Inert

Injection Volume on Column:

1.0 μ L

RSD:

1.66

%

Agilent Recommended:

 \leq 5.00

Pass

Mass Ratio

0.39

%

 \leq 5.00

Pass

Overall Mass Ratio Precision Test Status

Pass

Date: April 18, 2023 3:15:25 PM
System ID: GM-2

Page 5 / 16

Instrument Details

Purpose

This section describes the as found system configuration.

Details

System

System ID	GM-2
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
Inlet	Front
Detector	External
LTM Included?	No

Sampler 1

Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN10120123
Firmware Revision	A.10.08
Usage	Sample Injection
Location	Front
Syringe Volume (µL)	10

Date: April 18, 2023 3:15:25 PM
System ID: GM-2

Sampler 2

Manufacturer	Agilent Technologies
Type	Tray
Name	7693A
Model Number	G4514A
Serial Number	CN10060099
Firmware Revision	A.10.16
Vial Heater	Not Installed

Mainframe 1

Manufacturer	Agilent Technologies
Name	7890
Model Number	G3440A
Serial Number	CN10141049
Firmware Revision	A.01.16
Oven Type	Standard

Inlet 1

Manufacturer	Agilent Technologies
Name	7890
Type	MMI
Location	Front
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes

Detector 1

Manufacturer	Agilent Technologies
Name	Mass Spectrometer
Type	Mass Spectrometer
Location	External

Date: April 18, 2023 3:15:25 PM
System ID: GM-2

Mass Spectrometer 1

Manufacturer	Agilent Technologies
Type	SQ
Name	5975C Inert XL with TAD
Serial Number	US10153217
Firmware Revision	5.02.12
High Vacuum System	Turbo Pump
Scouting Run Standard	OFN Std

MS EI Source 1

Manufacturer	Agilent Technologies
Source Type	EI - Inert
Number of filaments	2

Date: April 18, 2023 3:15:25 PM
System ID: GM-2

Electronic Signature

Purpose

This signature page was created and published because the ACE sign-off action was executed, which is valid for the entire document, including attachments. The ACE sign-off is an electronic signature that requires two distinct identification components: unique username and personal password. The Agilent representative who has delivered this service understands the meaning and legal status of an electronic signature. As a trained official operator, the Agilent representative has a unique password and login to access ACE and electronically sign this document. (Other e-signatures can be applied to this document using a Document Content Management or other suitable method defined in your data access and control procedures.)

Details

Full Name of Signer:	Supasak Nimsongtham
Logged On User Name:	supasak.nimsongtham@agilent.com
Signature Creation Date:	April 18, 2023
Reason for Signature:	Executed protocol and published this original version of document

Regulatory Disclaimer

This document provides a protocol to verify and record instrument configuration and evidence of proper operation. It has been prepared from our interpretation of applicable regulations as well as industry best practices. The document is designed to provide an important component of a complete compliance package. Validation depends upon many factors and use of this protocol alone does not assure compliance. Agilent Technologies makes no promises or representations as to its sufficiency for any specific regulatory program.

Warranty

Agilent Technologies makes no warranty of any kind to this material, including but not limited to, the implied warranties or merchantability and fitness for a particular purpose. Agilent Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Date: April 18, 2023 3:15:25 PM
System ID: GM-2

User Name: supasak.nimsongtham
Hostname: SCG1115HKC

System Id: GM-2
Print Date: April 18, 2023 3:15:30 PM

ALS GM2 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:14:23 PM	Audit	Session Created	Session	None
April 18, 2023 2:14:23 PM	Start	Configuration	Session	None
April 18, 2023 2:14:23 PM	Audit	Entitlement	Licensing	User is Field Engineer and does not require an unlock code
April 18, 2023 2:15:04 PM	Audit	EqpLoaded	Session	EQP details for primary technique [GC] - File path: [ProtocolPacks\GCs\Configurations\02.51\GC.02.51.eqp], EQP File Name: [GC.02.51.eqp], EQP Name: [AgilentRecommended], Protocol Revision: [GC.02.51] EQP details for hyphenated technique [GCMS] - File path: [ProtocolPacks\GCMS\Configurations\02.51\GCMS.02.51.eqp], EQP File Name: [GCMS.02.51.eqp], EQP Name: [AgilentRecommended]
April 18, 2023 2:15:07 PM	End	Configuration	Session	None
April 18, 2023 2:15:11 PM	Start	Qualification	Session	QC
April 18, 2023 2:15:11 PM	Start	Execution	System Inspection and Basic Safety and Operation - 7890: - Qualitative Test - No setpoints associated	None
April 18, 2023 2:17:27 PM	End	Execution	System Inspection and Basic Safety and Operation - 7890: - Qualitative Test - No setpoints associated	Run Count: 1

Page 1 / 7

Date: April 18, 2023 3:15:25 PM
System ID: GM-2

Page 10 / 16

User Name: supasak.nimsongtham
Hostname: SCG1115HKC

System Id: GM-2
Print Date: April 18, 2023 3:15:36 PM

ALS GM2 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:17:28 PM	Start	Execution	Inlet Pressure Accuracy - Front MM: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
April 18, 2023 2:17:33 PM	End	Execution	Inlet Pressure Accuracy - Front MM: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count: 1
April 18, 2023 2:17:36 PM	Start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 18, 2023 2:18:00 PM	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 18, 2023 2:18:01 PM	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 18, 2023 2:18:03 PM	Start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 18, 2023 2:18:20 PM	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
April 18, 2023 2:18:22 PM	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 18, 2023 2:18:44 PM	Start	Execution	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None

Page 2 / 7

Date: April 18, 2023 3:15:25 PM
System ID: GM-2

Page 11 / 16

User Name: supasak.niamsongtham
Hostname: SCG1115HKC

System ID: GM-2
Print Date: April 18, 2023 3:15:30 PM

ALS GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:19:31 PM	Audit	Data	GC Oven Temperature Stability - 780C - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
April 18, 2023 2:19:33 PM	End	Execution	GC Oven Temperature Stability - 780C - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Run Count : 1
April 18, 2023 2:19:36 PM	Start	Execution	Log Amp - 5975C Inert XL with TAD SQ: - Source: EI - Inert	None
April 18, 2023 2:19:45 PM	End	Execution	Log Amp - 5975C Inert XL with TAD SQ: - Source: EI - Inert	Run Count : 1
April 18, 2023 2:19:49 PM	Start	Execution	RFPA - 5975C Inert XL with TAD SQ: - Source: EI - Inert	None
April 18, 2023 2:32:54 PM	End	Execution	RFPA - 5975C Inert XL with TAD SQ: - Source: EI - Inert	Run Count : 1
April 18, 2023 2:32:57 PM	Start	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: EI - Inert Filament 1 (Qualitative - No setpoints associated)	None
April 18, 2023 2:34:05 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: EI - Inert Filament 1 (Qualitative - No setpoints associated)	Run Count : 1
April 18, 2023 2:34:07 PM	Start	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: EI - Inert Filament 2 (Qualitative - No setpoints associated)	None
April 18, 2023 2:34:20 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: EI - Inert Filament 2 (Qualitative - No setpoints associated)	Run Count : 1

Page 3 / 7

Date: April 18, 2023 3:15:25 PM
System ID: GM-2

Page 12 / 16

User Name: supasak.niamsongtham
Hostname: SCG1115HKC

System ID: GM-2
Print Date: April 18, 2023 3:15:30 PM

ALS GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:34:23 PM	Start	Execution	Scouting Run - Injection Tower, Front MMI, SQ: - Source: EI - Inert-Part of GCMS System Preparation	None
April 18, 2023 2:34:56 PM	Audit	Data	Scouting Run - Injection Tower, Front MMI, SQ: - Source: EI - Inert-Part of GCMS System Preparation	Data Res Path : EXGM-2 OQ2023/SNF1_001.D\\DATA.MS
April 18, 2023 2:35:12 PM	End	Execution	Scouting Run - Injection Tower, Front MMI, SQ: - Source: EI - Inert-Part of GCMS System Preparation	Run Count : 1
April 18, 2023 2:35:13 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 1 - L: >= 320	None
April 18, 2023 2:35:24 PM	Audit	Data	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 1 - L: >= 320	Data Res Path : EXGM-2 OQ2023/SNF1_001.D\\DATA.MS
April 18, 2023 2:35:45 PM	End	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 1 - L: >= 320	Run Count : 1
April 18, 2023 2:35:47 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	None
April 18, 2023 2:35:52 PM	Start	Execution	Injection Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	None

Page 4 / 7

Date: April 18, 2023 3:15:25 PM
System ID: GM-2

Page 13 / 16

User Name: supasak.nimsongtham
 Hostname: SCG1115HMC

System Id: GM-2
 Print Date: April 18, 2023 3:15:30 PM

ALS GM2 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path: E:\GM-2\OQ2023\PMRP\PMRP002.D\DATA.MS
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path: E:\GM-2\OQ2023\PMRP\PMRP003.D\DATA.MS
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path: E:\GM-2\OQ2023\PMRP\PMRP004.D\DATA.MS
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path: E:\GM-2\OQ2023\PMRP\PMRP005.D\DATA.MS
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path: E:\GM-2\OQ2023\PMRP\PMRP006.D\DATA.MS
April 18, 2023 2:36:21 PM	Audit	Data	Injection Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path: E:\GM-2\OQ2023\PMRP\PMRP007.D\DATA.MS
April 18, 2023 2:36:42 PM	End	Execution	Injection Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Run Count: 1
April 18, 2023 2:36:45 PM	Start	Execution	Mass Ratio Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	None

Page 6 / 7

Date: April 18, 2023 3:15:25 PM
 System ID: GM-2

Page 14 / 16

User Name: supasak.nimsongtham
 Hostname: SCG1115HMC

System Id: GM-2
 Print Date: April 18, 2023 3:15:30 PM

ALS GM2 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:37:04 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path: E:\GM-2\OQ2023\PMRP\PMRP002.D\DATA.MS
April 18, 2023 2:37:04 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path: E:\GM-2\OQ2023\PMRP\PMRP003.D\DATA.MS
April 18, 2023 2:37:04 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path: E:\GM-2\OQ2023\PMRP\PMRP004.D\DATA.MS
April 18, 2023 2:37:04 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path: E:\GM-2\OQ2023\PMRP\PMRP005.D\DATA.MS
April 18, 2023 2:37:05 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path: E:\GM-2\OQ2023\PMRP\PMRP006.D\DATA.MS
April 18, 2023 2:37:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path: E:\GM-2\OQ2023\PMRP\PMRP007.D\DATA.MS
April 18, 2023 2:37:17 PM	End	Execution	Mass Ratio Precision - Injection Tower, Front MM, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Run Count: 1
April 18, 2023 2:37:23 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MM, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	None

Page 6 / 7

Date: April 18, 2023 3:15:25 PM
 System ID: GM-2

Page 15 / 16

User Name: supasakulmsongtham
Host Name: SC01115HKG

System Id: GM-2
Print Date: April 18, 2023 3:15:33 PM

ALS GM2 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:58:38 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MM, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	None
April 18, 2023 2:57:00 PM	Audit	Data	Data Manager	Data Manager was in a data verification state but the user chose to start over
April 18, 2023 2:57:16 PM	Audit	Data	Signal to Noise EI - Injection Tower, Front MM, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	Data files Path: ENGM-2 002023GNF2_003.D\\DATA.MS
April 18, 2023 2:57:53 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MM, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	None
April 18, 2023 2:58:05 PM	End	Execution	Signal to Noise EI - Injection Tower, Front MM, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	Run Count: 1
April 18, 2023 3:01:14 PM	End	Qualification	Session	QQ
April 18, 2023 3:01:14 PM	Start	Reporting	Session	None
April 18, 2023 3:14:47 PM	Audit	Reporting	Session	Report Generated: Certificate

Page 7 / 7

Date: April 18, 2023 3:15:25 PM
System ID: GM-2

Page 16 / 16



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUNG BANGKOK 10250
TEL: 0-2717-3000-29 FAX: 0-2719-9434



Cert.No.: 23CH1086
Page.: 1 of 2

Certificate of Calibration

Equipment:	pH Meter
Manufacturer:	Mettler Toledo
Model:	Seven2Go S2
Serial No.:	C232588428
ID No.:	RYG_FS0606
Condition As-Received:	Used Item
Received Date:	01 September 2023
Calibration Date:	04 September 2023
Reference:	2309-0010DSC-3
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 Lomgagtrakul
Approved by:	 Approved Signatory
Issue Date:	7 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 0058057



Cert. No.: 23CH1086
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 (\pm mV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter S/N.: C232588428	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	-178	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 (\pm)	Coverage factor k
pH Electrode S/N.: 2295997	4.008	4.01	183	0.0079	2.00
	6.986	6.99	9	0.0093	2.00
	10.010	10.01	-168	0.0096	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 %.

-o0o-

Saitip

a 1178952



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
5344 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL: 0 2717 2000 29 FAX: 0 2719 9191



Cert. No.: 23LM154
Page.: 1 of 2

Certificate of Calibration

Equipment : pH Meter with Sensor
Manufacturer : Mettler Toledo
Model : Seven2GO S2
Serial No. : C232588428
ID No. : RYG_FS0606
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 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V
Calibrated by : Kunchit Promprat
Approved by : *[Signature]*
Approved Signatory
() Pornthippa Tameyakul
() Porpan Paipim
(✓) Suwit Imjai

Issue Date : 6 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 0058112



Equipment : pH Meter with Sensor
Condition As-Received : Used Item
Reference : 2309-0010DSC-4
Procedure Used :-

Cert. No.: 23LM154
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	ATB843	23I24	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.: 2295997

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °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	40.3	0.296	0.16	2.00
50.0	120	50.003	50.3	0.297	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 %.

-o-o-

a 1178763

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2843 8301-0, e-mail: service.thailand@sartorius.com



NSC-TIS-TIS 17025
CALIBRATION 0426

SARTORIUS

Certificate

of Calibration

REVIEW BY Pranball

APPROVED BY Pranball

NEXT CAL. DATE 22/02/2025

Model Number : MSE224S-100-DU

Certificate No. : 24B00089

Description : Analytical Balance

Issued Date : Friday, February 23, 2024

Serial Number : 0026207038

Reference No. : 229196

ID No. : RYG_EN0002

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.Pluakdaeng, Rayong.21140, Thailand.

Calibrated By : Mr.Chonchai Inthana

Calibration

Calibration Date : Thursday, February 22, 2024

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 : 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 expended 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 form 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 Luven 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)

S
T
A
M
P



SOP FM 33 03 February 2022

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2043 8361-6 Fax: +66 2043-6367, 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. : 24BCI0069
Issued Date : Friday, February 23, 2024
Reference No. : 229196
Page No. : 2 of 2

Calibration Results : Without Adjustment

Repeatability

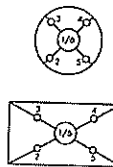
The repeatability is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express repeatability quantitatively.

Nominal Value : (Low Load)	20.0000	199.9959
20 g	20.0000	200.0000
Tolerance	20.0001	200.0000
0.0001 g	20.0000	199.9999
	20.0001	200.0000
Nominal Value : (High Load)	19.9999	200.0000
200 g	20.0000	200.0000
Tolerance	20.0000	199.9999
0.0001 g	19.9999	200.0001
	19.9999	200.0000
Standard Deviation	0.00007	0.00006

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 OIML R76).

Nominal value :	100	g
Tolerance	0.0004	g
		Difference
	1	-
	2	-0.0001
	3	-0.0001
	4	0.0000
	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)	D splayed Value (g)	Deviation (g)	Uncertainty (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



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484



Certificate of Calibration

Cert. No.: 24TM632
Page : 1 of 3

Equipment : Hot Air Oven
Manufacturer : Memmert
Model : UFE 500
Serial No. : G511.1572
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 ± 10) °C
Relative Humidity : (50 ± 30) %

Calibrated by : Man Pattanapongpaiboon

Approved by :

() Pornthippa Tameyakul
() Unnopphol Harachai
(✓) Suwit Imjai

Issue Date : 22 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-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	23LM115	TPA	11 Jul 2024

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

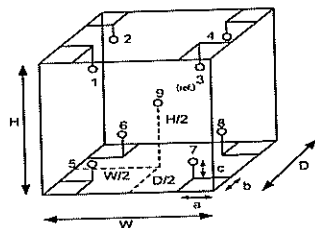
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



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

Environment during calibration		
	Beginning	Finished
Temp. (°C)	27	27
REL.Humid. (%)	57	59
AC Supply (Volt)	222	224

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-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)
	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 %.

-000-



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX 0-2719-9484



Certificate of Calibration

Certificate No.: 23E3924
Page: 1 of 2

Equipment: pH Meter
Manufacturer: Mettler Toledo
Model: SevenExcellence
Serial No.: BB34291445
ID No.: RYG_EN0152
Condition As-Received: Used Item
Received Date: 08 December 2023
Calibration Date: 14 December 2023

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.

Reference: 2312-0151DSC Submitted by: ALS Laboratory Group (Thailand) Co., Ltd. Rayong Branch
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 10) %
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng,
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	5502A	2435802	EE-0041-23	28 Apr 2024

2. This result of calibration was made on requested at the point specified by customer.

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

4. This Certification is traceable to the International System of Unit maintained through:-
- National Institute of Metrology Thailand (NIMT)

REVIEW BY	<i>N. Bannit</i>
APPROVED BY	<i>[Signature]</i>
NEXT CAL. DATE	<i>14/12/24</i>

Calibrated by: Napachanok Prasomsosokiri
Issue Date: 15 December 2023

Approved Signatory:

☐ Phalinee Prabpaijal
☒ Nuntawat Khamchai
☐ Pongsagorn Boonyaporn

B 0331106



Cert. No.: 23E3924
Page.: 2 of 2

Result of calibration :- (*) Without adjustment () After adjustment

Function: DC voltage measurement	Range: 2000 mV		
Standard Value	UUC* Reading	Error	Uncertainty
(mV)	(mV)	(mV)	(± μV)
-200.0000	-199.9	0.1	68
-150.0000	-150.0	0.0	65
-100.0000	-100.0	0.0	63
-50.0000	-50.0	0.0	61
0.0000	0.0	0.0	58
50.0000	50.0	0.0	61
100.0000	100.0	0.0	63
150.0000	150.0	0.0	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.

-o0o-

a 1193422



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-9381



Cert.No.: 23CH1574
Page.: 1 of 3

Certificate of Calibration

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : SevenExcellence
Serial No. : B834291445
ID No. : RYG_EN0152
Condition As-Received: Used Item
Received Date : 08 December 2023
Calibration Date : 15 December 2023
Reference : 2312-0151DSC-3
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 standard thermometer

Calibrated by : Warakorn Lerngagrakul

Approved by : 
Approved Signatory

() Saithip Meangmai
() Warakorn Lerngagrakul
(x) Ponpan Paipim

Issue Date : 19 December 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 0061696



Cert.No.: 23CH1574
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	913598	14 July 2025
pH 6.986	CPA chem	931959	01 Oct 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.: B834291445	4.000	177.48	177.3	4.000	0.058	2.00
	7.000	0.00	-0.1	7.000	0.058	2.00
	10.000	-177.48	-177.5	10.000	0.058	2.00

a 1193852



Cert.No.: 23CH1574

Page: 3 of 3

Calibration Results**Function : pH Measurement**

Performing three buffers standard curve by using buffer nominal pH (4,7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (\pm)	Coverage factor <i>k</i>
pH Electrode	4.008	4.013	184.1	0.0045	2.00
S/N.: 3225368	6.986	6.988	8.7	0.0084	2.00
	9.997	10.002	-164.7	0.0088	2.11

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLab®Expert Pro-ISM
- Serial No. : 3225368

Dimension of probe;

- Length : 120 mm
- Diameter : 12 mm
- Immersion Depth : 100 mm

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (\pm °C)	Coverage factor <i>k</i>
25.0	25.003	24.3	-0.703	0.13	2.00

Remark : - UUC* = Unit Under Calibration

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

-o0o-

a 1193851



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

**Certificate of Calibration**

Cert. No.: 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 \pm 10) °CRelative Humidity : (50 \pm 30) %

Calibrated by : Man Pattanapongpaiboon

Approved by :

Approved Signatory

() 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
Procedure Used :-

Cert. No.: 24TM634
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	23LM115	TPA	11 Jul 2024

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

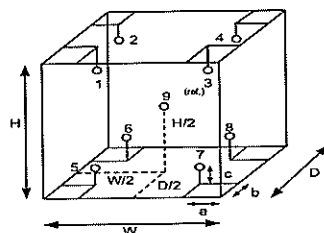
3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



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	

Environment during calibration		
	Beginning	Finished
Temp. (°C)	27	27
REL.Humid. (%)	59	59
AC Supply (Volt)	224	223

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)
	Position									
	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 %.

-o0o-



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484



Certificate of Calibration

Cert. No.: 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 : $(26 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$

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.

REVIEW BY *Thanitak*
APPROVED BY *D. J. J. J.*
NEXT CAL DATE: 21/09/25



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2403-05630C-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.

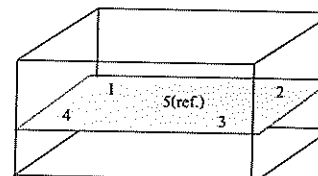
Remark : TPA : Technology Promotion Association (Thailand - Japan)

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)
			Position					
			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 %.

-000-



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. 0-2719-9484

Cert.No.: 23TW168
Page.: 1 of 2

Certificate of Testing

Equipment : DO Meter
Manufacturer : YSI
Model : 5000-115V
Serial No. : 15E102786
ID No. : RYG_EN0032
Received Date : 21 July 2023
Test Date : 24 July 2023
Reference : 2307-0713DSC-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 : Saithip
Approved Signatory

() Malee Bulkruea
(✓) Saithip Meangmai
() Warakorn Lernagatrakul

Issue Date : 25 July 2023

REVIEW BY	N. Bant...
APPROVED BY	D. ...
NEXT CAL DATE	24/01/25

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).

<u>Instruments</u>	<u>Serial No.</u>	<u>ID No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
1) Burette	-	130BU10	23CG1172	22 Mar 2025
2) Balance	1126143764	140RC004	22MM50	20 Sep 2023

2. Standard Material :-

<u>Material</u>	<u>Manufacturer</u>	<u>Lot.No.</u>	<u>Assay</u>
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: 15E100464

<u>Titration Method</u> (Azide Modification Method)	<u>DO Meter</u> Reading	<u>Standard Deviation</u>
(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

-o0o-

a 1172155



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534-4 PATTANAKARN ROAD SOI 16, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-9484



Cert. 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 Hiahib

Approved by : 
Approved Signatory

() Pornthippa 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	221285	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 %.

-000-

a 1159515



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
5314 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-9484



Cert. No.: 23TM962
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. Piuakdaeng, 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 :

- () Pornthippa 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

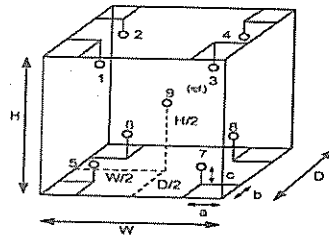
2. This certificate is valid only to the item calibrated on date and place of calibration.

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 :

a = 10 cm
 b = 10 cm
 c = 10 cm

Dimension of Chamber :

D = 0.60 m
 W = 1.0 m
 H = 1.2 m
 Capacity = 0.75 m³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	23	23
REL.Humid. (%)	54	56
AC Supply (Volt)	223	222

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

Cert. No.: 23TM962
 Page : 3 of 3

Result of Calibration :-

(*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	20.0	0.019	0.72	1.0	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	Position									
	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 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 %.

-o0o-

a 1165129



Certificate of Calibration



Equipment: SPECTROPHOTOMETER
Model: DR6000
Serial No. (or ID.): 1627845 (RYG_EN0037)
Manufacturer: HACH
Condition: In Condition

Certificate No.: C06230441
Issued Date: 19 September 2023
Job No.: WO-00005382
Page: 1 of 3

Customer: ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)
616/10 Moo 5 T. Maenam Khu,
A. Pluakdaeng, Rayong 21140, Thailand.

Environment Condition: Temperature 23.9 °C ± 0.2
Humidity 65.3 %RH ± 1.4

REVIEW BY: *N. Banerjee*
APPROVED BY: *D. K.*
NEXT CAL. DATE: 18/3/25

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 Rungueang
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 Sterna 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

(Signature)
(Mr. Nattapat Rungueang)
Person in charge

(Signature)
(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 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.

DKSH Technology Limited
2533 Sukhumvit Road, Bangkok, Phrasakong, Bangkok 10250
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/calibration-thailand

Delivering Growth - in Asia and Beyond.

CAL-FM-C06-15: 12 Sep 2022



Certificate No.: C06230441 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	
637.98	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
	1.0288	1.028	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
	0.4595	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	0.466	-0.0008	0.0045
	0.9468	0.946	0.0008	0.0045
590 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
	0.2579	0.257	0.0009	0.0045
	0.4971	0.487	0.0001	0.0045
	0.9720	0.971	0.0010	0.0045

บริษัท ดีเคเอส เอเซีย จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10250
2533 Sukhumvit Road, Bangkok, Phrasakong, Bangkok 10250
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/calibration-thailand

Delivering Growth - in Asia and Beyond.

CAL-FM-C06-15: 12 Sep 2022



Certificate No.: C06230441 Page 3 of 3

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)	
260.62 +/- 0.11 nm	260.6	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	SSW
Standard Wavelength (nm)	268.66	266.69	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 ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangkok 10260, Thailand
Phone: +66 2020 7000 Email: info.asia@dksh.com Website: www.dksh.com/asia-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					
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิตช์ ปิด – เปิด เครื่อง (On-Off Switch)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Spectrophotometer					
<input type="checkbox"/>	<input type="checkbox"/>	6. แรงดันไฟฟ้า (Battery Backup) >= 2.5 VDC	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. ความยาวคลื่น (Wavelength Check)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. แหล่งกำเนิดแสง (UV < 3,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	9.2 Hours
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. แหล่งกำเนิดแสง (Visible < 5,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	741.5 Hours
<input checked="" type="checkbox"/>	<input type="checkbox"/>	11. ช่องวัดหลายตัวอย่าง (Carousel Module)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
pH Meter and Conductivity Meter					
<input type="checkbox"/>	<input type="checkbox"/>	12. อิเล็กโทรด (Electrode and Connection Cable)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	13. ระดับสารละลายใน Electrode (Level KCl)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	15. ขาจับอิเล็กโทรด (Stand)	<input type="checkbox"/>	<input type="checkbox"/>	
Turbidimeter					
<input type="checkbox"/>	<input type="checkbox"/>	16. ค่าความรบกวนที่ต่ำสุด (No Sample)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	17. ระดับการส่องสว่างของแสง (>= 2.5 ไม่น้อย 3.0)	<input type="checkbox"/>	<input type="checkbox"/>	
Automatic titrator					
<input type="checkbox"/>	<input type="checkbox"/>	18. สภาพ Piston Burettes	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	19. Function Rinsing and Dosing	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	<input type="checkbox"/>	<input type="checkbox"/>	

เพิ่มเติมข้อมูล: *656.1nm=656.1nm

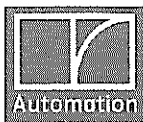
*486.0nm=485.5nm

Mr.Nattapat Rungrueang
Service Engineer

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangkok 10260, Thailand
Phone: +66 2020 7000 Email: info.asia@dksh.com Website: www.dksh.com/asia-thailand

Delivering Growth - In Asia and Beyond.

CAL-FM-F31-03; 20 Jul 2022



Automation Service Co.,Ltd.

Head Office : 929,929/1 Soi Pattanakarn 30,
Pattanakarn Road, Suanluang, Bangkok
Tel: 02-319-9994 Fax: 02-319-9596
www.automation.co.th

Sales & Service Center
Rayong : 1/15 Huaypong Rd., Muang, Rayong (T. 038-682-152)
Lamphun : 122/5 M.4, Ban Kiang, Muang, Lamphun (T. 053-581-876)
Prachinburi : 688 M.10, Thatum, Srinakharinwirot, Prachinburi (T. 037-209-880)

MTOC : L-1113/2023

Report No. : ALS-799/02

ASI Maintenance Report

Instrument : Automatic Sample Injector Measuring : Vial 40 mL
Model : ASI-L Place of Installation : -
Serial No. : H57415200799 Department : LABORATORY
Manufacture : Shimadzu

Customer : ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaen Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand

Date of Maintenance : 10 / 11 / 2023

Ambient Condition : Temperature $26.0 \pm 5^\circ\text{C}$

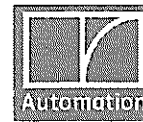
: Humidifier $60 \pm 15\% \text{RH}$

Maintenance By : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

Approved By : N. Phungsomsek
(Mr. Nipon Phungsomsek)
Technician Manager

User Name : Sinluk P.
(Mr.)

SHIMADZU ANALYZER
1/3



Automation Service Co.,Ltd.

Head Office : 929,929/1 Soi Pattanakarn 30,
Pattanakarn Road, Suanluang, Bangkok
Tel: 02-319-9994 Fax: 02-319-9596
www.automation.co.th

Sales & Service Center
Rayong : 1/15 Huaypong Rd., Muang, Rayong (T. 038-682-152)
Lamphun : 122/5 M.4, Ban Kiang, Muang, Lamphun (T. 053-581-876)
Prachinburi : 688 M.10, Thatum, Srinakharinwirot, Prachinburi (T. 037-209-880)

MTOC : L-1113/2023

Report No. : ALS-799/02

Maintenance Sheet

Customer : ALS Laboratory Date : 10 / 11 / 2023
Model : ASI-L Serial No. H57415200799

Item	Carry out maintenance work	Result	Exchange	Comment
1.	Arm Drive section	O.K.		
	Check Arm Drive Belt for wear and tension	O.K.		
	Check grease of Screw Arm Drive	O.K.		
2.	Rinse pump (only ASI-V 24ml, 40ml)	O.K.		
	Check pump rate(>40mL/min)	O.K.		
	Check pump and tube connection for leakage	O.K.		
	Check if outlet flow is in proper condition	O.K.		
3.	Check and if necessary exchange consumable, Maintenance parts	O.K.		See appropriate list of maintenance parts
4.	Check Stirrer (When installed)	O.K.		
5.	Verify ASI function via mechanical check	O.K.		

Inspection by : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

SHIMADZU ANALYZER
2/3



Automation Service Co.,Ltd.

Head Office : 929,929/1 Soi Pattanakarn 30,
Pattanakarn Road, Suanluang, Bangkok
Tel: 02-319-9994 Fax: 02-319-9596
www.automation.co.th

Sales & Service Center
Rayong : 1/15 Huaypong Rd., Muang, Rayong [T. 038-692-152]
Lamphun : 122/5 M.4, Ban Kiang, Muang, Lamphun [T. 053-591-876]
Prachinburi : 608 M.10, Thabum, Srimahaphoto, Prachinburi [T. 037-208-090]

MTOC : L-1113/2023

Report No. : ALS-799/02

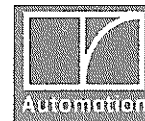
List of Consumable, Maintenance parts

Pos.	Part Number	Part Name	Result	Exchange	Recommended Interval
1.	017-27021-01	Grease Paste, Lubricant 100g	O.K.	✓	1 time per year
2.	032-22661-02	Belt, 60S2m596, Arm Drive	O.K.		1 time per year Depending on condition
3.	034-03067-02	Spring, F-642, Arm Drive	O.K.		Depending on condition
4.	042-00405-11	Pump Head, for ASI Rinse Pump (only ASI-V 24mL, 40mL)	O.K.		After 300 h of operating
5.	638-41448-01	Std. Needle Type1 24mL, 40mL* (for tube 2, 1x1, 6), [Sparge needle]	N/A		Depending on condition
6.	638-41448-02	Std. Needle Type1 125mL* (for tube 2, 1x1, 6)	N/A		Depending on condition
7.	631-41660-03	Flare Pipe 2x1,5x700mm* (for Standard Needle Type1 24mL, 40mL, 125mL)	N/A		Depending on condition (may cut to origin length 600mm)
8.	638-41450-01	Needle for Suspended Particles,* 0,8mm (only ASI-V 24mL, 40mL)	N/A		Depending on condition
9.	638-41450-01	Std. Needle Type2 125mL* (for tube 1,4x0,9)	N/A		Depending on condition
10.	638-41472-01	Std. Needle Type2 24mL, 40mL* (for tube 1,4x0,9)	O.K.		Depending on condition
11.	631-41660-02	Flare Pipe 1,4x0,9x600mm* (for Suspended + Needle Type2)	O.K.		Depending on condition
12.	638-41449-01	Double Needle , only 24mL,40mL (simultaneous sparge type)*	N/A		Depending on condition
13.	631-41660-01	Flare Pipe 1,1x0,6x600mm* (for Double Needle 24mL,40mL)	N/A		Depending on condition

*Note: needed parts depending on installed needle types!

Inspection by : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

SHIMADZU ANALYZER
3/3



Automation Service Co.,Ltd.

Head Office : 929,929/1 Soi Pattanakarn 30,
Pattanakarn Road, Suanluang, Bangkok
Tel: 02-319-9994 Fax: 02-319-9596
www.automation.co.th

Sales & Service Center
Rayong : 1/15 Huaypong Rd., Muang, Rayong [T. 038-692-152]
Lamphun : 122/5 M.4, Ban Kiang, Muang, Lamphun [T. 053-591-876]
Prachinburi : 608 M.10, Thabum, Srimahaphoto, Prachinburi [T. 037-208-090]

MTOC : L-1112/2023

Report No. : ALS-416/02

TOC-L Maintenance Report

Instrument : Total Organic Carbon Analyzer Measuring : TC 0 ~ 30000 mg/L
Model : TOC-LCSH Place of Installation : -
Serial No. : H54425300416 Department : LABORATORY
Manufacture : Shimadzu

Customer : ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaen Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand

Date of Maintenance : 10 / 11 / 2023

Ambient Condition : Temperature 26.0 ± 5 °C
Humidifier 60 ± 15 %RH

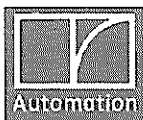
REVIEW BY	<u>Vichuta N.</u>
APPROVED BY	<u>Sinlert P.</u>
NEXT CAL. DATE	<u>10/11/24</u>

Maintenance By : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

Approved By : N. Pong
(Mr. Nipon Phungsomsak)
Technician Manager

User Name : Sinlert P.
()

SHIMADZU ANALYZER
1/4



Automation Service Co., Ltd.

Head Office : 929,929/1 Soi Pattanakarn 30,
Pattanakarn Road, Suanluang, Bangkok
Tel: 02-319-9994 Fax: 02-319-9596
www.automation.co.th

Sales & Service Center
Rayong : 1/15 Huaypong Rd., Muang, Rayong (T. 038-892-152)
Lamphun : 122/5 M.4, Ban Klang, Muang, Lamphun (T. 053-581-876)
Prachinburi : 688 M.10, Thatum, Srimahaphola, Prachinburi (T. 037-208-880)

MTOC : L-1112/2023

Report No. : ALS-416/02

Maintenance Sheet

Customer : ALS Laboratory

Date : 10 / 11 / 2023

Model : TOC-LCSH

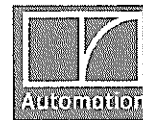
Serial No. H54425300416

Item	Carry out maintenance work	Result	Exchange	Comment
1.	Check functionality of the device			
	Check furnace temperature (Standard cat. 680 °C / for TN cat. 720 °C)	O.K.		
	Check dehumidifier temperature (1 °C)	O.K.		
	Check the entire flow line related to leakage	O.K.		
	Check baseline status (OK)	O.K.		
	Check carrier gas pressure (200 ±10 kPa)	O.K.		
	Check carrier gas flow rate (150 mL/min)	O.K.		
2.	Tubes			
	Check all tubing for contamination, if necessary clean them	O.K.		
	Check all tubing for tight connection	O.K.		
3.	Container and Drainage			
	Fill up humidifier with pure water to max. level	O.K.		
	Check filling of dilution water and acid container	O.K.		
	Rinse Drain Pot, after wards refill again with pure water	O.K.		
	Check if outlet flow is in proper conditions	O.K.		
4.	TC and IC Injection			
	Clean injector Block	O.K.		
	Check injector Block for wear	O.K.		
	Check injection tube adjustment	O.K.		
	Check injection for leakage	O.K.		
	Check injection for clogging	O.K.		
5.	IC Measurement (N-type)			
	Check acidification in syringe			
	Check sparging in syringe			
6.	Eye check of 8-Port valve, for sample residues or moist spots that indicate possible leakage	O.K.		
7.	Check and If necessary exchange consumable, Maintenance parts	O.K.		See list of consumable, maintenance parts

Inspection by :

Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

SHIMADZU ANALYZER
2/4



Automation Service Co., Ltd.

Head Office : 929,929/1 Soi Pattanakarn 30,
Pattanakarn Road, Suanluang, Bangkok
Tel: 02-319-9994 Fax: 02-319-9596
www.automation.co.th

Sales & Service Center
Rayong : 1/15 Huaypong Rd., Muang, Rayong (T. 038-892-152)
Lamphun : 122/5 M.4, Ban Klang, Muang, Lamphun (T. 053-581-876)
Prachinburi : 688 M.10, Thatum, Srimahaphola, Prachinburi (T. 037-208-880)

MTOC : L-1112/2023

Report No. : ALS-416/02

Item	Carry out maintenance work	Result	Exchange	Comment
8.	Due to instrument condition, clean the instrument inside and outside.	O.K.		
9.	After checking the system and exchanging of consumable and maintenance parts a new 1-3 point calibration have to be done.	O.K.		Addition test 1.
10.	After wards the calibration perform check sample measurement.	O.K.		Addition test 2.

Addition test

Test no.	Test conditions	Meas. value	Result
1.	Calibration TC standard solution at 0, 0.1, 0.5, 1, 5 10, 20 Injection volume 50 µL No. of measurement 2 times (Max.3)		Attachment : ALS-416/02 Page 1/4 - 2/4
	Criteria : R ² = 0.995 or more	1.0000	Pass
2.	Measurement of reagent water and TC standard solution at 5.0 mg/L injection volume 50 µL No. of measurement 2 times (Max.3) and calculate accuracy by <u>Meas. of TC standard – Meas. of Reagent water</u>		Attachment : ALS-416/02 Page 3/4 - 4/4
	Criteria : Accuracy %Recovery 10% or less	5.112 – 0.1493 = 4.9627 ppm	Pass

Inspection by : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

SHIMADZU ANALYZER
3/4



Automation Service Co.,Ltd.

Head Office : 929,929/1 Soi Pattanakarn 30,
Pattanakarn Road, Suanluang, Bangkok
Tel : 02-318-9994 Fax: 02-318-9596
www.automation.co.th

Sales & Service Center
Rayong : 1/15 Huaypong Rd., Muang, Rayong [T. 038-682-152]
Lamphun : 122/5 M.4, Ban Klang, Muang, Lamphun [T. 053-581-870]
Prachinburi : 688 M.10, Thatum, Srirachaphol, Prachinburi [T. 037-208-880]

MTOC : L-1112/2023

Report No. : ALS-416/02

List of Consumable, Maintenance parts

Pos.	Part Number	Part Name	Result	Exchange	Recommended Interval
1.	036-11209-84	O-ring, 4D P10A (Viton , for TC,IC Slider)	O.K.	✓	1 time per year, Depending on condition
2.	036-11219-84	O-ring, 4D P20 (for sealing TC-Combustion tube)	O.K.	✓	1 time per year, Depending on condition
3.	638-15025	O-ring, P1FE (for TC,IC-Slider)	O.K.	✓	1 time per year, Depending on condition
4.	630-00105-01	Platinum net, (2pcs-set) (to support catalyst)	O.K.	✓	6 month same time as catalyst exchange
5.	630-00557	Silica Wool (to support catalyst)	O.K.	✓	6 month same time as catalyst exchange
6.	630-00992	Halogen Scrubber	O.K.	✓	6 month
7.	630-00996	High Sensitivity TC Catalyst (When installed)	N/A		Depending on condition
8.	638-60116	Regular Catalyst (33g) (When installed)	O.K.	✓	6 month
9.	638-56251-01	8-Port valve rotor	O.K.	✓	1 time per year
10.	638-41323	TC-Combustion Tube	O.K.	✓	6 month same time as catalyst exchange
11.	631-43404-01	Packing, gasket slider (for TC-Injection tube)	O.K.		1 time per year, Depending on condition
12.	638-59296	Syringe 5mL	O.K.		Depending on condition
13.	638-59296-01	Plunger Tip (for syringe 5mL)	O.K.	✓	6 month
14.	042-00405-11	IC reagent supply pump head	O.K.		1 time per year
15.	630-00999	CO2-Absorber (for cell space purge)	O.K.	✓	1 time per year
16.	630-00964	Molecular Sieves 13x	O.K.	✓	1 time per year

Note. Table indicates the guidelines replacement periods when NPOC measurement is performed on sample that are comparatively as clean as tap water, use standard catalyst and at a rate of about 500 sample per month (operating five days a week)

Inspector By

Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

SHIMADZU ANALYZER

4/4

TOC-Control L Report

2023_11_10_001_PM_2-2dx

Instrument Information

Instrument Options
Catalyst

TOC AS16C Unit
Regular Sensitivity

Cal. Curve

Sample Name:
Sample ID:
Cal. Curve:
Status:

Unlabeled
Unlabeled
TC 01 - 20 ppm 2023_11_10_12_18_04 cal
Completed

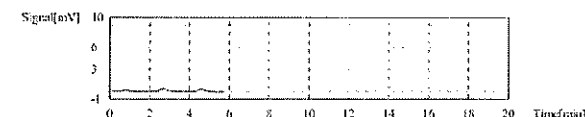


Conc: 0.000mg/L

Peak	Area	Height	Width	Time
1	0.0452	0.000	0.000	11-10-2023 12:43:17 PM
2	0.0543	0.000	0.000	11-10-2023 12:43:27 PM
3	0.0492	0.000	0.000	11-10-2023 12:43:37 PM

Acid Add.
Mean Area
SD Area
CV Area

0.000%
0.000%
0.000%
0.000%

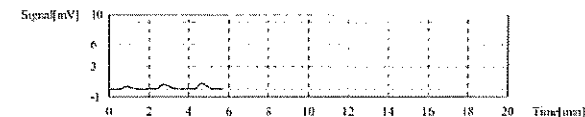


Conc: 0.1000mg/L

Peak	Area	Height	Width	Time
1	1.56	0.000	0.000	11-10-2023 12:54:28 PM
2	1.64	0.000	0.000	11-10-2023 12:57:17 PM
3	1.84	0.000	0.000	11-10-2023 12:58:05 PM

Acid Add.
Mean Area
SD Area
CV Area

0.000%
1.922
0.000%
4.85%

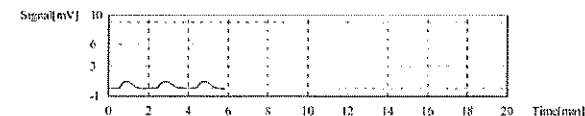


Conc: 0.5000mg/L

Peak	Area	Height	Width	Time
1	3.24	0.000	0.000	11-10-2023 1:09:21 PM
2	3.29	0.000	0.000	11-10-2023 1:09:32 PM
3	3.87	0.000	0.000	11-10-2023 1:12:45 PM

Acid Add.
Mean Area
SD Area
CV Area

0.000%
3.324
0.000%
2.62%



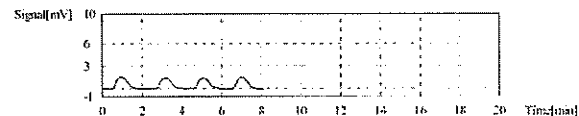
Conc: 1.000mg/L

TOC-Control L Report

2023-11-10 00:19:47

Time	Area	Height	Width	Time	Area	Height	Width
1	5.414	5.414	1.000	11/10/2023 1:14:59 PM			
2	5.459	5.459	1.000	11/10/2023 1:14:59 PM			
3	5.950	5.950	1.000	11/10/2023 1:14:59 PM			
4	5.954	5.954	1.000	11/10/2023 1:29:22 PM			

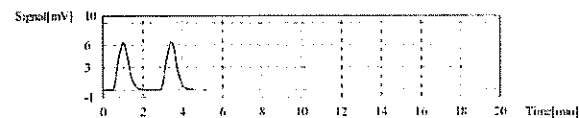
Acid Add: 0.000%
Mean Area: 5.522
SD Area: 0.98539
CV Area: 1.40%



Conc: 5.000mg/L

Time	Area	Height	Width	Time	Area	Height	Width
1	23.13	23.13	4.021	11/10/2023 1:28:50 PM			
2	23.13	23.13	4.021	11/10/2023 1:28:50 PM			

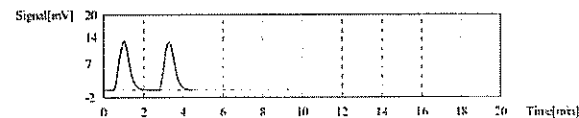
Acid Add: 0.000%
Mean Area: 23.19
SD Area: 0.85057
CV Area: 0.27%



Conc: 10.00mg/L

Time	Area	Height	Width	Time	Area	Height	Width
1	35.62	35.62	2.101	11/10/2023 1:31:31 PM			
2	35.70	35.70	2.101	11/10/2023 1:39:30 PM			

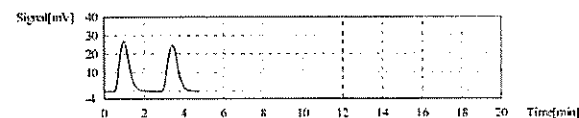
Acid Add: 0.000%
Mean Area: 35.47
SD Area: 0.7599
CV Area: 0.64%



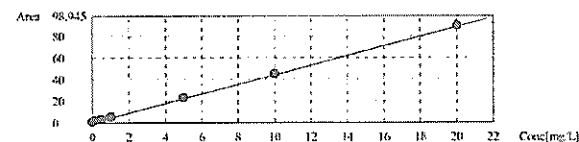
Conc: 20.00mg/L

Time	Area	Height	Width	Time	Area	Height	Width
1	10.55	10.55	1.000	11/10/2023 1:33:12 PM			
2	20.15	20.15	1.000	11/10/2023 1:43:48 PM			

Acid Add: 0.000%
Mean Area: 59.55
SD Area: 0.4353
CV Area: 0.94%



Slope: 4.438
Intercept: 0.000
r^2: 1.0000
RSE(%): N/A
Zero Shift: Yes



TOC-Control L Report

2023-11-10 00:19:47

Instrument Information

Instrument Options
Catalyst

TOC-ASLHC Unit
Regular Sensitivity

Sample

Sample Name:
Sample ID:
Origin:
Status:
Chk. Result:

TC 5
Dried
TC 0.1 - Typical
Completed

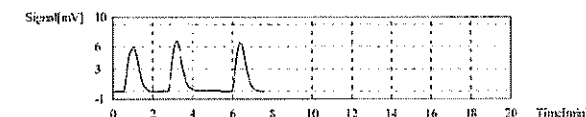
Time	Area	Height	Width	Time	Area	Height	Width
1	22.36	22.36	1.000	11/10/2023 1:27:21 PM			
2	22.80	22.80	1.000	11/10/2023 1:27:21 PM			
3	22.82	22.82	1.000	11/10/2023 2:03:44 PM			

1. Dist

Anal: TC

Time	Area	Height	Width	Time	Area	Height	Width
1	22.36	22.36	1.000	11/10/2023 1:27:21 PM			
2	22.80	22.80	1.000	11/10/2023 1:27:21 PM			
3	22.82	22.82	1.000	11/10/2023 2:03:44 PM			

Mean Area: 22.69
Mean Conc: 5.112mg/L



TOC-Control L Report

2023 11 10 09:17 PM 55.8x

1. အသုံးပြုသူများ၏အသုံးပြုမှု

Instrument Options
Catalyst

TGC ASIC Unit
Regular Sensitivity

Sample

Sample Name
Sample ID
Origin
Status
Chk. Result

Water
Unleaded
TP (11.50) per gal
Complete

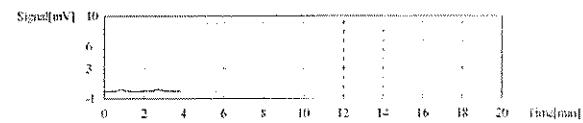
[illegible]

1 Det

Anal., TC

1	0.635	0.1829 mg/L	50ml	1.000	0.03-30 ppm 2023 11 10 12 19 total	21.10.2023 20.48 PM
	0.635	0.1888 mg/L	50ml	1.000	0.03-30 ppm 2023 11 10 12 19 total	21.10.2023 20.48 PM

Mean Area	0.6826
Mean Conc.	0.149, mg/L



ภาคผนวก จ

สำเนาหนังสือใบอนุญาตขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน



ที่ อก ๐๓๑๐(๑)/ ๑ ๖ ๑ ๖ ๘

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒ ๐ พฤศจิกายน ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบลอราทอรี 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 แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐
ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด
ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ ๔๘๑ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูล
หรือวัสดุที่ไม่ใช่แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กันยายน ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ
กรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีระ จันทน์โรจน์)

นักวิทยาศาสตร์อาวุโส ฝ่ายวิชาการแผน
ผู้จัดการกองวิจัยและพัฒนาสิ่งแวดล้อมพิษโรงงาน
ปฏิบัติการตามแผนฉบับกรมโรงงานอุตสาหกรรม

กองวิจัยและเฝ้าระวังมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๔๙

ไปรษณีย์อิเล็กทรอนิกส์ sarabak@diw.mail.go.th



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



สิ่งที่ส่งมาด้วย ๑

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ๑ ๖ ๑ ๖ ๘ ลงวันที่ ๒ ๐ พฤศจิกายน ๒๕๖๖

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

- | | |
|----------------------------------|----------------------------|
| ๑) นางสาวยุทธา จันทน์เปล่ง | ทะเบียนเลขที่ ว-๒๐๔-ก-๐๐๐๑ |
| ๒) นางสาวจันนีย์ โคมการกุล ณ นคร | ทะเบียนเลขที่ ว-๒๐๔-ก-๐๐๐๒ |
| ๓) นายศราวุธ จิตรานนท์ | ทะเบียนเลขที่ ว-๒๐๔-ก-๐๐๐๓ |
| ๔) นางสาวกนกกร เอนก | ทะเบียนเลขที่ ว-๒๐๔-ก-๐๐๐๔ |
| ๕) นายสุริยา สอนแก้ว | ทะเบียนเลขที่ ว-๒๐๔-ก-๐๐๐๕ |
| ๖) นายวิชาญ ชุมทรัพย์ | ทะเบียนเลขที่ ว-๒๐๔-ก-๐๐๐๖ |

เอกสารแนบท้ายหนังสือรับข้ออาชญาขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอนแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ๑๖๑๖๘ ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๘๓ ราย

๑) นายกางบิลลิต กิตติคุณาณชัย	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๑
๒) นายภัทรพล สว่างใจธรรม์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๒
๓) นายณริธิป เทือกชัยคำ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๓
๔) นายศิริโชค พงษ์ประสม	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๔
๕) นายณัฐวุฒิ ตัวงแพง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๕
๖) นางสาวจินดา ไชจุลธรรม	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๖
๗) นางสาวสาวิตรี น้อยเสถียร	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๗
๘) นางสาวชนัญญาณจน์ อัมม	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๘
๙) นางสาวนรินทร์ สายเส็ง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๙
๑๐) นางสาวนันทวิศ สมบูรณ์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๐
๑๑) นางสาวศรณิชา เจริญทรัพย์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๑
๑๒) นางสาวธัญญธร มงคลจิรวุฒิ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๒
๑๓) นางสาวศิริลักษณ์ บุนนาค	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๓
๑๔) นายณพพงศ์ จันทร์พันธุ์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๔
๑๕) นายณรเศรษฐ์ โกมลย์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๕
๑๖) นายอัมวา จริยา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๖
๑๗) นางสาวเกศรินทร์ แก้วมัน	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๗
๑๘) นางสาวสุวิมล ชัยเรืองวุฒิ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๘
๑๙) นางสาวสุชาดา ธรรมถาวร	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๙
๒๐) นางสาวเปมิภา ชัยเดชธนกุล	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๐
๒๑) นางสาวศศิธร หมูลสวัสดิ์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๑
๒๒) นางสาวเลวาลักษณ์ ภูณภาพาร	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๒
๒๓) นายอภิสิทธิ์ สิงหา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๓
๒๔) นายศักดิ์สิทธิ์ ไพศาลพิสุทธิ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๔
๒๕) ว่าที่ร้อยตรีหญิง พรรณิภา จำเจริญ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๕
๒๖) นางจิตดา คำภูแก้ว	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๖
๒๗) นางสาวอรรณณ รักยง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๗
๒๘) นางสาวนพรัตน์ แยมกรานต์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๘
๒๙) นายจุลเดช วารินทร์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๙
๓๐) นางสาวคณัฐรัตน์ ร้องคำ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๐
๓๑) นายพรมณ์ ศิริบัณฑิต	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๑
๓๒) นายอุทิศ อุณลิ้ม	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๒
๓๓) ว่าที่ร้อยตรี เจริญเกียรติ อมรศรีเสริม	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๓
๓๔) นางสาววริยา สร้างนา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๔
๓๕) นายอนุพงศ์ รัตนศรีประเสริฐ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๕

วิทย์

๓๖) นางสาวจุฑารัตน์...

๓๖) นางสาวจุฑารัตน์ โอนสันเทียะ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๖
๓๗) นางสาวจุฑารัตน์ พิมพ์กิจ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๗
๓๘) นางสาวปรารถนาทิพย์ กิจไพศาลศักดิ์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๘
๓๙) นางสาวเดือนใจ ทางกลาง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๙
๔๐) นางสาวจิราพร ศิริเวช	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๐
๔๑) นายวรกร สุกกรักษ์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๑
๔๒) นายพนง วิริยะสหกิจ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๒
๔๓) นายธนิศ เจริญ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๓
๔๔) นายณิศร ชำเพชร	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๔
๔๕) นายภูวิช พรหมสะอาด	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๕
๔๖) นายณเดช ไกศาพิพัฒน์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๖
๔๗) นายชวฤทธิ์ วงษ์จันทร์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๗
๔๘) นายอาทิตย์ ศรีเสน	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๘
๔๙) นายเจตนาพร คงศักดิ์ไทย	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๙
๕๐) นายจรัส บุญยั้ง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๐
๕๑) นายธนชาติ เอนก	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๑
๕๒) นายอภิวัฒน์ ทุมพู	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๒
๕๓) นางสาวสุภาวัญญา มาก	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๓
๕๔) นางสาวพัชรา ขวาลสมบูรณ์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๔
๕๕) นางสาวธิดา บุญเพ็ง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๕
๕๖) นางสาวภาณุมาศ นามวัฒน์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๖
๕๗) นางสาวอุไรรัตน์ ทังสร้างแป้น	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๗
๕๘) นายธีรวัฒน์ ปวงสุข	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๘
๕๙) นายอิทธิพล ยะโส	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๙
๖๐) นายประพนธ์ วรรณสุขชัย	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๐
๖๑) นายชยธร พวงทิพย์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๑
๖๒) นางสาวกนกวรรณ จันทร์บาล	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๒
๖๓) นายสิทธิโชค ธงเงิน	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๓
๖๔) นางสาววรรณใจ บุญ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๔
๖๕) นางสาวพรรณธิดา ทุมคง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๕
๖๖) นายณภัทร ศิริวิริยะ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๖
๖๗) นายสุวิชา ทองอ่อน	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๗
๖๘) นายวิญญู บุญตะนัย	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๘
๖๙) นายสมบูรณ์ บุตรจันทร์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๙
๗๐) นายวิรัตน์ ไชยชนะรา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๐
๗๑) นายณฤเบศน์ เพิ่มพูน	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๑
๗๒) นายจิณัฐ ขวาละอ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๒
๗๓) นายอัสรี นามบุรี	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๓
๗๔) นายอัครเดช จอสา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๔

วิทย์

๗๕) นายประเสริฐ...

๗๕) นายประเสริฐ สุระขันธ
๗๖) นายบุญล จันทรเนียม
๗๗) นายพิรพงษ์ ทองคุณปรีดา
๗๘) นายณฤพล ทองบุษ
๗๙) นายอนุวัฒน์ ม่วงแพ
๘๐) นายเจตศราวุฒิ ปัดตะมะ
๘๑) นายกฤษณะ สายวรรณ
๘๒) นายพิชัย บุญยงค์
๘๓) นายภาณุพงศ์ โยมวงศ์
๘๔) นายสามารถ คุ้มปลี
๘๕) นายสัญญาชัย โกศรีนาม
๘๖) นายณัฐวุฒิ ศรีประเสริฐ
๘๗) นายชลธิช บากหมม
๘๘) นายพงศธร ชัยทิพย์
๘๙) นายสิทธิโชค หาสิตา
๙๐) นายรณกร อินสุตา
๙๑) นางสาววรณิชา ขาติวันชัย
๙๒) นางสาวพิมพ์ตะวัน มีนากุล
๙๓) นางสาวเพชรรัตน์ สิงห์สมบุญ
๙๔) นางสาวชญานิษฐ์ พรหมจันทร์
๙๕) นายกริต ทวีราช
๙๖) นายจักริน หมั่นวิชา
๙๗) นายฉัตรชัย สุขเปี้ย
๙๘) นายณรณห์ ต๊ะทองคำ
๙๙) นายศุภพล สมนอก
๑๐๐) นายทักษ์คนัย อุบลศรี
๑๐๑) นายธนสวรรค์ นามะกุลนา
๑๐๒) นายธิตินพงศ์ บัวแดง
๑๐๓) นายณนหทัย อุปถัมภ์
๑๐๔) นายณัฐพล คุณสุทธิ
๑๐๕) นายณัฏฐวัฒน์ สาริน
๑๐๖) นายปิยะนัฐ พลมะศรี
๑๐๗) นายพงศ์สิริ โสมเขียว
๑๐๘) นายพีรพัฒน์ กำคำ
๑๐๙) นายภาณุพงศ์ มาโนทัย
๑๑๐) นายมงคล ผลาทิพย์
๑๑๑) นายสิริรินทร์ ทองอัน
๑๑๒) นายอนเนชา หันสมัย
๑๑๓) นายอดิศักดิ์ ฝมไผ

ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๕
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๖
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๗
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๘
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๙
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๐
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๑
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๒
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๓
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๔
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๕
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๖
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๗
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๘
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๙
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๙๐
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๙๑
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๙๒
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๙๓
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๙๔
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๙๕
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๙๖
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๙๗
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๙๘
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๙๙
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๐
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๑
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๒
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๓
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๔
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๕
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๖
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๗
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๘
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๙
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๑๐
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๑๑
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๑๒
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๑๓

รวม

๑๑๓) นายอนันตชัย...

๑๑๔) นายอนันตชัย วิสม
๑๑๕) นายวรุต ศิณิก
๑๑๖) นายแสงตะวัน นตะสัด
๑๑๗) นายยุทธพงศ์ รัตนะ
๑๑๘) นายชัยวุฒิ ไชยชนะกิจ
๑๑๙) นายวิศรุต ศรีธรรมมา
๑๒๐) นายณนทกร เผือกผ่อง
๑๒๑) นายกำชัย สุทธะ
๑๒๒) นางสาวณัฐภรณ์ บุญตะนัย
๑๒๓) นางสาวพัชรินทร์ แสนสร้อย
๑๒๔) นายไพรัชย์ เปี่ยมพิมาย
๑๒๕) นางสาวสุภาภศ ทองมาก
๑๒๖) นางสาวสลิลา จิตรสว่าง
๑๒๗) นางสาวงโมพร เล็กภูเขียว
๑๒๘) นางสาวกฤติมาพร คำมีแก่น
๑๒๙) นางสาวสกุลรัตน์ ภาคภูมิ
๑๓๐) นางสาวไพรินทร์ ศรีวิปี
๑๓๑) นางสาวทิพนคร ฝอยปัญญา
๑๓๒) นางสาวสาธิตา ปานทอง
๑๓๓) นางสาวอริสา ทองนวล
๑๓๔) นางสาวอรรษา คำคล้อง
๑๓๕) นางสาวชุตารณณ์ สุนทรสนาน
๑๓๖) นางสาวอัญชลี คำจันทร์
๑๓๗) นายบุญฤทธิ์ เอี่ยมเทศ
๑๓๘) นางสาวศุภรดา ปันมยุรา
๑๓๙) นางสาวหาฤดี คุณนาบ
๑๔๐) นางสาวจิราเจต พองดา
๑๔๑) นางสาวอารยา มีชัย
๑๔๒) นางสาววิชชุดา นาคผจญ
๑๔๓) นางสาวนันทยา จันทะสุน
๑๔๔) นายกิตติพงศ์ แซ่ลี
๑๔๕) นายอนุวัติ ภูถวิล
๑๔๖) นายธีรพล แสงทอง
๑๔๗) นายศักดิ์พัฒน์ บุญมัน
๑๔๘) นายธิตะวิมล เอมอุไร
๑๔๙) นายชัยณรงค์ ศรีปิ่นทร์
๑๕๐) นางสาวอัจฉราวรรณ สวนสนอง
๑๕๑) นางสาวณัฐพร สิงหา
๑๕๒) นายกัมเรศ แหม่มไค

ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๑๔
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๑๕
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๑๖
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๑๗
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๑๘
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๑๙
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๒๐
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๒๑
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๒๒
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๒๓
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๒๔
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๒๕
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๒๖
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๒๗
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๒๘
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๒๙
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๓๐
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๓๑
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๓๒
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๓๓
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๓๔
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๓๕
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๓๖
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๓๗
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๓๘
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๓๙
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๔๐
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๔๑
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๔๒
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๔๓
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๔๔
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๔๕
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๔๖
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๔๗
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๔๘
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๔๙
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๐
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๑
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๒

รวม

๑๕๓) นางสาวอุบล...

๑๕๓) นางสาวอุบล เด็กศิริ
๑๕๔) นางสาวมโนรัตน์ ทองบุตร
๑๕๕) นายภาคภูมิ แทนไทย
๑๕๖) นางสาวสุภาณัฐ เมล์ท้วง
๑๕๗) นางสาวพรทิวา สาตาชนม์
๑๕๘) นายเอกวิทย์ วันทะนา
๑๕๙) นายไตรมณฑล ทิพย์วรรณ
๑๖๐) นายจิรเมธ ประเสริฐศิริพงศ์
๑๖๑) นายจิรายุส เกษมสุข
๑๖๒) นายจรัสศักดิ์ ศรีวิชัย
๑๖๓) นายณัฐกฤษณ์ สะพานแก้ว
๑๖๔) นายบุรณศักดิ์ ปะที
๑๖๕) นายปิ่นณวิชัย เสมอทรัพย์
๑๖๖) นายพิชญพงษ์ ไชยา
๑๖๗) นายภัทรพงษ์ มณฑาทอง
๑๖๘) นายวสันต์ ตรีนกุล
๑๖๙) นายภาณุเดช เพชรสุด
๑๗๐) นายอนุกุล วิริยะแสง
๑๗๑) นายภัทรพงษ์ มีสุข
๑๗๒) นางสาวนุชรี สิละทีป
๑๗๓) นางสาวสุภาวดี โกศรนาม
๑๗๔) นางสาวอรณิช เทียนคำ
๑๗๕) นางสาวพรเพ็ญ ขอบสอน
๑๗๖) นางสาววันวิสา ขอนพิกุล
๑๗๗) นางสาวอรรพรรณ เถาว์ทอง
๑๗๘) นางสาวอัยยลิณ เมอวิณณ์
๑๗๙) นางสาววิสา คุ้มครอง
๑๘๐) นายวุฒิกร ศิริวรรณ
๑๘๑) นางสาวจรรวรรณ กระจำหันธุ์

ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๓
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๔
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๕
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๖
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๗
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๘
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๕๙
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๐
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๑
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๒
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๓
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๔
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๕
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๖
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๗
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๘
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๖๙
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๐
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๑
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๒
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๓
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๔
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๕
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๖
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๗
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๘
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๗๙
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๘๐
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๘๑

Signature

เอกสารแนบท้ายหนังสือรับข้ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ๓ ๖ ๑ ๖ ๘ 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⁾

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⁾

40 Manganese...

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⁾

น้ำใต้ดิน...

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⁾

18 Bis(2-ethylhexyl)phthalate...

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⁾

36 Chrysene...

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⁾

56 1,3-Dichloropropene...

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⁾

76 γ-HCH...

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⁾

94 N-Nitrosodiphenylamine...

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 ₆)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^{(1)(4,25)}

110 TPH (C₇-C₁₆)...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
110	TPH (C ₉ -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 ⁽⁵⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
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 ⁽⁵⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾

อากาศเสีย...

อากาศเสีย (ปล่องระบาย) จำนวน 28 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
2	Arsenic	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
3	Beryllium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
4	Cadmium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
5	Carbon Monoxide	1) Instrumental Analyzer Method ⁽⁵⁾ 2) Sampling Bag Non-Dispersive Infrared Method ⁽⁵⁾
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾ 2) Isokinetic Sampling, Ion Chromatographic Method ⁽⁵⁾
7	Chromium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
8	Cobalt	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
9	Copper	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric 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⁾

15 Lead...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	Lead	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
16	Manganese	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
17	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[5] 2) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^[5]
18	Nickel	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
19	Opacity	Ringelmann's Method ^[2]
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ^[5] 2) Absorption Sampling, Alkaline Permanganate/Colorimetric Method ^[5] 3) Instrumental Analyzer Method ^[5]
21	Selenium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
22	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Instrumental Analyzer Method ^[5]
23	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5]
24	Tellurium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
25	Tin	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
26	Total Suspended Particulate	1) Isokinetic Sampling, Gravimetric Method ^[5] 2) Paired Train, Isokinetic Sampling, Gravimetric Method ^[5]

27 Vanadium...

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]

5 Beryllium...

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)

10 Chromium (VI)...

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) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
18	Endrin	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)
19	Heptachlor	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)
20	Lead	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)

22 Mercury...

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)

- 2-Chlorobiphenyl...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	<ul style="list-style-type: none"> - 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',5,6-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) Electrometric Method ^(23,24)
29	pH	
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)

31 Silver...

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)

ดิน...

ดิน จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
2	Acetone	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25) 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ⁽¹³⁾
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
4	Anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
8	Barium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
9	Benz(a)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25) <i>สมย</i>

11 Benzo(b)fluoranthene

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	Benzo(b)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
12	Benzo(k)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
13	Benzoic acid	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
14	Benzo(a)pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 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) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
17	Bis(2-chloroethyl)ether	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
18	Bis(2-ethylhexyl)phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
21	Butanol	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
22	Butyl Benzyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26) <i>สมย</i>

23 Cadmium...

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 ^(10,25) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,24)
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 ^(10,25) 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)

35 Chrysene...

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)

49 1,2-Dichloroethane...

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-Dichloropropane	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)

63 Di-n-Octyl Phthalate...

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⁾

73 n-Hexane...

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⁾

84 Methanol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25) 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
88	2-methylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
89	2-Methylnaphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
91	Naphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
93	Nitrobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
94	N-Nitrosodiphenylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
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)

96 Polychlorinated biphenyls (PCBs)

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',5,6-Heptachlorobiphenyl - 2,2',3,3',4,4',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)

99 Phenol...

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 ₉ -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)

115 2,4,5-Trichlorophenol...

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 ^(15,23)
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 ^(15,23)
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
121	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
122	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
123	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,23)
125	Zinc	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)

เอกสารอ้างอิง

- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2566. เรื่อง การจัดการสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว. ราชกิจจานุเบกษา. 31 พฤษภาคม 2566. เล่มที่ 140 ตอนพิเศษ 126 ง.
- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้ถ่านเป็นเชื้อเพลิง. ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125 ง.
- สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.
- APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 24th ed. Washington, DC: APHA, 2023.

5. United States...

- United States Environmental Protection Agency. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2023.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. SW-846, 2014.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Acid Digestion of Sludges and Sediments and Soils. SW-846 Method 3050B, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Alkaline Digestion for Hexavalent Chromium. SW-846 Method 3060A, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Separatory Funnel Liquid-Liquid Extraction. SW-846 Method 3510C, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Soxhlet Extraction. SW-846 Method 3540C, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Automated Soxhlet Extraction. SW-846 Method 3541, 1994.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Microscale Solvent Extraction (MSE). SW-846 Method 3570, 2002.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Volatile Organic Compounds (VOCs) in Various Sample Matrices Using Equilibrium Headspace Analysis. SW-846 Method 5021A, 2014.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Purge-and-Trap for Aqueous Samples. SW-846 Method 5030B, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. SW-846 Method 5035, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Inductively Coupled Plasma-Atomic Emission Spectrometry. SW-846 Method 6010B, 1996.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Inductively Coupled Plasma-Mass Spectrometry. SW-846 Method 6020A, 2007.
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Antimony and Arsenic (Atomic Absorption, Borohydride Reduction). SW-846 Method 7062, 1994. **เพิ่มใหม่**
- United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Chromium, Hexavalent (Colorimetric). SW-846 Method 7196A, 1992. **เพิ่มใหม่**

20. United States...

20. United States...

- ๓๒ -

20. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique). SW-846 Method 7471B, 2007.

21. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Mercury in Solids and Solutions by Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry. SW-846 Method 7473, 2007.

22. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Nonhalogenated Organics by Gas Chromatography. SW-846 Method 8015C, 2007.

23. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. pH Electrometric Measurement. SW-846 Method 9040C, 2004.

24. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Soil and Waste pH. SW-846 Method 9045D, 2004.

25. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). SW-846 Method 8260D, 2018.

26. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). SW-846 Method 8270E, 2018.

27. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Total and Amenable Cyanide: Distillation SW-846 Method 9010B, 1996.

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

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

30. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Mercury in Sediment and Tissue Samples by Atomic Fluorescence Spectrometry. SW-846 Method 7474, 2007.

31. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. Ultrasonic Extraction. SW-846 Method 3550C, 2007.

พิมพ์



ที่ อก ๐๓๑๐/๑/ ๕ ๑ ๒ ๑

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๕ มิถุนายน ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขีตสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๕ มีนาคม ๒๕๖๗

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๕ ซอยพัฒนาการ ๕๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓ ราย

- | | |
|--------------------------|----------------------------|
| ๑) นางสาวพรณิศา ทุมคง | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๕ |
| ๒) นายกำชัย สุทธิระ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๒๓ |
| ๓) นางสาวศุภรดา ปันมยุรา | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๓๘ |

๒. ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑๒ ราย

- | | |
|------------------------------|----------------------------|
| ๑) นางสาวฐานิดา กลิ่นเขียว | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๔๒ |
| ๒) นางสาวกัญญ์สสร สลายคำ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๔๓ |
| ๓) นางสาวณัฐนันท์ กันทวงค์ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๔๔ |
| ๔) นายอำนาจ วงษาเคน | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๔๕ |
| ๕) นายกฤษณพล ปิณฑาวงศ์ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๔๖ |
| ๖) นายณชากร ธรรมชาติ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๔๗ |
| ๗) นายวิชิตนทร์ ม่องสามสวน | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๔๘ |
| ๘) นายณัฐพงศ์ โสภา | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๔๙ |
| ๙) นายศักรินทร์ ปานเพ็ง | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๕๐ |
| ๑๐) นายณัฐพล ทุมขึ้น | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๕๑ |
| ๑๑) นายธนา สุพาพันธุ์ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๕๒ |
| ๑๒) นายบรรณารักษ์ แก้วหงษ์ชา | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๕๓ |

อนึ่ง หนังสือฉบับนี้...

- ๒ -

อนึ่ง หนังสือฉบับนี้จะหม.คอาฯพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๒ กันยายน ๒๕๖๘

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายพรยศ กิตินกรอง)

รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๓๑ ๖๓๑๑ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๕๓๑ ๖๓๑๒ ต่อ ๒๑๕๔

ไปรษณีย์อิเล็กทรอนิกส์ saraban@dlw.mail.go.th





ที่ กก ๐๓๓๐(๓)/ ๖๔๗๐

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๘ มิถุนายน ๒๕๖๕

เรื่อง ขันทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขณิสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๙ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำ
ห้องปฏิบัติการวิเคราะห์ และรายการสารมลพิษที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป
(ประเทศไทย) จำกัด ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ๖-๓๒๓ สดงานที่ตั้งเลขที่
๖๔๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้ อำเภอลำลูกกระถัง จังหวัดระยอง โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายเดช ช้างชน	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๔๒
๒) นางวิลาวัลย์ บริรักษ์	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๔๓
๓) นายสุพจน์ สลามเต๊ะ	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๔๔

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นางสาวณัฐมล บรรจงกิจ	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๔๕
๒) นางพจนา สีดา	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๔๖
๓) นางสาวอนิศา กุลสุริวงศ์	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๔๗
๔) นายพิทยา ทองแดง	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๔๘
๕) นางชลธิชา สุปงกช	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๔๙
๖) ว่าที่ ร.ต.รณชัย ม่วงมา	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๕๐
๗) นายวรวิทย์ ทับทา	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๕๑
๘) นายศักดิ์รินทร์ จรัสกาย	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๕๒
๙) นายสุรศักดิ์ สาชิน	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๕๓
๑๐) นางสาวเพชรคุณ ภาณุदानนท์	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๕๔
๑๑) นายสถาพร ดาแก้ว	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๕๕
๑๒) นายสุทธิดำรงค์ โชคปิตินันท์	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๕๖

๑๓) นายวัลลภ...

-๒-

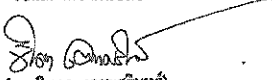
๑๓) นายวัลลภ หันไชยเนาว์	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๕๗
๑๔) นางสาวนาสิ เจริญตระกูล	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๕๘
๑๕) นางสาวนิศา ผดุงจิตต์	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๕๙
๑๖) นายธนะสิทธิ์ วงศ์ไชย	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๖๐
๑๗) นายชัยนุสรณ์ เลิศนันทกุลชัย	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๖๑
๑๘) นายสัจจา เพ็ชรแสง	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๖๒
๑๙) นายกัณตกล มณีสัมพันธ์	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๖๓
๒๐) นางสาวจันทิพย์ โกลเมณฑ	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๖๔
๒๑) นายสุภาวรินทร์ อ็อกจินดา	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๖๕
๒๒) นายศุภณัฐ ทิพย์พันธ์	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๖๖
๒๓) นายศุภชัย วงศ์สุริย์ฉาย	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๖๗
๒๔) นายปฐมพงศ์ กรสวัสดิ์	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๖๘
๒๕) นายไสว ต้นโพธิ์	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๖๙
๒๖) นางสาวกิตติยา สัตยาภิรมย์ภักดี	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๗๐
๒๗) นางสาวเจษฎาพร ศรีบุญเรือง	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๗๑
๒๘) นางสาวสุรินทร์ สิงห์เงา	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๗๒
๒๙) นางสาวธิดารัตน์ ศิริมงคลโร	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๗๓
๓๐) นายพิพัฒน์ นิภัทร์เศรษฐี	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๗๔
๓๑) นายศิริวิทย์ เรืองสม	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๗๕
๓๒) นายปราเมศ สัตยาคุณ	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๗๖
๓๓) นายณฤพาท ธรรมสระโร	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๗๗
๓๔) นางสาวสุภาวรัตน์ โสจันทร์	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๗๘
๓๕) นายพชรกร อินทรเสนา	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๗๙
๓๖) นายทิวากร เชื้อมาก	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๘๐
๓๗) นายอนุรักษ ทองขจรศักดิ์	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๘๑
๓๘) นายอภิชาติ วิลาศ	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๘๒
๓๙) นายจรัสวี ศรีรักษา	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๘๓
๔๐) นายประสานมิตร เชื้อนเพชร	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๘๔
๔๑) นายภาณุวัฒน์ รุ่งบง	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๘๕
๔๒) นายสันติ ชัยชนะ	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๘๖
๔๓) นายสิทธิชัย แก้วเกตุ	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๘๗
๔๔) นายทินกร กุลชาติ	ทะเบียนเลขที่ ๖-๓๒๓-จ-๙๔๘๘

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๑๔ รายการ
อากาศเสีย (ปล่องระบายน) จำนวน ๘ รายการ และน้ำใต้ดิน จำนวน ๓ รายการ รวมทั้งสิ้นจำนวน ๒๕ รายการ
ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้มีอายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์
จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบ
คำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการ
วิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นางจินดา เตชะจันทน์)
ผู้อำนวยการกองวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม
๒๘ มิ.ย. ๒๕๖๕

กองวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ศูนย์วิจัยและพัฒนาสิ่งแวดล้อมโรงงานภาคตะวันออก
โทร. ๐ ๓๘๐๕ ๙๖๖๓-๓
ไปรษณีย์อิเล็กทรอนิกส์ cdivw@mail.go.th

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๓๒๓

ที่ อก ๐๓๑๐(๓)/ ๖๔๗๐

ลงวันที่ ๒๘ มิถุนายน ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ

หนังสือ 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 ^[5]
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 ^[2] 2) Instrumental Analyzer Method ^[10]

วิภา สันตสุข

(นางสาววิภา สันตสุข)

ผู้อำนวยการ

ศูนย์วิจัยและพัฒนาสิ่งแวดล้อมโรงงานภาคตะวันออก

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]

เอกสารอ้างอิง

1. ธงชัย พรหมสวัสดิ์ และวิบูลย์ลักษณ์ วิสุทธิศักดิ์, บรรณาธิการ. (2547) คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย.
2. APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 23rd ed. Washington, DC : APHA, 2017
3. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้แก๊สเป็นเชื้อเพลิง. ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.
4. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำของโรงงาน. ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.
5. United States Environmental Protection. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2017.
6. United States Environmental Protection. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2019.
7. United States Environmental Protection. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2020.
8. United States Environmental Protection Agency. Determination of Carbon Monoxide Emissions from Stationary Sources; Instrumental Analyzer Procedure. 40 CFR 60. Appendix A Method 10, 2017.
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.

วิภาดา สัมฤทธิ์ผล

(นางสาววิภาดา สัมฤทธิ์ผล)

ผู้อำนวยการ

ศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก

ศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก กองวิจัยและเฝ้าระวังมลพิษโรงงาน กรมโรงงานอุตสาหกรรม โทร ๐ ๒๑๐๕ ๙๐๖๓-๓

สำเนา

ที่ ออก ๐๓๒๐/ ๖๐๘๓

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๖ 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 ๖-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู่ อำเภอลพบุรี จังหวัดลพบุรี ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดดังนี้

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

ก. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ ราย

- | | | |
|------------------------------|---------------|--------------|
| ๑) นางสาวเจษฎาพร ศรีบุญเรือง | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๙๔๙๑ |
| ๒) นางสาวณัฐรินทร์ สิงห์เภา | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๙๔๙๒ |
| ๓) นางสาวนิศา มุ่งจิตต์ | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๙๔๙๓ |
| ๔) นายศุภณัฐ พิสัยพันธ์ | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๙๔๙๔ |
| ๕) นายสิทธิชัย แก้วเกตุ | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๙๔๙๕ |

ข. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๒ ราย

- | | | |
|------------------------------|---------------|--------------|
| ๑) นายณัฐพงษ์ เท่งขาวนา | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๑๐๐๑ |
| ๒) นางสาวกัญญารัตน์ รักดี | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๑๐๐๒ |
| ๓) นางสาวจุฑาจิตน์ สีทองหลวง | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๑๐๐๓ |
| ๔) นางสาวจิตติภา ประเทืองสุข | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๑๐๐๔ |
| ๕) นายสรเสริญ คุ้มสุข | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๑๐๐๕ |
| ๖) นายณัฐวุฒิ อดมพรมราช | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๑๐๐๖ |
| ๗) นายจิตรกร สีวะสา | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๑๐๐๗ |
| ๘) นายสิททิพย์ สุวรรณรัตน์ | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๑๐๐๘ |
| ๙) นายสิทธิพันธ์ เสนาธิ์ | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๑๐๐๙ |
| ๑๐) นายอนุวัฒน์ เตมา | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๑๐๑๐ |
| ๑๑) นายสุวิทย์ นราพงษ์ | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๑๐๑๑ |
| ๑๒) นายอดิศักดิ์ ตะริสุนย์ | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๑๐๑๒ |

อนึ่ง...

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 ๖๐๕๔ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์



ที่ อก ๐๓๑๐/๖๕๖๕๔

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

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 ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้คู อำเภอบลุกแดง
จังหวัดระยอง ขอเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย)
จำกัด เพิ่มขอบข่ายสารมลพิษที่วิเคราะห์ในน้ำเสีย จำนวน ๑๓ รายการ และน้ำใต้ดิน ๓ รายการ ตามสิ่งที่ส่ง
มาด้วย

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์
เอกชนที่ อก ๐๓๑๐(๓)/๖๔๗๐ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๔ คือในวันที่ ๒๘ มิถุนายน ๒๕๖๗ ทั้งนี้ สามารถ
ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายทวี อำพาพันธ์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๔ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๓๒๓
ที่ อก ๐๓๒๐/๒๕๖๕๗ ลงวันที่ ๑๐ พ.ย. ๒๕๖๕

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	Chemical Oxygen Demand	2) 5-Day BOD Test, Azide Modification Method 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



ที่ อก ๐๓๒๐/ ๔ ๖ ๐๐ 1

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๕ พฤษภาคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๐ มีนาคม ๒๕๖๗

ตามคำขอ ที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่แก้ว อำเภอลำปาง
จังหวัดลำปาง ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑ ราย

นางสาวเพชรคุณ ภาณุคานนท์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๔๔

๒. ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑๕ ราย

๑) นายณัฐพล เจียงวรวิงศ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๓

๒) นายชานนท์ บุญชื่น ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๔

๓) นายณัฐกานต์ วงศ์อินทร์อยู่ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๕

๔) นายอานนท์ โพธิ์พระทอง ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๖

๕) นายณัฏฐ์ ถั่วกลาง ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๗

๖) นายศุภณัฐ พิสัยพันธ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๘

๗) นายวสันต์ คินันต์ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๙

๘) นายวิญญู อิมพาลี ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๐

๙) นายศุภณัฐ สกุลกิตติศักดิ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๑

๑๐) นายเอกชัย ถิ่นทอง ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๒

๑๑) นายพงษ์เทพ สีทธิเลาะ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๓

๑๒) นายทินกร กุมภาชี ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๔

๑๓) นางสาวนันทยา เบลูจันน์ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๕

๑๔) นายสิทธิชัย ยันพิมาย ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๖

๑๕) นางสาวภาณิน พลอดทอง ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๒๗



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



อนึ่ง...

อนึ่ง หนังสือฉบับนี้จะส่งนายพรหมพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๒๗ มิถุนายน ๒๕๖๗

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นายพรหม พรหมกรอง)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๓๑๓ ๖๐๕๗ ต่อ ๕๐๐๑-๒
ไปรษณีย์อิเล็กทรอนิกส์ elrw@dlw.mail.go.th



✉ bangkok@alsglobal.com



ALS Line Official
ID: @alsthailand



ALS Facebook
Search: ALS Thailand



right solutions.
right partner.