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 :
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2236690
Date Received : Mar 24, 2022
Date Reported : Mar 31, 2022
Report Number: 2266997-1

Sample Number	2236690-1
Sampled Date	Mar 24, 2022
Sample Description	Emission from Stationary Source
Location	Reactor Feed Heater (AF-7) (GPS 47P 0733750, 1404290)
Date Analysis Commenced	Mar 25, 2022
Condition of Sample	Extracted into two 2-L collection flasks, one 10-L air sampling bag, one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	758	mmHg	Diameter	1.50	m	Oxygen	5.4	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	8.8	%
Type of Process	Combustion		Stack Temperature	194	°C	Gas Velocity	2.8	m/s
Type of Fuel	Natural Gas		Moisture	14.83	%	Flow Rate (Actual O2)	9532	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O_2	Result at 5.4 % O_2	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing										
Carbon Monoxide *	11:30 AM - 11:40 AM	ppm	-	1.0	<1.0	<1.0	690	-	US EPA, Method 10	Rayong
Oxides of Nitrogen *	11:15 AM - 11:25 AM	ppm	-	1.06	27.8	31.0	200	47	US EPA, Method 7	Rayong
Total Suspended Particulate	11:15 AM - 12:03 PM	mg/m3	-	0.5	<0.5	<0.5	320	50	US 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 ว-323-จ-9447

Approved by D. Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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

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: 2236690
Date Received : Mar 24, 2022
Date Reported : Mar 31, 2022
Report Number: 2266997-1

Sample Number	2236690-1
Sampled Date	Mar 24, 2022
Sample Description	Emission from Stationary Source
Location	Reactor Feed Heater (AF-7) (GPS 47P 0733750, 1404290)
Date Analysis Commenced	Mar 25, 2022
Condition of Sample	Extracted into two 2-L collection flasks, one 10-L air sampling bag, one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	758	mmHg	Diameter	1.50	m	Oxygen	5.4	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	8.8	%
Type of Process	Combustion		Stack Temperature	194	°C	Gas Velocity	2.8	m/s
Type of Fuel	Natural Gas		Moisture	14.83	%	Flow Rate (Actual O2)	9532	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Carbon Monoxide *	11:30 AM - 11:40 AM	g/s	-	-	<0.003	-	-	Calculated	Rayong
Oxides of Nitrogen *	11:15 AM - 11:25 AM	g/s	-	-	0.155	-	0.99	Calculated	Rayong
Total Suspended Particulate *	11:15 AM - 12:03 PM	g/s	-	-	<0.001	-	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 : Tinnakorn Kulchart

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

Technical Management Thanita K.
Thanita Kulsuriwong
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ทะเบียนเลขที่ ว-323-จ-9447

Approved by D. Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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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 : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2236690
Date Received : Mar 24, 2022
Date Reported : Mar 31, 2022
Report Number: 2266997-2

Sample Number	2236690-1
Sampled Date	Mar 24, 2022
Sample Description	Emission from Stationary Source
Location	Reactor Feed Heater (AF-7) (GPS 47P 0733750, 1404290)
Date Analysis Commenced	Mar 30, 2022
Condition of Sample	Extracted into two 2-L collection flasks, one 10-L air sampling bag, one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	758	mmHg	Diameter	1.50	m	Oxygen	5.4	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	8.8	%
Type of Process	Combustion		Stack Temperature	194	°C	Gas Velocity	2.8	m/s
Type of Fuel	Natural Gas		Moisture	14.83	%	Flow Rate (Actual O2)	9532	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O_2	Result at 5.4 % O_2	Method	Testing Location
Air Testing								
Methane as Propane	11:30 AM - 11:40 AM	ppm	-	0.4	<0.4	<0.4	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong
Non-Methane Hydrocarbon as Propane	11:30 AM - 11:40 AM	ppm	-	0.4	2.2	2.5	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong
Total Hydrocarbon as Propane	11:30 AM - 11:40 AM	ppm	-	0.4	2.2	2.5	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 : Tinnakorn Kulchart

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

Approved by Thanita K.
Thanita Kulsuriwong
Scientist (4)

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Analysis / Test Report

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 : 4513256049
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2236695
Date Received : Mar 24, 2022
Date Reported : Jun 28, 2022
Report Number: 2358782-1

Sample Number	2236695-1
Sampled Date	Mar 24, 2022
Sample Description	Emission from Stationary Source
Location	Fired Heater (AF-9) (GPS 47P 0733750, 1404298)
Date Analysis Commenced	Mar 25, 2022
Condition of Sample	Extracted into two 2-L collection flasks, one 10-L air sampling bag, one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	758	mmHg	Diameter	1.60	m	Oxygen	4.6	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	9.4	%
Type of Process	Combustion		Stack Temperature	247	°C	Gas Velocity	5.8	m/s
Type of Fuel	Natural Gas		Moisture	12.34	%	Flow Rate (Actual O2)	21032	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O_2	Result at 4.6 % 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	-	US EPA, Method 10	Rayong
Oxides of Nitrogen *	11:05 AM - 11:20 AM	ppm	-	1.06	30.6	35.9	200	47	US EPA, Method 7	Rayong
Total Suspended Particulate	11:00 AM - 11:48 AM	mg/m3	-	0.5	<0.5	<0.5	320	50	US 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
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Approved by

D. Changchon

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

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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 : 4513256049
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2236695
Date Received : Mar 24, 2022
Date Reported : Jun 28, 2022
Report Number: 2358782-1

Sample Number	2236695-1
Sampled Date	Mar 24, 2022
Sample Description	Emission from Stationary Source
Location	Fired Heater (AF-9) (GPS 47P 0733750, 1404298)
Date Analysis Commenced	Mar 25, 2022
Condition of Sample	Extracted into two 2-L collection flasks, one 10-L air sampling bag, one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	758	mmHg	Diameter	1.60	m	Oxygen	4.6	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	9.4	%
Type of Process	Combustion		Stack Temperature	247	°C	Gas Velocity	5.8	m/s
Type of Fuel	Natural Gas		Moisture	12.34	%	Flow Rate (Actual O2)	21032	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 *	11:05 AM - 11:20 AM	g/s	-	-	0.395	-	1.14	Calculated	Rayong
Total Suspended Particulate *	11:00 AM - 11:48 AM	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.

Note:

This Analysis test report is reissued to supersede report No.2267005-1, Date Reported : Mar 31, 2022 due to revise analytical information.

Sampled By : Suphanut Pisaipan

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.
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Approved by D. Changchon
Dej Changchon
Senior Manager
ทะเบียนเลขที่ ว-323-ค-9442

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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 : 4701206240
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2269481
Date Received : Jun 10, 2022
Date Reported : Jun 28, 2022
Report Number: 2358779-1

Sample Number	2269481-1
Sampled Date	Jun 10, 2022
Sample Description	Emission from Stationary Source
Location	Fired Heater (AF-9)
Date Analysis Commenced	Jun 10, 2022
Condition of Sample	Extracted into one 10-L air sampling bag

Stack Description

Ambient Pressure	758	mmHg	Diameter	1.60	m	Oxygen	3.2	%
Ambient Temperature	31.0	°C	Shape	Circle		Carbon Dioxide	9.2	%
Type of Process	Combustion		Stack Temperature	240	°C	Gas Velocity	4.0	m/s
Type of Fuel	Natural Gas		Moisture	7.69	%	Flow Rate (Actual O2)	15636	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O_2	Result at 3.2 % O_2	Method	Testing Location
Air Testing								
Methane as Propane	10:15 AM - 10:25 AM	ppm	-	0.4	0.4	0.5	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong
Non-Methane Hydrocarbon as Propane	10:15 AM - 10:25 AM	ppm	-	0.4	0.6	0.8	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong
Total Hydrocarbon as Propane	10:15 AM - 10:25 AM	ppm	-	0.4	1.0	1.3	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong

Note:
This Analysis test report is reissued to supersede report No.2335535-1, Date Reported : Jun 16, 2022 due to revise analytical information.

Sampled By : Tarin Octjinda

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

Approved by ThanitaK.
Thanita Kulsuriwong
Scientist (4)

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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 : 4513256049
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2236696
Date Received : Mar 25, 2022
Date Reported : Jun 28, 2022
Report Number: 2358786-1

Sample Number	2236696-1
Sampled Date	Mar 25, 2022
Sample Description	Emission from Stationary Source
Location	Styrene Funace (GPS 47P 0733853, 1404279)
Date Analysis Commenced	Mar 26, 2022
Condition of Sample	Extracted into three 2-L collection flasks, one 10-L air sampling bag, one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	758	mmHg	Diameter	2.75	m	Oxygen	6.8	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	8.1	%
Type of Process	Combustion		Stack Temperature	196	°C	Gas Velocity	4.8	m/s
Type of Fuel	Natural Gas		Moisture	14.45	%	Flow Rate (Actual O2)	55608	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O_2	Result at 6.8 % O_2	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing										
Carbon Monoxide *	10:40 AM - 10:50 AM	ppm	-	1.0	<1.0	<1.0	690	-	US EPA, Method 10	Rayong
Oxides of Nitrogen *	10:25 AM - 10:40 AM	ppm	-	1.06	36.2	36.7	200	200	US EPA, Method 7	Rayong
Total Suspended Particulate	10:20 AM - 11:08 AM	mg/m3	-	0.5	1.3	1.3	320	60	US 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 Kulsuriwong
Scientist (4)
ทะเบียนเลขที่ ว-323-จ-9447

Approved by

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

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

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 : 4513256049
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2236696
Date Received : Mar 25, 2022
Date Reported : Jun 28, 2022
Report Number: 2358786-1

Sample Number	2236696-1
Sampled Date	Mar 25, 2022
Sample Description	Emission from Stationary Source
Location	Styrene Funace (GPS 47P 0733853, 1404279)
Date Analysis Commenced	Mar 26, 2022
Condition of Sample	Extracted into three 2-L collection flasks, one 10-L air sampling bag, one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	758	mmHg	Diameter	2.75	m	Oxygen	6.8	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	8.1	%
Type of Process	Combustion		Stack Temperature	196	°C	Gas Velocity	4.8	m/s
Type of Fuel	Natural Gas		Moisture	14.45	%	Flow Rate (Actual O2)	55608	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Carbon Monoxide *	10:40 AM - 10:50 AM	g/s	-	-	<0.015	-	-	Calculated	Rayong
Oxides of Nitrogen *	10:25 AM - 10:40 AM	g/s	-	-	1.071	-	8.23	Calculated	Rayong
Total Suspended Particulate *	10:20 AM - 11:08 AM	g/s	-	-	0.020	-	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.

Note:

This Analysis test report is reissued to supersede report No.2267027-1, Date Reported : Mar 31, 2022 due to revise analytical information.

Sampled By : Tinnakorn Kulchart

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

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

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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
P/O : 4701206240
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2269486
Date Received : Jun 10, 2022
Date Reported : Jun 28, 2022
Report Number: 2358780-1

Sample Number	2269486-1
Sampled Date	Jun 10, 2022
Sample Description	Emission from Stationary Source
Location	Styrene Funace
Date Analysis Commenced	Jun 10, 2022
Condition of Sample	Extracted into one 10-L air sampling bag

Stack Description

Ambient Pressure	758	mmHg	Diameter	2.75	m	Oxygen	7.0	%
Ambient Temperature	31.0	°C	Shape	Circle		Carbon Dioxide	7.9	%
Type of Process	Combustion		Stack Temperature	202	°C	Gas Velocity	4.3	m/s
Type of Fuel	Natural Gas		Moisture	5.26	%	Flow Rate (Actual O2)	54867	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O_2	Result at 7.0 % O_2	Method	Testing Location
Air Testing								
Methane as Propane	10:50 AM - 11:00 AM	ppm	-	0.4	<0.4	<0.4	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong
Non-Methane Hydrocarbon as Propane	10:50 AM - 11:00 AM	ppm	-	0.4	0.6	0.6	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong
Total Hydrocarbon as Propane	10:50 AM - 11:00 AM	ppm	-	0.4	0.6	0.6	Total Hydrocarbon Analyzer, Based on US EPA Method 25A	Rayong

Note:
This Analysis test report is reissued to supersede report No.2335537-1, Date Reported : Jun 16, 2022 due to revise analytical information.

Sampled By : Tarin Octjinda

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

Approved by Thanita K.
Thanita Kulsuriwong
Scientist (4)

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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: 2229814
Date Received : Mar 28, 2022
Date Reported : Mar 31, 2022
Report Number: 2251787-1

Sample Description Air Quality
Location บ้านอ่าวประดู่ (โรงพยาบาลส่งเสริมสุขภาพตำบลดาภวน) (GPS 47P 0735531, 1402769)
Date Analysis Commenced Mar 29, 2022
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)
2229814-1	Mar 21 - Mar 22, 2022	0.022	0.013	758	31
2229814-2	Mar 22 - Mar 23, 2022	0.022	0.013	758	30
2229814-3	Mar 23 - Mar 24, 2022	0.041	0.021	758	31
2229814-4	Mar 24 - Mar 25, 2022	0.028	0.020	758	31
2229814-5	Mar 25 - Mar 26, 2022	0.022	0.012	758	32
2229814-6	Mar 26 - Mar 27, 2022	0.028	0.015	758	32
2229814-7	Mar 27 - Mar 28, 2022	0.024	0.011	758	32
Guideline		0.33	0.12	-	-

Reference Method
Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B
Particulate Metter (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 : Adisak Talesoon

Approved by Thanita K.
Thanita Kulsuriwong
Scientist (4)

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.

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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
P/O :
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2227918
Date Received : Mar 28, 2022
Date Reported : Apr 01, 2022
Report Number: 2276703-1

Sample Description Air Quality
Location บ้านอ่าวประดู่ (โรงพยาบาลส่งเสริมสุขภาพตำบลดาดาวน) (GPS 47P 0735531, 1402769)
Parameter Nitrogen dioxide (ppm)
Measurement Date Mar 21, 2022 - Mar 28, 2022
Measurement by Adisak Talesoon

Time	2227918-1 Mar 21, 2022	2227918-2 Mar 22, 2022	2227918-3 Mar 23, 2022	2227918-4 Mar 24, 2022	2227918-5 Mar 25, 2022	2227918-6 Mar 26, 2022	2227918-7 Mar 27, 2022
11:00 AM - 12:00 PM	0.004	0.005	0.007	0.003	0.005	0.004	0.006
12:00 PM - 01:00 PM	0.002	0.004	0.005	0.004	0.003	0.004	0.005
01:00 PM - 02:00 PM	0.002	0.003	0.006	0.005	0.003	0.004	0.006
02:00 PM - 03:00 PM	0.003	0.004	0.008	0.006	0.003	0.005	0.009
03:00 PM - 04:00 PM	0.003	0.003	0.007	0.006	0.003	0.004	0.005
04:00 PM - 05:00 PM	0.004	0.004	0.006	0.005	0.004	0.007	0.006
05:00 PM - 06:00 PM	0.005	0.003	0.010	0.005	0.006	0.006	0.006
06:00 PM - 07:00 PM	0.007	0.004	0.008	0.007	0.007	0.007	0.007
07:00 PM - 08:00 PM	0.008	0.010	0.012	0.008	0.010	0.011	0.006
08:00 PM - 09:00 PM	0.006	0.010	0.011	0.008	0.010	0.009	0.007
09:00 PM - 10:00 PM	0.004	0.006	0.009	0.008	0.008	0.007	0.006
10:00 PM - 11:00 PM	0.004	0.005	0.007	0.006	0.004	0.005	0.005
11:00 PM - 12:00 AM	0.003	0.005	0.004	0.008	0.004	0.004	0.005
12:00 AM - 01:00 AM	0.002	0.004	0.006	0.004	0.004	0.003	0.009
01:00 AM - 02:00 AM	0.002	0.003	0.007	0.004	0.004	0.003	0.008
02:00 AM - 03:00 AM	0.004	0.005	0.006	0.003	0.004	0.003	0.004
03:00 AM - 04:00 AM	0.003	0.005	0.005	0.004	0.003	0.003	0.004
04:00 AM - 05:00 AM	0.002	0.004	0.005	0.006	0.004	0.003	0.003
05:00 AM - 06:00 AM	0.003	0.005	0.005	0.005	0.003	0.004	0.004
06:00 AM - 07:00 AM	0.005	0.005	0.006	0.005	0.005	0.008	0.005
07:00 AM - 08:00 AM	0.010	0.009	0.006	0.005	0.010	0.009	0.005
08:00 AM - 09:00 AM	0.007	0.014	0.008	0.008	0.010	0.011	0.007
09:00 AM - 10:00 AM	0.004	0.006	0.006	0.005	0.005	0.010	0.005
10:00 AM - 11:00 AM	0.004	0.007	0.004	0.004	0.005	0.011	0.004
Average	0.004	0.006	0.007	0.006	0.005	0.006	0.006
1hr - Maximum	0.010	0.014	0.012	0.008	0.010	0.011	0.009
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 EPAMethod Part 50 App. F (Chemiluminescence)

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Approved by

Sararat Mongkonjirawut
Scientist (4)

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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
P/O :
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID : 2229813
Date Received : Mar 28, 2022
Date Reported : Apr 01, 2022
Report Number : 2251777-1

Sample Number 2229813-1 to 7
Parameter Wind Speed / Wind Direction
Location บ้านอ่าวประดู่ (โรงพยาบาลส่งเสริมสุขภาพตำบลดากวน) (GPS 47P 0735531, 1402769)
Sampling Date Mar 21 - Mar 28, 2022
Sampling by Adisak Talesoon

Time	Mar 21 - Mar 22, 2022			Mar 22 - Mar 23, 2022			Mar 23 - Mar 24, 2022			Mar 24 - Mar 25, 2022			Mar 25 - Mar 26, 2022			Mar 26 - Mar 27, 2022			Mar 27 - Mar 28, 2022		
	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	1.3	196.0	SSW	0.7	194.0	SSW	0.5	97.0	E	0.0	-	-	0.4	150.0	SSE	0.6	131.0	SE	1.5	145.0	SE
12:00 PM - 01:00 PM	1.3	225.0	SW	1.8	215.0	SW	1.1	112.0	ESE	3.3	183.0	S	0.9	177.0	S	1.8	229.0	SW	0.9	225.0	SW
01:00 PM - 02:00 PM	0.3	234.0	SW	0.5	259.0	W	1.0	129.0	SE	0.4	158.0	SSE	2.0	159.0	SSE	0.9	252.0	WSW	1.2	141.0	SE
02:00 PM - 03:00 PM	0.4	282.0	WNW	0.3	274.0	W	0.9	172.0	S	1.2	177.0	S	1.2	165.0	SSE	2.1	235.0	SW	0.9	196.0	SSW
03:00 PM - 04:00 PM	1.0	229.0	SW	0.9	301.0	WNW	1.6	225.0	SW	1.6	118.0	ESE	0.7	87.0	E	1.0	165.0	SSE	1.4	192.0	SSW
04:00 PM - 05:00 PM	0.5	291.0	WNW	0.7	245.0	WSW	0.0	-	-	0.3	239.0	WSW	1.3	164.0	SSE	1.8	203.0	SSW	1.2	223.0	SW
05:00 PM - 06:00 PM	2.3	254.0	WSW	0.3	221.0	SW	0.0	-	-	0.6	221.0	SW	0.3	203.0	SSW	0.4	213.0	SSW	0.3	191.0	S
06:00 PM - 07:00 PM	0.4	294.0	WNW	0.2	-	-	0.5	220.0	SW	0.6	212.0	SSW	0.0	-	-	0.3	211.0	SSW	0.5	144.0	SE
07:00 PM - 08:00 PM	2.2	187.0	S	0.2	-	-	0.3	211.0	SSW	0.5	193.0	SSW	2.0	163.0	SSE	1.1	190.0	S	0.4	219.0	SW
08:00 PM - 09:00 PM	0.0	-	-	1.0	275.0	W	0.2	-	-	0.3	184.0	S	2.3	139.0	SE	1.0	206.0	SSW	0.1	-	-
09:00 PM - 10:00 PM	0.1	-	-	0.2	-	-	0.5	195.0	SSW	0.3	188.0	S	0.6	183.0	S	0.2	-	-	1.0	173.0	S
10:00 PM - 11:00 PM	0.7	142.0	SE	0.4	325.0	NW	0.3	133.0	SE	0.2	-	-	1.1	200.0	SSW	0.1	-	-	0.4	159.0	SSE
11:00 PM - 12:00 AM	0.3	203.0	SSW	0.3	261.0	W	0.6	210.0	SSW	0.2	-	-	1.3	257.0	WSW	0.1	-	-	0.1	-	-
12:00 AM - 01:00 AM	0.7	215.0	SW	0.6	254.0	WSW	0.6	210.0	SSW	0.4	228.0	SW	1.2	222.0	SW	0.5	235.0	SW	1.0	203.0	SSW
01:00 AM - 02:00 AM	0.4	220.0	SW	0.5	282.0	WNW	1.1	235.0	SW	1.2	204.0	SSW	0.4	175.0	S	2.7	254.0	WSW	1.4	229.0	SW
02:00 AM - 03:00 AM	0.6	295.0	WNW	0.9	214.0	SW	2.4	213.0	SSW	1.3	226.0	SW	0.0	-	-	0.6	212.0	SSW	0.0	-	-
03:00 AM - 04:00 AM	0.7	255.0	WSW	0.8	212.0	SSW	3.2	264.0	W	1.5	224.0	SW	1.2	231.0	SW	0.2	-	-	0.6	242.0	WSW
04:00 AM - 05:00 AM	0.2	-	-	0.0	-	-	2.6	100.0	E	2.4	224.0	SW	0.8	233.0	SW	0.6	197.0	SSW	0.0	-	-
05:00 AM - 06:00 AM	0.0	-	-	1.2	30.0	NNE	0.3	100.0	E	0.3	288.0	WNW	0.0	-	-	0.0	-	-	0.2	-	-
06:00 AM - 07:00 AM	0.0	-	-	0.0	-	-	0.3	236.0	SW	0.1	-	-	0.4	240.0	WSW	0.7	138.0	SE	0.4	63.0	ENE
07:00 AM - 08:00 AM	1.5	249.0	WSW	0.3	253.0	WSW	0.6	143.0	SE	0.1	-	-	0.7	195.0	SSW	1.5	201.0	SSW	0.0	-	-
08:00 AM - 09:00 AM	0.4	287.0	WNW	0.8	256.0	WSW	0.5	158.0	SSE	0.3	208.0	SSW	0.9	217.0	SW	2.1	196.0	SSW	0.3	224.0	SW
09:00 AM - 10:00 AM	1.7	266.0	W	0.0	-	-	1.2	142.0	SE	0.9	118.0	ESE	0.5	233.0	SW	2.5	225.0	SW	0.6	245.0	WSW
10:00 AM - 11:00 AM	0.4	228.0	SW	0.0	-	-	1.3	159.0	SSE	0.5	175.0	S	0.8	184.0	S	0.1	-	-	0.5	215.0	SW

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jittranont
Assistant General Manager

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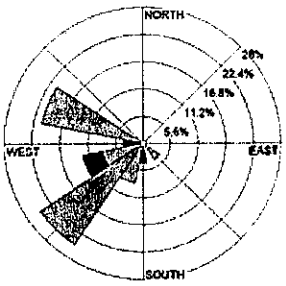
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

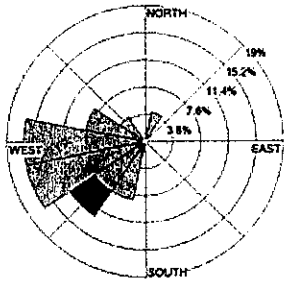
Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O :
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID : 2229813
Date Received : Mar 28, 2022
Date Reported : Apr 01, 2022
Report Number : 2251777-1

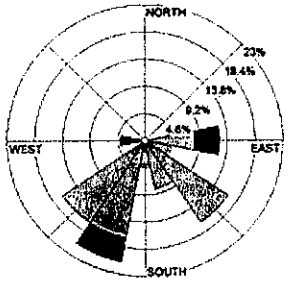
Wind Rose



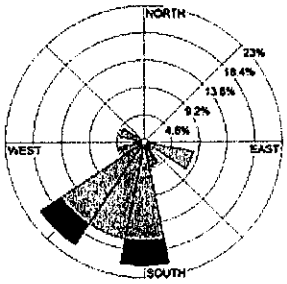
Date : Mar 21-22, 2022



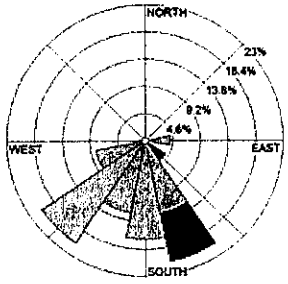
Date : Mar 22-23, 2022



Date : Mar 23-24, 2022



Date : Mar 24-25, 2022



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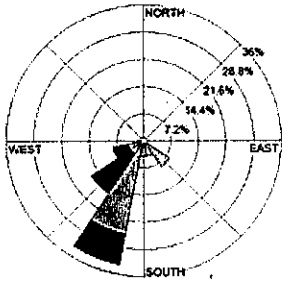
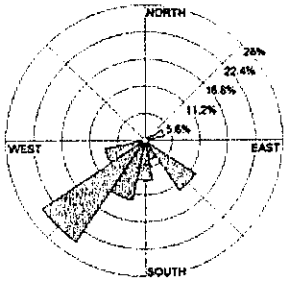
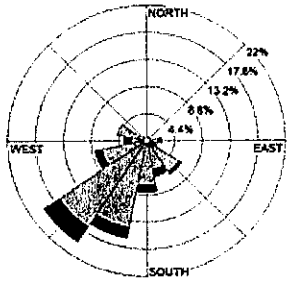


Date : Mar 26-27, 2022



Date : Mar 27-28, 2022



Date : Mar 21-28, 2022

	WS(m/s)	%
	≥ 10.0	0.00
	8.0-10.0	0.00
	5.5-8.0	0.00
	3.3-5.5	0.60
	1.7-3.3	10.12
	0.3-1.7	68.45
	Calms	20.83

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Approved by

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

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: 2229816
Date Received : Mar 28, 2022
Date Reported : Mar 31, 2022
Report Number: 2251828-1

Sample Description Air Quality
Location บ้านมาบตาพุด (GPS 47P 0735346, 1406705)
Date Analysis Commenced Mar 29, 2022
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)
2229816-1	Mar 21 - Mar 22, 2022	0.023	0.013	758	31
2229816-2	Mar 22 - Mar 23, 2022	0.017	0.012	758	30
2229816-3	Mar 23 - Mar 24, 2022	0.034	0.019	758	31
2229816-4	Mar 24 - Mar 25, 2022	0.029	0.016	758	31
2229816-5	Mar 25 - Mar 26, 2022	0.020	0.010	758	32
2229816-6	Mar 26 - Mar 27, 2022	0.020	0.010	758	32
2229816-7	Mar 27 - Mar 28, 2022	0.023	0.010	758	32
Guideline		0.33	0.12	-	-

Reference Method

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

Particulate Metter (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 : Adisak Talesoon

Approved by ThanitaK.
Thanita Kulsuriwong
Scientist (4)

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.

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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
P/O :
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2227924
Date Received : Mar 28, 2022
Date Reported : Apr 01, 2022
Report Number: 2276710-1

Sample Description Air Quality
Location บ้านมาบตาพุด (GPS 47P 0735346, 1406705)
Parameter Nitrogen dioxide (ppm)
Measurement Date Mar 21, 2022 - Mar 28, 2022
Measurement by

Time	2227924-1 Mar 21, 2022	2227924-2 Mar 22, 2022	2227924-3 Mar 23, 2022	2227924-4 Mar 24, 2022	2227924-5 Mar 25, 2022	2227924-6 Mar 26, 2022	2227924-7 Mar 27, 2022
09:00 AM - 10:00 AM	0.005	0.002	0.004	0.010	0.012	0.002	0.004
10:00 AM - 11:00 AM	0.006	0.001	0.002	0.010	0.006	0.002	0.003
11:00 AM - 12:00 PM	0.006	0.002	0.007	0.014	0.004	0.002	0.002
12:00 PM - 01:00 PM	0.003	0.002	0.005	0.024	0.003	0.002	0.002
01:00 PM - 02:00 PM	0.002	0.002	0.003	0.002	0.004	0.003	0.002
02:00 PM - 03:00 PM	0.001	0.003	0.003	0.006	0.004	0.007	0.002
03:00 PM - 04:00 PM	0.003	0.002	0.004	0.016	0.004	0.002	0.001
04:00 PM - 05:00 PM	0.001	0.002	0.002	0.003	0.013	0.003	0.005
05:00 PM - 06:00 PM	0.001	0.002	0.002	0.003	0.006	0.003	0.004
06:00 PM - 07:00 PM	0.001	0.004	0.002	0.002	0.005	0.002	0.002
07:00 PM - 08:00 PM	0.001	0.002	0.013	0.003	0.008	0.002	0.001
08:00 PM - 09:00 PM	0.001	0.002	0.001	0.006	0.005	0.002	0.001
09:00 PM - 10:00 PM	0.001	0.002	0.003	0.002	0.005	0.002	0.002
10:00 PM - 11:00 PM	0.001	0.002	0.005	0.002	0.004	0.002	0.004
11:00 PM - 12:00 AM	0.001	0.002	0.004	0.001	0.005	0.002	0.005
12:00 AM - 01:00 AM	0.002	0.002	0.006	<0.001	0.006	0.002	0.004
01:00 AM - 02:00 AM	0.002	0.003	0.007	<0.001	0.006	0.002	0.006
02:00 AM - 03:00 AM	0.003	0.004	0.007	0.002	0.009	0.003	0.005
03:00 AM - 04:00 AM	0.004	0.005	0.010	0.002	0.014	0.002	0.002
04:00 AM - 05:00 AM	0.002	0.009	0.004	0.003	0.009	0.003	0.002
05:00 AM - 06:00 AM	0.007	0.011	0.005	0.005	0.012	0.006	0.002
06:00 AM - 07:00 AM	0.004	0.005	0.005	0.011	0.005	0.006	0.003
07:00 AM - 08:00 AM	0.002	0.004	0.005	0.005	0.002	0.004	0.002
08:00 AM - 09:00 AM	0.003	0.004	0.006	0.002	0.003	0.004	0.003
Average	0.003	0.003	0.005	0.006	0.006	0.003	0.003
1hr - Maximum	0.007	0.011	0.013	0.024	0.014	0.007	0.006
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 EPAMethod Part 50 App. F (Chemiluminescence)

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

Sararat Mongkonjirawut
Scientist (4)

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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
P/O :
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID : 2229815
Date Received : Mar 28, 2022
Date Reported : Apr 01, 2022
Report Number : 2251809-1

Sample Number 2229815-1 to 7
Parameter Wind Speed / Wind Direction
Location บ้านมาบตาพุด (GPS 47P 0735346, 1406705)
Sampling Date Mar 21 - Mar 28, 2022
Sampling by Adisak Talesoon

Time	Mar 21 - Mar 22, 2022			Mar 22 - Mar 23, 2022			Mar 23 - Mar 24, 2022			Mar 24 - Mar 25, 2022			Mar 25 - Mar 26, 2022			Mar 26 - Mar 27, 2022			Mar 27 - Mar 28, 2022		
	WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)	
09:00 AM - 10:00 AM	1.2	325.0	NW	3.6	205.0	SSW	0.3	210.0	SSW	0.6	220.0	SW	0.2	-	-	0.5	232.0	SW	1.5	278.0	W
10:00 AM - 11:00 AM	0.5	289.0	WNW	4.7	207.0	SSW	0.2	-	-	1.6	145.0	SE	0.5	234.0	SW	0.7	233.0	SW	2.2	328.0	NNW
11:00 AM - 12:00 PM	1.3	282.0	WNW	1.8	205.0	SSW	2.3	195.0	SSW	0.3	164.0	SSE	0.1	-	-	0.2	-	-	1.6	314.0	NW
12:00 PM - 01:00 PM	0.0	-	-	3.1	204.0	SSW	0.6	147.0	SSE	0.8	217.0	SW	1.3	228.0	SW	0.4	239.0	WSW	3.3	310.0	NW
01:00 PM - 02:00 PM	0.0	-	-	1.8	204.0	SSW	1.4	113.0	ESE	0.9	227.0	SW	0.3	223.0	SW	0.5	236.0	SW	2.2	271.0	W
02:00 PM - 03:00 PM	2.6	111.0	ESE	2.2	224.0	SW	1.3	212.0	SSW	1.0	234.0	SW	0.2	-	-	0.7	234.0	SW	1.5	265.0	W
03:00 PM - 04:00 PM	1.5	120.0	ESE	0.9	211.0	SSW	1.8	211.0	SSW	0.2	-	-	0.4	223.0	SW	0.4	165.0	SSE	1.2	241.0	WSW
04:00 PM - 05:00 PM	2.2	110.0	ESE	0.8	155.0	SSE	0.6	212.0	SSW	1.6	145.0	SE	0.5	210.0	SSW	0.3	154.0	SSE	0.6	229.0	SW
05:00 PM - 06:00 PM	2.5	222.0	SW	0.0	-	-	0.0	-	-	1.5	144.0	SE	0.6	211.0	SSW	0.3	154.0	SSE	0.0	-	-
06:00 PM - 07:00 PM	2.7	216.0	SW	0.0	-	-	0.0	-	-	1.3	154.0	SSE	1.3	213.0	SSW	0.2	-	-	0.0	-	-
07:00 PM - 08:00 PM	2.2	212.0	SSW	0.2	-	-	0.6	165.0	SSE	0.2	-	-	0.6	207.0	SSW	1.3	209.0	SSW	0.0	-	-
08:00 PM - 09:00 PM	2.6	166.0	SSE	1.6	169.0	S	0.3	164.0	SSE	0.3	213.0	SSW	0.5	117.0	ESE	0.6	206.0	SSW	1.2	177.0	S
09:00 PM - 10:00 PM	1.6	149.0	SSE	1.3	107.0	ESE	0.3	209.0	SSW	0.7	210.0	SSW	1.3	98.0	E	1.1	188.0	S	1.9	187.0	S
10:00 PM - 11:00 PM	0.0	-	-	1.5	202.0	SSW	0.2	-	-	0.2	-	-	1.2	96.0	E	2.3	125.0	SE	1.6	156.0	SSE
11:00 PM - 12:00 AM	0.0	-	-	0.3	200.0	SSW	0.6	123.0	ESE	1.5	206.0	SSW	2.4	96.0	E	2.6	205.0	SSW	0.0	-	-
12:00 AM - 01:00 AM	2.0	197.0	SSW	1.9	203.0	SSW	0.3	123.0	ESE	0.7	195.0	SSW	2.2	96.0	E	0.6	208.0	SSW	2.5	213.0	SSW
01:00 AM - 02:00 AM	1.6	194.0	SSW	0.6	189.0	S	0.2	-	-	0.3	193.0	SSW	0.9	199.0	SSW	1.5	211.0	SSW	1.0	225.0	SW
02:00 AM - 03:00 AM	3.1	198.0	SSW	0.5	198.0	SSW	1.1	196.0	SSW	0.2	-	-	1.0	190.0	S	2.2	203.0	SSW	1.9	216.0	SW
03:00 AM - 04:00 AM	3.3	199.0	SSW	0.5	200.0	SSW	1.3	201.0	SSW	0.7	200.0	SSW	1.1	203.0	SSW	0.0	-	-	3.3	215.0	SW
04:00 AM - 05:00 AM	3.6	197.0	SSW	0.3	206.0	SSW	1.6	335.0	NNW	0.5	191.0	S	0.7	186.0	S	0.0	-	-	2.3	200.0	SSW
05:00 AM - 06:00 AM	2.8	144.0	SE	1.4	190.0	S	0.3	335.0	NNW	0.4	127.0	SE	0.9	197.0	SSW	0.0	-	-	0.0	-	-
06:00 AM - 07:00 AM	3.0	144.0	SE	0.4	187.0	S	0.5	208.0	SSW	0.1	-	-	1.1	197.0	SSW	2.0	173.0	S	0.3	148.0	SSE
07:00 AM - 08:00 AM	0.0	-	-	0.9	192.0	SSW	1.2	217.0	SW	0.4	237.0	WSW	0.5	216.0	SW	1.3	184.0	S	0.2	-	-
08:00 AM - 09:00 AM	0.0	-	-	0.3	196.0	SSW	1.8	217.0	SW	0.9	233.0	SW	0.3	235.0	SW	1.3	186.0	S	1.3	164.0	SSE

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

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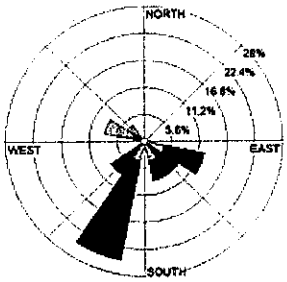
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

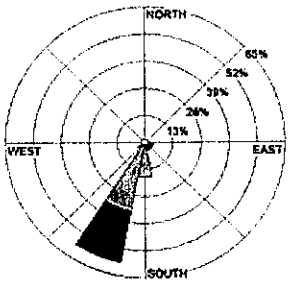
Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O :
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID : 2229815
Date Received : Mar 28, 2022
Date Reported : Apr 01, 2022
Report Number : 2251809-1

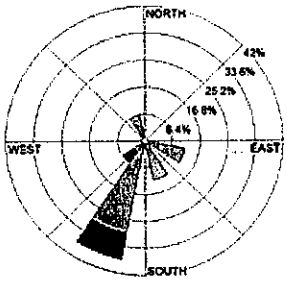
Wind Rose



Date : Mar 21-22, 2022



Date : Mar 22-23, 2022



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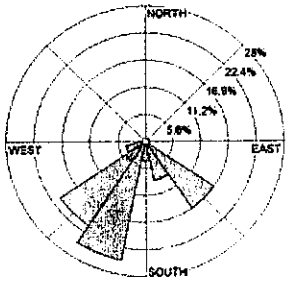
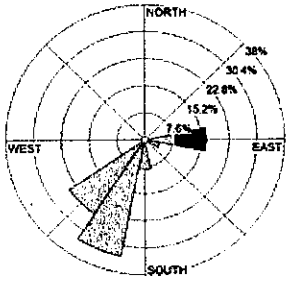
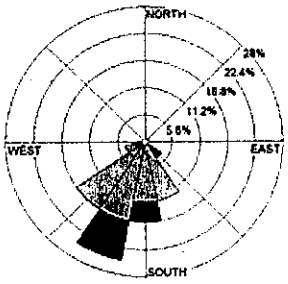


Date : Mar 24-25, 2022



Date : Mar 25-26, 2022



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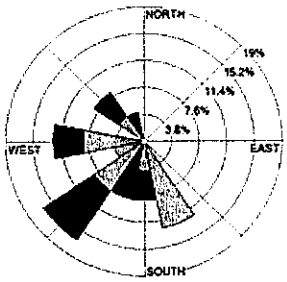
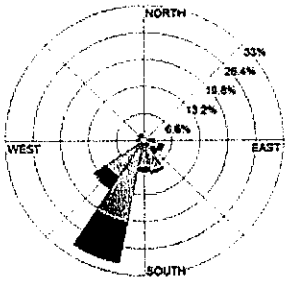


Date : Mar 27-28, 2022



Date : Mar 21-28, 2022

	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	17.86
	0.3-1.7	58.93
	Calms	19.64

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Approved by

Sarayuth Jittranont
Assistant General Manager

ภาคผนวก ค-3

คุณภาพน้ำ

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 : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 21143780
Date Received : Jan 19, 2022
Date Reported : Jan 27, 2022
Report Number : 2173037-1

Sample Number	21143780-1
Sampled Date	Jan 19, 2022 10:10 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Jan 19, 2022
Condition of Sample	Contained in two amber glass bottles, three plastic bottles and four glass vials, 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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	26	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	8	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	7	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	8.4	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	33.7	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	930	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Technical Management

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

Approved by

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

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

Analysis / Test Report

TESTING
No.0009

Lot ID: 21143780

Date Received : Jan 19, 2022
Date Reported : Jan 27, 2022
Report Number : 2173037-2

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)

Sample Number	21143780-1
Sampled Date	Jan 19, 2022 10:10 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Jan 20, 2022
Condition of Sample	Contained in two amber glass bottles, three plastic bottles and four glass vials, 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	Based on US EPA, Method 5030B and 8260D	Bangkok
1,1,2-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,1-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,2-Dichloroethane *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,3-Dichloropropane *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Benzene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Carbontetrachloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
cis-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Ethylbenzene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Hexachlorobutadiene *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Methyl Chloride *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Methylene Chloride (Dichloromethane)	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Tetrachloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Toluene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Xylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
trans-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok

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Approved by Siriluk P.
Siriluk Puengpang
Supervisor

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

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 :
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 21143780
Date Received : Jan 19, 2022
Date Reported : Jan 27, 2022
Report Number : 2173037-2

Sample Number	21143780-1
Sampled Date	Jan 19, 2022 10:10 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Jan 20, 2022
Condition of Sample	Contained in two amber glass bottles, three plastic bottles and four glass vials, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Trichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Vinyl chloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	10.6	No Standard	Based on APHA (2017), 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 , 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.

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Approved by Siriluk P.
Siriluk Puengpang
Supervisor

Analysis / Test Report

TESTING
No.0042

Lot ID: 221487

Date Received : Feb 02, 2022
Date Reported : Feb 09, 2022
Report Number : 2195041-1

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)

Sample Number	221487-1
Sampled Date	Feb 02, 2022 10:27 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Feb 02, 2022
Condition of Sample	Contained in two amber glass bottles, three plastic bottles and four glass vials, 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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	33	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	6	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	5	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	8.2	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	34.6	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	824	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Technical Management

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

Approved by

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

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

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 :
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 221487
Date Received : Feb 02, 2022
Date Reported : Feb 10, 2022
Report Number : 2195041-2

Sample Number	221487-1
Sampled Date	Feb 02, 2022 10:27 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Feb 03, 2022
Condition of Sample	Contained in two amber glass bottles, three plastic bottles and four glass vials, 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	Based on US EPA, Method 5030B and 8260D	Bangkok
1,1,2-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,1-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,2-Dichloroethane *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,3-Dichloropropane *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Benzene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Carbontetrachloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
cis-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Ethylbenzene *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Hexachlorobutadiene *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Methyl Chloride *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Methylene Chloride (Dichloromethane)	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Tetrachloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Toluene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Xylene	ug/L	1.5	5	<5	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
trans-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok

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

Analysis / Test Report

TESTING
No.0009

Lot ID: 221487
Date Received : Feb 02, 2022
Date Reported : Feb 10, 2022
Report Number : 2195041-2

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)

Sample Number	221487-1
Sampled Date	Feb 02, 2022 10:27 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Feb 03, 2022
Condition of Sample	Contained in two amber glass bottles, three plastic bottles and four glass vials, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Trichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Vinyl chloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	11.2	No Standard	Based on APHA (2017), 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 : Pathompong Kornsawat , 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.

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Approved by Siriluk P.
Siriluk Puengpang
Supervisor

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 : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 2217928
Date Received : Mar 08, 2022
Date Reported : Mar 15, 2022
Report Number : 2227847-1

Sample Number	2217928-1
Sampled Date	Mar 08, 2022 10:30 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Mar 08, 2022
Condition of Sample	Contained in one amber glass bottle, three plastic bottles and four glass vials, 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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	25	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	7	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	5	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	8.1	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	32.6	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	720	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

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

Technical Management

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

Approved by

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

Analysis / Test Report

TESTING
No.0009

Lot ID: 2217928
Date Received : Mar 08, 2022
Date Reported : Mar 16, 2022
Report Number : 2227847-2

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)

Sample Number	2217928-1
Sampled Date	Mar 08, 2022 10:30 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Mar 09, 2022
Condition of Sample	Contained in one amber glass bottle, three plastic bottles and four glass vials, 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	Based on US EPA, Method 5030B and 8260D	Bangkok
1,1,2-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,1-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,2-Dichloroethane	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,3-Dichloropropane *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Benzene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Carbontetrachloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
cis-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Ethylbenzene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Hexachlorobutadiene *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Methyl Chloride *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Methylene Chloride (Dichloromethane)	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Styrene	ug/L	1.5	5	<5	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Tetrachloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Toluene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Xylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
trans-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok

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

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 :
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 2217928
Date Received : Mar 08, 2022
Date Reported : Mar 16, 2022
Report Number : 2227847-2

Sample Number	2217928-1
Sampled Date	Mar 08, 2022 10:30 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Mar 09, 2022
Condition of Sample	Contained in one amber glass bottle, three plastic bottles and four glass vials, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Trichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Vinyl chloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	10.3	No Standard	Based on APHA (2017), 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 : Satcha Phetsawaeng , Thitipong Buadaeng

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

Analysis / Test Report

TESTING
No.0042

Lot ID: 2223877

Date Received : Apr 05, 2022
Date Reported : Apr 12, 2022
Report Number : 2239749-1

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)

Sample Number	2223877-1
Sampled Date	Apr 05, 2022 11:00 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Apr 05, 2022
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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	27	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	6	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	5	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	8.1	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	33.1	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	776	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Remark :
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Technical Management

Narumon Banchongkit
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ทะเบียนเลขที่ ว-323-จ-9445

Approved by

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ทะเบียนเลขที่ ว-323-ค-9442

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

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 :
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 2223877
Date Received : Apr 05, 2022
Date Reported : Apr 12, 2022
Report Number : 2239749-2

Sample Number	2223877-1
Sampled Date	Apr 05, 2022 11:00 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Apr 07, 2022
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	Based on US EPA, Method 5030B and 8260D	Bangkok
1,1,2-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,1-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,2-Dichloroethane	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,3-Dichloropropane *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Benzene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Carbontetrachloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
cis-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Ethylbenzene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Hexachlorobutadiene *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Methyl Chloride *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Methylene Chloride (Dichloromethane)	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Tetrachloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Toluene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Xylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
trans-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok

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Specialist 1

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

Analysis / Test Report

TESTING
No.0009

Lot ID: 2223877
Date Received : Apr 05, 2022
Date Reported : Apr 12, 2022
Report Number : 2239749-2

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)

Sample Number	2223877-1
Sampled Date	Apr 05, 2022 11:00 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Apr 07, 2022
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							
Trichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Vinyl chloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	10.5	No Standard	Based on APHA (2017), 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 : Pathompong Kornsawat , Thanasoun Namakunna

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

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

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 : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 2232228
Date Received : May 03, 2022
Date Reported : May 11, 2022
Report Number : 2256858-1

Sample Number	2232228-1
Sampled Date	May 03, 2022 11:00 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	May 03, 2022
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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	19	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	5	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	5	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	7.6	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	30.6	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	424	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

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

Technical Management

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

Approved by

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

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

Analysis / Test Report

TESTING
No.0009

Lot ID: 2232228

Date Received : May 03, 2022
Date Reported : May 11, 2022
Report Number : 2256858-2

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)

Sample Number	2232228-1
Sampled Date	May 03, 2022 11:00 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	May 05, 2022
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	Based on US EPA, Method 5030B and 8260D	Bangkok
1,1,2-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,1-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,2-Dichloroethane	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,3-Dichloropropane *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Benzene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Carbontetrachloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
cis-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Ethylbenzene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Hexachlorobutadiene *	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Methyl Chloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Methylene Chloride (Dichloromethane)	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Tetrachloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Toluene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Xylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
trans-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok

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Approved by Siriluk P.
Siriluk Puengpang
Supervisor

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

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 :
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 2232228
Date Received : May 03, 2022
Date Reported : May 11, 2022
Report Number : 2256858-2

Sample Number	2232228-1
Sampled Date	May 03, 2022 11:00 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	May 05, 2022
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							
Trichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Vinyl chloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	6.19	No Standard	Based on APHA (2017), 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 : Pathompong Kornsawat , Thanasoun Namakunna

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Approved by Siriluk P.
Siriluk Puengpang
Supervisor

Analysis / Test Report

TESTING
No.0042

Lot ID: 2255922

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4513256049
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Date Received : Jun 08, 2022
Date Reported : Jun 16, 2022
Report Number : 2308372-1

Sample Number	2255922-1
Sampled Date	Jun 08, 2022 11:30 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Jun 08, 2022
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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	25	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	7	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	6	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	8.2	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	34.2	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	772	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Technical Management

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

Approved by

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

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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 : 4513256049
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 2255922
Date Received : Jun 08, 2022
Date Reported : Jun 16, 2022
Report Number : 2308372-2

Sample Number	2255922-1
Sampled Date	Jun 08, 2022 11:30 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Jun 09, 2022
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	Based on US EPA, Method 5030B and 8260D	Bangkok
1,1,2-Trichloroethane	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,1-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,2-Dichloroethane	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
1,3-Dichloropropane	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Benzene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Carbontetrachloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
cis-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Ethylbenzene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Hexachlorobutadiene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Methyl Chloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Methylene Chloride (Dichloromethane)	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Tetrachloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Toluene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Xylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
trans-1,2-Dichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok

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Approved by Siriluk P.
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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
P/O : 4513256049
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 2255922
Date Received : Jun 08, 2022
Date Reported : Jun 16, 2022
Report Number : 2308372-2

Sample Number	2255922-1
Sampled Date	Jun 08, 2022 11:30 AM
Sample Description	Wastewater
Location	AZ-1
Date Analysis Commenced	Jun 09, 2022
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							
Trichloroethylene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Vinyl chloride	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	10.3	No Standard	Based on APHA (2017), 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 : Pathompong Kornsawat , Thanasoun Namakunna

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

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 : 4503142326
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 21143783
Date Received : Jan 19, 2022
Date Reported : Jun 27, 2022
Report Number : 2173088-1 C6

Sample Number	21143783-1
Sampling Date	Jan 19, 2022 10:30 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	Jan 19, 2022
Condition of Sample	Contained in two amber glass bottles, seven plastic bottles and six glass vials, 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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	29	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	13	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	11	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	8.3	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	30.1	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	656	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	10	≤50	APHA (2017), 2540 D	Rayong

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

Remark :
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Technical Management

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ทะเบียนเลขที่ ว-323-จ-9445

Approved by

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ทะเบียนเลขที่ ว-323-ค-9442

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

Analysis / Test Report

TESTING
No.0009

Lot ID: 21143783

Date Received : Jan 19, 2022
Date Reported : Jun 27, 2022
Report Number : 2173088-3 C6

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4503142326
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Sample Number	21143783-1
Sampling Date	Jan 19, 2022 10:30 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	Jan 20, 2022
Condition of Sample	Contained in two amber glass bottles, seven plastic bottles and six glass vials, 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	Based on US EPA, Method 5030B and 8260D	Bangkok
Styrene	ug/L	1.5	5	<5	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	6.89	No Standard	Based on APHA (2017), 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 , Thanasoun Namakunna

Remark :
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Approved by Sawitree N.
Sawitree Noisangiam
Manager

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

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 : 4503142326
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 221491
Date Received : Feb 02, 2022
Date Reported : Jun 27, 2022
Report Number : 2195053-1 C6

Sample Number	221491-1
Sampling Date	Feb 02, 2022 10:42 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	Feb 02, 2022
Condition of Sample	Contained in two amber glass bottles, seven plastic bottles and four glass vials, 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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	25	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	5	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	5	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	8.3	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	34.6	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	796	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

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

Technical Management

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

Approved by

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

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

Analysis / Test Report

TESTING
No.0009

Lot ID: 221491

Date Received : Feb 02, 2022
Date Reported : Jun 27, 2022
Report Number : 2195053-3 C6

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4503142326
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Sample Number	221491-1
Sampling Date	Feb 02, 2022 10:42 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	Feb 03, 2022
Condition of Sample	Contained in two amber glass bottles, seven plastic bottles and four glass vials, 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	Based on US EPA, Method 5030B and 8260D	Bangkok
Styrene	ug/L	1.5	5	<5	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	10.5	No Standard	Based on APHA (2017), 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 : Pathompong Kornsawat , Thanasoun Namakunna

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Approved by Siriluk P.
Siriluk Puengpang
Supervisor

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

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 : 4503142326
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 2217933
Date Received : Mar 08, 2022
Date Reported : Mar 17, 2022
Report Number : 2227861-1 Rev. No.1C6

Sample Number	2217933-1
Sampling Date	Mar 08, 2022 10:05 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	Mar 08, 2022
Condition of Sample	Contained in four amber glass bottles, eight plastic bottles and six glass vials, 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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	19	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	17	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	15	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	8.1	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	30.8	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	692	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	10	≤50	APHA (2017), 2540 D	Rayong

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

Note : This Analysis test report is reissued to supersede report No.2227861-3, Date Reported : Mar 16, 2022 due to revise sampling information.

Sampling By : Satcha Phetsawaeng , Thitipong Buadaeng

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

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

Approved by

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

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

Analysis / Test Report

TESTING
No.0009

Lot ID: 2217933

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4503142326
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Date Received : Mar 08, 2022
Date Reported : Mar 17, 2022
Report Number : 2227861-3 Rev. No.1C6

Sample Number	2217933-1
Sampling Date	Mar 08, 2022 10:05 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	Mar 09, 2022
Condition of Sample	Contained in four amber glass bottles, eight plastic bottles and six glass vials, 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	Based on US EPA, Method 5030B and 8260D	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	8.52	No Standard	Based on APHA (2017), 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 : This Analysis test report is reissued to supersede report No.2227861-3, Date Reported : Mar 16, 2022 due to revise sampling information.

Sampling By : Satcha Phetsawaeng , Thitipong Buadaeng

Remark :
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Approved by Siriluk P.
Siriluk Puengpang
Supervisor

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 : 4503142326
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 2223879
Date Received : Apr 05, 2022
Date Reported : Apr 12, 2022
Report Number : 2239754-1 C6

Sample Number	2223879-1
Sampling Date	Apr 05, 2022 10:44 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	Apr 05, 2022
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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	20	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	17	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	15	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	8.2	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	28.4	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	612	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	6	≤50	APHA (2017), 2540 D	Rayong

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

Remark :
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Technical Management

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

Approved by

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

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Analysis / Test Report

TESTING
No.0009

Lot ID: 2223879
Date Received : Apr 05, 2022
Date Reported : Apr 12, 2022
Report Number : 2239754-3 C6

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4503142326
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Sample Number	2223879-1
Sampling Date	Apr 05, 2022 10:44 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	Apr 06, 2022
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	Based on US EPA, Method 5030B and 8260D	Bangkok.
Styrene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	6.90	No Standard	Based on APHA (2017), 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 : Pathompong Kornsawat , Thanasoun Namakunna

Remark :
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Approved by Sawitree N.
Sawitree Noisangiam
Assistant 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 : 4503142326
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 2232230
Date Received : May 03, 2022
Date Reported : Jun 29, 2022
Report Number : 2256860-1 C6

Sample Number	2232230-1
Sampling Date	May 03, 2022 11:15 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	May 03, 2022
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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	22	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	6	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	5	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	7.6	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	29.7	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	380	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Remark :
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Technical Management

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

Approved by

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

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Analysis / Test Report

TESTING
No.0009

Lot ID: 2232230

Date Received : May 03, 2022
Date Reported : Jun 29, 2022
Report Number : 2256860-3 C6

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4503142326
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Sample Number	2232230-1
Sampling Date	May 03, 2022 11:15 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	May 04, 2022
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	Based on US EPA, Method 5030B and 8260D	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	5.49	No Standard	Based on APHA (2017), 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 : Pathompong Kornsawat , Thanasoun Namakunna

Remark :
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Approved by Sawitree N.
Sawitree Noisangiam
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 : 4503142326
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Lot ID: 2255925
Date Received : Jun 08, 2022
Date Reported : Jun 27, 2022
Report Number : 2308375-1 C6

Sample Number	2255925-1
Sampling Date	Jun 08, 2022 11:15 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	Jun 08, 2022
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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	25	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	13	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	11	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	8.3	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	33.4	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	716	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Remark :
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Technical Management

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

Approved by

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

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Analysis / Test Report

TESTING
No.0009

Lot ID: 2255925

Date Received : Jun 08, 2022
Date Reported : Jun 27, 2022
Report Number : 2308375-3 C6

Client : Siam Styrene Monomer Co., Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Maptaphut, Muang, Rayong Thailand 21150
P/O : 4503142326
Project Name : Water Testing
Project Location: Map Ta Phut_EBSM (SSMC)

Sample Number	2255925-1
Sampling Date	Jun 08, 2022 11:15 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	Jun 09, 2022
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	Based on US EPA, Method 5030B and 8260D	Bangkok
Styrene	ug/L	1.5	5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	8.21	No Standard	Based on APHA (2017), 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 : Pathompong Kornsawat , Thanasoun Namakunna

Remark :
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Approved by Chanatt L.
Chanattagarn Imchom
Supervisor

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 :
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2229839
Date Received : Mar 11, 2022
Date Reported : Mar 15, 2022
Report Number: 2259330-1

Sample Number	2229839-1
Parameter	Noise (Leq 24 hrs.)
Location	บริเวณริมรั้วโครงการฝั่งตะวันออก
Measurement Date	Mar 07 - Mar 08, 2022
Measurement by	Thitipong Buadaeng
Sound Level meter	Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	67.2	90.1	66.7
11:00 AM - 12:00 PM	67.2	75.7	66.7
12:00 PM - 01:00 PM	67.3	76.1	66.8
01:00 PM - 02:00 PM	67.3	73.7	66.9
02:00 PM - 03:00 PM	67.3	88.0	66.8
03:00 PM - 04:00 PM	67.4	69.2	67.0
04:00 PM - 05:00 PM	67.7	70.2	67.3
05:00 PM - 06:00 PM	67.8	69.1	67.5
06:00 PM - 07:00 PM	68.0	69.3	67.7
07:00 PM - 08:00 PM	68.1	69.1	67.8
08:00 PM - 09:00 PM	68.1	75.6	67.7
09:00 PM - 10:00 PM	68.0	69.5	67.7
10:00 PM - 11:00 PM	68.5	81.3	68.0
11:00 PM - 12:00 AM	69.0	75.3	68.6
12:00 AM - 01:00 AM	68.7	70.1	68.4
01:00 AM - 02:00 AM	68.9	70.2	68.5
02:00 AM - 03:00 AM	69.0	70.3	68.6
03:00 AM - 04:00 AM	69.1	70.6	68.7
04:00 AM - 05:00 AM	69.0	74.6	68.7
05:00 AM - 06:00 AM	69.0	82.7	68.6
06:00 AM - 07:00 AM	68.9	70.3	68.5
07:00 AM - 08:00 AM	68.8	72.7	68.4
08:00 AM - 09:00 AM	68.6	71.3	68.2
09:00 AM - 10:00 AM	68.6	73.9	68.1
Leq Average 24 hrs. (dB(A))	68.3		
Lmax (dB(A))		90.1	
L90 (dB(A))			67.8
Ldn (dB(A))	75.2		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2

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

Technical Management Thanita K.
Thanita Kulsuriwong
Scientist (4)

Approved by Supot S.
Supot Salamteh
Section Head

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

Analysis / Test Report

LABORATORY ACCREDITATION BLA-DSS
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: 2229839
Date Received : Mar 11, 2022
Date Reported : Mar 15, 2022
Report Number: 2259331-1

Sample Number	2229839-2
Parameter	Noise (Leq 24 hrs.)
Location	บริเวณริมรั้วโครงการฝั่งตะวันออก
Measurement Date	Mar 08 - Mar 09, 2022
Measurement by	Thitipong Buadaeng
Sound Level meter	Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	68.4	69.9	68.0
11:00 AM - 12:00 PM	68.0	71.3	67.6
12:00 PM - 01:00 PM	67.8	73.1	67.3
01:00 PM - 02:00 PM	67.7	74.7	67.4
02:00 PM - 03:00 PM	68.0	72.8	67.7
03:00 PM - 04:00 PM	68.2	73.6	67.8
04:00 PM - 05:00 PM	68.2	69.2	67.9
05:00 PM - 06:00 PM	68.3	69.8	68.0
06:00 PM - 07:00 PM	68.4	69.7	68.1
07:00 PM - 08:00 PM	68.4	71.0	68.1
08:00 PM - 09:00 PM	68.7	70.1	68.3
09:00 PM - 10:00 PM	68.7	70.0	68.4
10:00 PM - 11:00 PM	68.6	70.0	68.3
11:00 PM - 12:00 AM	68.7	70.2	68.4
12:00 AM - 01:00 AM	68.7	70.3	68.3
01:00 AM - 02:00 AM	68.8	70.2	68.4
02:00 AM - 03:00 AM	68.7	70.1	68.3
03:00 AM - 04:00 AM	68.7	70.0	68.4
04:00 AM - 05:00 AM	68.7	70.2	68.4
05:00 AM - 06:00 AM	68.7	71.9	68.3
06:00 AM - 07:00 AM	68.0	69.6	67.6
07:00 AM - 08:00 AM	67.6	73.5	67.1
08:00 AM - 09:00 AM	67.9	78.9	67.2
09:00 AM - 10:00 AM	67.2	68.6	66.8
Leq Average 24 hrs. (dB(A))	68.3		
Lmax (dB(A))		78.9	
L90 (dB(A))			68.0
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 และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548

Technical Management Thanita K.
Thanita Kulsuriwong
Scientist (4)

Approved by Supot S.
Supot Salamteh
Section Head

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

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: 2229839
Date Received : Mar 11, 2022
Date Reported : Mar 15, 2022
Report Number: 2259332-1

Sample Number	2229839-3
Parameter	Noise (Leq 24 hrs.)
Location	บริเวณริมรั้วโครงการฝั่งตะวันออก
Measurement Date	Mar 09 - Mar 10, 2022
Measurement by	Thitipong Buadaeng
Sound Level meter	Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	67.9	71.1	67.5
11:00 AM - 12:00 PM	68.3	77.0	67.6
12:00 PM - 01:00 PM	68.3	72.5	67.7
01:00 PM - 02:00 PM	68.0	73.0	67.5
02:00 PM - 03:00 PM	67.8	72.4	67.4
03:00 PM - 04:00 PM	67.9	71.0	67.5
04:00 PM - 05:00 PM	68.0	70.0	67.7
05:00 PM - 06:00 PM	68.2	69.4	67.9
06:00 PM - 07:00 PM	68.2	69.2	67.9
07:00 PM - 08:00 PM	68.2	69.3	67.9
08:00 PM - 09:00 PM	68.3	69.7	68.0
09:00 PM - 10:00 PM	68.3	71.3	68.0
10:00 PM - 11:00 PM	68.2	69.5	67.9
11:00 PM - 12:00 AM	68.0	69.6	67.7
12:00 AM - 01:00 AM	67.9	69.6	67.6
01:00 AM - 02:00 AM	67.9	69.2	67.6
02:00 AM - 03:00 AM	67.8	69.4	67.5
03:00 AM - 04:00 AM	68.0	69.4	67.7
04:00 AM - 05:00 AM	68.1	71.1	67.8
05:00 AM - 06:00 AM	68.1	78.6	67.7
06:00 AM - 07:00 AM	67.7	70.0	67.4
07:00 AM - 08:00 AM	67.8	77.0	67.4
08:00 AM - 09:00 AM	67.9	81.6	67.4
09:00 AM - 10:00 AM	67.3	69.3	66.9
Leq Average 24 hrs. (dB(A))	68.0		
Lmax (dB(A))		81.6	
L90 (dB(A))			67.6
Ldn (dB(A))	74.4		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2

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

Technical Management Thanita K.
Thanita Kulsuriwong
Scientist (4)

Approved by Supot S.
Supot Salamteh
Section Head

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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 :
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2229838
Date Received : Mar 09, 2022
Date Reported : Mar 15, 2022
Report Number: 2257295-1

Sample Number	2229838-1
Parameter	Noise (Leq 8 hrs.)
Location	AT-3
Measurement Date	Mar 08, 2022
Measurement by	Satcha Phetsawaeng

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:41 AM - 09:41 AM	79.2	80.2	78.9
09:41 AM - 10:41 AM	79.0	80.1	78.8
10:41 AM - 11:41 AM	78.9	80.1	78.6
11:41 AM - 12:41 PM	78.7	82.6	78.5
12:41 PM - 01:41 PM	79.2	89.6	78.9
01:41 PM - 02:41 PM	78.7	84.1	78.4
02:41 PM - 03:41 PM	78.8	81.3	78.5
03:41 PM - 04:41 PM	78.8	88.0	78.6
Leq Average 8 hrs. (dB(A))	78.9		
Lmax (dB(A))		89.6	
Standard (dB(A))	90	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
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Technical Management Thanita K.
Thanita Kulsuriwong
Scientist (4)

Approved by Supot S.
Supot Salamteh
Section Head

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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 : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2229838
Date Received : Mar 09, 2022
Date Reported : Mar 15, 2022
Report Number: 2257296-1

Sample Number	2229838-2
Parameter	Noise (Leq 8 hrs.)
Location	FT-2
Measurement Date	Mar 08, 2022
Measurement by	Satcha Phetsawaeng

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	83.9	86.4	83.0
11:00 AM - 12:00 PM	83.7	87.0	82.7
12:00 PM - 01:00 PM	83.6	86.6	82.5
01:00 PM - 02:00 PM	83.7	86.9	82.6
02:00 PM - 03:00 PM	83.7	86.6	82.6
03:00 PM - 04:00 PM	83.9	87.1	82.6
04:00 PM - 05:00 PM	84.0	87.5	82.6
05:00 PM - 06:00 PM	84.0	90.1	82.6
Leq Average 8 hrs. (dB(A))	83.8		
Lmax (dB(A))		90.1	
Standard (dB(A))	90	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
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Technical Management Thanita K.
Thanita Kulsuriwong
Scientist (4)

Approved by Supot S.
Supot Salamteh
Section Head

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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: 2253547
Date Received : May 06, 2022
Date Reported : May 11, 2022
Report Number: 2307296-1

Sample Number	2253547-1
Parameter	Noise (Leq 8 hrs.)
Location	AT-3
Measurement Date	May 05, 2022
Measurement by	Satcha Phetsawaeng

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:30 AM - 10:30 AM	79.2	81.9	79.0
10:30 AM - 11:30 AM	79.0	80.3	78.9
11:30 AM - 12:30 PM	79.1	80.2	78.9
12:30 PM - 01:30 PM	79.2	80.2	79.0
01:30 PM - 02:30 PM	79.3	80.4	79.2
02:30 PM - 03:30 PM	79.3	80.4	79.2
03:30 PM - 04:30 PM	79.3	80.2	79.1
04:30 PM - 05:30 PM	79.3	80.2	79.1
Leq Average 8 hrs. (dB(A))	79.2		
Lmax (dB(A))		81.9	
Standard (dB(A))	90	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
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Technical Management Thanita K.
Thanita Kulsuriwong
Scientist (4)

Approved by Supot S.
Supot Salamteh
Section Head

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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 : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2253547
Date Received : May 06, 2022
Date Reported : May 11, 2022
Report Number: 2307297-1

Sample Number 2253547-2
Parameter Noise (Leq 8 hrs.)
Location FT-2
Measurement Date May 05, 2022
Measurement by Satcha Phetsawaeng

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:19 AM - 10:19 AM	83.9	87.4	82.8
10:19 AM - 11:19 AM	83.8	86.5	82.6
11:19 AM - 12:19 PM	83.8	87.0	82.2
12:19 PM - 01:19 PM	83.6	86.7	81.5
01:19 PM - 02:19 PM	83.5	89.4	81.5
02:19 PM - 03:19 PM	83.6	91.7	81.7
03:19 PM - 04:19 PM	83.6	87.3	81.7
04:19 PM - 05:19 PM	83.5	87.9	81.6
Leq Average 8 hrs. (dB(A))	83.7		
Lmax (dB(A))		91.7	
Standard (dB(A))	90	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
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Technical Management Thanita K.
Thanita Kulsuriwong
Scientist (4)

Approved by Supot S.
Supot Salamteh
Section Head

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ภาคผนวก ค-6

คุณภาพอากาศในสถานประกอบการ

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 : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2229836
Date Received : Mar 09, 2022
Date Reported : Mar 17, 2022
Report Number : 2251919-1

Sample Number	2229836-1
Sampled Date	Mar 08, 2022
Sample Description	Air Quality
Location	FT-3/CT-3
Date Analysis Commenced	Mar 10, 2022
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	757 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Styrene	10:10 AM - 12:10 PM	ppm	-	0.05	<0.05	100	Based on NIOSH (2003), 1501	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 : Satcha Phetsawaeng

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

Approved by Saranya C.
Saranya Chalermthamrong
Scientist (4)

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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 : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2229836
Date Received : Mar 09, 2022
Date Reported : Mar 17, 2022
Report Number : 2251919-1

Sample Number	2229836-2
Sampled Date	Mar 08, 2022
Sample Description	Air Quality
Location	AT-3
Date Analysis Commenced	Mar 10, 2022
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	757 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Benzene	10:05 AM - 12:05 PM	ppm	-	0.06	<0.06	1	Based on NIOSH (2003), 1501	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 : Satcha Phetsawaeng

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

Approved by Saranya C.
Saranya Chalermthamrong
Scientist (4)

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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 : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2229836
Date Received : Mar 09, 2022
Date Reported : Mar 17, 2022
Report Number : 2251919-1

Sample Number	2229836-3
Sampled Date	Mar 08, 2022
Sample Description	Air Quality
Location	AT-4/AT-5
Date Analysis Commenced	Mar 10, 2022
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	757 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Ethylbenzene	10:00 AM - 12:00 PM	ppm	-	0.05	<0.05	100	Based on NIOSH (2003), 1501	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 : Satcha Phetsawaeng

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

Approved by Saranya C.
Saranya Chalermthamrong
Scientist (4)

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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 : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2253536
Date Received : May 06, 2022
Date Reported : May 13, 2022
Report Number : 2303022-1

Sample Number	2253536-1
Sampled Date	May 05, 2022
Sample Description	Air Quality
Location	FT-3/CT-3
Date Analysis Commenced	May 07, 2022
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	756 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Styrene	09:30 AM - 11:30 AM	ppm	-	0.05	<0.05	100	Based on NIOSH (2003), 1501	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 : Satcha Phetsawaeng

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

Approved by Saranya C.
Saranya Chalermthamrong
Scientist (4)

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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 : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2253536
Date Received : May 06, 2022
Date Reported : May 13, 2022
Report Number : 2303022-1

Sample Number	2253536-2
Sampled Date	May 05, 2022
Sample Description	Air Quality
Location	AT-3
Date Analysis Commenced	May 07, 2022
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	756 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Benzene	09:30 AM - 11:30 AM	ppm	-	0.06	<0.06	1	Based on NIOSH (2003), 1501	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 : Satcha Phetsawaeng

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

Approved by Saranya C.
Saranya Chalermthamrong
Scientist (4)

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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 : Environmental Quality Monitoring
Project Location : Map Ta Phut_EBSM (SSMC)

Lot ID: 2253536
Date Received : May 06, 2022
Date Reported : May 13, 2022
Report Number : 2303022-1

Sample Number	2253536-3
Sampled Date	May 05, 2022
Sample Description	Air Quality
Location	AT-4/AT-5
Date Analysis Commenced	May 07, 2022
Condition of Sample	Drawn into one sorbent tube, refrigerated
• **Barometric Pressure**	756 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Ethylbenzene	09:30 AM - 11:30 AM	ppm	-	0.05	<0.05	100	Based on NIOSH (2003), 1501	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 : Satcha Phetsawaeng

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

Approved by Saranya C.
Saranya Chalermthamrong
Scientist (4)

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ใบรับรองการสอบเทียบเครื่องมือ

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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Stack	Total Hydrocarbon as Propane	Console Control Unit	BKK_FS0468	12-Jan-22	12-Jul-22	6
Stack	Total Hydrocarbon as Propane	Console Control Unit	RYG_FS0315	12-Jan-22	12-Jul-22	6
Stack	Total Hydrocarbon as Propane	Total Hydrocarbon Analyzer	RYG_EN0038	14-Jan-22	14-Jan-23	12
Stack	Total Hydrocarbon as Propane	FID Analyzer	BKK_FS0758	4-Jan-22	4-Jul-22	6
Stack	Total Suspended Particulate	Console Control Unit	BKK_FS0468	12-Jan-22	12-Jul-22	6
Stack	Total Suspended Particulate	Console Control Unit	RYG_FS0315	12-Jan-22	12-Jul-22	6
Stack	Total Suspended Particulate	Digital Balance	RYG_EN0003	23-Mar-22	23-Mar-23	12
Stack	Oxides of Nitrogen	Console Control Unit	BKK_FS0468	12-Jan-22	12-Jul-22	6
Stack	Oxides of Nitrogen	Console Control Unit	RYG_FS0315	12-Jan-22	12-Jul-22	6
Stack	Oxides of Nitrogen	Vacuum Gauge	BKK_FS0435	9-Apr-21	8-Oct-22	18
Stack	Oxides of Nitrogen	Vacuum Gauge	RYG_FS0333	6-Oct-21	6-Apr-23	18
Stack	Oxides of Nitrogen	SPECTROPHOTOMETER	RYG_EN0037	1-Apr-21	1-Oct-22	18
Ambient	Total Suspended Particulate	High Volume	RYG_FS0393	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0291	-	-	On site Calibration
Ambient	Total Suspended Particulate	Digital Balance	RYG_EN0001	23-Mar-22	23-Mar-23	12
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0191	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0188	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	Digital Balance	RYG_EN0001	23-Mar-22	23-Mar-23	12
Ambient	Nitrogen Dioxide	NO2 Analyzer	BKK_FS1064	4-Jan-22	4-Jul-22	6
Ambient	Nitrogen Dioxide	NO2 Analyzer	BKK_FS0797	4-Jan-22	4-Jul-22	6

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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0413	29-Jul-21	27-Jan-23	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0412	29-Jul-21	27-Jan-23	18
Workplace	Benzene	Field Rotameter	RYG_FS0199	4-Jan-22	4-Apr-22	3
Workplace	Benzene	Field Rotameter	RYG_FS0199	1-Apr-22	1-Jul-22	3
Workplace	Benzene	GC-MSD	BKK_EN0119	1-Oct-21	1-Apr-23	18
Workplace	Ethyl Benzene	Field Rotameter	RYG_FS0199	4-Jan-22	4-Apr-22	3
Workplace	Ethyl Benzene	Field Rotameter	RYG_FS0199	1-Apr-22	1-Jul-22	3
Workplace	Ethyl Benzene	GC-MSD	BKK_EN0119	1-Oct-21	1-Apr-23	18
Workplace	Styrene	Field Rotameter	RYG_FS0199	4-Jan-22	4-Apr-22	3
Workplace	Styrene	Field Rotameter	RYG_FS0199	1-Apr-22	1-Jul-22	3
Workplace	Styrene	GC-MSD	BKK_EN0119	1-Oct-21	1-Apr-23	18
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0215	9-Aug-21	9-Aug-22	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0021	21-Jan-22	21-Jan-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0019	10-Jan-22	10-Jan-23	12
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0215	9-Aug-21	9-Aug-22	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0439	6-Aug-21	6-Aug-22	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0304	2-Jun-21	2-Jun-22	12
Noise	Leq 24 hrs	Sound Calibrator	RYG_FS0215	9-Aug-21	9-Aug-22	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0020	10-Jan-22	10-Jan-23	12

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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Rayong Lab	pH at 25 oC	pH meter	RYG_EN0183	17-Mar-22	17-Mar-23	12
Rayong Lab	BOD (5 days at 20°C)	DO meter with Sensor	RYG_EN0140	2-Feb-21	3-Aug-22	18
Rayong Lab	BOD (5 days at 20°C)	Incubator	RYG_EN0154	22-Apr-22	21-Oct-23	18
Rayong Lab	COD	Spectrophotometer	RYG_EN0037	1-Apr-21	1-Oct-22	18
Rayong Lab	Total Suspended Solids	Electronic Balance	RYG_EN0002	23-Mar-22	23-Mar-23	12
Rayong Lab	Total Suspended Solids	Chember Oven	RYG_EN0010	5-May-21	3-Nov-22	18
Rayong Lab	Oil & Grease	Electronic Balance	RYG_EN0002	23-Mar-22	23-Mar-23	12
Rayong Lab	Oil & Grease	Chember Oven	RYG_EN0006	5-May-21	3-Nov-22	18
Rayong Lab	Oil & Grease	Water Bath	RYG_EN0061	5-May-21	3-Nov-22	18
Rayong Lab	Temperature	Digital Thermometer	RYG_FS0467	7-Jul-21	7-Jul-22	18
Rayong Lab	Color (at Original pH)	Spectrophotometer	RYG_EN0037	1-Apr-21	1-Oct-22	18
Rayong Lab	Color (at pH 7.0)	Spectrophotometer	RYG_EN0037	1-Apr-21	1-Oct-22	18
Water Lab	Benzene	Gas Chromatography (MSD)	BKK_EN0059	24-Dec-20	24-Jun-22	18
Water Lab	Styrene	Gas Chromatography (MSD)	BKK_EN0059	24-Dec-20	24-Jun-22	18
Water Lab	Total Organic carbon	TOC Analyzer	BKK_EN0066	25-Oct-21	25-Oct-22	12

DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date :	12-Jan-22	Ambient Temperature (°C)	28
Calibration sheet No. :	C-120122-BKK_FS0469	Relative Humidity (%) :	55

Digital Temperature ID	BKK_FS0469	Reference Temperature ID	BKK_FS0609
Serial No. :	1302005	Serial No. :	7688004
Model :	XC-572-V	Model :	FLUKE 714
		Next Calibrate :	13 Jan 22

Location	Reference Temperature °C	Digital Temperature °C	Error °C	Remark
Stack	0	0	0	
	25	24	-1	
	50	49	-1	
	100	98	-2	
	150	148	-2	
	200	197	-3	
	250	247	-3	
	300	297	-3	
	500	497	-3	
	1000	997	-3	
	1200	1197	-3	
Probe	100	99	-1	
	125	124	-1	
	150	149	-1	
Oven	100	99	-1	
	125	124	-1	
	150	149	-1	
Filter	100	100	0	
	125	125	0	
	150	149	-1	
Exit	0	0	0	
	10	11	1	
	20	21	1	
Meter	0	0	0	
	25	25	0	
	50	50	0	
AUX	0	0	0	
	25	25	0	
	50	50	0	

Calibrated by Saksit Phaisanphisut
(Mr.Saksit Phaisanphisut)
Field Scientist (4)

Approved by : Wichan Choonharat
Mr.Wichan Choonharat
Manager

Form 281-049 (02/05/02)

CONSOLE CONTROL UNIT CALIBRATION TEST REPORT

Calibration of Date	:	12 Jan 22	Barometric Pressure (mm.Hg) :	760
Next Cal. Date	:	12 Jul 22	Relative Humidity (%) :	55.0
			Temperature (°C) :	28.0

Console Control Meter Data

Calibration No.	:	C-120122-BKK_FS0468
Dry Gas Meter No.	:	BKK_FS0468
Console Serial No.	:	1302005
Console Model No.	:	XC-572-V

Reference Dry Gas Meter Data

Serial No. :	1607009
Model No. :	SK25EXSR-QC6
Correction Factor (Yr) :	1.0060
Next Calibration Date :	8 Apr 22

ΔH (mm.H_2O)	⊙ Minutes	Reference Dry Gas Meter Calibration				Console Control ; Drygas Meter						Dry Gas Meter Correction Factor (Y)	Orifice Calibration Factor ΔH@
		Vr (Liters)			Tr (°C)	Vm (Liters)			Ti (°C)	To (°C)	Avg.Tm (°C)		
		Final	Initial	Total		Final	Initial	Total					
15	12.38	150.00	0.00	150.00	30.0	2564504.0	2564355.0	149.00	29.0	29.0	29.0	1.0079	47.0425
25	9.33	150.00	0.00	150.00	31.0	2564661.0	2564510.0	151.00	30.0	30.0	30.0	0.9936	44.6773
50	6.57	150.00	0.00	150.00	31.0	2564821.0	2564670.0	151.00	31.0	31.0	31.0	0.9945	44.1525
80	5.14	150.00	0.00	150.00	31.0	2564983.0	2564830.0	153.00	32.0	32.0	32.0	0.9819	43.1065
120	4.18	150.00	0.00	150.00	32.0	2565149.0	2564995.0	154.00	32.0	32.0	32.0	0.9686	43.0440
											Avg.	0.9893	44.4066

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

ΔH@ : Orifice pressure differential that equates to 21.24 lm of air @ 25 C and 760 mm of mercury , mmH2O ; tolerance for individual values ± 5.08 from average .

Procedure; 40 CFR 60,APP A,METH ,SEC 5.3 & 7

Calibrated by: Saksit Phaisanphisut
(Mr.Saksit Phaisanphisut)
Field Scientist (4)

Approved by: Wichan Choonharat
(Mr.Wichan Choonharat)
Manager

Form No. 05-281-23 (13/01/03)

Pitot Tube Calibration Data

Pitot Tube Identification Number :	BKK_FS0472	Calibration Date :	12 Jan 22
Lab test duct Number :	258-1-13-01	Standard Pitot ID :	BKK_FS0441
Calibration Sheet No. :	C-120122-BKK_FS0472	Cp Standard :	0.99

Type S Pitot Tube Coefficient Data

	Type s pitot tube Leg A,B	Standard pitot tube (ΔP, mm.H_2O)	Type s pitot tube (ΔP, mm.H_2O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 2	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 3	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
			$\overline{Cp}$	0.842	0.842

$$Cp(S) = Cp_{std}\sqrt{\frac{\Delta P(std)}{\Delta P\ (s)}}$$

$$\left[\overline{Cp}_{(A)} - \overline{Cp}_{(B)}\right] \text{ must BE} \leq 0.01$$

$$\text{Average deviation}(A \text{ or } B) = \frac{\sum \left[Cp\ (s) - Cp(A \text{ or } B)\right]}{3} \text{ must BE} \leq 0.01$$

Calibrated by Saksit Phaisanphisit

(Mr.Saksit Phaisanphisut)

Field Scientist (4)

Approved by : Wichan Choonharat

Mr.Wichan Choonharat

Manager

Form 281-046 (04/03/02)

Pitot Tube Calibration Data

Pitot Tube Identification Number :	BKK_FS0473	Calibration Date :	12 Jan 22
Lab test duct Number :	258-1-13-01	Standard Pitot ID :	BKK_FS0441
Calibration Sheet No. :	C-120122-BKK_FS0473	Cp Standard :	0.99

Type S Pitot Tube Coefficient Data

	Type s pitot tube Leg A,B	Standard pitot tube (ΔP, mm.H_2O)	Type s pitot tube (ΔP, mm.H_2O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 2	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 3	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
			$\overline{Cp}$	0.842	0.842

$$Cp(S) = Cp_{std}\sqrt{\frac{\Delta P(std)}{\Delta P\ (s)}}$$

$$\left[\overline{Cp}_{(A)} - \overline{Cp}_{(B)}\right] \text{ must BE} \leq 0.01$$

$$\text{Average deviation}(A \text{ or } B) = \frac{\sum \left[Cp\ (s) - Cp(A \text{ or } B)\right]}{3} \text{ must BE} \leq 0.01$$

Calibrated by Saksit Phaisanphisit

(Mr.Saksit Phaisanphisut)

Field Scientist (4)

Approved by : Wichan Choonharat

Mr.Wichan Choonharat

Manager

Form 281-046 (04/03/02)

CONSOLE CONTROL UNIT CALIBRATION TEST REPORT

Calibration of Date	:	12 Jan 22	Barometric Pressure (mm.Hg) :	760	
Next Cal. Date	:	12 Jul 22	Relative Humidity (%)	:	58.3
			Temperature (°C)	:	25.0

Console Control Meter Data			*Reference Dry Gas Meter Data*	
Calibration No.	:	C-120122-RYG_FS0315	Serial No. :	1607009
Dry Gas Meter No.	:	RYG_FS0315	Model No. :	DGM-SK25RM-QS8
Console Serial No.	:	1706091	Correction Factor (Yr) :	1.0060
Console Model No.	:	XC-572-V	Next Calibration Date :	8 Apr 22

ΔH ($mm.H_2O$)	Θ Minutes	Reference Dry Gas Meter Calibration				Console Control ; Drygas Meter						Dry Gas Meter Correction Factor (Y)	Orifice Calibration Factor ΔH@
		Vr (Liters)			Tr (°C)	Vm (Liters)			Ti (°C)	To (°C)	Avg.Tm (°C)		
		Final	Initial	Total		Final	Initial	Total					
15	12.30	150.00	0.00	150.00	27.0	1274534.0	1274390.0	144.00	27.0	27.0	27.0	1.0464	45.8249
25	9.45	150.00	0.00	150.00	30.0	1274689.0	1274545.0	144.00	28.0	28.0	28.0	1.0385	45.8355
50	6.73	150.00	0.00	150.00	30.0	1274843.0	1274700.0	143.00	28.0	28.0	28.0	1.0432	46.4941
80	5.22	150.00	0.00	150.00	30.0	1275003.0	1274860.0	143.00	30.0	30.0	30.0	1.0471	44.4583
120	4.27	150.00	0.00	150.00	30.0	1275163.0	1275020.0	143.00	30.0	30.0	30.0	1.0431	44.6230
											Avg.	1.0437	45.4472

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

ΔH@ : Orifice pressure differential that equates to 21.24 lm of air @ 25 C and 760 mm of mercury , mmH2O ; tolerance for individual values ± 5.08 from average .

Procedure; 40 CFR 60,APP A,METH ,SEC 5.3 & 7

Calibrated by: (Mr.Warawut Pubpa)
Field Scientist(3)

Approved by: Wichan Choonharat
(Mr.Wichan Choonharat)
Manager

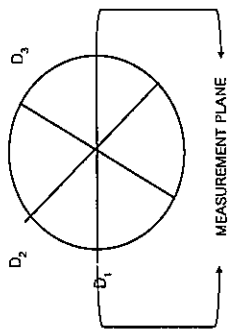
Form No. QS 281-23 (13/01/03)

PROBE NOZZLE DIAMETER CALIBRATION DATA SHEET

Calibration Date 12 Jan 22 — Nozzle Set ID. : BKK_FS0474

Calibration Sheet No. : C-120122-BKK_FS0474 — Vernier Caliper ID. : BKK_FS0626

Nozzle ID #	Nozzle Diameter (cm.) D_1	D_2	D_3	Hi - Lo ΔD	$(D_1 + D_2 + D_3)/3$ D_{avg}
1	0.300	0.300	0.300	0.000	0.300
2	0.450	0.450	0.450	0.000	0.450
3	0.600	0.600	0.600	0.000	0.600
4	0.780	0.780	0.780	0.000	0.780
5	0.932	0.932	0.932	0.000	0.932
6	1.094	1.094	1.094	0.000	1.094
7	1.264	1.264	1.264	0.000	1.264



Where :

D_1, D_2, D_3 = There 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: Wichan Choonharat
Mr.Wichan Choonharat
Manager

Form No. QS 281-026 (13/01/03)

DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date :	12-Jan-22	Ambient Temperature (°C) :	24
Calibration sheet No. :	C-120122-RYG_FS0316	Relative Humidity (%) :	58.4

Digital Temperature ID	RYG_FS0316	Reference Temperature ID .	BKK_FS0609
Console Serial No. :	1706091	Serial No. :	7688004
Console Model :	XC-572-V	Model :	FLUKE 714
		Next Calibrate :	13 Jan 22

Location	Reference Temperature °C	Digital Temperature °C	Error °C	Remark
Stack	0	0	0	
	25	27	2	
	50	53	3	
	100	104	4	
	150	154	4	
	200	202	2	
	250	253	3	
	300	304	4	
	500	505	5	
	1000	1003	3	
	1200	1202	2	
Probe	100	104	4	
	125	129	4	
	150	154	4	
Oven	100	104	4	
	125	129	4	
	150	154	4	
Filter	100	104	4	
	125	129	4	
	150	154	4	
Exit	0	0	0	
	10	11	1	
	20	22	2	
Meter	0	0	0	
	25	27	2	
	50	52	2	
AUX	0	0	0	
	25	27	2	
	50	53	3	

Calibrated by

(Mr.Warawut Pubpa)

Field Scientist (3)

Approved by : Wichan Choonharat

Mr.Wichan Choonharat

Manager

Form 281-048 (02/05/02)

PROBE NOZZLE DIAMETER CALIBRATION DATA SHEET

Calibration Date	12 Jan 22	Nozzle Set ID. :	RYG_FS0319
Calibration Sheet No. :	C-120122-RYG_FS0319	Vernier Caliper ID. :	BKK_FS0626

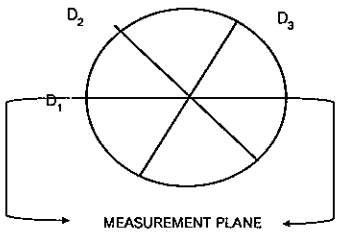
Nozzle ID #	Nozzle Diameter (cm.)			Hi - Lo	$(D_1 + D_2 + D_3) / 3$
	D_1	D_2	D_3	ΔD	D_{avg}
1	0.300	0.300	0.300	0.000	0.300
2	0.470	0.465	0.465	0.005	0.467
3	0.600	0.600	0.600	0.000	0.600
4	0.770	0.760	0.755	0.015	0.762
5	0.920	0.930	0.930	0.010	0.927
6	1.080	1.080	1.085	0.005	1.082
7	1.240	1.220	1.235	0.020	1.232
8	1.550	1.570	1.540	0.030	1.553

Where :

D_1, D_2, D_3 = There 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 $\leq$ 0.100 mm.

D_{avg} = $(D_1 + D_2 + D_3) / 3$



Calibrated by

(Mr.Warawut Pubpa)

Field Scientist (3)

Approved by : Wichan Choonharat

(Mr.Wichan Choonharat)

Manager

Form No. QS 281-025 (13/01/03)

Pitot Tube Calibration Data

Pitot Tube Identification Number :	RYG_FS0320	Calibration Date :	12 Jan 22
Lab test duct Number :	258-1-13-01	Standard Pitot ID :	BKK_FS0441
Calibration Sheet No. :	C-120122-RYG_FS0320	Cp Standard :	0.99

Type S Pitot Tube Coefficient Data

	Type s pitot tube Leg A,B	Standard pitot tube (ΔP, mm.H_2O)	Type s pitot tube (ΔP, mm.H_2O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 2	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 3	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
			$\overline{C}p$	0.842	0.842

$$Cp(S) = Cp_{std}\sqrt{\frac{\Delta P(std)}{\Delta P\ (s)}}$$

$$\left|\overline{Cp}_{(A)} - \overline{Cp}_{(B)}\right| \text{ must BE} \leq 0.01$$

$$\text{Average deviation}(A \text{ or } B) = \frac{\sum_{1}^{3}\left[Cp\ (s) - Cp(A \text{ or } B)\right]}{3} \text{ must BE} \leq 0.01$$

Calibrated by

(Mr.Warawut Pubpa)

Field Scientist (3)

Approved by : Wichan Choonharat

Mr.Wichan Choonharat

Manager

Form 281-046 (01/03/02)

Pitot Tube Calibration Data

Pitot Tube Identification Number :	RYG_FS0321	Calibration Date :	12 Jan 22
Lab test duct Number :	258-1-13-01	Standard Pitot ID :	BKK_FS0441
Calibration Sheet No. :	C-120122-RYG_FS0321	Cp Standard :	0.99

Type S Pitot Tube Coefficient Data

	Type s pitot tube Leg A,B	Standard pitot tube (ΔP, mm.H_2O)	Type s pitot tube (ΔP, mm.H_2O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 2	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 3	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
			$\overline{C}p$	0.842	0.842

$$Cp(S) = Cp_{std}\sqrt{\frac{\Delta P(std)}{\Delta P\ (s)}}$$

$$\left|\overline{Cp}_{(A)} - \overline{Cp}_{(B)}\right| \text{ must BE} \leq 0.01$$

$$\text{Average deviation}(A \text{ or } B) = \frac{\sum_{1}^{3}\left[Cp\ (s) - Cp(A \text{ or } B)\right]}{3} \text{ must BE} \leq 0.01$$

Calibrated by

(Mr.Warawut Pubpa)

Field Scientist (3)

Approved by : Wichan Choonharat

Mr.Wichan Choonharat

Manager

Form 281-046 (01/03/02)

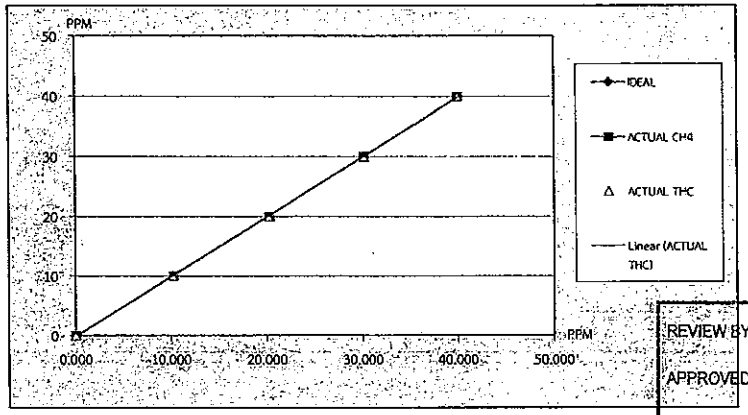
JNAC
JIRANATE ASSOCIATES CO.,LTD.

TEST REPORT

CUSTOMER NAME	: ALS Laboratory Group (Thailand) Co., Ltd. [บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด]		
EQRIPMENT NAME	: THC Analyzer		
MANUFACTURER	: HORIBA	MODEL : APHA-370	SERIAL NO : U430GTHB
STANDARD GAS CONCENTRATION (PPM) :	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	0.000	0.000	0.000	-	0.000	0.000	-
1	10.000	10.240	0.240	2.40	10.210	0.210	2.10
2	20.000	20.230	0.230	1.15	20.200	0.200	1.00
3	30.000	30.120	0.120	0.40	30.170	0.170	0.57
4	40.000	40.000	0.000	0.00	40.000	0.000	0.00
AVERAGE (%)				0.99	-		0.92



REVIEW BY Thanitall.

APPROVED BY D.

NEXT CAL. DATE 14/1/2023

CALIBRATED BY : วรายุส คัลจิงเจริญ DATE : 4/1/65

CHECKED BY : สันติ ปัสนะ DATE : 14/1/65

JNAC JIRANATE ASSOCIATES CO., LTD.

ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : เจ้าหน้าที่ฝ่ายบริการหลังการขาย , โทร 02-868-0812 # 15,16 , E-Mail : Engineer@jiranatee.com
เลขที่ 63/14-15,67/35-36 ถนนเพชรเกษม 7,7/1 แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600 โทร 02-8680812-13 โทรสาร 02-868-1889

JNAC
JIRANATE ASSOCIATES CO.,LTD.

CHECK LIST

CUSTOMER NAME : ALS Laboratory Group (Thailand) Co., Ltd. [บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด]		
EQUIPMENT NAME : THC Analyzer		
MANUFACTURER : HORIBA	MODEL : APHA-370	SERIAL NO. : U430GTHB

TEST VALUES

NO.	THC Analyzer (APHA - 370)	UNIT	BEFORE	AFTER
1	Signal (CH4)	mV	29.500	51.300
2	Signal (THC)	mV	39.200	56.500
3	Detector	Temp °C , Standard Value : Ambient temp (5°Cto15°C)	47.300	47.400
		Pressure kPa , Standard Value : (Ambient/1013x100-20)±4kPa	81.900	81.800
4	Ambient	kPa current atmospheric pressure	101.500	101.400
5	Purlifire	°C , Standard Value : 390 °C to 430 °C	420.200	420.300
		kPa , Normal value : 8 kPa to 25 kPa	10.200	10.300
6	NMHC	°C , Standard Value : 230 °C to 260 °C	243.000	243.200
7	DC 24 V	V , Standard Value : 24 V ± 0.5 V	23.900	23.900
8	DC 5 V	V , Standard Value : 5 V ± 0.5 V	5.000	5.000
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 Samping Reading	PPM	2.900	3.680
12	NMHC Samping Reading	PPM	0.720	0.230
13	THC Samping Reading	PPM	3.620	3.730
14	Zero Gas CH4/THC	PPM	0.27/0.32	0.00/0.00
15	Span Gas	PPM	37.80/37.85	40.0/40.0
G	Gas H2 ...../.....	20 PSI	20	20

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

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

อาการที่ตรวจพบ

- Service Maintenance

รายละเอียดการดำเนินการ

-

ผลการดำเนินการ

- เรียบร้อย เครื่องสามารถดำเนินการตรวจวัดได้ตามปกติ

CALIBRATED BY : วรายุส คัลจิงเจริญ DATE : 14/1/65

CHECKED BY : สันติ ปัสนะ DATE : 14/1/65

JNAC JIRANATE ASSOCIATES CO., LTD.

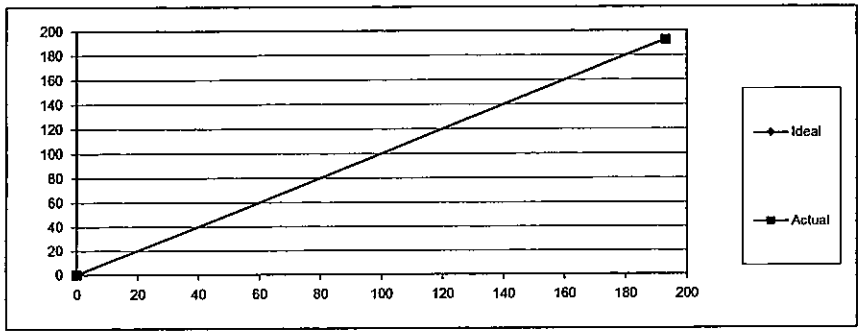
ต้องการข้อมูลทางด้านเทคนิคเพิ่มเติม : เจ้าหน้าที่ฝ่ายบริการหลังการขาย , โทร 02-868-0812 # 15-16 , E-Mail : Engineer@jiranatee.com
เลขที่ 63/14-15,67/35-36 ซอยเพชรเกษม 7,7/1 ถนนเพชรเกษม แขวงวัดท่าพระ เขตบางกอกใหญ่ กรุงเทพฯ 10600 โทร 02-868-0812-13 โทรสาร 02-868-1889

CALIBRATION REPORT

Calibration Date	4-Jan-22	Equipment ID	BKK_FS0758
Equipment Name	FID Analyzer	Manufacturer	Baseline Mocon
Model	9000H	Serial No.	0315EF0047
Std.Gas Conc.(ppm)	193	Cylinder No.	D619622
Certified Date	17-Sep-14	Expired Date	17-Sep-22

CALIBRATION RESULTS

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.04	0.04	0.04
SPAN	193.00	192.80	-0.20	-0.10
AVERAGE (%)				-0.03



Calibrated By

(Mr. Apisit Sing-ha)
Field Environmental Scientist (4)

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

ALS Laboratory Group

RYG_EN0003

PENTA CALIBRATION

PENTA CALIBRATION CO., LTD.
66/124 The Connect 33 Village Kanchanaphisek Road
Dokmai Prawet Bangkok 10250
Tel: +66 (0) 2069-9773
www.pentacal.com

Certificate of Calibration

NSC-TISI-TIS17025
CALIBRATION 0324

Represent to Certificate of Calibration ,PTC/07/22099

Certificate No.:	PTC/07/22099	Page:	1 of 2
Equipment:	Digital Balance	Condition:	Normal
Manufacturer:	Sartorius	Serial No:	31709552
Model:	MSU224S-100-DU	ID No:	RYG_EN0003
Type of Balance:	Single interval		

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

REVIEW BY Thanitall.
APPROVED BY D.
NEXT CAL. DATE 23/03/23

Environment Condition:

Temperature	23.9 °C	±	0.3 °C
Humidity	58.1 %RH	±	4.4 %RH
Air density	1.17	kg/m^3	

Calibration Place: ALS Laboratory Group (Thailand) Co.,Ltd.
616/10 Moo 5 T.Maenamkoo, A.Pluakdaeng,
Rayong 21140, Thailand

The Method used: In house method, PTC-WI-07, base on Euramet cg. 18

Traceability: This certificate is traceable to the SI Units through Thai Calibration Service Co.,ltd. , NSC-ONSC Accreditation No.: Calibration 0189

Date Received: March 23, 2022
Calibration Date: March 23, 2022
Issued Date: March 25, 2022
Calibration By: Mr. Rungroje Melakul

PENTA CALIBRATION CO.,LTD

(Mr.Kriangsak Kalasri)
Reviewed by

Approved By :
(Mr. Keattisak Kerdto)
Laboratory Manager

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 recognised 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). The effect that the results relate only to the items calibrated.

This calibration certificate shall not be reproduced except in full only, without written approval from penta calibration co ., ltd

PENTA CALIBRATION

PENTA CALIBRATION CO., LTD.
66/124 The Connect 33 Village Kanchanaphisek Road
Dokmai Prawet Bangkok 10250
Tel: +66 (0) 2069-9773
www.pentacal.com

Represent to Certificate of Calibration ,PTC/07/22099

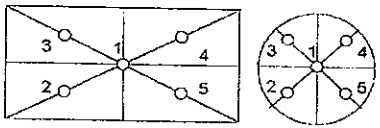
Certificate No.: PTC/07/22099

Measurement Results:

Without Adjustment :

Function Calibration: Non Adjustment

Eccentric Error: Weight to be 1/3 ,1/2 or of Maximum capacity



Eccentricity test 100 (g)

Position (g)				
1	2	3	4	5
0.0000	0.0000	-0.0001	-0.0001	0.0001
Maximum deviation:		0.0001		

Repeatability Test : Weight to be 1/2 ≤ L_1 ≤ Maximum capacity

Determination of the standard deviation of weighing balance., Readability 0.0001 (g)

Nominal test value (g)	Standard Deviation
200	0.00007

Error of indication : from nominal value., Readability 0.0001 (g)

Nominal Value (g)	Conventional Mass (g)	Indication (g)	Correction of Balance (g)	Uncertainty (g)	k
0	0.00000	0.0000	0.0000	0.00020	2.65
0.01	0.01000	0.0099	0.0001	0.00020	2.43
0.1	0.10000	0.1000	0.0000	0.00020	2.43
0.5	0.50000	0.5000	0.0000	0.00020	2.43
1	1.00000	1.0000	0.0000	0.00020	2.43
5	5.00001	5.0000	0.0000	0.00020	2.43
10	10.00000	10.0000	0.0000	0.00020	2.43
20	20.00003	20.0000	0.0000	0.00020	2.43
50	50.00004	50.0000	0.0000	0.00021	2.32
100	100.00004	99.9999	0.0001	0.00022	2.17
200	200.00011	200.0000	0.0001	0.00027	2.05

Note: Weight of adjust - (g)

The End of Certificate

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

NSC-TISI-TIS17025 CALIBRATION 0008

Certificate of Calibration

Certificate No. : 21P1350
Page : 1 of 2

Equipment : Digital Vacuum Gauge
Manufacturer: Dwyer
Model : DPGA-00
Serial No.: DVG03
ID No.: BKK_FS0435
Condition As-Received: Used Item
Received Date: 09 April 2021
Calibration Date: 20 April 2021

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: 2104-0323WSC
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Atmospheric Pressure: 1010 mbar

Submitted by: ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Phatthanakan, Khet Suan Luang,
Bangkok 10250 Thailand

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to in-house calibration procedure CP-P06, using " DKD-R 6-1 ; Calibration of Pressure Gauges, Edition 03/2014 " as a guidelines.

Condition of this result of calibration

1.Reference standards instuments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Pressure Calibrator	PC106P	1189	MP-0113-20	14 Jul 2021

2.This instrument was installed in vertical orientation and lower groove of pressure sensor was used as the reference level.
3.This result of calibration was made on requested at the point specified by customer.
4.Scale and conversion factor is 1 kPa = 0.2953 inHg
5.This instrument was used clean air as pressure media.
6.The certificate is valid only to the item calibrated on date and place of calibration.
7.This Certification is traceable to the International System of Unit maintained at:-
-National Institute of Metrology Thailand (NIMT)

REVIEW BY Narakorn P.
APPROVED BY
NEXT CAL. DATE 8/10/22

Calibrated by : Suwit Aussaree
Issue Date : 21 April 2021

Approved Signatory : Attapol P.
[ ] Phalinee Prabpaipal
[ ] Sura Suwannasri
[✓] Attapol Panurach

B 0256843

Result of calibration:- Without adjustment **Range :** 0 inHg to -30 inHg
Function:- Vacuum Pressure Measurement **Resolution :** 0.01 inHg

Increasing Pressure

Applied Pressure (inHg)	0.000	-4.998	-9.996	-14.994	-19.992	-26.487
UUC* Indication (inHg)	0.00	-5.05	-10.10	-15.20	-20.30	-26.90
Error (inHg)	0.000	-0.052	-0.104	-0.206	-0.308	-0.413

Decreasing Pressure

Applied Pressure (inHg)	-26.487	-19.992	-14.994	-9.996	-4.998	0.000
UUC* Indication (inHg)	-26.90	-20.30	-15.20	-10.10	-5.05	0.00
Error (inHg)	-0.413	-0.308	-0.206	-0.104	-0.052	0.000

The uncertainty of measurement was ± 0.090 inHg
* UUC = Unit Under Calibration
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 %.

-ooo-

Attapol P.

a 1046981

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

NSC-TISI-TIS17025 CALIBRATION 0008

Certificate of Calibration

Certificate No. : 21P3344
Page : 1 of 2

Equipment :	Vacuum Gauge
Manufacturer:	QualityWell
Model :	F221AVD
Serial No.:	VG02
ID No.:	RYG_FS0333
Condition As-Received:	Used Item
Received Date:	01 October 2021
Calibration Date:	06 October 2021

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:	2110-0066WSC
Ambient Temperature:	(23 ± 2) °C
Relative Humidity:	(50 ± 15) %
Atmospheric Pressure:	1008 mbar

Submitted by: ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Phatthanakan, Khet Suan Luang,
Bangkok 10250 Thailand

Procedure used: The calibration was conducted by direct comparison method against Pressure Measuring Instruments Standard according to in-house calibration procedure CP-P06, using " DKD-R 6-1 ; Calibration of Pressure Gauges, Edition 03/2014 " as a guidelines.

Condition of this result of calibration

1.Reference standards instuments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Digital Pressure Gauge	15PSIXP2I	158670	21P2929	03 Sep 2022

2.This instrument was installed in vertical orientation and center of the dial was used as the reference level.
3.This result of calibration was made on requested at the point specified by customer.
4.Scale and conversion factor is 1 kPa = 0.2953 inHg
5.This instrument was used clean air as pressure media.
6.The certificate is valid only to the item calibrated on date and place of calibration.
7.This Certification is traceable to the International System of Unit maintained at:-
-National Institute of Metrology Thailand (NIMT)

REVIEW BY Pimakorn P.
APPROVED BY
NEXT CAL. DATE 6/4/23

Calibrated by : Nopparat Phongam
Issue Date : 07 October 2021

Approved Signatory : Attapol P.
[ ] Phalinee Prabpalpal
[ ] Sura Suwannasri
[✓] Attapol Panurach

B 0270821

Cert.No.: 21P3344
Page: 2 of 2

Result of calibration:- Without adjustment
Function:- Vacuum Pressure Measurement

Range : 0 inHg to -30 inHg
Scale Interval : 0.5 inHg(The Fifth Estimate)

Increasing Pressure

Applied Pressure (inHg)	0.00	-4.97	-9.97	-14.97	-19.99	-26.02
UUC* Indication (inHg)	0.0	-5.0	-10.0	-15.0	-20.0	-26.0
Error (inHg)	0.00	-0.03	-0.03	-0.03	-0.01	0.02

Decreasing Pressure

Applied Pressure (inHg)	-26.00	-19.97	-14.95	-9.96	-4.97	0.00
UUC* Indication (inHg)	-26.0	-20.0	-15.0	-10.0	-5.0	0.0
Error (inHg)	0.00	-0.03	-0.05	-0.04	-0.03	0.00

The uncertainty of measurement was ± 0.12 inHg
* UUC = Unit Under Calibration
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 %.

-o0o-

Attapol P.

a 1075036

SPC Calibration Center

SPC RT
Part of DKSH Grou

ilac-MRA
NSC-TISI-TIS 17025 Calibration 0097

Certificate of Calibration

Equipment:	SPECTROPHOTOMETER	Certificate No.:	C06210159
Model:	DR6000	Issued Date:	01 April 2021
Serial No. (or ID.):	1627845 (RYG_EN0037)	Job No.:	KSPR2104738
Manufacturer:	HACH	Page:	1 of 3
Condition:	In Condition		

REVIEW BY N.Bamrit
APPROVED BY D.
NEXT CAL. DATE 01/10/22

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

Environment Condition:

Temperature	25.1	°C	±	0.4	°C
Humidity	48.8	%RH	±	3.7	%RH

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

Calibration By: Mr. Chattuphon Foithong
Calibration Date: 01 April 2021
The Method used: In house method, SPCC-WI-24, base on ASTM E 275-08 and ASTM E 387-04
Traceability: This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Starna Scientific Limited.

The standard for Wavelength Certificate No. 87146 and 87152
The standard for Photometric Certificate No. 87220 and 87139
The standard for Stray light Certificate No. 87163 and 87161
The standard for Spectral resolution Certificate No. 87173

(Mr. Chattuphon Foithong)
Person in charge

SPC RT
บริษัท เอสพีซี อาร์ทีี จำกัด
SPC RT Co., Ltd.

(Mr. Dumrong Boonsopon)
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 SPC RT Co., Ltd.

บริษัท เอสพีซี อาร์ทีี จำกัด
SPC RT CO., LTD.
สาขาที่ 00003 1194 ซอยวชิรธรรมสาธิต 57 ถนนสุขุมวิท 101/1 แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร 10260
Branch 00003 1194 Soi Wachirothamsathit 57, Sukhumvit 101/1 Road, Bangchak, Phrakhanong, Bangkok 10260 Thailand

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	418.4	0.21	0.13
536.66	536.7	-0.04	0.13
637.98	638.3	-0.32	0.14
748.48	748.7	-0.22	0.14
807.03	807.4	-0.37	0.14

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.5890	0.590	-0.0010	0.0045
	0.7616	0.762	-0.0004	0.0045
	1.0263	1.027	-0.0007	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.5787	0.579	-0.0003	0.0045
	0.7442	0.744	0.0002	0.0045
	1.0039	1.004	-0.0001	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.5292	0.530	-0.0008	0.0045
	0.6865	0.687	-0.0005	0.0045
	0.9534	0.954	-0.0006	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.5468	0.546	0.0008	0.0045
	0.6957	0.695	0.0007	0.0045
	0.9991	0.998	0.0011	0.0045
590 nm	0.0000	0.000	0.0000	0.0045
	0.5851	0.584	0.0011	0.0045
	0.7238	0.723	0.0008	0.0045
	1.0957	1.094	0.0017	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.5692	0.568	0.0012	0.0045
	0.6914	0.691	0.0004	0.0045
	1.0881	1.087	0.0011	0.0045

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
	0.7307	0.730	0.0007	0.0080
257 nm	0.0000	0.000	0.0000	0.0080
	0.8516	0.850	0.0016	0.0080
313 nm	0.0000	0.000	0.0000	0.0080
	0.2836	0.285	-0.0014	0.0080
350 nm	0.0000	0.000	0.0000	0.0080
	0.6319	0.629	0.0029	0.0080

Stray light *

Standard: cut-off	UUC: Wavelength (nm)	UUC: Transmission (%T)	Absorbance (A)
260.57 +/- 0.11 nm	260.6	1.5	1.824
392.03 +/- 0.11 nm	392.0	1.5	1.824

The stray light transmission reference is less than 1.0 T(%) and absorbance is greater than 2.0 (A)

Spectral Resolution *

Nominal Concentration 0.02 % v/v	Peak	Trough	Ratio	SBW
Standard Wavelength (nm)	268.72	266.76	1.39	2.00
UUC: Wavelength (nm)	268.2	266.1		
Std Absorbance (A)	0.4616	0.2797		
Absorbance (A)	0.416	0.300		

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

The End of Certificate

SPC Calibration Center

Part of DKSH Grou

ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: KSPR2104738

ชนิดเครื่องมือ: SPECTROPHOTOMETER รุ่น: DR6000 หมายเลขเครื่อง: 1627845

ตรวจสอบ (รับ) 01 Apr 2021 ปกติ	ไม่ปกติ	รายการตรวจเช็ค	ตรวจสอบ (ส่ง) 01 Apr 2021 ปกติ	ไม่ปกติ	หมายเหตุ
		General			
☑	☐	1. ความสมบูรณ์เครื่อง	☑	☐	
☑	☐	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	☑	☐	
☑	☐	3. สวิทช์ ปิด – เปิด เครื่อง (On-Off Swicth)	☑	☐	
☑	☐	4. ปุ่มกด (Keypad)	☑	☐	
☑	☐	5. หน้าจอ (Display, Screen Contrast)	☑	☐	
		Spectrophotometer			
☐	☐	6. แรงดันไฟฟ้า (Battery Backup) >= 2.5 VDC	☐	☐	
☐	☐	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	☐	☐	
☑	☐	8. ความยาวคลื่น (Wavelength Check)	☑	☐	656.1=656.1 nm
☑	☐	9. แหล่งกำเนิดแสง (UV < 3,000 hour)	☑	☐	
☑	☐	10. แหล่งกำเนิดแสง (Visible < 5,000 hour)	☑	☐	
☑	☐	11. ช่องวัดหลายตัวอย่าง (Carousel Module)	☑	☐	
		pH Meter and Conductivity Meter			
☐	☐	12. อิเล็คโทรด (Electrode and Connection Cable)	☐	☐	
☐	☐	13. ระดับสารละลายใน Electrode (Level KCl)	☐	☐	
☐	☐	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	☐	☐	
☐	☐	15. ขาจับอิเล็คโทรด (Stand)	☐	☐	
		Turbidimeter			
☐	☐	16. ค่าความขุ่นที่ต่ำสุด (No Sample)	☐	☐	
☐	☐	17. ระดับการส่องสว่างของแสง (>= 2.5 ไม่เกิน 3.0)	☐	☐	
		Automatic titrator			
☐	☐	18. สภาพ Piston Burettes	☐	☐	
☐	☐	19. Function Rinsing and Dosing	☐	☐	
☐	☐	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	☐	☐	

เพิ่มเติม/ข้อแนะนำ :

Mr. Chattuphon Foithong

Service Engineer

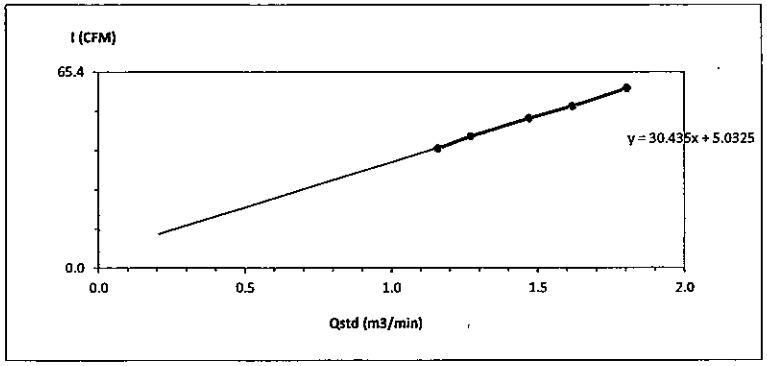
บริษัท เอสพีซี อาร์ที จำกัด
SPC RT CO., LTD.
ชั้นที่ 00003 1194 ซอยวัชรพลเศรษฐ 57 ถนนสุขุมวิท 101/1 แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร 10260
Floor 00003 1194 Soi Wachirapolsetsatha 57, Sukhumvit 101/1 Road, Bangchak, Phrakhanong, Bangkok 10260 Thailand

ALS

High Volume Air Sampler Calibration Worksheet

Project Site :	Siam Styrene Monomer Co.,Ltd	Barometric Pressure (mm Hg) :	758
Calibrate Location :	บ้านอ่าวประดู่ (โรงพยาบาลส่งเสริมสุขภาพตำบลตลาดกวน)	Temperature (°C) :	31
Calibrate Date :	21-Mar-22	High Volume ID :	RYG_FS0393
CalibrationSheet No.:	C-210322-RYG_FS0393	High Volume Model :	TE-5170D
Calibrator ID:	RYG_FS0206	High Volume S/N :	5682
Calibrator Model :	TE-5028A	Calibrator Slope :	1.4867
Calibrator S/N :	1543	Calibrator Intercept :	-0.0445

Test No.	Delta H_2O (inch)	Q_{std} (m^3/min)	I : Chart (CFM)	Linear Regression
1	2.8	1.1574	40	Slope : 30.4354
2	3.4	1.2708	44	Intercept : 5.0325
3	4.6	1.4709	50	Correlation Coefficient : 0.9995
4	5.6	1.6184	54	
5	7.0	1.8041	60	



Calibrated by Adisak. T

(Mr. Adisak Talesoon)
Field Scientist(2)

Approved by :

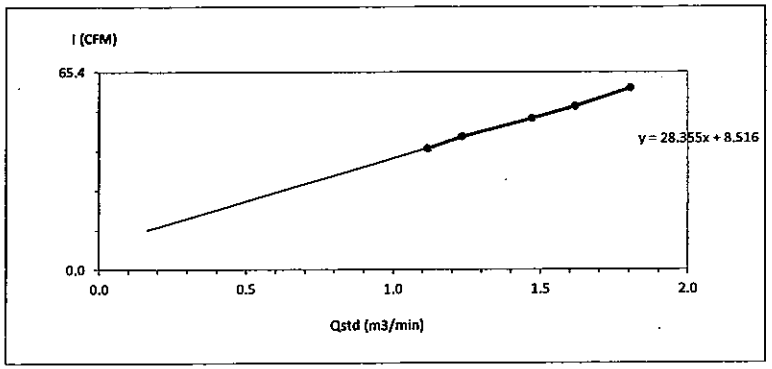
(Mr. Noppong Juntarupan)
Enviro Field Coordinator Scientist (3)

FORM NO.: F 06-073 REVISION NO.: - ISSUE DATE: 14/03/16

High Volume Air Sampler Calibration Worksheet

Project Site :	Siam Styrene Monomer Co.,Ltd	**Barometric Pressure (mm Hg) :**	758
Calibrate Location :	บ้านมาบตาพุด	**Temperature (°C) :**	31
Calibrate Date :	21-Mar-22	**High Volume ID :**	RYG_FS0291
CalibrationSheet No.:	C-210322-RYG_FS0291	**High Volume Model :**	TE-5170D
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	5333
Calibrator Model :	TE-5028A	**Calibrator Slope :**	1.4867
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.0445

Test No.	Delta H_2O (inch)	Q_{std} (m^3/min)	I : Chart (CFM)	Linear Regression	
1	2.6	1.1169	40	Slope :	28.3550
2	3.2	1.2342	44	Intercept :	8.5160
3	4.6	1.4709	50	Correlation Coefficient :	0.9988
4	5.6	1.6184	54		
5	7.0	1.8041	60		



Calibrated by Adisak. T

(Mr. Adisak Talesoon)
Field Scientist(2)

Approved by :

(Mr. Noppong Juntarupan)
Enviro Field Coordinator Scientist (3)

FORM NO.: F 06-073 REVISION NO.: - ISSUE DATE: 14/03/16

RYG_EN0001

PENTA CALIBRATION

PENTA CALIBRATION CO., LTD.
66/124 The Connect 33 Village Kanchanaphisek Road
Dokmai Prawet Bangkok 10250
Tel: +66 (0) 2069-9773
www.pentacal.com

Certificate of Calibration

NSC-TISI-TIS17025
CALIBRATION 0324

Represent to Certificate of Calibration ,PTC/07/22102

Certificate No.:	PTC/07/22102	Page:	1 of 2
Equipment:	Digital Balance	Condition:	Normal
Manufacturer:	Sartorius	Serial No:	25409664
Model:	LA130S-F	ID No:	RYG_EN0001
Type of Balance:	Single interval		

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

REVIEW BY Thanitah.
APPROVED BY
NEXT CAL. DATE 23/03/23

Environment Condition:

Temperature	23.9 °C	±	0.3 °C
Humidity	58.1 %RH	±	4.4 %RH
Air density	1.17	kg/m^3	

Calibration Place: ALS Laboratory Group (Thailand) Co.,Ltd.
616/10 Moo 5 T.Maenamkoo, A.Pluakdaeng,
Rayong 21140, Thailand

The Method used: In house method, PTC-Wt-07, base on Euramet cg. 18

Traceability: This certificate is traceable to the SI Units through Thai Calibration Service Co.,ltd.
. NSC-ONSC Accreditation No.: Calibration 0189

Date Received: March 23, 2022
Calibration Date: March 23, 2022
Issued Date: March 25, 2022
Calibration By: Mr. Rungroje Metakul

PENTA CALIBRATION CO.,LTD

(Mr.Kriangsak Kalasri)
Reviewed by

Approved By :
(Mr. Keatlisak Kerdto)
Laboratory Manager

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 recognised 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). The effect that the results relate only to the items calibrated.

This calibration certificate shall not be reproduced except in full only, without written approval from penta calibration co ., ltd

PTC-FMC-07-02: 2 Feb 2020

PENTA CALIBRATION

PENTA CALIBRATION CO., LTD.
66/124 The Connect 33 Village Kanchanaphisek Road
Dokmai Prawet Bangkok 10250
Tel: +66 (0) 2069-9773
www.pentacal.com

Represent to Certificate of Calibration ,PTC/07/22102

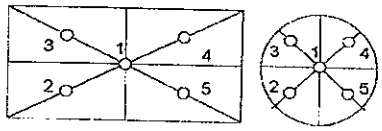
Certificate No.: PTC/07/22102

Measurement Results:

Without Adjustment :

Function Calibration: Non Adjustment

Eccentric Error: Weight to be 1/3 ,1/2 or of Maximum capacity



Eccentricity test 50 (g)

Position (g)				
1	2	3	4	5
0.0000	0.0000	-0.0001	0.0000	0.0001
Maximum deviation:		0.0001		

Repeatability Test : Weight to be 1/2 ≤ L_1 ≤ Maximum capacity

Determination of the standard deviation of weighing balance., Readability 0.0001 (g)

Nominal test value (g)	Standard Deviation
100	0.00009

Error of indication : from nominal value., Readability 0.0001 (g)

Nominal Value (g)	Conventional Mass (g)	Indication (g)	Correction of Balance (g)	Uncertainty (g)	k
0	0.00000	0.0000	0.0000	0.00026	2.87
0.01	0.01000	0.0100	0.0000	0.00026	2.65
0.05	0.05000	0.0500	0.0000	0.00026	2.65
0.1	0.10000	0.1000	0.0000	0.00026	2.65
0.5	0.50000	0.4999	0.0001	0.00026	2.65
1	1.00000	0.9999	0.0001	0.00026	2.65
2	2.00000	1.9999	0.0001	0.00026	2.65
5	5.00001	5.0000	0.0000	0.00026	2.65
10	10.00000	10.0001	-0.0001	0.00026	2.65
20	20.00003	20.0001	-0.0001	0.00026	2.52
100	100.00004	100.0001	-0.0001	0.00027	2.18

Note: Weight of adjust - (g)

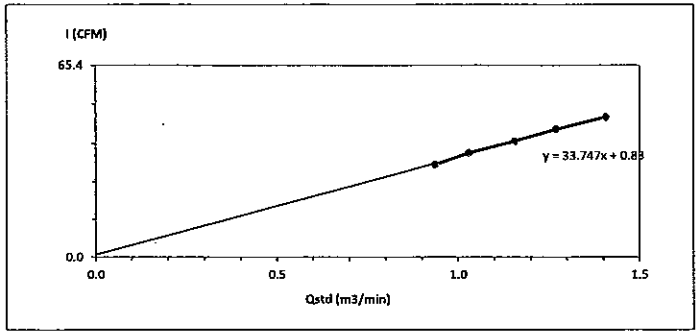
The End of Certificate

ALS

High Volume Air Sampler Calibration Worksheet

Project Site :	Siam Styrene Monomer Co.,Ltd	Barometric Pressure (mm Hg) :	758
Calibrate Location :	บ้านอ่าวประดู่ (โรงพยาบาลส่งเสริมสุขภาพตำบลดาวน)	Temperature (°C) :	31
Calibrate Date :	21-Mar-22	High Volume ID :	RYG_FS0191
CalibrationSheet No.:	C-210322-RYG_FS0191	High Volume Model :	TE-5009X
Calibrator ID:	RYG_FS0206	High Volume S/N :	5330
Calibrator Model :	TE-502BA	Calibrator Slope :	1.4867
Calibrator S/N :	1543	Calibrator Intercept :	-0.0445

Test No.	Delta H_2O (inch)	Q_{std} (m^3/min)	I : Chart (CFM)	Linear Regression	
1	1.8	0.9368	32	Slope :	33.7468
2	2.2	1.0310	36	Intercept :	0.8300
3	2.8	1.1574	40	Correlation Coefficient :	0.9983
4	3.4	1.2708	44		
5	4.2	1.4075	48		



Calibrated by Adisak.T

(Mr. Adisak Talesoon)
Field Scientist(2)

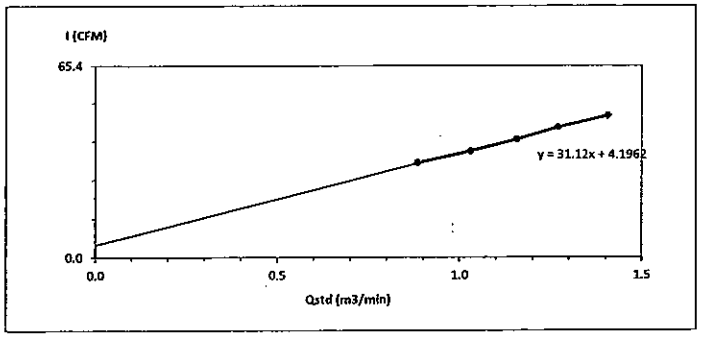
Approved by :

(Mr. Noppong Juntarupan)
Enviro Field Coordinator Scientist (3)

High Volume Air Sampler Calibration Worksheet

Project Site :	Siam Styrene Monomer Co.,Ltd	Barometric Pressure (mm Hg) :	758
Calibrate Location :	บ้านมาบตาพุด	Temperature (°C) :	31
Calibrate Date :	21-Mar-22	High Volume ID :	RYG_FS0188
CalibrationSheet No.:	C-210322-RYG_FS0188	High Volume Model :	TE-5009X
Calibrator ID:	RYG_FS0206	High Volume S/N :	4796
Calibrator Model :	TE-5028A	Calibrator Slope :	1.4867
Calibrator S/N :	1543	Calibrator Intercept :	-0.0445

Test No.	Delta H_2O (Inch)	Q_{std} (m^3/min)	I : Chart (CFM)	Linear Regression
1	1.6	0.8858	32	Slope : 31.1203
2	2.2	1.0310	36	Intercept : 4.1962
3	2.8	1.1574	40	Correlation Coefficient : 0.9992
4	3.4	1.2708	44	
5	4.2	1.4075	48	



Calibrated by Adisak. T

(Mr. Adisak Talesoon)
Field Scientist(2)

Approved by :

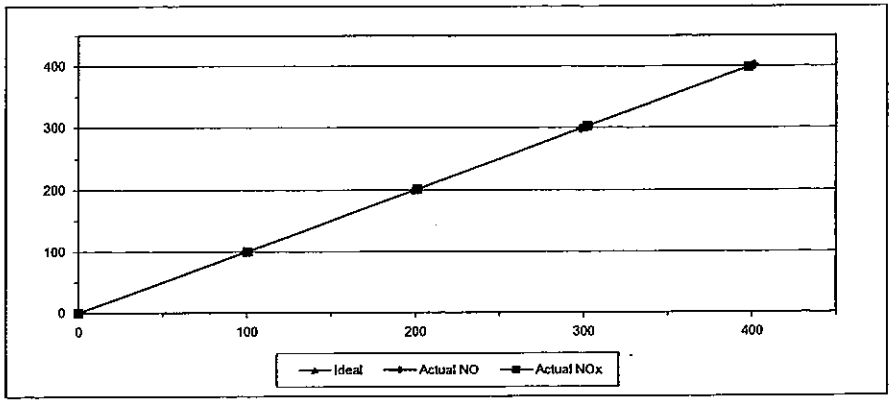
(Mr. Noppong Juntarupan)
Enviro Field Coordinator Scientist (3)

FORM NO.: F 06-074 REVISION NO.: - ISSUE DATE: 14/03/16

MULTIPOINT CALIBRATION REPORT

Calibration Date	4-Jan-22	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	148EH0E0	Equipment ID	BKK_FS1064
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	51.33	Cylinder No.	LL36633
Cylinder Pressure (psi)	1200	Certified By	Airgas Inc.
Certified Date	18-Mar-14	Expired Date	18-Mar-22

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.00	-1.00	-1.00	100.70	0.70	0.70
2	200.00	199.40	-0.60	-0.30	201.50	1.50	0.75
3	300.00	298.60	-1.40	-0.47	302.30	2.30	0.77
4	400.00	401.40	1.40	0.35	398.00	-2.00	-0.50
AVERAGE (%)				-0.26			0.36



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

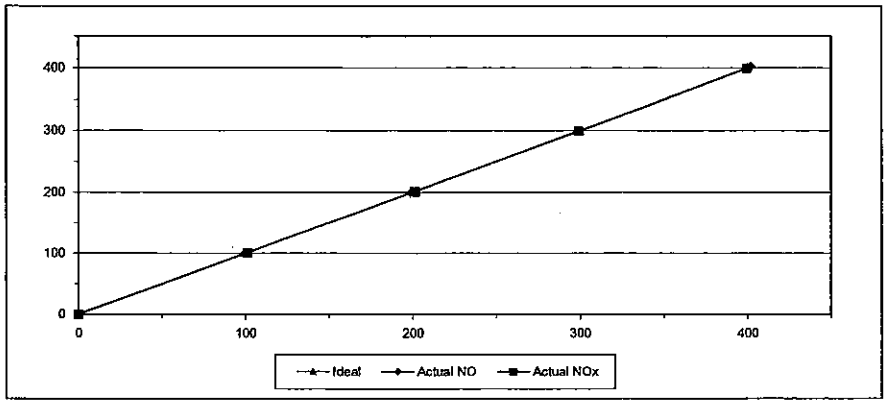
ALS Laboratory Group

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	4-Jan-22	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	H73KYD1M	Equipment ID	BKK_FS0797
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	51.33	Cylinder No.	LL36633
Cylinder Pressure (psi)	1200	Certified By	Airgas Inc.
Certified Date	18-Mar-14	Expired Date	18-Mar-22

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.70	-0.30	-0.30	101.00	1.00	1.00
2	200.00	198.60	-1.40	-0.70	201.30	1.30	0.65
3	300.00	299.00	-1.00	-0.33	299.20	-0.80	-0.27
4	400.00	402.10	2.10	0.53	399.50	-0.50	-0.13
AVERAGE (%)				-0.14			0.27



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

ALS Laboratory Group

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

JNAC
JIRANATE ASSOCIATES CO.,LTD.
63/14-15,67/35-36, Soi Petchkasem7,7/1, Petchkasem Rd,
Wattthapra, Bangkokyai,Bangkok 10600 Thailand.
Tel.: (66) 02-8680812#13 Fax.: (66) 02-8680860 www.jiranatee.com

CERTIFICATE OF CALIBRATION

Certificate No: WS-13072021
Page 1 of 2 pages

REVIEW BY .....
APPROVED BY .....
NEXT CAL. DATE 27/1/23

Measurement Item : Cup anemometer with data logger.

Manufacturer : Data logger: Novalynx.
: Cup anemometer: Novalynx.

Model/Type : Data logger: 200-WS-25LS.
: Cup anemometer: WS-02F.

Serial Number : Data logger: A5376.
: Cup anemometer: -.

ID No : Data logger: RYG_FS0413.
: Cup anemometer: -.

Customer : ALS laboratory group (Thailand) co. ltd.
: 104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.

Test Conditions

: Wind tunnel cross test section area	900	cm^2
: Anemometer frontal area	100	cm^2
: Diameter of mounting pipe		mm
: Blockage ratio of test object	0.111	(-)

Test Conditions

: Air temperature	24.8	±0.8 °C
: Air pressure	1007.4	±0.4 hPa
: Relative air humidity	52.4	±3.5 %RH

Calibration Procedure: Calibration was carried out base on:
IEC 61400-12-1 ED.1: 2005-Power Performance Measurements of Electricity Producing Wind Turbines;
MCASNCT Anemometer Calibration Procedure - Version 2: 2009.

Traceability: This calibration documents the traceable to national standard, Which realize the unit of measurements according to the international system of units (SI) through National Institute of Metrology Thailand (NIMT).

Measurement Date : Jul 29, 2021.
Issued Date : Jul 29, 2021.

Calibrated by
☑ Mr. Sorawit Thachatad
☐ Miss Orathai Wiwatwittaya

JNAC JIRANATE ASSOCIATES CO., LTD.

Approved Signatory: .....
Mr. Porinya Booncharoen
Technical Support
and Calibration Manager

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

63/14-15,67/35-36, Soi Petchkasem7,7/1, Petchkasem Rd,
Wathapra, Bangkokyai,Bangkok 10600 Thailand.
Tel.: (66) 02-8680812#13 Fax.: (66) 02-8680860 www.jiranatee.com

Result of calibration: ☑ Without adjustment ☐ With adjustment
Calibration in the range of 1 - 16 m/s at a calibration interval of 1 m/s.
The results of calibration and associated measurement uncertainties are reported in the table below.

V_{sto} Reading m/s	V_{UUC} Reading m/s	Error (m/s)	Uncertainty (%)
2.067	2.0	-0.1	2.4
4.138	4.1	0.0	1.2
6.03	6.1	0.1	0.97
7.99	8.0	0.0	0.84
10.00	10.1	0.1	0.59
12.03	12.2	0.2	0.72
13.99	14.3	0.3	0.47
15.98	16.4	0.4	0.35
15.03	15.3	0.3	0.38
12.99	13.1	0.1	0.69
11.01	11.1	0.1	0.57
9.01	9.0	0.0	0.87
6.99	7.1	0.1	0.81
5.177	5.1	-0.1	0.97
2.972	3.1	0.1	1.6
1.044	0.9	-0.1	5.3

UUC*: Unit Under Calibration
The reported expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%

Appendix 1: Instrumentations

NO	Sensor	Manufacturer	Model/Type	Calibration Date	Certificate Report Number	Range
1	Pitot static	TESTO INC.	06352145	July 16, 2020	MW-0035-20	5 - 30 m/s
2	Precision Differential Pressure Meter	Zoglab	DPM2500	July 16, 2020	MW-0035-20	5 - 30 m/s
3	Air velocity transducer (hot wire)	TSI INC.	8455-12	July 20, 2020	MW-0036AA-20	0 - 5 m/s
4	Temperature	Zoglab	DSP-THP	March 30, 2021	CL-027-64	-30 - 70°C
5	Relative humidity	Zoglab	DSP-THP	March 30, 2021	RH-03032021	0 - 100 %RH
6	Atmospheric pressure	Zoglab	DSP-THP	March 30, 2021	BP-01032021	500 - 1100 hPa
7	Wind tunnel	CSSOM	MP3300	-	-	0 - 50 Hz

End of certificate of calibration

JIRANATE ASSOCIATES CO., LTD.

63/14-15,67/35-36, Soi Petchkasem7,7/1, Petchkasem Rd,
Wathapra, Bangkokyai,Bangkok 10600 Thailand.
Tel.: (66) 02-8680812#13 Fax.: (66) 02-8680860 www.jiranatee.com

CERTIFICATE OF CALIBRATION

Certificate No.: WD-13072021
Page 1 of 2 pages

Measurement Item : Wind direction sensor with data logger.

Manufacturer : Data logger: Novalynx.
: Wind direction sensor: Novalynx.

Model/Type : Data logger: 200-WS-25LB.
: Wind direction sensor: WS-02F.

Serial Number : Data logger: A5375.
: Wind direction sensor: -.

ID No : Data logger: RYG_FS0413.
: Wind direction sensor: -.

Customer : ALS laboratory group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.

Environmental Condition:
The measurement was carried out in an ambient temperature of (23±3)°C, and relative humidity of (40±10)%.

Measurement Method:
The wind direction sensor calibration according to comparison method with reference angle measurement electronic theodolite and line laser is used for axis control. The measurement were taken at 45° intervals in clockwise and counterclockwise directions.

Note: The UUC was warmed up for 1 hour prior to the calibration being performed

Traceability:
The measurement results are traceable to the international system of units (SI) through Certificate No.: CC563-07-0045, Certificate No.: KWS63/0044.

Measurement Date : Jul. 29, 2021.
Issued Date : Jul. 29, 2021.

Performed by
☑ Mr. Sorawit Thachalad
☐ Miss Orathai Wiwatwitaya

JIRANATE ASSOCIATES CO., LTD.

Approved Signatory:.....
Mr. Parinya Booncharoen.
Technical Support
and Calibration Manager

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Wathapra, Bangkokyai,Bangkok 10600 Thailand.
Tel.: (66) 02-8680812#13 Fax.: (66) 02-8680860 www.jiranatee.com

Continuation of Certificate of Calibration Number

Certificate No: WD-13072021

Result of calibration: ☐ Without adjustment ☑ With adjustment.
Calibration in the range of 0 - 360 ° at a calibration interval of 45°.
The results of calibration and associated measurement uncertainties are reported in table below.

NO	Turning Direction	Nominal Angle (°)	Standard Reading (°)	UUC* Reading (°)	Error (°)	Uncertainty ±(°)
1	Clockwise	0/360	360	359	-1	3.0
2		45	45	42	-3	3.0
3		90	90	87	-3	3.0
4		135	135	134	-1	3.0
5		180	180	181	1	3.0
6		225	225	228	3	3.0
7		270	270	273	3	3.0
8		315	315	318	3	3.0
9	Counter Clockwise	0/360	360	359	-1	3.0
10		45	45	42	-3	3.0
11		90	90	87	-3	3.0
12		135	135	134	-1	3.0
13		180	180	181	1	3.0
14		225	225	228	3	3.0
15		270	270	273	3	3.0
16		315	315	318	3	3.0

UUC*: Unit Under Calibration The reported expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%

End of Certificate of Calibration

JIRANATE ASSOCIATES CO.,LTD.

63/14-15,67/35-36, Soi Petchkasem7,7/1, Petchkasem Rd,
Wathapra, Bangkokyai,Bangkok 10600 Thailand.
Tel.: (66) 02-8680812#13 Fax.: (66) 02-8680860 www.jiranatee.com

CERTIFICATE OF CALIBRATION

Certificate No: WS-12072021

REVIEW BY Narakorn P.
APPROVED BY
NEXT CAL. DATE 27/1/23

Measurement Item : Cup anemometer with data logger.

Manufacturer : Data logger: Novalynx.
: Cup anemometer: Novalynx.

Model/Type : Data logger: 200-WS-25LB.
: Cup anemometer: WS-02F.

Serial Number : Data logger: A5374.
: Cup anemometer: -

ID No : Data logger: RYG_FS0412.
: Cup anemometer: -

Customer : ALS laboratory group (Thailand) co. ltd.
: 104 Phatthanakan 40, Phatthanakan Rd. Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.

Test Conditions

: Wind tunnel cross test section area	900	cm^2
: Anemometer frontal area	100	cm^2
: Diameter of mounting pipe		mm
: Blockage ratio of test object	0.111	[-]

Test Conditions

: Air temperature	23.9	±0.8 °C
: Air pressure	1007.7	±0.4 hPa
: Relative air humidity	57.7	±3.5 %RH

Calibration Procedure Calibration was carried out base on:
IEC 61400-12-1 ED.1: 2005-Power Performance Measurements of Electricity Producing Wind Turbines;
MEASNET Anemometer Calibration Procedure - Version 2: 2009;

Traceability This calibration documents the traceable to national standard. Which realize the unit of measurements according to the international system of units (SI) through National Institute of Metrology Thailand (NIMT).

Measurement Date : Jul 29, 2021
Issued Date : Jul 29, 2021.

Calibrated by
☑ Mr. Sorawit Trachalad
☐ Miss Oratnai Wiwatwittaya.

JIRANATE ASSOCIATES CO.,LTD.

Approved Signatory:
Mr. Patinya Booncharoen
Technical Support
and Calibration Manager

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Watthapra, Bangkokyai,Bangkok 10600 Thailand.
Tel.: (66) 02-8680812#13 Fax.: (66) 02-8680860 www.jiranatee.com

Continuation of Certificate of Calibration Number

Certificate No: WS-12072021

Result of calibration: ☑ Without adjustment ☐ With adjustment
Calibration in the range of 1 - 16 m/s at a calibration interval of 1 m/s.
The results of calibration and associated measurement uncertainties are reported in the table below.

V_{510} Reading m/s	V_{UUC} Reading m/s	Error (m/s)	Uncertainty (%)
2.075	2.0	-0.1	2.5
4.150	4.1	-0.1	1.3
5.98	6.0	0.0	0.96
8.01	8.1	0.1	0.66
10.03	10.1	0.1	0.77
12.02	12.2	0.2	0.65
13.98	14.3	0.3	0.41
16.03	16.4	0.4	0.59
14.98	15.3	0.3	0.49
13.00	13.2	0.2	0.51
11.01	11.1	0.1	0.52
8.97	9.0	0.0	0.97
7.01	7.0	0.0	0.81
5.196	5.1	0.1	0.98
2.980	3.1	0.1	1.7
1.037	0.9	-0.1	5.4

UUC*: Unit Under Calibration
The reported expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%

Appendix 1: Instrumentations

NO	Sensor	Manufacturer	Model/Type	Calibration Date	Certificate Report Number	Range
1	Pitot static	TESTO INC.	06352145	July 16, 2020	MW-0035-20	5 - 30 m/s
2	Precision Differential Pressure Meter	Zeplab	DPM2500	July 16, 2020	MW-0035-20	5 - 30 m/s
3	Air velocity transducer (hot wire)	TSI INC.	8455-12	July 20, 2020	MW-0036AA-20	0 - 5 m/s
4	Temperature	Zeplab	DSR-THP	March 30, 2021	CL-027-64	-30 - 70°C
5	Relative humidity	Zeplab	DSR-THP	March 30, 2021	RH-03032021	0 - 100 %RH
6	Atmospheric pressure	Zeplab	DSR-THP	March 30, 2021	BP-01032021	500 - 1100 hPa
7	Wind tunnel	GESOM	MP3300	-		0 - 50 m/s

End of certificate of calibration

JIRANATE ASSOCIATES CO., LTD.

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Watthapra, Bangkokyai,Bangkok 10600 Thailand.
Tel.: (66) 02-8680812#13 Fax.: (66) 02-8680860 www.jiranatee.com

CERTIFICATE OF CALIBRATION

Certificate No.: WD-12072021

Measurement Item : Wind direction sensor with data logger.

Manufacturer : Data logger: Novalynx.
: Wind direction sensor: Novalynx.

Model/Type : Data logger: 200-WS-25LB.
: Wind direction sensor: WS-02P.

Serial Number : Data logger: A5374.
: Wind direction sensor: -.

ID No : Data logger: RYO_PS0412.
: Wind direction sensor: -.

Customer : ALS laboratory group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.

Environmental Condition:
The measurement was carried out in an ambient temperature of (23±3)°C, and relative humidity of (40±10)%.

Measurement Method:
The wind direction sensor calibration according to comparison method with reference angle measurement electronic theodolite and line laser is used for axis control. The measurement were taken at 45° intervals in clockwise and counterclockwise directions.

Note: The UUC was warmed up for 1 hour prior to the calibration being performed

Traceability:
The measurement results are traceable to the international system of units (SI) through Certificate No.: CC553-07-0045, Certificate No.: KWS63/0044.

Measurement Date : Jul 29, 2021.
Issued Date : Jul 29, 2021.

Performed by
☑ Mr. Sorawit Thachalad
☐ Miss Orathai Wiwatwitteya

JIRANATE ASSOCIATES CO., LTD.

Approved Signatory:.....
Mr. Parinya Boonchareon.
Technical Support
and Calibration Manager

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Wattthapra, Bangkokyai,Bangkok 10600 Thailand.
Tel.: (66) 02-8680812#13 Fax.: (66) 02-8680860 www.jiranatee.com

Continuation of Certificate of Calibration Number

Certificate No: WD-12072021

Result of calibration: ☐ Without adjustment ☑ With adjustment.

Calibration in the range of 0 - 360 ° at a calibration interval of 45°.

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

NO	Turning Direction	Nominal Angle (°)	Standard Reading (°)	UUC* Reading (°)	Error (°)	Uncertainty ±(°)
1	Clockwise	0/360	360	359	-1	3.0
2		45	45	42	-3	3.0
3		90	90	87	-3	3.0
4		135	135	133	-2	3.0
5		180	180	178	-2	3.0
6		225	225	226	1	3.0
7		270	270	273	3	3.0
8		315	315	318	3	3.0
9	Counter Clockwise	0/360	360	359	-1	3.0
10		45	45	42	-3	3.0
11		90	90	87	-3	3.0
12		135	135	133	-2	3.0
13		180	180	178	2	3.0
14		225	225	226	1	3.0
15		270	270	273	3	3.0
16		315	315	318	3	3.0

UUC*: Unit Under Calibration The reported expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%

End of Certificate of Calibration

JIRANATE ASSOCIATES CO., LTD.

ROTA METER CALIBRATION RESULT JANUARY 2022

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R^2)
BKK_FS0577	05 Jan 22	Y = 0.9899x + 0.9112	0.9999
BKK_FS0579	05 Jan 22	Y = 1.007x - 0.0299	1.0000
BKK_FS0583	05 Jan 22	Y = 1.0513x + 1.869	0.9967
BKK_FS0584	05 Jan 22	Y = 1.0048x - 1.069	1.0000
BKK_FS0585	05 Jan 22	Y = 1.0076x - 1.1036	0.9999
BKK_FS0586	05 Jan 22	Y = 0.9933x + 3.2655	1.0000
BKK_FS0587	05 Jan 22	Y = 1.0401x - 17.457	0.9996
BKK_FS0588	05 Jan 22	Y = 1.0154x + 4.8357	0.9999
BKK_FS0589	05 Jan 22	Y = 0.9918x + 4.8069	0.9999
BKK_FS0590	05 Jan 22	Y = 0.9861x + 10.07	0.9995
BKK_FS0591	05 Jan 22	Y = 1.0117x - 92.415	0.9995
BKK_FS0592	05 Jan 22	Y = 1.0031x - 69.305	0.9996
BKK_FS0593	05 Jan 22	Y = 1.0131x - 98.198	0.9996
BKK_FS0594	05 Jan 22	Y = 1.0075x - 7.0829	0.9999
BKK_FS0595	05 Jan 22	Y = 1.0249x - 98.162	0.9999
BKK_FS0596	05 Jan 22	Y = 0.9843x - 26.806	0.9991
BKK_FS0597	05 Jan 22	Y = 1.0203x - 122.14	0.9999
BKK_FS1004	04 Jan 22	Y = 0.9651x + 19.648	0.9989
BKK_FS1005	04 Jan 22	Y = 1.0096x + 4.6643	0.9997
BKK_FS1006	04 Jan 22	Y = 1.2188x - 7.1214	0.9994
BKK_FS1007	05 Jan 22	Y = 1.0563x - 1.0912	1.0000
BKK_FS1008	05 Jan 22	Y = 0.9689x + 1.9061	1.0000
BKK_FS1009	05 Jan 22	Y = 1.0132x + 1.1633	0.9960
BKK_FS1010	05 Jan 22	Y = 1.0033x + 0.5758	0.9999
BKK_FS1014	05 Jan 22	Y = 1.0021x + 0.3148	0.9998
BKK_FS1015	05 Jan 22	Y = 0.9994x + 1.786	1.0000
BKK_FS1016	05 Jan 22	Y = 1.0105x - 80.256	0.9998
BKK_FS1017	05 Jan 22	Y = 0.9995x + 0.649	1.0000
BKK_FS1018	05 Jan 22	Y = 1.0011x + 1.1786	1.0000
BKK_FS1019	05 Jan 22	Y = 1.0023x - 68.424	0.9996
BKK_FS1020	05 Jan 22	Y = 0.9887x + 2.8844	0.9999
BKK_FS1021	05 Jan 22	Y = 0.9659x + 1.4905	0.9978
BKK_FS1022	05 Jan 22	Y = 1.022x - 17.957	0.9997
BKK_FS1023	05 Jan 22	Y = 1.0094x + 0.0717	0.9999
BKK_FS1024	05 Jan 22	Y =1.0042x + 0.4086	0.9997
BKK_FS1025	05 Jan 22	Y = 1.0132x - 88.507	0.9996
BKK_FS1026	05 Jan 22	Y = 0.9902x + 0.9554	1.0000
BKK_FS1027	05 Jan 22	Y = 1.0086x - 2.279	1.0000
BKK_FS1028	05 Jan 22	Y = 1.0105x - 81.055	0.9997

ROTA METER CALIBRATION RESULT JANUARY 2022

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R^2)
BKK_FS1029	05 Jan 22	Y = 0.9935x + 0.8234	1.0000
BKK_FS1030	05 Jan 22	Y = 1.0039x + 0.515	0.9999
BKK_FS1031	05 Jan 22	Y = 1.009x - 79.295	0.9998
BKK_FS1039	04 Jan 22	Y = 0.9916x + 6.1524	0.9988
BKK_FS1040	04 Jan 22	Y = 1.0133x - 10.177	0.9985
BKK_FS1041	04 Jan 22	Y = 1.0805x - 1.7381	0.9998
BKK_FS1042	04 Jan 22	Y = 1.0061x + 1.3405	0.9994
BKK_FS1043	04 Jan 22	Y = 1.0112x - 10.393	0.9999
BKK_FS1044	04 Jan 22	Y = 1.0495x - 1.0136	0.9996
BKK_FS1161	05 Jan 22	Y = 0.9812x + 15571	1.0000
BKK_FS1162	05 Jan 22	Y = 0.9932x + 5.0014	0.9997
BKK_FS1163	05 Jan 22	Y = 1.0082x - 82.062	0.9998
BKK_FS1164	05 Jan 22	Y = 0.9914x + 0.8427	0.9997
BKK_FS1165	05 Jan 22	Y = 0.9893x + 6.5919	0.9998
BKK_FS1166	05 Jan 22	Y = 1.0031x - 77.881	0.9996
RYG_FS0197	04 Jan 22	Y = 1.0068x + 1.7152	0.9998
RYG_FS0198	04 Jan 22	Y = 0.9986x + 18.196	0.9995
RYG_FS0199	04 Jan 22	Y = 1.1202x - 3.5782	0.9999

Review By : (Mr. Wichan Choonharat)
Enviro Field Services Manager

Approved By : (Mr.Sarayuth Jittranont)
Assistant General Manager

ROTA METER CALIBRATION RESULT APRIL 2022

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R^2)
BKK_FS0577	01 Apr 22	Y = 1.0202x + 0.1976	1.0000
BKK_FS0579	01 Apr 22	Y = 1.0078x + 0.4789	0.9998
BKK_FS0583	01 Apr 22	Y = 1.016x + 0.3922	1.0000
BKK_FS0584	01 Apr 22	Y = 1.0036x + 2.2262	0.9997
BKK_FS0585	01 Apr 22	Y = 1.0189x - 5.6476	0.9997
BKK_FS0586	01 Apr 22	Y = 1.0095x - 1.1524	0.9995
BKK_FS0587	01 Apr 22	Y = 1.013x - 3.6619	0.9996
BKK_FS0588	01 Apr 22	Y = 1.0154x + 4.8357	0.9999
BKK_FS0589	01 Apr 22	Y = 0.9918x + 4.8069	0.9999
BKK_FS0590	01 Apr 22	Y = 1.0038x - 0.4857	0.9996
BKK_FS0591	01 Apr 22	Y = 0.9705x - 52.174	0.9986
BKK_FS0592	01 Apr 22	Y = 0.9646x - 37.642	0.9985
BKK_FS0593	01 Apr 22	Y = 0.9767x - 58.445	0.9988
BKK_FS0594	01 Apr 22	Y = 0.9902x - 62.87	0.9999
BKK_FS0595	01 Apr 22	Y = 1.0249x - 98.162	0.9999
BKK_FS0596	01 Apr 22	Y = 0.9843x - 26.806	0.9991
BKK_FS0597	01 Apr 22	Y = 0.9802x - 61.653	0.9978
BKK_FS1004	01 Apr 22	Y = 0.9696x + 17.69	0.9990
BKK_FS1005	01 Apr 22	Y = 1.0065x + 5.6786	0.9997
BKK_FS1006	01 Apr 22	Y = 1.2142x - 7.1037	0.9993
BKK_FS1007	01 Apr 22	Y = 0.9917x + 1.6592	1.0000
BKK_FS1008	01 Apr 22	Y = 1.0132x + 0.7207	1.0000
BKK_FS1009	01 Apr 22	Y = 1.0132x + 1.1633	0.9960
BKK_FS1010	01 Apr 22	Y = 1.0033x + 0.5758	0.9999
BKK_FS1011	01 Apr 22	Y = 1.0234x + 0.1759	0.9996
BKK_FS1012	01 Apr 22	Y = 1.0106x - 2.0048	0.9997
BKK_FS1013	01 Apr 22	Y = 0.9677x - 35.851	0.9997
BKK_FS1014	01 Apr 22	Y = 1.0021x + 0.3148	0.9998
BKK_FS1015	01 Apr 22	Y = 0.9994x + 1.786	1.0000
BKK_FS1016	01 Apr 22	Y = 1.0105x - 80.256	0.9998
BKK_FS1017	01 Apr 22	Y = 0.9995x + 0.649	1.0000
BKK_FS1018	01 Apr 22	Y = 1.0011x + 1.1786	1.0000
BKK_FS1019	01 Apr 22	Y = 1.0023x - 68.424	0.9996
BKK_FS1020	01 Apr 22	Y = 1.0547x - 0.666	0.9998
BKK_FS1021	01 Apr 22	Y = 1.018x - 3.3286	0.9998
BKK_FS1022	01 Apr 22	Y = 0.9932x - 57.035	0.9986
BKK_FS1023	01 Apr 22	Y = 1.0094x + 0.0717	0.9999
BKK_FS1024	01 Apr 22	Y =1.0042x + 0.4086	0.9997

ROTA METER CALIBRATION RESULT APRIL 2022

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R^2)
BKK_FS1025	01 Apr 22	Y = 1.0132x - 88.507	0.9996
BKK_FS1026	01 Apr 22	Y = 1.0018x + 1.0776	0.9997
BKK_FS1027	01 Apr 22	Y = 1.0053x + 0.231	0.9995
BKK_FS1028	01 Apr 22	Y = 0.9792x - 60.312	0.9982
BKK_FS1029	01 Apr 22	Y = 0.9935x + 0.8234	1.0000
BKK_FS1030	01 Apr 22	Y = 1.0039x + 0.515	0.9999
BKK_FS1031	01 Apr 22	Y = 1.009x - 79.295	0.9998
BKK_FS1039	01 Apr 22	Y = 0.9868x + 7.8119	0.9993
BKK_FS1040	01 Apr 22	Y = 1.0096x - 7.2905	0.9990
BKK_FS1041	01 Apr 22	Y = 1.076x - 2.0503	0.9999
BKK_FS1042	01 Apr 22	Y = 1.0054x + 1.6095	0.9995
BKK_FS1043	01 Apr 22	Y = 1.0108x - 11.048	0.9999
BKK_FS1044	01 Apr 22	Y = 1.0468x - 0.9391	0.9997
BKK_FS1161	01 Apr 22	Y = 1.0126x + 0.7738	0.9999
BKK_FS1162	01 Apr 22	Y = 0.9994x + 2.6357	0.9995
BKK_FS1163	01 Apr 22	Y = 0.977x - 55.03	0.9987
BKK_FS1164	01 Apr 22	Y = 0.9914x + 0.8427	0.9997
BKK_FS1165	01 Apr 22	Y = 0.9893x + 6.5919	0.9998
BKK_FS1166	01 Apr 22	Y = 1.0031x - 77.881	0.9996
RYG_FS0197	01 Apr 22	Y = 1.0055x + 1.1914	0.9998
RYG_FS0198	01 Apr 22	Y = 0.996x + 23.788	0.9996
RYG_FS0199	01 Apr 22	Y = 1.1166x - 3.3942	0.9998

Review By : (Mr. Wichan Choonharat)
Enviro Field Services Manager

Approved By : (Mr.Sarayuth Jittranont)
Assistant General Manager

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Agilent CrossLab Compliance Services

Certificate of System Qualification

GC-OQ + GCMS-OQ

REVIEW BY Sarayut M.
APPROVED BY Ch
NEXT CAL. DATE 1 April 23

System ID:	GM-2
Organization Name:	ALS Laboratory Group (Thailand) Co., Ltd.
Organization Location:	104 Phatthanakan 40, Phattanakan Rd., Kheiwaeng Suan Luang, Khet Suan Luang, Bangkok 10250
Date:	October 1, 2021 1:10:17 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	24.9	psi

Accuracy: 0.1 psi
Agilent Recommended: <= 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 7890

Setpoint Status:	Pass					
Zone:	Oven					
	Setpoint/Actual					
Temperature:	230.0	230.5	°C			
Accuracy:		0.5	°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	101.5	°C			
Accuracy:		1.5	°C			
Agilent Recommended:	>=	-1.0	% setpoint in K	(	-3.7	°C)
	<=	1.0	% setpoint in K	(	3.7	°C)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name:	7890		
Setpoint Status:	Pass		
	Setpoint/Average		
Temperature:	100.0	101.5	°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			

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:				RFPA Voltage:	
			6	mV			461	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
	Injection Tower			
Name:	7693A			
Source:	EI - Inert			

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Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Signal to Noise EI

Tested Combination1 Front MMI / External SQ

Name: 5975C Inert XL with TAD

Source: EI - Inert Filament: 1

Setpoint Status: Pass

Signal to Noise: 619

Agilent Recommended: >= 320

Source: EI - Inert Filament: 2

Setpoint Status: Pass

Signal to Noise: 647

Agilent Recommended: >= 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 uL

Area RSD: 4.75 % Retention Time RSD: 0.02 %

Agilent Recommended: <= 5.00 <= 1.00

Overall Injection Precision Test Status

Pass

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Mass Ratio Precision

Tested Combination1 Front MMI / External SQ

Injection Tower

Name: 7693A

Source: EI - Inert

Setpoint Status: Pass

Injection Volume on Column: 1.0 uL

	Area Mass 1 Abundance*s	Mass Ratio
RSD:	4.75 %	0.81 %
Agilent Recommended:	<= 5.00	<= 5.00
	Pass	Pass

Overall Mass Ratio Precision Test Status

Pass

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

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

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

Electronic Signature

Purpose

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Details

Full Name of Signer:	Supasak Nimsongtham
Logged On User Name:	supasak.nimsongtham@agilent.com
Signature Creation Date:	October 1, 2021
Reason for Signature:	Executed protocol and published this original version of document

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User Name: supasak.nimsongtham
Hostname: 5CG1115HKC

System Id: GM-2
Print Date: October 1, 2021 1:10:19 PM

ALS_GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:42:37 PM	Audit	SessionCreated	Session	None
October 1, 2021 12:42:37 PM	Start	Configuration	Session	None
October 1, 2021 12:42:37 PM	Audit	Entitlement	Licensing	User is FieldEngineer and does not require an unlock code
October 1, 2021 12:44:21 PM	Audit	EqpLoaded	Session	EQP details for primary technique [Gc] - File path: [ProtocolPacks/Gc/Configurations/02.51/Gc.02.51.eqp], EQP File Name: [Gc.02.51.eqp], EQP Name: [AgilentRecommended] 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]
October 1, 2021 12:44:24 PM	End	Configuration	Session	None
October 1, 2021 12:44:28 PM	Start	Qualification	Session	OQ
October 1, 2021 12:44:28 PM	Start	Execution	System Inspection and Basic Safety and Operation - 7890: - Qualitative Test - No setpoints associated	None

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User Name: supasak.nimsongtham
Hostname: 5CG1115HKC

System Id: GM-2
Print Date: October 1, 2021 1:10:19 PM

ALS_GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:47:35 PM	End	Execution	System Inspection and Basic Safety and Operation - 7890: - Qualitative Test - No setpoints associated	Run Count : 1
October 1, 2021 12:47:37 PM	Start	Execution	Inlet Pressure Accuracy - Front MMI: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
October 1, 2021 12:47:42 PM	End	Execution	Inlet Pressure Accuracy - Front MMI: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
October 1, 2021 12:47:44 PM	Start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
October 1, 2021 12:48:04 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
October 1, 2021 12:48:05 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
October 1, 2021 12:48:07 PM	Start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
October 1, 2021 12:48:34 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
October 1, 2021 12:48:36 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

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User Name: supasak.nimsongtham
Hostname: 5CG1115HKC

System Id: GM-2
Print Date: October 1, 2021 1:10:19 PM

ALS_GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:48:38 PM	Start	Execution	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None
October 1, 2021 12:49:34 PM	Audit	Data	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
October 1, 2021 12:49:35 PM	End	Execution	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Run Count : 1
October 1, 2021 12:49:37 PM	Start	Execution	Log Amp - 5975C Inert XL with TAD SQ: - Source: EI - Inert	None
October 1, 2021 12:49:47 PM	End	Execution	Log Amp - 5975C Inert XL with TAD SQ: - Source: EI - Inert	Run Count : 1
October 1, 2021 12:49:48 PM	Start	Execution	RFPA - 5975C Inert XL with TAD SQ: - Source: EI - Inert	None
October 1, 2021 12:50:23 PM	End	Execution	RFPA - 5975C Inert XL with TAD SQ: - Source: EI - Inert	Run Count : 1
October 1, 2021 12:50:25 PM	Start	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: - EI - Inert Filament 1 (Qualitative - No setpoints associated)	None
October 1, 2021 12:50:49 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: - EI - Inert Filament 1 (Qualitative - No setpoints associated)	Run Count : 1
October 1, 2021 12:50:50 PM	Start	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: - EI - Inert Filament 2 (Qualitative - No setpoints associated)	None
October 1, 2021 12:50:59 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: - EI - Inert Filament 2 (Qualitative - No setpoints associated)	Run Count : 1

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User Name: supasak.nimsongtham
Hostname: 5CG1115HKC

System Id: GM-2
Print Date: October 1, 2021 1:10:19 PM

ALS_GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:51:01 PM	Start	Execution	Scouting Run - Injection Tower, Front MMI, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	None
October 1, 2021 12:51:18 PM	Audit	Data	Scouting Run - Injection Tower, Front MMI, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	Data files Path : E:\GM2OQ2021\SCOUTING RUN001.D\DATA.MS
October 1, 2021 12:51:42 PM	Audit	Data	Scouting Run - Injection Tower, Front MMI, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	Data files Path : E:\GM2OQ2021\SCOUTING RUN001.D\DATA.MS
October 1, 2021 12:52:42 PM	Audit	Data	Scouting Run - Injection Tower, Front MMI, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	Data files Path : E:\GM2OQ2021\SCOUTING RUN001.D\DATA.MS
October 1, 2021 12:53:25 PM	End	Execution	Scouting Run - Injection Tower, Front MMI, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	Run Count : 1
October 1, 2021 12:53:27 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 1 - L: >= 320	None
October 1, 2021 12:53:40 PM	Audit	Data	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 1 - L: >= 320	Data files Path : E:\GM2OQ2021\SNF1_001.D \DATA.MS
October 1, 2021 12:53:55 PM	End	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 1 - L: >= 320	Run Count : 1

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User Name: supasak.nimsongtham
Hostname: SCG1115HKC

System Id: GM-2
Print Date: October 1, 2021 1:10:19 PM

ALS_GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:53:59 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	None
October 1, 2021 12:54:04 PM	Audit	Data	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	Data files Path : E:\GM2OQ2021\SNF2_001.D \DATA.MS
October 1, 2021 12:54:22 PM	End	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	Run Count : 1
October 1, 2021 12:54:26 PM	Start	Execution	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Rel. Time): <= 1.00%	None
October 1, 2021 12:54:37 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Rel. Time): <= 1.00%	Data files Path : E:\GM2OQ2021\P_MRP003. D\DATA.MS
October 1, 2021 12:54:37 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Rel. Time): <= 1.00%	Data files Path : E:\GM2OQ2021\P_MRP004. D\DATA.MS
October 1, 2021 12:54:37 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Rel. Time): <= 1.00%	Data files Path : E:\GM2OQ2021\P_MRP005. D\DATA.MS
October 1, 2021 12:54:37 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Rel. Time): <= 1.00%	Data files Path : E:\GM2OQ2021\P_MRP006. D\DATA.MS

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User Name: supasak.nimsongtham
Hostname: SCG1115HKC

System Id: GM-2
Print Date: October 1, 2021 1:10:19 PM

ALS_GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:54:37 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Rel. Time): <= 1.00%	Data files Path : E:\GM2OQ2021\P_MRP007. D\DATA.MS
October 1, 2021 12:54:37 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Rel. Time): <= 1.00%	Data files Path : E:\GM2OQ2021\P_MRP008. D\DATA.MS
October 1, 2021 12:54:52 PM	End	Execution	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Rel. Time): <= 1.00%	Run Count : 1
October 1, 2021 12:54:55 PM	Start	Execution	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	None
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM2OQ2021\P_MRP003. D\DATA.MS
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM2OQ2021\P_MRP004. D\DATA.MS
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM2OQ2021\P_MRP005. D\DATA.MS
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM2OQ2021\P_MRP006. D\DATA.MS

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User Name: supasak.nimsongtham
Hostname: SCG1115HKC

System Id: GM-2
Print Date: October 1, 2021 1:10:19 PM

ALS_GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM2OQ2021\P_MRP007.D\DATA.MS
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM2OQ2021\P_MRP008.D\DATA.MS
October 1, 2021 12:55:10 PM	End	Execution	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Run Count : 1
October 1, 2021 12:55:13 PM	End	Qualification	Session	OQ
October 1, 2021 12:55:13 PM	Start	Reporting	Session	None
October 1, 2021 1:09:11 PM	Audit	Reporting	Session	Report Generated : Certificate

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SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

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

NSC-TISI-TIS 17025
CALIBRATION 0394

Cert. No. : ACC21009
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) %

REVIEW BY Nanakorn
APPROVED BY
NEXT CAL. DATE 9/8/22

Received Date : 05 AUGUST 2021
Calibration Date : 09 AUGUST 2021
Date of Issue : 11 AUGUST 2021

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petch
(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.

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-0011-21	10-Feb-22
Digital Multimeter	33461A	MY53220104	EEL.BP. 05/0264	10-Feb-22
Digital Multimeter	8846A	1997025	EEL.BP. 06/0264	05-Feb-22
Digital Multimeter	33461A	MY53220116	EEL.BP. 04/0264	10-Feb-22
Programmable Attenuator	MAT-1070	62100114	1500-07774E	08-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KAI	34560495	AA-3003-21	16-Feb-22
Audio Analyzer	AVR-3360A	V744B6069	EF-0010-21	10-Feb-22

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).

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit (dB)
94	94.06	0.06	0.14	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Tolerance limit (%)
1000	1001.5	0.1	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
1.67	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 lavel of confidence of approximately 95 %

End of Calibration Certificate

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

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

NSC-TISI-TIS 17025
CALIBRATION 0394

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 01222722 / 143840 / 22769
ID No.: RYG_FS0021

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) %

REVIEW BY Manakorn P.
APPROVED BY
NEXT CAL. DATE 21/1/23

Received Date : 14 JANUARY 2022
Calibration Date : 21-24 JANUARY 2022
Date of Issue : 25 JANUARY 2022

Calibrated by : Nathakorn Pisutpaisan

Approved by :

(Thanakul Petchurai)

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

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert.No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0012-21	10-Feb-22
Waveform Generator	33511B	MY52302742	EF-0011-21	10-Feb-22
Digital Multimeter	33461A	MY53220104	EEL.BP.05/0264	10-Feb-22
Digital Multimeter	33461A	MY53220076	EEL.BP. 03/0264	08-Feb-22
Digital Multimeter	34461A	MY60024273	1-1518072525-1	15-Sep-22
Programmable Attenuator	MAT-1070	62100114	1500-07774E	08-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KA1	34560495	AA-3003-21	16-Feb-22

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).

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.96)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
16.8

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

Frequency Weighting	Measured value (dB)
A - weight	11.9
C - weight	18.0
Flat	23.7

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.1	0.1	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-0.5	-0.4	-0.4	±5.0

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	-
Slow	94.0	0.0	± 0.1
Leq	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. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.1	0.1	± 1.1
84.0	84.1	0.1	± 1.1
79.0	79.1	0.1	± 1.1
74.0	74.1	0.1	± 1.1
69.0	69.1	0.1	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.1	0.1	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.1	0.1	± 1.1
28.0	28.0	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

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	±5.0
	2	8	117.0	117.0	0.0	±2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	±5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	±5.0
	2	8	108.0	108.0	0.0	±2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.7	-0.7	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.6	89.5	-0.1	±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 lavel of confidence of approximately 95 %.

End of Calibration Certificate

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

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

NSC-TISI-TIS 17025
CALIBRATION 0394

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 01122607 / 145554 / 34373
ID No.: RYG_FS0019

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) %

REVIEW BY Nathakorn P.
APPROVED BY
NEXT CAL. DATE 10/1/23

Received Date : 05 JANUARY 2022
Calibration Date : 10-12 JANUARY 2022
Date of Issue : 13 JANUARY 2022

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petch.
(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.

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0012-21	10-Feb-22
Waveform Generator	33511B	MY52302742	EF-0011-21	10-Feb-22
Digital Multimeter	33461A	MY53220104	EEL.BP. 05/0264	10-Feb-22
Digital Multimeter	33461A	MY53220076	EEL.BP. 03/0264	08-Feb-22
Digital Multimeter	34461A	MY60024273	1-15180725251-1	15-Sep-22
Programmable Attenuator	MAT-1070	62100114	1500-07774E	08-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KAI	34560495	AA-3003-21	16-Feb-22

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

T. Petch.

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

T. Petch..

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.96)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
16.5

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

Frequency Weighting	Measured value (dB)
A - weight	13.1
C - weight	19.4
Flat	24.8

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.5	0.5	0.6	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-1.7	-1.7	-1.6	±5.0

T. Petch -

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	-0.1	±2.0
125	-0.1	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.0	0.0	± 0.3

T. Petch.

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.1	0.1	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.1	0.1	± 1.1
69.0	69.1	0.1	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.1	0.1	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.9	-0.1	± 1.1

T. Petch.

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 , -5.0
	2	8	117.0	117.0	0.0	1.0 , -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 , -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 , -5.0
	2	8	108.0	108.0	0.0	1.0 , -2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	136.3	-0.1	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

T. Petch.

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.5	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

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SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

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

NSC-TISI-TIS 17025
CALIBRATION 0394

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00597169 / 180411 / 88181
ID No.: RYG_FS0439

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) %

REVIEW BY: Nanthan P.
APPROVED BY:
NEXT CAL. DATE: 6/8/22

Received Date : 05 AUGUST 2021
Calibration Date : 06 -10 AUGUST 2021
Date of Issue : 11 AUGUST 2021

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petch.
(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.

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0012-21	10-Feb-22
Waveform Generator	33511B	MY52302742	EF-0011-21	10-Feb-22
Digital Multimeter	33461A	MY53220104	EEL.BP-05/0264	10-Feb-22
Digital Multimeter	8846A	1997025	EEL.BP-06/0264	05-Feb-22
Digital Multimeter	33461A	MY53220116	EEL.BP-04/0264	10-Feb-22
Programmable Attenuator	MAT-1070	62100114	1500-07774E	08-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KA1	34560495	AA-3003-21	16-Feb-22

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

T. Petch.

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.96)	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	17.5
Flat	23.0

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 84 dB.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.3	0.3	± 1.5
1000	0.0	0.0	0.1	± 1.0
8000	1.3	1.4	1.4	±5.0

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	0.0	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	-
Slow	94.0	0.0	± 0.1
Leq	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. 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	33.9	-0.1	± 1.1
30.0	29.9	-0.1	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.8	-0.2	± 1.1
25.0	24.9	-0.1	± 1.1

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, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
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	-
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

T. Pothan.

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.6	89.6	0.0	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

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

End of Calibration Certificate

T. Pothan.

ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT
975 Moo 4, Bangpoo Industrial Estate, Soi 8, Sukhumvit Road km 37,
Phraek Sa, Mueang Samut Prakan, Samut Prakan 10280
Tel: +66 2709 4860-8 Fax: +66 2324 0917-8

NSC-TISI-TIS 17025
CALIBRATION 0119

Certificate No.: 0225SV21
Operation No.: CP2021050035

Certificate of Calibration

Equipment:	Sound Level Meter
Manufacturer:	RION
Model/Type:	NL-42 (Meter), UC-52 (Microphone), NH-24 (Preamplifier)
Serial No.:	00472132 (Meter), 169445 (Microphone), 72466 (Preamplifier)
ID No.:	RYG_FS0304
Customer:	ALS Labolatory Group (Thailand) Co.,Ltd.
Address:	104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan Khet Suan Luang, Bangkok 10250 Thailand
Received Date:	28 May 2021
Calibrated Date:	2 - 9 June 2021
Issued Date:	11 June 2021
Calibrated by:	Ms. Juntaporn Kunhakom

REVIEW BY Pitakorn P.
APPROVED BY
NEXT CAL. DATE 2/6/22

Approved by:
(Mr. Sittichai Sw...)
Group Manager

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%. This certificate may not be reproduced other than in full except with the prior written approval of the Electrical and Electronics Institute, Foundation for Industrial Development.

F-CAL-004 Ed.0

ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: 0225SV21

Calibration Report

Equipment:	Sound Level Meter
Manufacturer:	RION
Model/Type:	NL-42 (Meter), UC-52 (Microphone), NH-24 (Preamplifier)
Serial No.:	00472132 (Meter), 169445 (Microphone), 72466 (Preamplifier)
ID No.:	RYG_FS0304
Ambient Temperature:	(23 ± 2) °C
Relative Humidity:	(50 ± 15) %
Pressure:	(101.3 ± 1.5) kPa

Method of Calibration :-
IEC 61672-3:2013.

Condition of this result of calibration

1. Reference standards instrument :-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Standard microphone	4180	2787490	AA-1001-21	12 January 2022
2) Sine generator	1051	1501442	0151RF20	21 September 2021
3) Arbitrary Function Generator	AFG2021	C010063	0099RF20	17 June 2021
4) Programmable Attenuator	PA5	2913	EF-0017-21	1 April 2022
5) Programmable Attenuator	PA5	2755	EF-0034-20	10 November 2021
6) 6.5 Digit precision multimeter	8846A	9609027	0498EL20	10 August 2021
7) 6.5 Digit precision multimeter	8846A	9610014	0669EL20	27 October 2021
8) Pressure humidity and Temperature Transmitter	PTU301	L3950484	CL1-P210020 0176TE21	22 March 2022 1 April 2022

2. This result of calibration was found accurate as shown on date and place of calibration only.
3. This certification is traceable to the international system of unit maintained at :-
   Reference standards instrument for Acoustic function
   - National Institute of Metrology (Thailand)
   Reference standards instrument for Electrical function
   - National Institute of Metrology (Thailand)
   - Electrical and Electronics Institute; ONSC Accredited Calibration No.0119

Result of Calibration:-

Function : 1. Indication at the calibration check frequency

Reference Acoustic Signal (dB)	Measured value (dB)	Deviation (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.0

Note : Absolute sensitivity was established by the use of the Sound Calibrator RION Type NC-74 S/N : 34615278.

F-CAL-005 Ed.1

Certificate No.: 0225SV21

Calibration Report

Function : 2. Self-generated Noise

2.1 Microphone Installed

Measured value (dB)
14.5

2.2 Microphone replaced by the electrical input signal device

Frequency Weighting	Measured value (dB)
A-weighting	10.4
C-weighting	17.5
Z-weighting	23.1

Function : 3. Acoustical signal tests of frequency weightings (Without Windscreen)

Meter free-field acoustic response at a level of 84 dB.

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
125	0.3	0.6	0.3	±1.5
1000	0.1	0.1	0.1	±1.0
8000	-0.9	-0.9	-1.0	±5.0

Function : 4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
63	-0.1	-0.1	0.0	±2.0
125	0.0	-0.1	0.0	±1.5
250	0.0	-0.1	0.0	±1.5
500	0.1	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	0.1	0.1	0.0	±5.0

Function : 5. Frequency and time weighting at 1 kHz

5.1 Frequency weighting at 1 kHz

Frequency Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
C-weighting	94.0	0.0	±0.2
A-weighting	94.0	0.0	±0.2
Z-weighting	94.0	0.0	±0.2

Certificate No.: 0225SV21

Calibration Report

5.2 Time weighting at 1 kHz

Time Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	94.0	0.0	±0.1
Slow	94.0	0.0	±0.1
LAeq	94.0	0.0	±0.1

Function : 6. Long-Term Stability

Long-term stability over 30 minutes, with steady 1 kHz signal at reference level.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
30	94.0	94.0	0.0	±0.3

Function : 7. Level Linearity on the reference level range

7.1 Level Linearity on the reference level range, Upper

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.1
99.0	99.0	0.0	±1.1
104.0	104.0	0.0	±1.1
109.0	109.0	0.0	±1.1
114.0	114.0	0.0	±1.1
119.0	119.0	0.0	±1.1
124.0	124.0	0.0	±1.1
129.0	129.0	0.0	±1.1
130.0	130.0	0.0	±1.1
131.0	131.0	0.0	±1.1
132.0	132.0	0.0	±1.1
133.0	133.0	0.0	±1.1
134.0	134.0	0.0	±1.1
135.0	135.0	0.0	±1.1
136.0	136.0	0.0	±1.1
137.0	137.0	0.0	±1.1

7.2 Level Linearity on the reference level range, Lower

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
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

Certificate No.: 0225SV21

Calibration Report

7.2 Level Linearity on the reference level range, Lower (Cont.)

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
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	33.9	-0.1	±1.1
29.0	28.8	-0.2	±1.1
24.0	23.9	-0.1	±1.1

Function : 8. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	200	126.0	0.0	±1.0
	2	109.0	0.0	+1.0 ; -2.5
	0.25	99.9	-0.1	+1.5 ; -5.0
Slow	200	119.6	0.0	±1.0
	2	100.0	0.0	+1.0 ; -5.0
LAE	200	120.0	0.0	±1.0
	2	100.0	0.0	+1.0 ; -2.5
	0.25	90.9	-0.1	+1.5 ; -5.0

Function : 9. Peak C sound level

Number of cycles in test signal	Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Complete cycle	125.4	125.4	0.0	±3.0
Positive half cycle	124.4	124.1	-0.3	±2.0
Negative half cycle	124.4	124.1	-0.3	±2.0

Function : 10. Overload indication

Measured value (dB)		Deviated value (dB)	Acceptance limits (dB)
Positive one-half cycle	Negative one-half cycle		
139.5	139.4	-0.1	±1.5

Certificate No.: 0225SV21

Calibration Report

Function : 11. High-Level Stability

High-level stability over 5 minutes, with steady 1 kHz signal, 1 dB below upper boundary.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
5	129.0	129.0	0.0	±0.3

Uncertainty of measurement

Function	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1) Indication at the calibration check frequency	0.30	Not applicable
2) Self-generated Noise	0.10	Not applicable
3) Acoustical signal tests of frequency weightings - Free-field sound pressure response level	0.30	0.60 (10Hz to 4kHz) 0.70 (>4kHz to 10kHz)
4) Electrical signal tests of frequency weightings	0.20	0.20
5) Frequency and time weighting at 1 kHz	0.20	0.20
6) Long-Term Stability	0.10	0.10
7) Level Linearity on the reference level range	0.30	0.30
8) Tone burst response	0.20	0.30
9) Peak C sound level	0.20	0.35
10) Overload indication	0.20	0.25
11) High-Level Stability	0.10	0.10

Remarks: 1. The acceptance limit is for the deviated value.
2. Acceptance limits was IEC61672-3:2013 Class 2.

- - End of Report - -

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

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

NSC-TISI-TIS 17025
CALIBRATION 0394

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 01222716 / 143832 / 22763
ID No.: RYG_FS0020

Condition As Found : GOOD

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

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

REVIEW BY Nitnaporn P.
APPROVED BY
NEXT CAL. DATE 10/1/23

Received Date : 05 JANUARY 2022
Calibration Date : 10-12 JANUARY 2022
Date of Issue : 13 JANUARY 2022

Calibrated by : Nathakorn Pisutpaisan

Approved by :
(Thanakul Petchurai)

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

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0012-21	10-Feb-22
Waveform Generator	33511B	MY52302742	EF-0011-21	10-Feb-22
Digital Multimeter	33461A	MY53220104	EEL.BP. 05/0264	10-Feb-22
Digital Multimeter	33461A	MY53220076	EEL.BP. 03/0264	08-Feb-22
Digital Multimeter	34461A	MY60024273	1-15180725251-1	15-Sep-22
Programmable Attenuator	MAT-1070	62100114	1500-07774E	08-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KAI	34560495	AA-3003-21	16-Feb-22

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).

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.96)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.6

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

Frequency Weighting	Measured value (dB)
A - weight	12.6
C - weight	19.2
Flat	24.6

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	0.7	0.7	0.7	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-2.1	-2.0	-2.0	±5.0

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

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	-
Slow	94.0	0.0	±0.1
Leq	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. 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	38.9	-0.1	±1.1
34.0	34.0	0.0	±1.1
30.0	29.9	-0.1	±1.1
29.0	28.9	-0.1	±1.1
28.0	27.9	-0.1	±1.1
27.0	26.9	-0.1	±1.1
26.0	25.9	-0.1	±1.1
25.0	24.8	-0.2	±1.1

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, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	136.3	-0.1	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.1	0.1	-
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.6	89.6	0.0	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

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

End of Calibration Certificate

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX. 0-2719-9484

ilac-MRA

NSC-TISI-TIS17025
CALIBRATION 0003

Cert.No.: 22CH405
Page.: 1 of 3

Certificate of Calibration

Equipment :	pH Meter
Manufacturer :	Mettler Toledo
Model :	Sevon Compact S220
Serial No. :	C104059460
ID No. :	RYG_EN0183
Condition As-Received:	Used Item
Received Date :	16 March 2022
Calibration Date :	17 March 2022
Reference :	2203-0611DSC-4
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

REVIEW BY N. Bamrit
APPROVED BY
NEXT CAL. DATE 17/3/23

Calibrated by : Warakorn Lerngagtrakul

Approved by : Malee
Approved Signatory

(✓) Malee Butkruea
( ) Saithip Meangmai
( ) Warakorn Lerngagtrakul

Issue Date : 22 March 2022

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 0037307

Cert.No.: 22CH405
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	21E2682	25 Aug 2022
2) Ref. Standard Thermometer	4982054	110RC044	21I1201	26 Oct 2022

This certification is traceable to the International System of Unit maintained at:-
- Traceable to National Institute of Metrology (Thailand), NIMT

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	788995	01 Jan 2024
pH 6.982	CPA chem	761017	02 Aug 2022
pH 10.015	CPA chem	766824	04 Sep 2022

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	Coverage factor
	pH	mV	mV	pH	(±mV)	k
pH Meter	4.000	177.48	177.4	4.000	0.058	2.00
S/N.: C104059460	7.000	0.00	-0.1	7.000	0.058	2.00
	10.000	-177.48	-177.5	10.000	0.058	2.00

Malee

a 1100955

Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (±)	Coverage factor *k*
pH Electrode	4.008	4.010	177.7	0.0046	2.00
S/N.: 1453404	6.982	6.988	3.6	0.0084	2.00
	10.015	10.010	-172.9	0.0073	2.05

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLab Expert Pro-ISM
- Serial No. : 1453404

Dimension of probe;

- Length : 120 mm.
- Diameter : 12 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor *k*
25.0	25.002	24.9	-0.102	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-

Malu.

a 1100954

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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NSC-TISI-TIS17025 CALIBRATION 0008

Certificate of Calibration

Equipment :	pH Meter
Manufacturer:	Mettler Toledo
Model :	SevenCompact S220
Serial No.:	C104059460
ID No.:	RYG_EN0183
Condition As-Received:	Used Item
Received Date:	16 March 2022
Calibration Date:	21 March 2022
Reference:	2203-0611DSC
Ambient Temperature:	(23 ± 2) °C
Relative Humidity:	(50 ± 10) %

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

Procedure used: Calibration were conducted using in-house calibration Procedure CP-E17 According to direct measurement method with Multi-Product Calibrator.

Condition of this result of calibration

1.Reference standards instuments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Multi-Product Calibrator	5500A	6440007	21E1444	07 May 2022

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 at:-

-National Institute of Metrology Thailand (NIMT)

REVIEW BY N.Bandit
APPROVED BY
NEXT CAL. DATE 21/3/23

Calibrated by : Pongsagorn Boonyaporn
Issue Date : 22 March 2022

Approved Signatory :
[✓] Phalinee Prabpaipal
[ ] Nuntawat Khamchai
[ ] Pornthippa Tameyakul

B 0284414

Result of calibration :- (*) Without adjustment ( ) After adjustment

Function: DC voltage measurement **Range:** 2000 mV

Standard Value (mV)	UUC* Reading (mV)	Error (mV)	Uncertainty (± µV)
-200.0000	-200.0	0.0	72
-150.0000	-150.0	0.0	69
-100.0000	-100.0	0.0	65
-50.0000	-50.0	0.0	62
0.0000	0.0	0.0	58
50.0000	50.0	0.0	62
100.0000	100.0	0.0	65
150.0000	150.0	0.0	69
200.0000	200.0	0.0	72

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 1101070

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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Certificate of Testing

Equipment : DO Meter
Manufacturer : YSI
Model : 5100
Serial No. : 15L102139
ID No. : RYG_EN0140
Received Date : 29 January 2021
Test Date : 02 February 2021
Reference : 2101-0817DSC-1
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
Rayong Branch
Eastern Seaboard Industrial Estate (Rayong)
64/77 Moo 4,Building No.B1, Highway 331,
Km91.5, T.Pluakdaeng, A.Pluakdaeng,
Rayong 21140 Thailand

REVIEW BY M.Bandit
APPROVED BY D.
NEXT CAL. DATE 3/8/22

Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method

Calibrated by : Walalak Sirithean

Approved by : Malu.
Approved Signatory

(✓) Malee Butkruea
( ) Saithip Meangmai
( ) Warakorn Lemgagtrakul

Issue Date : 3 February 2021

B 0252485

Result : Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: 16C100647

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.02	8.02	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-

Malu.

a 1038971

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Ilac-MRA

NSC-TISI-TIS17025 CALIBRATION 0000

Certificate of Calibration

Equipment :	DO Meter with Sensor
Manufacturer :	YSI
Model :	5100
Serial No. :	15L102139
ID No. :	RYG_EN0140
Submitted by :	ALS Laboratory Group (Thailand) Co.,Ltd. Rayong Branch Eastern Seaboard Industrial Estate (Rayong) 64/77 Moo 4 Building No.B1, Highway 331 km. 91.5, T. Pluakdaeng, A. Pluakdaeng, Rayong 21140 Thailand
Location :	TPA On Site Calibration Laboratory
Received Order :	29 January 2021
Calibrated Date :	3 February 2021
Ambient Temperature :	(26 ± 10) °C
Relative Humidity :	(50 ± 30) %
AC Line Voltage :	(220 ± 22) V
Calibrated by :	Malee Butkruea
Approved by :	Approved Signatory

( ) Pornthippa Tameyakul
(✓) Suwit Imjai

Issue Date : 4 February 2021

The Uncertainties are for a confidence probability of approximately 95%

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A 0024028

Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2101-0817DSC-2

Cert. No.: 21TM271
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	Model	Serial No.	Cert. No.	Due Date
1) Digital Thermometer	1523	2188080	20I1389	20 Nov 2021

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 maintained at:-
   - National Institute of Metrology Thailand (NIMT)

Result of Calibration :- (*) Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 16C100647

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (±°C)	Coverage Factor k
20.00	60	20.008	19.96	-0.048	0.15	2.00

UUC* : Unit Under Calibration

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

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a 1038626

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NSC-TISI-TCS17025 CALIBRATION 0008

Certificate of Calibration

Cert. No.: 22TM317
Page.: 1 of 3

Equipment : Low Temp. Incubator
Manufacturer : Memmert
Model : IPP750
Serial No. : V818.0084
ID No. : RYG_EN0154
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch) 616/10 Moo 5 T.Maenam Khu, A.Pluakdaeng, Rayong 21140, Thailand
Location : BOD Room

REVIEW BY N.Bamrit
APPROVED BY D.
NEXT CAL. DATE 21/10/23

Received Order : 22 April 2022
Calibration Date : 22 April 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %

Calibrated by : Man Pattanapongpalboon

Approved by :
Approved Signatory

( ) Pornthippa Tameyakul
(✓) Malee Butkruea
( ) Suwit Imjai

Issue Date : 3 May 2022

The Uncertainties are for a confidence probability of approximately 95%

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A 0040735

Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2204-0146OC-1

Cert. No.: 22TM317

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

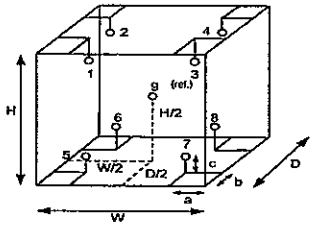
Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY44031769	21LM12	02 Sep 2022

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



Environment during calibration		
[redacted]	Beginning	Finished
Temp. (°C)	25	25
REL.Humid. (%)	54	58
AC Supply (Volt)	221	223

Position :	Ref. Std. ID No.:
1	9RTD-2/1
2	9RTD-2/2
3	9RTD-2/3
4	9RTD-2/4
5	9RTD-2/5
6	9RTD-2/6
7	9RTD-2/7
8	9RTD-2/8
9 (ref.)	9RTD-2/9

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

Malu .

Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2204-0146OC-1

Cert. No.: 22TM317

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)	Uncertainty (±°C)	Coverage Factor *k*
20.0	20.0	20.0	0.022	0.20	0.22	0.30	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
20.0	20.209	20.174	20.199	20.110	20.075	20.062	20.027	20.069	20.030

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

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Malu .

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66/124 The Connect 33 Village Kanchanaphisek Road
Dokmai Prawet Bangkok 10250
Tel: +66 (0) 2069-9773
www.pentacal.com

Certificate of Calibration

NSC-TISI-TIS17025
CALIBRATION 0324

Represent to Certificate of Calibration ,PTC/07/22103

Certificate No.:	PTC/07/22103	Page:	1 of 2
Equipment:	Digital Balance	Condition:	Normal
Manufacturer:	Sartorius	Serial No:	26207038
Model:	MSE224S-100-DU	ID No:	RYG_EN0002
Type of Balance:	Single interval		

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

REVIEW BY Thanitall.
APPROVED BY D.
NEXT CAL. DATE 23/03/24

Environment Condition:

Temperature	23.9 °C	±	0.3 °C
Humidity	58.1 %RH	±	4.4 %RH
Air density	1.17		kg/m^3

Calibration Place: ALS Laboratory Group (Thailand) Co.,Ltd.
616/10 Moo 5 T.Maenamkoo, A.Pluakdaeng,
Rayong 21140, Thailand

The Method used: In house method, PTC-WI-07, base on Euramet cg. 18

Traceability: This certificate is traceable to the SI Units through Thai Calibration Service Co.,ltd.
. NSC-ONSC Accreditation No.: Calibration 0189

Date Received: March 23, 2022
Calibration Date: March 23, 2022
Issued Date: March 25, 2022
Calibration By: Mr. Rungroje Metakul

PENTA CALIBRATION CO.,LTD.

(Mr.Kriangsak Kalasri)
Reviewed by

Approved By :
(Mr. Keattisak Kerdto)
Laboratory Manager

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 recognised 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). The effect that the results relate only to the items calibrated.

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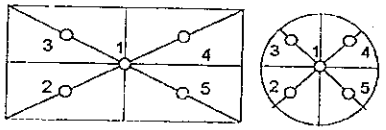
Dokmai Prawet Bangkok 10250
Tel: +66 (0) 2069-9773
www.pentacal.com

Measurement Results:

Without Adjustment :

Function Calibration: Non Adjustment

Eccentric Error: Weight to be 1/3 .1/2 or of Maximum capacity



Eccentricity test 100 (g)

Position (g)				
1	2	3	4	5
0.0000	0.0000	-0.0002	0.0002	0.0002
Maximum deviation:			0.0002	

Repeatability Test : Weight to be 1/2 ≤ L, ≤ Maximum capacity

Determination of the standard deviation of weighing balance., Readability 0.0001 (g)

Nominal test value (g)	Standard Deviation
200	0.00003

Error of indication : from nominal value., Readability 0.0001 (g)

Nominal Value (g)	Conventional Mass (g)	Indication (g)	Correction of Balance (g)	Uncertainty (g)	k
0	0.00000	0.0000	0.0000	0.000086	2.16
0.01	0.01000	0.0100	0.0000	0.00010	2.06
0.1	0.10000	0.1000	0.0000	0.00010	2.06
1	1.00000	1.0000	0.0000	0.00010	2.06
2	2.00000	1.9999	0.0001	0.00010	2.06
5	5.00001	5.0000	0.0000	0.00010	2.06
10	10.00000	10.0000	0.0000	0.00010	2.06
20	20.00003	19.9999	0.0001	0.00011	2.05
50	50.00004	49.9999	0.0001	0.00012	2.00
100	100.00004	100.0001	-0.0001	0.00017	2.00
200	200.00011	200.0000	0.0001	0.00027	2.00

Note: Weight of adjust - (g)

The End of Certificate

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NSC-TISI-TIS17025 CALIBRATION 0008

Cert. No.: 21TM827
Page.: 1 of 3

Certificate of Calibration

REVIEW BY Thamtalk.
APPROVED BY D.
NEXT CAL. DATE 3/11/22

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 :	5 May 2021
Calibration Date :	5 May 2021
Ambient Temperature :	(26 ± 10) °C
Relative Humidity :	(50 ± 30) %
Calibrated by :	Khit Rutanaprapachai
Approved by :	Approved Signatory

( ) Pornthippa Tameyakul
(✓) Malee Butkruea
( ) Suwit Imjai

Issue Date : 14 May 2021

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2105-0005OC-4

Cert. No.: 21TM827
Page.: 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD) and Thermocouple Type T.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY57013823	21LM3	26 Feb 2022

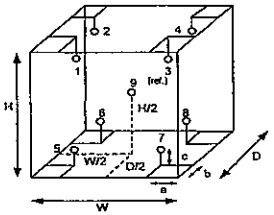
2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	29
REL.Humid. (%)	59	56
AC Supply (Volt)	220	221



Probe Installation Details :			Dimension of Chamber :		
a =	5.0	cm	D =	0.40	m
b =	5.0	cm	W =	0.56	m
c =	5.0	cm	H =	0.48	m
			Capacity =	0.11	m³

	Ref. Std. ID No.: @ Calibration Point	
Position :	(104) °C	(180) °C
1	21-17RTD-01	19-17TC-01
2	21-17RTD-02	19-17TC-02
3	17RTD-03	19-17TC-03
4	17RTD-04	19-17TC-04
5	17RTD-05	19-17TC-05
6	17RTD-06	19-17TC-06
7	17RTD-07	19-17TC-07
8	17RTD-08	19-17TC-08
9 (ref.)	17RTD-09	19-17TC-09

Equipment : Hot Air Oven

Condition As-Received : Used Item

Reference : 2105-0005OC-4

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Cert. No.: 21TM827

Page.: 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (±°C)	Coverage Factor *k*
104.0	104.0	104.0	0.063	0.54	0.70	0.42	2
180.0	180.0	180.0	0.15	0.89	1.3	1.1	2

Calibration Point (°C)	Measured Temperature (°C) Position								
	1	2	3	4	5	6	7	8	9 (ref.)
104.0	104.243	103.732	103.760	103.742	103.863	103.743	104.311	103.689	103.815
180.0	180.101	180.481	179.401	179.692	179.980	179.943	180.127	179.915	179.709

Average* : The average of 30 values in each position.

Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.

Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

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Malu.

a 1054286

RYG_EN0006

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ilac-MRA

NSC-TISI-TIS17025 CALIBRATION 0005

Cert. No.: 21TM829

Page.: 1 of 3

Certificate of Calibration

REVIEW BY Thanatall.

APPROVED BY D.

NEXT CAL. DATE 3/11/22.

Equipment : Hot Air Oven

Manufacturer : Memmert

Model : UM 400

Serial No. : b495.0899

ID No. : RYG_EN0006

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 : 5 May 2021

Calibration Date : 5 - 6 May 2021

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Khit Ruttanaprapachai

Approved by : Malu.
Approved Signatory

( ) Pornthippa Tameyakul
(✓) Malee Butkruea
( ) Suwit Imjai

Issue Date : 14 May 2021

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0028096

Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2105-0005OC-1

Cert. No.: 21TM829
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	MY57013823	21LM3	26 Feb 2022

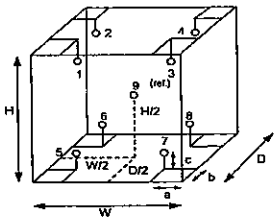
2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
[redacted]	Beginning	Finished
Temp. (°C)	29	30
REL.Humid. (%)	56	58
AC Supply (Volt)	221	222



Position :	Ref. Std. ID No.:
1	21-17RTD-01
2	21-17RTD-02
3	17RTD-03
4	17RTD-04
5	17RTD-05
6	17RTD-06
7	17RTD-07
8	17RTD-08
9 (ref.)	17RTD-09

Probe Installation Details :

a = 5.0 cm
b = 5.0 cm
c = 5.0 cm

Dimension of Chamber :

D = 0.33 m
W = 0.40 m
H = 0.40 m
Capacity = 0.053 m³

Mahu .

a 1054310

Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2105-0005OC-1

Cert. No.: 21TM829
Page.: 3 of 3

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (±°C)	Coverage Factor *k*
70.0	70.0	70.0	0.21	1.8	2.0	0.55	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
70.0	70.404	70.277	70.607	70.307	68.789	69.257	68.846	69.331	70.495

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-27 FAX.0-2719-9484

NSC-TISI-TIS17025 CALIBRATION 0008

Cert. No.: 21TM673
Page.: 1 of 3

Certificate of Calibration

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 :	5 May 2021
Calibration Date :	5 May 2021
Ambient Temperature :	(26 ± 10) °C
Relative Humidity :	(50 ± 30) %
Calibrated by :	Tawatchai Pama

REVIEW BY Thanitak
APPROVED BY D.
NEXT CAL. DATE 3/11/22

Approved by :

Approved Signatory

( ) Pornthippa Tameyakul
(✓) Malee Butkruea
( ) Suwit Imjai

Issue Date : 14 May 2021

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 :	Water Bath
Condition As-Received :	Used Item
Reference :	2105-0005OC-3

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT04 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:-

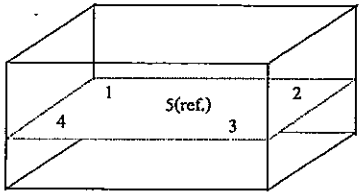
Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY44060450	21LM4	06 Mar 2022

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

	Environmental		AC Voltage Supply
	(°C)	(%R.H.)	(Volt)
Beginning of Calibration	22	68	230
Finished of Calibration	20	64	231



Front

Position :	Ref. Std. S/N.:
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 : 2105-0005OC-3
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source

Cert. No.: 21TM673
Page.: 3 of 3

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C) Position 1	2	3	4	5 (ref.)
85.0	85.0	85.0	84.891	84.893	84.880	84.892	84.917

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Uncertainty (± °C)	Coverage Factor *k*
85.0	0.089	0.052	0.22	2

Average* : The average of 30 values in each position.
Uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Stability : One-half of the greatest maximum difference of measured temperature at any one probe.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity.

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor *k*, providing a level of confidence of approximately 95 %.

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Malu

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NSC-MRA
NSC-TMI-TIS17025 CALIBRATION 0068

Certificate of Calibration

Certificate No. : 21T1200
Page : 1 of 2

Equipment : Digital Thermometer With Sensor
Manufacturer: Testo
Model : 106
Serial No.: 31281494/504
ID No.: RYG_FS0467
Condition As-Received: Used Item
Received Date: 02 July 2021
Calibration Date: 07 July 2021 to 08 July 2021
Reference: 2107-0069DSC
Ambient Temperature: (25 ± 3) °C
Relative Humidity: (50 ± 20) %

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

Procedure used: Calibration were conducted using in-house calibration procedure CP-T01 according to comparison with Platinum Resistance Thermometer (PRT) into liquid bath temperature controller.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1.Reference standards instuments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Digital Thermometer	1529-R	B19520	211680	26 Jun 2022
2) Platinum Resistance Thermometer	935-14-95	261589/1	211680	26 Jun 2022

2.The 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 maintained at:-
-National Institute of Metrology Thailand (NIMT)

REVIEW BY Tanasit
APPROVED BY Supt S
NEXT CAL. DATE 7/7/22

Calibrated by : Yossapon Poljom
Issue Date : 09 July 2021

Approved Signatory :
[ ] Phallnee Prabpaipal
[ ] Chatchawan Khunpiluek
[✓] Wanlop Larpkum

B 0265214

Result of Calibration:- Without Adjustment

Function: Temperature measurement

Dimension of probe : Diameter 3 mm., Length 55 mm. Sheath material : Stainless Steel

Immersion Depth (mm.)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of Measurement (±°C)
50	25.0029	24.9	-0.1029	0.12
50	30.0018	29.9	-0.1018	0.12
50	40.0035	40.0	-0.0035	0.12

UUC* : Unit Under Calibration

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.

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Certificate of System Qualification

GC-OQ + GCMS-OQ

System ID: GM-7
Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.
Organization Location: 104 Patthanakarn 40, Patthanakarn rd., Khwang Suan Luang, Khet Suan Luang, Bangkok 10250

Date: December 24, 2020 2:51:10 PM
EQP Name: AgilentRecommended , AgilentRecommended
EQP Revision: GC.02.50, GCMS.02.50
Overall Qualification Status: Pass

REVIEW BY Nat Sat
APPROVED BY KL AL
20/06/22
NEXT CAL DATE

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 SSL

Setpoint Status: Pass

	Setpoint		Actual	
Inlet Pressure:	25.0	psi	25.3	psi
Accuracy:			0.3	psi
Agilent Recommended:			<= 1.2	

Overall Inlet Pressure Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 7890

Setpoint Status: Pass

Zone: Oven

Setpoint/Actual

Temperature: 230.0 | 230.6 °C

Accuracy: 0.6 °C

Agilent Recommended: >= -1.0 % setpoint in K (-5.0 °C)

<= 1.0 % setpoint in K (5.0 °C)

Data for this setpoint was entered manually.

Reason: Data logging currently not available.

Setpoint Status: Pass

Zone: Oven

Setpoint/Actual

Temperature: 100.0 | 100.9 °C

Accuracy: 0.9 °C

Agilent Recommended: >= -1.0 % setpoint in K (-3.7 °C)

<= 1.0 % setpoint in K (3.7 °C)

Data for this setpoint was entered manually.

Reason: Data logging solution currently not available.

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: 7890

Setpoint Status: Pass

Setpoint/Average

Temperature: 100.0 | 100.9 °C

Stability: 0.0 °C

Agilent Recommended: <= 0.5

Data for this setpoint was entered manually.

Reason: Data logging solution currently not available.

Overall GC Oven Temperature Stability Test Status

Pass

Log Amp

Tested Combination1 Front SSL / External SQ

Name: 5977A

Setpoint Status: Pass

Overall Log Amp Test Status

Pass

RFPA

Tested Combination1 Front SSL / External SQ

Name: 5977A

Setpoint Status: Pass

Amu: 1050 m/z

Drift After Five Minutes: 15 mV

RFPA Voltage: 518 mV

Agilent Recommended: >= -100 and <= 100 <= 1100

Overall RFPA Test Status

Pass

Tune EI

Tested Combination1 Front SSL / External SQ

Name: 5977A

Setpoint Status: Pass

Filament: 1

Setpoint Status:. Pass

Filament: 2

Overall Tune EI Test Status

Pass

Signal to Noise EI

Tested Combination1	Front	SSL	/ External	SQ
Name:	5977A			

Source:	EI - Extractor	Filament:	1
Setpoint Status:	Pass		
Signal to Noise:	1472		
Agilent Recommended:	>= 1200		

Source:	EI - Extractor	Filament:	2
Setpoint Status:	Pass		
Signal to Noise:	3400		
Agilent Recommended:	>= 1200		

Overall Signal to Noise EI Test Status

Pass

Instrument Details

Purpose

This section describes the as found system configuration.

Details

System	
System ID	GM-7
Manufacturer	Agilent Technologies
Name	7890
Tested Combination1	
Injection Technique	Manual Injection
Inlet	Front
Detector	External
LTM Included?	No
Sampler 1	
Manufacturer	Agilent Technologies
Type	Manual Injection
Usage	Sample Injection
Syringe Volume (µL)	10
Mainframe 1	
Manufacturer	Agilent Technologies
Name	7890
Model Number	G3442B
Serial Number	CN14133181
Firmware Revision	B.02.03
Oven Type	Standard

Inlet 1

Manufacturer	Agilent Technologies
Name	7890
Type	SSL
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

Mass Spectrometer 1

Manufacturer	Agilent Technologies
Type	SQ
Name	5977A
Serial Number	US1415M209
Firmware Revision	5977 6.00.21
High Vacuum System	Turbo Pump
Scouting Run Standard	OFN Std

MS EI Source 1

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

Electronic Signature

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website : www.automation.co.th

MTOC : L-1010/2021

Report No. : ALS-799

ASI Maintenance Report

Instrument	: Automatic Sample Injector	Measuring	: Vial 40 mL
Model	: ASI-L	Place of Installation	: -
Serial No.	: H57415200799	Department	: LABOLATORY
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 : 25 / 10 / 2021

REVIEW BY Siriluk P.
APPROVED BY
NEXT CAL. DATE 25/10/2022

Ambient Condition : Temperature 22.6 ± 5 °C
: Humidifier 65 ± 15 %RH

Maintenance By : T.Somsi
(Mr. Tawatchai Somsi)
Technician

Approved By : N. Phung
(Mr. Nipon Phungsomsak)
Technician Manager

User Name : Siriluk P.
(~~Mr.~~ Miss Siriluk Puengpans)

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website : www.automation.co.th

MTOC : L-1010/2021

Report No. : ALS-799

Maintenance Sheet

Customer : ALS Laboratory Date : 25 / 10 / 2021
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 : T.Somsi
(Mr. Tawatchai Somsi)
Technician

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website : www.automation.co.th

MTOC : L-1010/2021 Report No. : ALS-799

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 : T.Somsi
(Mr. Tawatchai Somsi)
Technician

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website : www.automation.co.th

MTOC : L-1009/2021 Report No. : ALS-416

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 : 25 / 10 / 2021

REVIEW BY Siriluk P.
APPROVED BY K.L. A.L.
NEXT CAL. DATE 25/10/24

Ambient Condition : Temperature 22.6 ± 5 °C
: Humidifier 65 ± 15 %RH

Maintenance By : T.Somsi
(Mr. Tawatchai Somsi)
Technician

Approved By : N. Phung
(Mr. Nipon Phungsomsak)
Technician Manager

User Name : Siriluk P.
(Miss Siriluk Puengpan)

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website : www.automation.co.th

MTOC : L-1009/2021

Report No. : ALS-416

Maintenance Sheet

Customer : ALS Laboratory Date : 25 / 10 / 2021

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 : T. Somsi

(Mr. Tawatchai Somsi)
Technician

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website : www.automation.co.th

MTOC : L-1009/2021

Report No. : ALS-416

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 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 Meas. of TC standard – Meas. of Reagent water		Attachment : ALS-416 Page 3/4 - 4/4
	Criteria : Accuracy %Recovery 10% or less	5.222 – 0.1141 = 5.1079 ppm	Pass

Inspection by : T. Somsi

(Mr. Tawatchai Somsi)
Technician

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929,929/1 Soi Pattanakarn 30, Pattanakarn Rd., Suanluang, Suanluang, Bangkok 10250
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Rayong Branch : 1/15 Huaypong Rd., A. Muang, Rayong 21150 Tel. 038-592-152 Fax. 038-692-345
Lamphun Branch : 122/5 M.4, T.Ban Klang, A.Muang, Lamphun 51000 Tel/Fax. 053-581-876
website : www.automation.co.th

MTOC : L-1009/2021 Report No. : ALS-416

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, PIFE (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

(Mr. Tawatchai Somsi)
Technician

SHIMADZU ANALYZER
4/4

TOC-Control L Report

System Administrator, ALS LAB
2021_10_25_001_PM.tlx

Instr.Information

Instrument Options	TOC/ASI/IC Unit/
Catalyst	Regular Sensitivity

Cal. Curve

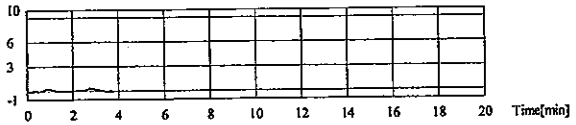
Sample Name:	Untitled
Sample ID:	Untitled
Cal. Curve:	NPOC 0.1-20 ppm.2021_10_25_15_19_29.cal
Status	Completed

Standard	NPOC

Conc: 0.000mg/L

1	0.6035	50ul	1.00	*******		10/25/2021 3:28:02 PM
2	0.7383	50ul	1.00	*******		10/25/2021 3:38:46 PM

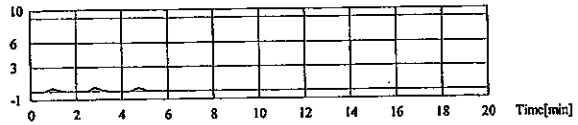
Acid Add.	1.500%
Sparge Gas Flow	80ml
Sp. Time	90.00sec
Mean Area	0.6710
SD Area	0.09546
CV Area	14.23%



Conc: 0.1000mg/L

1	1.067	50ul	10.00	*******		10/25/2021 3:39:54 PM
2	1.285	50ul	10.00	*******	E	10/25/2021 3:44:06 PM
3	1.102	50ul	10.00	*******		10/25/2021 3:48:18 PM

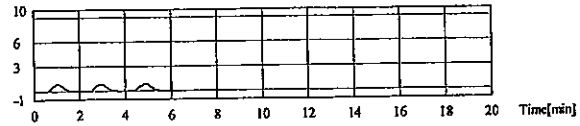
Acid Add.	1.500%
Sparge Gas Flow	80ml
Sp. Time	90.00sec
Mean Area	1.085
SD Area	0.02475
CV Area	2.28%



Conc: 0.5000mg/L

1	2.907	50ul	2.00	*******		10/25/2021 3:53:38 PM
2	3.168	50ul	2.00	*******	E	10/25/2021 3:58:51 PM
3	2.990	50ul	2.00	*******		10/25/2021 4:01:44 PM

Acid Add.	1.500%
Sparge Gas Flow	80ml
Sp. Time	90.00sec
Mean Area	2.949
SD Area	0.05869
CV Area	1.99%



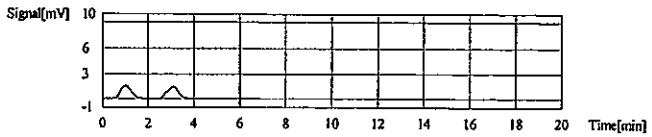
Conc: 1.000mg/L

1	5.045	50ul	1.00	*******		10/25/2021 4:08:39 PM
2	5.003	50ul	1.00	*******		10/25/2021 4:11:32 PM

TOC-Control L Report

System Administrator, ALS LAB
2021_10_25_001_PM.tlx

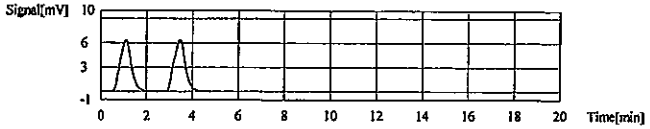
Acid Add.	1.500%
Sparge Gas Flow	80ml
Sp. Time	90.00sec
Mean Area	5.024
SD Area	0.02970
CV Area	0.59%



Conc: 5.000mg/L

1	22.21	50ul	4.000	*******	10/25/2021 4:21:08 PM
2	22.34	50ul	4.000	*******	10/25/2021 4:23:13 PM

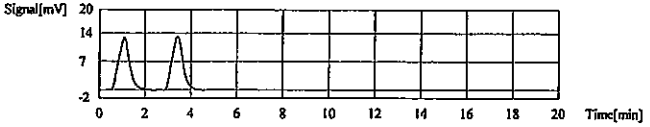
Acid Add.	1.500%
Sparge Gas Flow	80ml
Sp. Time	90.00sec
Mean Area	22.23
SD Area	0.02121
CV Area	0.10%



Conc: 10.00mg/L

1	43.42	50ul	2.000	*******	10/25/2021 4:33:06 PM
2	43.69	50ul	2.000	*******	10/25/2021 4:35:57 PM

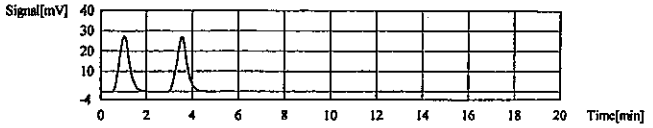
Acid Add.	1.500%
Sparge Gas Flow	80ml
Sp. Time	90.00sec
Mean Area	43.56
SD Area	0.1909
CV Area	0.44%



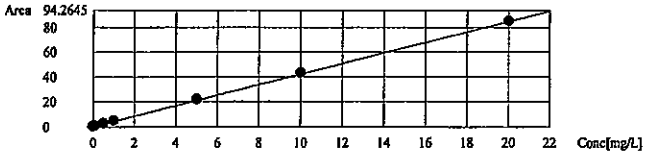
Conc: 20.00mg/L

1	85.75	50ul	1.000	*******	10/25/2021 4:43:23 PM
2	85.64	50ul	1.000	*******	10/25/2021 4:46:10 PM

Acid Add.	1.500%
Sparge Gas Flow	80ml
Sp. Time	90.00sec
Mean Area	85.69
SD Area	0.07778
CV Area	0.09%



Slope:	4.253
Intercept	0.000
r^2	1.0000
r	1.0000
Zero Shift	Yes



TOC-Control L Report

System Administrator, ALS LAB
2021_10_25_001_PM.tlx

Instr.Information

Instrument Options	TOC/ASI/IC Unit/
Catalyst	Regular Sensitivity

Sample

Sample Name:	Std TC 5 ppm
Sample ID:	Untitled
Origin:	NPOC 0.1-20 ppm.met
Status	Completed
Chk. Result	

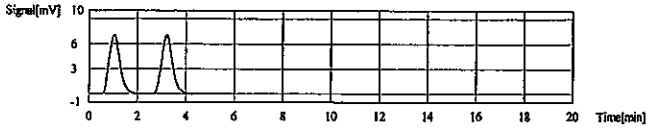
Unknown	NPOC	1.000	NPOC:5.222mg/L

1. Det

Anal.: NPOC

1	22.36	5.257mg/L	50ul	1.000	NPOC 0.1-20 ppm.2021_10_25_15_19_29.cal	10/25/2021 4:55:09 PM
2	22.06	5.187mg/L	50ul	1.000	NPOC 0.1-20 ppm.2021_10_25_15_19_29.cal	10/25/2021 4:57:54 PM

Mean Area	22.21
Mean Conc.	5.222mg/L
SD Area	0.2121
CV Area	0.96%
SD Conc	0.04988
CV Conc	0.96%



TOC-Control L Report

System Administrator, ALS LAB
2021_10_25_001_PM.tx

Instr.Information

Instrument Options	TOC/ASI/IC Unit/
Catalyst	Regular Sensitivity

Sample

Sample Name:	water
Sample ID:	Untitled
Origin:	Clean NPOC_normal.mct
Status	Completed
Chk. Result	

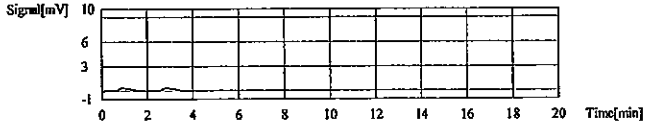
Unknown	NPOC	1.000	NPOC:0.1141ppm

1. Det

Anal.: NPOC

1	1.406	0.1143ppm	150uL	1.000	NPOC normal 0 - 10 ppm.2018_08_23_10_19_52.cal	10/25/2021 5:22:32 PM
2	1.400	0.1138ppm	150uL	1.000	NPOC normal 0 - 10 ppm.2018_08_23_10_19_52.cal	10/25/2021 5:29:31 PM

Mean Area	1.403
Mean Conc.	0.1141ppm
SD Area	0.00424
CV Area	0.30%
SD Conc	0.00034
CV Conc	0.30%



ภาคผนวก จ

สำเนาหนังสือใบอนุญาตขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน

ที่ อก ๐๓๑๐(๑)/ ๑๐๖๙

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๔๐๐

๒๘ มกราคม ๒๕๖๕

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๓๐ กรกฎาคม ๒๕๖๓

สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ แผ่น
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ตามสิ่งที่ส่งมาด้วย ๑

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖๒ ราย ตามสิ่งที่ส่งมาด้วย ๒

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๕๙ รายการ น้ำใต้ดิน จำนวน ๑๒๖ รายการ อากาศเสีย ๑๖ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๓๕ รายการ และดิน จำนวน ๑๒๕ รายการ รวมทั้งสิ้นจำนวน ๓๖๑ รายการ ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กันยายน ๒๕๖๖ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายศิระ จันทร์เฉิด)
นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาราชการแทน
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๒๐๒ ๔๑๔๖ ๐ ๒๒๐๒ ๔๐๐๒
โทรสาร ๐ ๒๓๕๔ ๓๒๐๘ ๐ ๒๓๕๔ ๓๔๑๕

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ลงวันที่ ๒๘ มกราคม ๒๕๖๔

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

๑) นางสาวยุพาพร จันทร์เปล่ง	ทะเบียนเลขที่ ว-๒๐๔-ค-๔๗๐๐
๒) นางสาวชัชนัย โกมารกุล ณ นคร	ทะเบียนเลขที่ ว-๒๐๔-ค-๔๗๐๑
๓) นายศรายุทธ จิตรานนท์	ทะเบียนเลขที่ ว-๒๐๔-ค-๔๗๐๒
๔) นางสาวกนกกร เอนก	ทะเบียนเลขที่ ว-๒๐๔-ค-๖๑๑๑
๕) นายสุริยา สอนแก้ว	ทะเบียนเลขที่ ว-๒๐๔-ค-๖๑๑๒
๖) นายวิชาญ ชุณหรัต	ทะเบียนเลขที่ ว-๒๐๔-ค-๖๑๑๓

(นายศิระ จันทร์เฉิด)
นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาราชการแทน
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ๑๐๖๙ ลงวันที่ ๒๘ มกราคม ๒๕๖๕

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖๒ ราย

๑) นางสาวจินดา โขจุลธรรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๐๘
๒) นางสาวสาวิตรี น้อยเสงี่ยม	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๐๙
๓) นางสาวชณัฐกาญจน์ อิ่มชม	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๐
๔) นางสาวนรินทร์ สายเส็ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๕
๕) นางสาวนันทวดี สมบูรณ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๖
๖) นางสาวศรัณยา เฉลิมธำรงค์	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๗
๗) นางสาวสรารัศมิ์ มงคลจิรวุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๙
๘) นางสาวศิริลักษณ์ พึ่งแพง	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๒๐
๙) นายนพพงศ์ จันทรุพันธุ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๐๘
๑๐) นายนรเศรษฐ์ โกมาลย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๑
๑๑) นายธันวา จริยา	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๔
๑๒) นางสาวเกศรินทร์ แก้วมั่น	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๖
๑๓) นางสาวสุวิมล ชัยเรืองวุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๗
๑๔) นางสาวสุชาดา ธรรมถาวร	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๑
๑๕) นางสาวเปมิกา ชัยเดชธนกุล	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๓
๑๖) นางสาวศศิธร หมูสวัสดิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๔
๑๗) นางสาวเสาวลักษณ์ ภู่นภาอำพร	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๕
๑๘) นายอภิสิทธิ์ สิงหา	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๖
๑๙) นายศักดิ์สิทธิ์ ไพศาลพิสุทธิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๗
๒๐) ว่าที่ร้อยตรีหญิง พรรณิภา ชำเจริญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๘
๒๑) นางจิลดา คำภูแก้ว	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๓๑
๒๒) นางสาวอรวรรณ รักยง	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๕
๒๓) นางสาวนพรัตน์ แย้มกรานต์	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๙
๒๔) นายจุลเดช วารินทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๐
๒๕) นางสาวดายุรัตน์ ร้องคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๑
๒๖) นายนคร สุขเจริญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๒
๒๗) นายบัญชา นามเขตต์	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๓
๒๘) นายพรมมี ศรีปัตเนตร	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๕
๒๙) นายอุทิศ อุ่นสิม	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๖
๓๐) ว่าที่ร้อยตรี เฉลิมเกียรติ อมรศรีเสริม	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๘
๓๑) นางสาววริยา สร้างนา	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๙
๓๒) นายอนุพงศ์ รัตนศรีประเสริฐ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๓๐
๓๓) นางสาวจุฑารัตน์ โอนสันเทียะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๒๔๒
๓๔) นางสาวจารุวรรณ พิมพ์อภิกฤติยา	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๗๖

๓๕) นางสาวปรางค์ทิพย์...

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๓๕) นางสาวปรางค์ทิพย์ กิจไพศาลศักดิ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๗๙
๓๖) นางสาวเตือนใจ ทางกลาง ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๐
๓๗) นางสาวจิราพร ศิริเวช ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๒
๓๘) นายวรากร ผูกรักษ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๓
๓๙) นายทนง วิริยะสหกิจ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๔
๔๐) นายธนิต เจนจบ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๕
๔๑) นายคณิศร ขำเพชร ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๖
๔๒) นายอรรคพล นิยมวิทยาพัน ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๗
๔๓) นายภูวิช พรหมสะอาด ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๘
๔๔) นายธนเดช โภคาพิพัฒน์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๙
๔๕) นายชวฤทธิ์ วงษ์จันทร์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๐
๔๖) นายอาทิตย์ ศรีเสน ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๑
๔๗) นายเจษดินทร์ คงศักดิ์ไทย ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๒
๔๘) นายจรัส บุญยิ่ง ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๕
๔๙) นายธนาณัติ เอนก ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๖
๕๐) นายอภิวัฒน์ ทุมหนู ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๗
๕๑) นางสาวสุภาขวัญ มาก ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๘
๕๒) นางสาวทัตพร ชวาลสมบูรณ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๐
๕๓) นางสาวธิติมา บุญเพ็ง ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๑
๕๔) นางสาวกนกอร เข็มเพ็ชร ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๒
๕๕) นางสาวพัชรียา หงษ์สมดี ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๓
๕๖) นางสาวภานิดา สุรวงศ์ตระกูล ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๔
๕๗) นางสาวภานุมาศ นามวัฒน์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๕
๕๘) นางสาวอุไรรัตน์ ทึงสร้างแป้น ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๖
๕๙) นายธีรวัฒน์ ปวงสุข ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๗
๖๐) นายอิทธิพล ยะโส ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๘
๖๑) นายประพจน์ วรรณชูชัย ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๙
๖๒) นายชยธร พวงทิพย์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๑๐
๖๓) นางสาวกนกวรรณ จันทบาล ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๑๑
๖๔) นางสาวเกษร หลักบุญ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๑๒
๖๕) นายสิทธิโชค ธงเงิน ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๑๓
๖๖) นางศิลาวรรณ ใจบุญ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๐๕
๖๗) นางสาวพรรณธิดา พุ่มคง ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๐๘
๖๘) นางสาวศรวณีย์ ยิ่งดี ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๐๙
๖๙) นายนวภัทร ศรีวิริยะ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๐
๗๐) นายสุวิชา ทองอ่อน ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๑
๗๑) นายวิญญู บุญตะนัย ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๓

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๗๒) นายสมบูรณ์...

๗๒) นายสมบูรณ์ บุตรจันทร์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๔
๗๓) นายวิรัตน์ ไชยนะรา ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๕
๗๔) นายนฤเบศน์ เพิ่มพูน ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๖
๗๕) นายจิรณัฐ ขาวละออ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๗
๗๖) นายสมโภช วันสา ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๙
๗๗) นายอัสรี นามบุรี ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๑๗
๗๘) นายณัฐนันท์ ปานประเสริฐ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๑๙
๗๙) นายอัศวเรศ จ่อสาว ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๐
๘๐) นายประเสริฐ สุระขันธ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๑
๘๑) นายนุกูล จันทร์เนียม ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๒
๘๒) นายพีรพงษ์ ทองคูณปรีดา ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๓
๘๓) นายนฤพล ทองนุช ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๔
๘๔) นายอนุวัฒน์ ม่วงแพร ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๕
๘๕) นายเจตศราวุฒิ ปัตตะมะ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๖
๘๖) นายกฤษณะ สายวรรณ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๗
๘๗) นายพิชัย บุญยงค์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๘
๘๘) นายภานุพงศ์ โฮมวงศ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๙
๘๙) นายสามารถ คุ้มปลี ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๐
๙๐) นายสัญชัย โกศรีนาม ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๑
๙๑) นายณัฐวุฒิ ศรีประเสริฐ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๒
๙๒) นายชวัลธัช นาคพนม ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๓
๙๓) นายพงศธร ชัยทิพย์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๕
๙๔) ว่าที่ร้อยตรี ภาณุพงศ์ แสนศรี ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๖
๙๕) นายสิทธิโชค ทาสีดา ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๗
๙๖) นายธนากร อินสุตา ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๘
๙๗) นางสาววรณิชชา ชาติวันชัย ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๙
๙๘) นางสาวพิมพ์ตะวัน มินากูล ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๔๑
๙๙) นางสาวเพชรัตน์ สิงห์สมบุญ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๔๒
๑๐๐) นางสาวชญานิน พรหมจันทร์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๔๓
๑๐๑) นายกีรติ ทวีราช ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๘๖
๑๐๒) นายจักริน หมั่นวิชา ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๘๗
๑๐๓) นายฉัตรชัย สุขเปีย ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๘๘
๑๐๔) นายณรนนท์ ต๊ะทองคำ ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๘๙
๑๐๕) นายดุลยพล สนนอก ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๐
๑๐๖) นายทักษ์ดนัย อุบลศรี ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๑
๑๐๗) นายธนศวร นามะกุณณา ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๒
๑๐๘) นายธิติพงศ์ บัวแดง ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๓

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๑๐๙) นายนนทชัย...

๑๐๙) นายนนทชัย อุปถัมภ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๔
๑๑๐) นายนัฐพล คุณสุทธิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๕
๑๑๑) นายนันทวัฒน์ สาริน	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๖
๑๑๒) นายปิยะนัฐ พลมะศรี	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๗
๑๑๓) นายพงศ์สิริ โสมเขียว	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๘
๑๑๔) นายพีรพัฒน์ กำคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๙
๑๑๕) นายภาณุพงศ์ มานิตย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๐
๑๑๖) นายมงคล ผลาทิพย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๑
๑๑๗) นายมุนินทร์ พูลศิริ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๒
๑๑๘) นายสิรินนท์ ทองอั๋น	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๓
๑๑๙) นายอเนชา ทันสมัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๔
๑๒๐) นายอดิศักดิ์ ผมไผ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๕
๑๒๑) นายอนันตชัย วีสม	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๖
๑๒๒) นายณัฐดนัย เจือละออง	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๗
๑๒๓) นายวรวุธ ดีนัก	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๘
๑๒๔) นายแสงตะวัน นะตะสัต	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๙
๑๒๕) นายยุทธพงศ์ รัตนะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๑๐
๑๒๖) นายชยัณวุฒิ ไชยฮะนิจ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๑๑
๑๒๗) นายวิศรุต ศรีธรรมมา	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๑๒
๑๒๘) นายนนทกร เผือกผ่อง	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๑๓
๑๒๙) นายกำชัย สุทธะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๑๔
๑๓๐) นางสาวณัฐภรณ์ รักทะเล	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๑๙
๑๓๑) นางสาวประภาภรณ์ บุตรพรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๐
๑๓๒) นางสาวนิลาวัลย์ นามพรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๑
๑๓๓) นางสาวพัชรินทร์ แสนสร้อย	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๒
๑๓๔) นายไพรวัลย์ เปรี่ยมพิมาย	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๓
๑๓๕) นางสาวศุภมาศ ทองมาก	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๔
๑๓๖) นางสาวลลิตา จิตรสว่าง	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๕
๑๓๗) นางสาวชไมพร เสิกภู่เขียว	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๖
๑๓๘) นางสาวกฤติมาพร คำมีแก่น	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๗
๑๓๙) นางสาวสกุลรัตน์ ภาคภูมิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๘
๑๔๐) นางสาวกาญจนา คงคูณ	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๙
๑๔๑) นางสาวไพรินทร์ ศรีรูปี	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๐
๑๔๒) นางสาวทิพเนตร ผุยปัญญา	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๑
๑๔๓) นางสาวสาธิตา ปานทอง	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๒
๑๔๔) นางสาวอริสา ทองนวล	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๓
๑๔๕) นางสาวอรยา ค้าคล่อง	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๔

(นายศิระ จันทร์เฉิด)
นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาราชการแทน
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
อธิบดีกรมควบคุมมลพิษ ปฏิบัติราชการแทนอธิบดีกรมควบคุมมลพิษ

๑๔๖) นางสาวชุดาภรณ์...

๑๔๖) นางสาวชุดาภรณ์ สุนทรสนาน	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๕
๑๔๗) นางสาวสุดารัตน์ นนท์ประสาท	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๖
๑๔๘) นางสาวรัชนีกร เนียมกลาง	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๗
๑๔๙) นางสาวกัญญารัตน์ ศรีนิลทา	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๘
๑๕๐) นางสาวอัญชลี คำจันทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๙
๑๕๑) นายบุญฤทธิ์ เอี่ยมเทศ	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๐
๑๕๒) นายศิริวัฒน์ พานิชย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๑
๑๕๓) นางสาวศุภรดา ปั้นมยุรา	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๒
๑๕๔) นางสาวพาฤดี คุณนาน	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๓
๑๕๕) นางสาวจิราเจต ฟองดา	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๔
๑๕๖) นางสาวกนกภรณ์ อุระ	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๕
๑๕๗) นางสาวอารยา มีชัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๖
๑๕๘) นางสาวจิตสุภา ประเทืองสุข	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๗
๑๕๙) นางสาวอริสา วิริยขันติธรรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๘
๑๖๐) นางสาววิชชุตา นาคผจญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๙
๑๖๑) นางสาวพนิดา ยอดอินทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๕๐
๑๖๒) นางสาวนันทิยา จันทะลุน	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๕๑

(นายศิระ จันทร์เฉิด)
นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาราชการแทน
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ๑๐๖๙ ลงวันที่ ๒๘ มกราคม ๒๕๖๕

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๖๑ รายการ

น้ำเสีย จำนวน 59 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 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 Method[4]
8	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
9	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
10	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic 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, Tritimetric Method[4]
16	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic 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

(นางริกาญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

19 Copper...

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 Method[4]
22	4,4′-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
23	2,4′-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
24	4,4′-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
25	2,4′-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
26	4,4′-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
27	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
28	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
29	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
30	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
31	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
32	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
33	Formaldehyde	Distillation, Colorimetric Method[3]
34	Free Chlorine	1) DPD Ferrous Titrimetric Method[4] 2) Iodometric Method[4]
35	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
36	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
37	Hexavalent Chromium	Filtration, 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	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 Method[4]

44 Methomyl...

(นางริกาญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
แทนอธิบดีกรมควบคุมมลพิษ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
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 ^{0}C[4]
55	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method[4]
56	Total Suspended Solids	Dried at 103-105 ^{0}C[4]
57	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
58	Trivalent Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation[4]
59	Zinc	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[4]

<u>น้ำใต้ดิน จำนวน 126 รายการ</u>

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...

(นางริกาญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
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...

(นางริกาญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

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] Equilibrium Headspace, 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)...

(นางริกาญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
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	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]

ริกญา

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51 cis-1,2-Dichloroethylene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
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	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]

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68 Fluorene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
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	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) Cold Vapor Atomic Absorption Spectrometric Method[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[4]

84 Methanol...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4] 2) Equilibrium Headspace, 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-Methylnapthalene	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	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]

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97 Pentachlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
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, Direct Photometric Method[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
102	Selenium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[4]
103	Silver	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[4]
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
109	TPH (C_5-C_8)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[13,24]
110	TPH ($C_{>8}$-C_{16})	Solvent Extraction, Gas Chromatographic Method[9,21]
111	TPH ($C_{>16}$-C_{35})	Solvent Extraction, Gas Chromatographic Method[9,21]
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...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[4]
120	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
121	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
122	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
123	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
124	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
126	Zinc	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[4]

<u>อากาศเสีย (ปล่องระบาย) จำนวน 16 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic, Digestion, Inductively Coupled Plasma Method[5]
2	Arsenic	Isokinetic, Digestion, Inductively Coupled Plasma Method[5]

3 Carbon Monoxide...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
3	Carbon Monoxide	1) Sampling Bag Non-Dispersive Infrared Method[5] 2) Non-Dispersive Infrared Method[5] 3) Instrumental Analyzer Method[5]
4	Chlorine	1) Absorption Sampling, Ion Chromatographic Method[5] 2) Isokinetic Sampling, Ion Chromatographic Method [5]
5	Copper	Isokinetic, Digestion, Inductively Coupled Plasma Method[5]
6	Dioxins	Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory or Analysis by Department of Industrial Works Registered Laboratory (Dioxins/Furans Analysis Approved)[5]
7	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method[5] 2) Isokinetic Sampling, Ion Chromatographic Method[5]
8	Hydrogen Sulfide	Absorption Sampling, Iodometric Method[5]
9	Lead	Isokinetic, Digestion, Inductively Coupled Plasma Method[5]
10	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[5] 2) Isokinetic, Digestion, Inductively Coupled Plasma Method[5]
11	Opacity	Ringelmann's Method[2]
12	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method[5] 2) Chemiluminescence Method[5] 3) Instrumental Analyzer Method[5]
13	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method[5] 2) UV.Fluorescence Method[5] 3) Instrumental Analyzer Method[5]
14	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method[5]
15	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method[5]
16	Xylene	Adsorption Sampling, Gas Chromatographic Method[5]

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สิ่งปฏิกูล...

<u>สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method [10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]

6 Cadmium...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,19,25] 2) Soxhlet Extraction, Gas Chromatographic Method [10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
9	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method[1,6,15,17] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method[1,6,16,17] 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method[7,8,15,17] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method[7,8, 16,17]
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method[1,6,17] 2) Alkaline Digestion, Colorimetric Method[8,17]

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11 Cobalt...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25]

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2) Soxhlet...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		2) Soxhlet Extraction, Gas Chromatographic Method[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method [10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[1,6,18]

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2) Waste Extraction...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		2) Waste Extraction, Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method[1,6,19] 3) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method[1,6,20] 4) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[18] 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method[19] 6) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method[20]
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method [10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method [10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]

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27 Polychlorinated...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5-Trichlorobiphenyl - 2,4',5-Trichlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5',6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,9,23] 2) Soxhlet Extraction, Gas Chromatographic Method[10,23] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method [10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
29	pH	Electrometric Method[29,30]
30	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16]
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method [10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15]

4) Digestion...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
35	Zinc	4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16] 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]

<u>ดิน จำนวน 125 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
4	Anthracene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
5	Antimony	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
8	Barium	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]

9 Benz(a)anthracene...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Benz(a)anthracene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
11	Benzo(b)fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
12	Benzo(k)fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
13	Benzoic acid	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
14	Benzo(a)pyrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
15	Benzo(g,h,i)perylene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
17	Bis(2-chloroethyl)ether	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
18	Bis(2-ethylhexyl)phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
21	Butanol	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method[12,24]
22	Butyl Benzyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
24	Carbazole	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]

26 Carbon tetrachloride...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
28	p-Chloroaniline	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
32	2-Chlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
33	Chromium	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method[7,8,15,17] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method[7,8,16,17]
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method[8,17]
36	Chrysene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
37	Cyanide	Extraction, Distillation, Colorimetric Method[26,27,28]
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
39	DDD	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]

40 DDE...

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ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
40	DDE	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
41	DDT	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
42	Dibenz(a,h)anthracene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
43	Di-n-Butyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
47	3,3-Dichlorobenzidine	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
53	2,4-Dichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]

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57 Dieldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
58	Diethyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
59	2,4-Dimethylphenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
60	2,4-Dinitrophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
61	2,4-Dinitrotoluene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
62	2,6-Dinitrotoluene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
63	Di-n-Octyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
67	Fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
68	Fluorene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
70	Heptachlor Epoxide	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]

71 Hexachlorobenzene...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
74	α-HCH	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
75	β-HCH	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
76	γ-HCH	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
77	Hexachlorocyclopentadiene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
78	Hexachloroethane	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
79	Indeno(1,2,3-cd)pyrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
80	Isophorone	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
81	Lead	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
82	Manganese	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[18]

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และทะเบียนห้องปฏิบัติการ

2) Thermal...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry[19] 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method[20]
84	Methanol	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method[12,24]
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
88	2-methylphenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
89	2-Methylnaphthalene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
91	Naphthalene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
92	Nickel	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
93	Nitrobenzene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
94	N-Nitrosodiphenylamine	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
95	N-Nitrosodi-n-propylamine	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232	1) Soxhlet Extraction, Gas Chromatographic Method [10,23] 2) Automated Soxhlet Extraction, Gas Chromatographic Method [23,32]

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- Aroclor 1242...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
	- Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5',6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	
97	Pentachlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
98	Phenanthrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
99	Phenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
100	Pyrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]

(นางริกาญจน์ ฉัตรสกุลวิไล)
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และทะเบียนห้องปฏิบัติการ

101 Selenium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
101	Selenium	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
102	Silver	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
103	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
108	TPH (C_5–C_8)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
109	TPH ($C_{>8}$– C_{16})	1) Solvent Extraction, Gas Chromatographic Method[11,21] 2) Automated Soxhlet Extraction, Gas Chromatographic Method[21,31]
110	TPH ($C_{>16}$ – C_{35})	1) Solvent Extraction, Gas Chromatographic Method[11,21] 2) Automated Soxhlet Extraction, Gas Chromatographic Method[21,31]
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
115	2,4,5-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]

ริกาญ

(นางริกาญจน์ ฉัตรสกุลวิไล)
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116 2,4,6-Trichlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
116	2,4,6-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
121	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
122	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
123	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
125	Zinc	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]

<u>เอกสารอ้างอิง</u>

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และทะเบียนห้องปฏิบัติการ

ที่ อก ๐๓๑๐(๓)/ ๖๔๗๐

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๘ มิถุนายน ๒๕๖๔

เรื่อง ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๙ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ และรายการสารมลพิษที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอปลวกแดง จังหวัดระยอง โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายเดช ช้างชน	ทะเบียนเลขที่ ว-๓๒๓-ค-๙๔๔๒
๒) นางวิลาวัณย์ บริรักษ์	ทะเบียนเลขที่ ว-๓๒๓-ค-๙๔๔๓
๓) นายสุพจน์ สลามเต๊ะ	ทะเบียนเลขที่ ว-๓๒๓-ค-๙๔๔๔

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นางสาวนฤมล บรรจงกิจ	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๔๕
๒) นางพจนา สีดา	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๔๖
๓) นางสาวธนิตา กุลสุริวงศ์	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๔๗
๔) นายพิทยา ทองแตง	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๔๘
๕) นางชลธิชา สุบงกช	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๔๙
๖) ว่าที่ ร.ต.รณชัย ม่วงมา	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๐
๗) นายวราวุฒิ พับพา	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๑
๘) นายศักดิ์นรินทร์ จรัสกาย	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๒
๙) นายสุรศักดิ์ สาชิน	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๓
๑๐) นางสาวเพชรคุณ ภวภูตานนท์	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๔
๑๑) นายสถาพร ถาแก้ว	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๕
๑๒) นายสุทธิ์ดำรงค์ โชคปิตินันท์	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๖

๑๓) นายวัลลภ...

๑๓) นายวัลลภ หันไชยเนาว์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๗
๑๔) นางสาววนาลี เหรียญตระกูล ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๘
๑๕) นางสาววนิดา ผดุงจิตต์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๙
๑๖) นายธนะสิทธิ์ วงศ์ษาไชย ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๐
๑๗) นายชัยนุสรณ์ เลิศนันทกุลชัย ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๑
๑๘) นายสัจจา เพ็ชรแสวง ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๒
๑๙) นายกันตภณ มณีสัมพันธ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๓
๒๐) นางสาวจันทนีย์ โกเมนชนะ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๔
๒๑) นายธารินทร์ อ๊อกจินดา ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๕
๒๒) นายศุภณัฐ พิสัยพันธ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๖
๒๓) นายศุภชัย วงศ์สุริย์ฉาย ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๗
๒๔) นายปฐมพงศ์ กรสวัสดิ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๘
๒๕) นายไสว ต้นโพธิ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๙
๒๖) นางสาวกิตติยา สัญญาอริยาภรณ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๐
๒๗) นางสาวเจษฎาพร ศรีบุญเรือง ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๑
๒๘) นางสาวมธุรินทร์ สิงห์เงา ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๒
๒๙) นางสาวธิดารัตน์ ศิริมังคะโร ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๓
๓๐) นายพิพัฒน์ นิภัทร์เศรษฐ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๔
๓๑) นายศิริวิทย์ เรืองสม ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๕
๓๒) นายปาราเมศ สัตยาคุณ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๖
๓๓) นายนฤนาท ธรรมสะโร ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๗
๓๔) นางสาวศุภรัตน์ โสจันทร์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๘
๓๕) นายพชรกร อินทรเสนา ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๙
๓๖) นายทิวากร เชื้อมาก ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๘๐
๓๗) นายอนุรักษ์ ทองขจรศักดา ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๘๑
๓๘) นายอภิชาติ วิลาศ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๘๒
๓๙) นายจรัสระวี ศรีรักษา ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๘๓
๔๐) นายประสานมิตร เขื่อนเพชร ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๘๔
๔๑) นายภานุวัฒน์ วังบง ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๘๕
๔๒) นายสันติ ชัยชนะ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๘๖
๔๓) นายสิทธิชัย แก้วเกตุ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๘๗
๔๔) นายทินกร กุลชาติ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๘๘

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๑๔ รายการ อากาศเสีย (ปล่องระบาย) จำนวน ๗ รายการ และน้ำใต้ดิน จำนวน ๓ รายการ รวมทั้งสิ้นจำนวน ๒๔ รายการ ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้มีอายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางจินดา เตชะศรินทร์)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๒๘ มิ.ย. ๒๕๖๔

กองวิจัยและเตือนภัยมลพิษโรงงาน
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๘๐๕ ๗๒๖๑-๓
ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๓๒๓
ที่ อก ๐๓๑๐(๓)/ ๖๔๗๐ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๔

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ

น้ำเสีย จำนวน 14 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method[2] 2) 5-Day BOD Test, Azide Modification Method[2]
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method[2] 2) Closed Reflux, Colorimetric Method[2] 3) Closed Reflux, Titrimetric Method[2]
3	Color	ADMI Weighted – Ordinate Spectrophotometric Method[2]
4	Cyanide	Distillation, Colorimetric Method[2]
5	Formaldehyde	Distillation, Colorimetric Method[1]
6	Free Chlorine	DPD-Ferrous Titrimetric Method[2]
7	Oil and Grease	Liquid-Liquid Partition-Gravimetric Method[2]
8	pH	Electrometric Method[2]
9	Phenols	1) Distillation, Chloroform Extraction Method[2] 2) Distillation, Direct Photometric Method[2]
10	Sulfide	ZnS Precipitation, Iodometric Method[2]
11	Temperature	Laboratory and Field Method[2]
12	Total Dissolved Solids	Dried at 180 ^{o}C[2]
13	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method[2]
14	Total Suspended Solids	Dried at 103-105 ^{o}C[2]

อากาศเสีย (ปล่องระบาย) จำนวน 7 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Carbon Monoxide	1) Sampling Bag, Non-Dispersive Infrared Method[5] 2) Instrumental Analyzer Method[8]
2	Hydrogen Sulfide	Absorption Sampling, Iodometric Method[5]
3	Opacity	Ringelmann's Method[3,4]
4	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method[6] 2) Instrumental Analyzer Method[9]
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method[5] 2) Instrumental Analyzer Method[10]

วิชุดา สัมฤทธิ์

(นางสาววิชุดา สัมฤทธิ์ผล)
ผู้อำนวยการ
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

Sulfuric Acid...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Sulfuric Acid	Isokinetic Sampling, Barium – Thorin Titrimetric Method[6]
7	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method[7]

<u>น้ำใต้ดิน จำนวน 3 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method[2]
2	pH	Electrometric Method[2]
3	Phenols	Distillation, Direct Photometric Method[2]

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ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก