

ภาคผนวก ค

ใบรับรองผลการตรวจวิเคราะห์คุณภาพสิ่งแวดล้อม

ภาคผนวก ค-1

คุณภาพอากาศจากแหล่งกำเนิด



Analysis / Test Report

TESTING
No.0042

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515493615
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2450289
Date Received : May 08, 2024
Date Reported : May 20, 2024
Report Number: 2982659-1

Page 1 of 2

Sample Number 2450289-1
Sampled Date May 08, 2024
Sample Description Emission from Stationary Source
Location Boiler (GPS 47P 0733747, 1404498)
Date Analysis Commenced May 09, 2024
Condition of Sample Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish, one plastic bottle, one 10-L air sampling bag, one amber plastic bottle and one sorbent tube, refrigerated

Stack Description

Ambient Pressure	757	mmHg	Diameter	0.99	m	Oxygen	8.3	%
Ambient Temperature	33.3	°C	Shape	Circle		Carbon Dioxide	7.2	%
Type of Process	Combustion		Stack Temperature	177	°C	Gas Velocity	6.0	m/s
Type of Fuel	Natural Gas		Moisture	11.77	%	Flow Rate (Actual O2)	9754	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O ₂ at 8.3 % O ₂		Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing										
Carbon Monoxide *	10:30 AM - 10:40 AM	ppm	-	1.0	1.2	1.09	690	-	United States Environmental Protection Agency, EPA Method 10	Rayong
Oxides of Nitrogen *	10:15 AM - 10:30 AM	ppm	-	1.06	63.6	57.65	200	106.28	United States Environmental Protection Agency, EPA Method 7	Rayong
Sulfur dioxide *	10:15 AM - 10:45 AM	ppm	-	2.0	4.86	4.41	60	-	United States Environmental Protection Agency, EPA Method 6	Rayong
Total Suspended Particulate	10:15 AM - 11:03 AM	mg/m3	-	0.5	3.2	2.90	320	100	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline :

Guideline

- 1).Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)
- 2).Emission Air Standard according to EIA study of SSLC-Latex Plant, Approval Letter No. Tor Sor 1009.9/13107 dated December 30, B.E.2547.

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)
ทะเบียนเลขที่ 7-323-จ-9447

Approved by

D. Chamon.

Dej Changchon
Senior Manager
ทะเบียนเลขที่ 7-323-ค-9442

Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. No part of this report may be reproduced in any form without written consent from the laboratory.
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Analysis / Test Report

TESTING
No.0042

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515493615
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2450289
Date Received : May 08, 2024
Date Reported : May 20, 2024
Report Number: 2982659-1

Page 2 of 2

Sample Number	2450289-1
Sampled Date	May 08, 2024
Sample Description	Emission from Stationary Source
Location	Boiler (GPS 47P 0733747, 1404498)
Date Analysis Commenced	May 09, 2024
Condition of Sample	Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish, one plastic bottle, one 10-L air sampling bag, one amber plastic bottle and one sorbent tube, refrigerated

Stack Description

Ambient Pressure	757	mmHg	Diameter	0.99	m	Oxygen	8.3	%
Ambient Temperature	33.3	°C	Shape	Circle		Carbon Dioxide	7.2	%
Type of Process	Combustion		Stack Temperature	177	°C	Gas Velocity	6.0	m/s
Type of Fuel	Natural Gas		Moisture	11.77	%	Flow Rate (Actual O2)	9754	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Carbon Monoxide *	10:30 AM - 10:40 AM	g/s	-	-	0.003	-	-	Calculated	Rayong
Oxides of Nitrogen *	10:15 AM - 10:30 AM	g/s	-	-	0.295	-	-	Calculated	Rayong
Sulfur dioxide *	10:15 AM - 10:45 AM	g/s	-	-	0.031	-	-	Calculated	Rayong
Total Suspended Particulate *	10:15 AM - 11:03 AM	g/s	-	-	0.008	-	-	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 SSLC-Latex Plant, Approval Letter No. Tor Sor 1009.9/13107 dated December 30, B.E.2547.

Sampled By : Sutdamrong Chokpitinan , Naratip Thueakchaikam

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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S:\Reports\Air Stack_O2_2GL.rpt (10:19AM)



Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4515493615

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2450289

Date Received : May 08, 2024

Date Reported : May 20, 2024

Report Number: 2982659-2

Page 1 of 2

Sample Number	2450289-1
Sampled Date	May 08, 2024
Sample Description	Emission from Stationary Source
Location	Boiler (GPS 47P 0733747, 1404498)
Date Analysis Commenced	May 09, 2024
Condition of Sample	Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish, one plastic bottle, one 10-L air sampling bag, one amber plastic bottle and one sorbent tube, refrigerated

Stack Description

Ambient Pressure	757	mmHg	Diameter	0.99	m	Oxygen	8.3	%
Ambient Temperature	33.3	°C	Shape	Circle		Carbon Dioxide	7.2	%
Type of Process	Combustion		Stack Temperature	177	°C	Gas Velocity	6.0	m/s
Type of Fuel	Natural Gas		Moisture	11.77	%	Flow Rate (Actual O ₂)	9754	Nm ³ /hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 % O ₂	Result at 8.3 % O ₂	Method	Testing Location
Air Testing								
1,3-Butadiene	10:30 AM - 10:45 AM	ppm	-	0.5	<0.5	<0.5	United States Environmental Protection Agency, EPA Method 18	Bangkok

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 SSLC-Latex Plant, Approval Letter No. Tor Sor 1009.9/13107 dated December 30, B.E.2547.

Approved by

Tanyatorn Mongkonjirawut

Supervisor

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S:\Reports\Air Stack_O2_NoGL.rpt (10:51AM)



Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4515493615

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2450289

Date Received : May 08, 2024

Date Reported : May 20, 2024

Report Number: 2982659-2

Page 2 of 2

Sample Number	2450289-1
Sampled Date	May 08, 2024
Sample Description	Emission from Stationary Source
Location	Boiler (GPS 47P 0733747, 1404498)
Date Analysis Commenced	May 09, 2024
Condition of Sample	Extracted into two 2-L collection flasks, one filter paper placed in plastic petri dish, one plastic bottle, one 10-L air sampling bag, one amber plastic bottle and one sorbent tube, refrigerated

Stack Description

Ambient Pressure	757	mmHg	Diameter	0.99	m	Oxygen	8.3	%
Ambient Temperature	33.3	°C	Shape	Circle		Carbon Dioxide	7.2	%
Type of Process	Combustion		Stack Temperature	177	°C	Gas Velocity	6.0	m/s
Type of Fuel	Natural Gas		Moisture	11.77	%	Flow Rate (Actual O2)	9754	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Method	Testing Location
Air Testing							
1,3-Butadiene	10:30 AM - 10:45 AM	g/s	-	-	<0.003	Calculated	Bangkok

Sampled By : Sutdamrong Chokpitinan , Naratip Thueakchaikam

Remark :

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

Approved by

Tanyatarn Mongkonjirawut
Supervisor

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S:\Reports_Air Stack_O2_NoGL.rpt (10:51AM)

ภาคผนวก ค-2

คุณภาพอากาศในบรรยากาศ



Analysis / Test Report



TESTING
No.0042

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4503127820

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut

Lot ID: 2417746

Date Received : Jun 17, 2024

Date Reported : Jul 02, 2024

Report Number: 2911687-1C7

Page 1 of 1

Sample Description	Air Quality
Location	บ้านนาตาพูด (GPS 47P 0735346, 1406705)
Date Analysis Commenced	Jun 17, 2024
Condition of Sample	Drawn into one glass filter paper (8x10 inch) placed in plastic bag and one quartz filter paper (8x10 inch) placed in plastic bag

Sample Number	Sampled Date	Particulate matter as PM 10 (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2417746-3	Jun 11 - Jun 12, 2024	0.010	751	31
2417746-4	Jun 12 - Jun 13, 2024	0.014	751	31
2417746-5	Jun 13 - Jun 14, 2024	0.017	751	32
Guideline		0.12	-	-

Reference Method

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

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

Sampled By : Chatchai Sukpla

Approved by

Wilawan Borirak
Manager

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4503127820

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut

Lot ID: 2417706

Date Received : Jun 18, 2024

Date Reported : Jun 24, 2024

Report Number: 2911613-1C7

Page 1 of 1

Sample Description	Air Quality						
Location	บ้านอ่าวประจักษ์ (โรงพยาบาลส่งเสริมสุขภาพตำบลตากวน) (GPS 47P 0735531, 1402769)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Jun 09, 2024 - Jun 16, 2024						
Measurement by	Chatchai Sukpia						
	2417706-1	2417706-2	2417706-3	2417706-4	2417706-5	2417706-6	2417706-7
Time	Jun 09, 2024	Jun 10, 2024	Jun 11, 2024	Jun 12, 2024	Jun 13, 2024	Jun 14, 2024	Jun 15, 2024
10:00 AM - 11:00 AM	0.008	0.018	0.022	0.006	0.002	0.007	0.014
11:00 PM - 12:00 AM	0.015	0.012	0.044	0.013	0.002	0.006	0.010
12:00 PM - 01:00 PM	0.019	0.012	0.034	0.017	0.002	0.006	0.005
01:00 PM - 02:00 PM	0.017	0.013	0.024	0.014	0.002	0.008	0.005
02:00 PM - 03:00 PM	0.016	0.012	0.021	0.019	0.003	0.010	0.006
03:00 PM - 04:00 PM	0.016	0.022	0.018	0.018	0.006	0.015	0.010
04:00 PM - 05:00 PM	0.009	0.035	0.024	0.008	0.006	0.017	0.019
05:00 PM - 06:00 PM	0.008	0.034	0.033	0.010	0.007	0.018	0.022
06:00 PM - 07:00 PM	0.010	0.031	0.035	0.011	0.004	0.016	0.020
07:00 PM - 08:00 PM	0.011	0.032	0.032	0.008	0.003	0.017	0.016
08:00 PM - 09:00 PM	0.007	0.032	0.027	0.010	0.002	0.010	0.015
09:00 PM - 10:00 PM	0.004	0.024	0.024	0.011	0.001	0.008	0.009
10:00 PM - 11:00 PM	0.002	0.018	0.020	0.012	0.001	0.010	0.012
11:00 PM - 12:00 AM	0.003	0.018	0.025	0.013	<0.001	0.008	0.013
12:00 AM - 01:00 AM	0.002	0.019	0.023	0.010	<0.001	0.008	0.006
01:00 AM - 02:00 AM	0.003	0.021	0.016	0.012	<0.001	0.006	0.006
02:00 AM - 03:00 AM	0.002	0.019	0.013	0.010	0.001	0.008	0.010
03:00 AM - 04:00 AM	0.002	0.015	0.018	0.012	0.002	0.009	0.008
04:00 AM - 05:00 AM	0.003	0.017	0.020	0.013	0.004	0.010	0.009
05:00 AM - 06:00 AM	0.006	0.019	0.021	0.020	0.010	0.009	0.012
06:00 AM - 07:00 AM	0.015	0.022	0.025	0.022	0.005	0.008	0.006
07:00 AM - 08:00 AM	0.015	0.020	0.015	0.017	0.009	0.007	0.005
08:00 AM - 09:00 AM	0.015	0.021	0.006	0.011	0.011	0.007	0.003
09:00 AM - 10:00 AM	0.024	0.017	0.006	0.001	0.012	0.013	0.004
Average	0.010	0.021	0.023	0.012	0.004	0.010	0.010
1hr - Maximum	0.024	0.035	0.044	0.022	0.012	0.018	0.022
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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

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Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150

Lot ID: 2417710
Date Received :Jun 17, 2024
Date Reported :Jun 21, 2024
Report Number :2911620-1 C7

P/O : 4514144337

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Page 1 of 2

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

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

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jitranont
Assistant General Manager



Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4514144337

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2417710

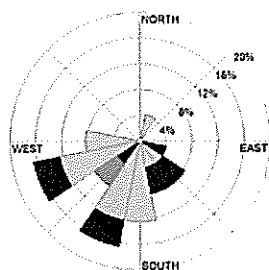
Date Received : Jun 17, 2024

Date Reported : Jun 21, 2024

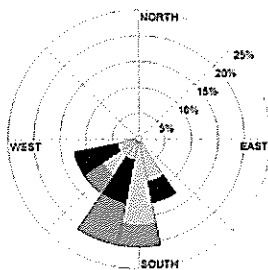
Report Number : 2911620-1 C7

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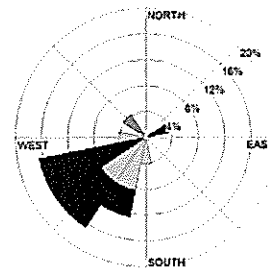
Wind Rose



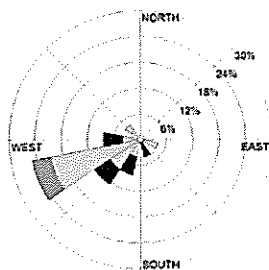
Date : Jun 09-10, 2024



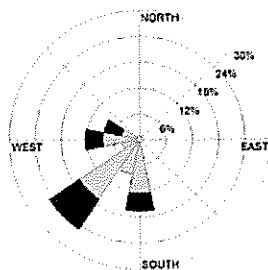
Date : Jun 10-11, 2024



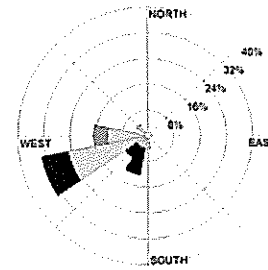
Date : Jun 11-12, 2024



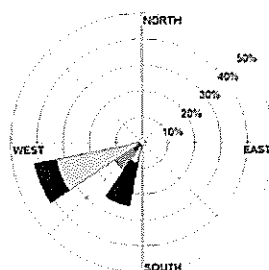
Date : Jun 12-13, 2024



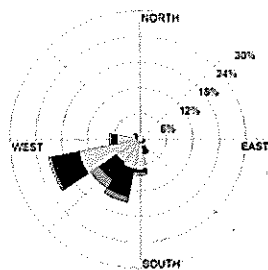
Date : Jun 13-14, 2024



Date : Jun 14-15, 2024



Date : Jun 15-16, 2024



Date : Jun 09-16, 2024

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

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

Approved by

Sarayuth Jittrantong
Assistant General Manager



Analysis / Test Report

TESTING
No.0042

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4503127820

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut

Lot ID: 2417712

Date Received : Jun 17, 2024

Date Reported : Jul 02, 2024

Report Number: 2911683-1C7

Page 1 of 1

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

Sample Number	Sampled Date	Particulate matter as PM 10 (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2417712-3	Jun 11 - Jun 12, 2024	0.011	751	29
2417712-4	Jun 12 - Jun 13, 2024	0.017	751	30
2417712-5	Jun 13 - Jun 14, 2024	0.025	751	31
Guideline		0.12	-	-

Reference Method

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

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

Sampled By : Chatchai Sukpla

Approved by

Wilawan Borirak
Manager

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4503127820

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut

Lot ID: 2417709

Date Received : Jun 18, 2024

Date Reported : Jun 24, 2024

Report Number: 2911617-1C7

Page 1 of 1

Sample Description	Air Quality						
Location	บ้านนาตาทุต (GPS 47P 0735346, 1406705)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Jun 09, 2024 - Jun 16, 2024						
Measurement by	Chatchai Sukpia						
	2417709-1	2417709-2	2417709-3	2417709-4	2417709-5	2417709-6	2417709-7
Time	Jun 09, 2024	Jun 10, 2024	Jun 11, 2024	Jun 12, 2024	Jun 13, 2024	Jun 14, 2024	Jun 15, 2024
11:00 AM - 12:00 PM	0.021	0.009	0.012	0.008	0.007	0.007	0.008
12:00 PM - 01:00 PM	0.016	0.008	0.008	0.006	0.006	0.005	0.007
01:00 PM - 02:00 PM	0.012	0.008	0.007	0.007	0.006	0.004	0.003
02:00 PM - 03:00 PM	0.008	0.010	0.007	0.007	0.007	0.005	0.002
03:00 PM - 04:00 PM	0.009	0.008	0.008	0.009	0.006	0.005	0.002
04:00 PM - 05:00 PM	0.005	0.008	0.007	0.010	0.009	0.008	0.004
05:00 PM - 06:00 PM	0.004	0.007	0.007	0.012	0.010	0.010	0.006
06:00 PM - 07:00 PM	0.006	0.008	0.010	0.015	0.012	0.018	0.006
07:00 PM - 08:00 PM	0.010	0.011	0.012	0.013	0.018	0.020	0.008
08:00 PM - 09:00 PM	0.012	0.019	0.018	0.018	0.022	0.020	0.003
09:00 PM - 10:00 PM	0.013	0.020	0.023	0.012	0.021	0.018	0.002
10:00 PM - 11:00 PM	0.010	0.015	0.019	0.009	0.016	0.017	0.002
11:00 PM - 12:00 AM	0.009	0.009	0.014	0.014	0.011	0.019	0.002
12:00 AM - 01:00 AM	0.009	0.011	0.011	0.012	0.008	0.014	0.002
01:00 AM - 02:00 AM	0.011	0.010	0.010	0.012	0.007	0.014	0.002
02:00 AM - 03:00 AM	0.011	0.011	0.014	0.013	0.015	0.007	0.002
03:00 AM - 04:00 AM	0.011	0.010	0.007	0.013	0.010	0.012	0.002
04:00 AM - 05:00 AM	0.007	0.006	0.015	0.015	0.008	0.006	0.003
05:00 AM - 06:00 AM	0.008	0.011	0.010	0.014	0.005	0.004	0.002
06:00 AM - 07:00 AM	0.007	0.014	0.009	0.013	0.013	0.002	0.002
07:00 AM - 08:00 AM	0.008	0.018	0.014	0.012	0.010	0.004	0.002
08:00 AM - 09:00 AM	0.011	0.016	0.011	0.014	0.011	0.005	0.003
09:00 AM - 10:00 AM	0.011	0.012	0.012	0.015	0.013	0.007	0.003
10:00 AM - 11:00 AM	0.013	0.015	0.012	0.013	0.010	0.009	0.006
Average	0.010	0.011	0.012	0.012	0.011	0.010	0.004
1hr - Maximum	0.021	0.020	0.023	0.018	0.022	0.020	0.008
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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

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Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150

Lot ID: 2417711
Date Received : Jun 17, 2024
Date Reported : Jun 21, 2024
Report Number : 2911663-1 C7

P/O : 4514144337

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Page 1 of 2

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

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

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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

Approved by

Sarayuth Jitranont
Assistant General Manager



Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4514144337

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2417711

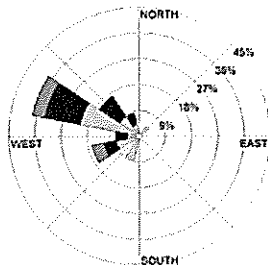
Date Received :Jun 17, 2024

Date Reported :Jun 21, 2024

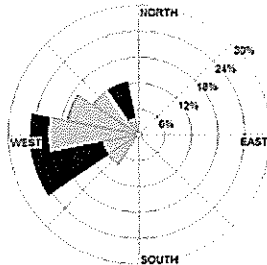
Report Number :2911663-1 C7

Page 2 of 2

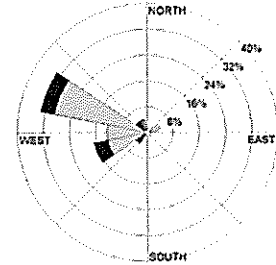
Wind Rose



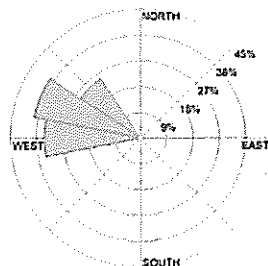
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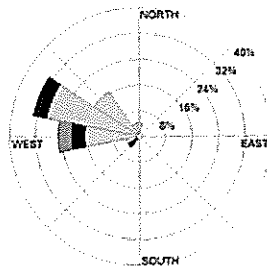
Date : Jun 10-11, 2024



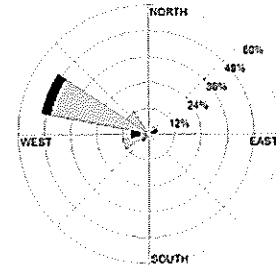
Date : Jun 11-12, 2024



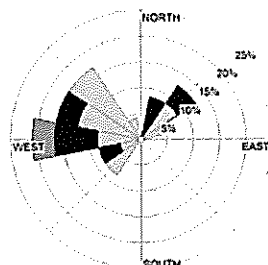
Date : Jun 12-13, 2024



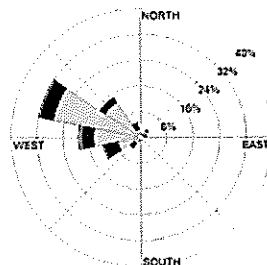
Date : Jun 13-14, 2024



Date : Jun 14-15, 2024



Date : Jun 15-16, 2024



Date : Jun 09-16, 2024

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

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Approved by

Sarayuth Jittranont
Assistant General Manager

ภาคผนวก ค-3

คุณภาพน้ำ



Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O :
Project Name : Water Testing
Project Location : Map Ta Phut_Latex (SSLC)

TESTING
No.0042
Lot ID: 244510
Date Received : Mar 06, 2024
Date Reported : Mar 14, 2024
Report Number : 2884630-1

Page 1 of 2

Sample Number 244510-1
Sampled Date Mar 06, 2024 9:05 AM
Sample Description Wastewater
Location H-306
Date Analysis Commenced Mar 06, 2024
Condition of Sample Contained in two amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	35	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	16	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	16	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	31.9	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	860	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-ก-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ก-9442

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

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Analysis / Test Report

TESTING

No.0042

Lot ID: 244510

Date Received : Mar 06, 2024

Date Reported : Mar 14, 2024

Report Number : 2884630-1

Client : Siam Synthetic Latex Co., Ltd.

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

P/O :

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Page 2 of 2

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

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

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O :

Project Name : Water Testing

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 244510

Date Received : Mar 06, 2024

Date Reported : Mar 14, 2024

Report Number : 2884630-2

Page 1 of 1

Sample Number	244510-1
Sampled Date	Mar 06, 2024 9:05 AM
Sample Description	Wastewater
Location	H-306
Date Analysis Commenced	Mar 13, 2024
Condition of Sample	Contained in two amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	12.7	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

Remark :

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

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

Approved by

Suwimon C.

Suwimon Chairuangwut
Scientist (3)

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S:\Reports\All_GL.rpt (10:55AM)



Analysis / Test Report

TESTING
No.0042

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4515493615

Project Name : Water Testing

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2455662

Date Received : Jun 05, 2024

Date Reported : Jun 13, 2024

Report Number : 2994697-1

Page 1 of 2

Sample Number	2455662-1						
Sampled Date	Jun 05, 2024 9:30 AM						
Sample Description	Wastewater						
Location	H-306						
Date Analysis Commenced	Jun 05, 2024						
Condition of Sample	Contained in two amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	11	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	9	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.9	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	36.6	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	242	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

Photchana S.

Photchana Seeda

Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9446

Approved by

D. Chamon.

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4515493615

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

TESTING

No.0042

Lot ID: 2455662

Date Received : Jun 05, 2024

Date Reported : Jun 13, 2024

Report Number : 2994697-1

Page 2 of 2

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

Note : Raw data of COD value (Refer to Lot ID 2455662-1) is 9.1 mg/L

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

Remark :

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

Technical Management

Photchana S.

Photchana Seeda

Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9446

Approved by

D. Changchon.

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515493615
Project Name : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 2455662

Date Received : Jun 05, 2024
Date Reported : Jun 13, 2024
Report Number : 2994697-2

Page 1 of 1

Sample Number 2455662-1
Sampled Date Jun 05, 2024 9:30 AM
Sample Description Wastewater
Location H-306
Date Analysis Commenced Jun 07, 2024
Condition of Sample Contained in two amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	5.04	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

Remark :

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Approved by

Suwimon C.

Suwimon Chairuangwut
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Analysis / Test Report

TESTING

No.0042

Lot ID: 244512

Date Received : Mar 20, 2024

Date Reported : Mar 27, 2024

Report Number : 2884631-1

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4515493615

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Page 1 of 2

Sample Number	244512-1						
Sampled Date	Mar 20, 2024 2:30 PM						
Sample Description	Wastewater						
Location	H-307						
Date Analysis Commenced	Mar 20, 2024						
Condition of Sample	Contained in two glass vials, two amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	<5	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	28.4	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	36	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	29	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4515493615

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

TESTING

No.0042

Lot ID: 244512

Date Received : Mar 20, 2024

Date Reported : Mar 27, 2024

Report Number : 2884631-1

Page 2 of 2

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

Note : Raw data of COD value (Refer to Lot ID 244512-1) is 21.1 mg/L

Sampling By : Chainusorn Lertnanthakunchai ทะเบียนเลขที่ ว-323-จ-9461 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ว-204-จ-0002

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515493615
Project Name : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 244512

Date Received : Mar 20, 2024
Date Reported : Mar 27, 2024
Report Number : 2884631-2

Page 1 of 1

Sample Number	244512-1
Sampled Date	Mar 20, 2024 2:30 PM
Sample Description	Wastewater
Location	H-307
Date Analysis Commenced	Mar 25, 2024
Condition of Sample	Contained in two 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							
Total Organic Carbon	mg/L	0.01	0.1	6.26	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Note : Raw data of COD value (Refer to Lot ID 244512-1) is 21.1 mg/L

Sampling By : Chainusorn Lertnanthakunchai , Pattarapol Sawangjaitam

Remark :

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Approved by

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Analysis / Test Report

TESTING

No.0042

Lot ID: 2455665

Date Received : Jun 11, 2024

Date Reported : Jun 19, 2024

Report Number : 2994699-1

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4515493615

Project Name : Water Testing

Project Location : Map Ta Phut_Latex (SSLC)

Page 1 of 2

Sample Number	2455665-1						
Sampled Date	Jun 11, 2024 11:30 AM						
Sample Description	Wastewater						
Location	H-307						
Date Analysis Commenced	Jun 11, 2024						
Condition of Sample	Contained in two glass vials, two amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	14	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	14	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.3	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	30.4	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	128	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	7	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

Photchana S.

Photchana Seeda

Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9446

Approved by

D. Chongchon.

Dej Chongchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4515493615

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

TESTING

No.0042

Lot ID: 2455665

Date Received : Jun 11, 2024

Date Reported : Jun 19, 2024

Report Number : 2994699-1

Page 2 of 2

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

Note : Raw data of COD value (Refer to Lot ID 2455665) is 20.9 mg/L

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

Remark :

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

Technical Management

Photchana S.

Photchana Seeda

Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9446

Approved by

D. Changchon.

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515493615
Project Name : Water Testing
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2455665

Date Received : Jun 11, 2024
Date Reported : Jun 19, 2024
Report Number : 2994699-2

Page 1 of 1

Sample Number	2455665-1						
Sampled Date	Jun 11, 2024 11:30 AM						
Sample Description	Wastewater						
Location	H-307						
Date Analysis Commenced	Jun 12, 2024						
Condition of Sample	Contained in two 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							
Total Organic Carbon	mg/L	0.01	0.1	5.17	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

Remark :

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

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Approved by

Siriluk P.

Siriluk Bunnak
Section Head

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7780-61/ EMAIL

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.

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

P/O :

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

TESTING

No.0042

Lot ID: 23147539

Date Received : Jan 16, 2024

Date Reported : Jan 24, 2024

Report Number : 2873038-1

Page 1 of 2

Sample Number	23147539-1
Sampled Date	Jan 16, 2024 9:21 AM
Sample Description	Wastewater
Location	H-304
Date Analysis Commenced	Jan 16, 2024
Condition of Sample	Contained in two amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	3.1	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	35	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	19	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	17	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	29.2	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	572	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	14	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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Analysis / Test Report

TESTING

No.0042

Lot ID: 23147539

Date Received : Jan 16, 2024

Date Reported : Jan 24, 2024

Report Number : 2873038-1

Client : Dow Chemical Thailand Ltd.

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

P/O :

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

Page 2 of 2

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

Sampling By : Sansoen Khuiyoksui ทะเบียนเลขที่ ๖-323-๖-0005 , Thanasoun Namakunna ทะเบียนเลขที่ ๖-204-๖-8592

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.

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

P/O :

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

Lot ID: 23147539

Date Received : Jan 16, 2024

Date Reported : Jan 24, 2024

Report Number : 2873038-2

Page 1 of 1

Sample Number	23147539-1
Sampled Date	Jan 16, 2024 9:21 AM
Sample Description	Wastewater
Location	H-304
Date Analysis Commenced	Jan 18, 2024
Condition of Sample	Contained in two amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	12.9	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Sansoen Khuiyoksui , Thanasoun Namakunna

Remark :

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Approved by

Siriluk P.

Siriluk Puengpang
Section Head

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.

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

P/O :

Project Name : Water Testing

Project Location : Map Ta Phut_PU (PPTL)

TESTING

No.0042

Lot ID: 23147875

Date Received : Feb 07, 2024

Date Reported : Feb 15, 2024

Report Number : 2873672-1

Page 1 of 2

Sample Number	23147875-1						
Sampled Date	Feb 07, 2024 9:15 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Feb 07, 2024						
Condition of Sample	Contained in two glass vials, two amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	43	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	28	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	27	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	31.2	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	740	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	10	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banngkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Chamon.

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ก-9442

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.

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

P/O :

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

TESTING

No.0042

Lot ID: 23147875

Date Received : Feb 07, 2024

Date Reported : Feb 15, 2024

Report Number : 2873672-1

Page 2 of 2

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

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

Remark :

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

Technical Management

N. Banphit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Chumon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.

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

P/O :

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

Lot ID: 23147875

Date Received : Feb 07, 2024

Date Reported : Feb 15, 2024

Report Number : 2873672-2

Page 1 of 1

Sample Number	23147875-1						
Sampled Date	Feb 07, 2024 9:15 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Feb 08, 2024						
Condition of Sample	Contained in two 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							
Total Organic Carbon	mg/L	0.01	0.1	14.7	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

Remark :

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Approved by

Suwimon C.

Suwimon Chairuangwut
Scientist (3)

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.

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

P/O :

Project Name : Water Testing

Project Location : Map Ta Phut_PU (PPTL)

TESTING

No.0042

Lot ID: 244520

Date Received : Mar 06, 2024

Date Reported : Mar 14, 2024

Report Number : 2884645-1

Page 1 of 2

Sample Number	244520-1						
Sampled Date	Mar 06, 2024 9:15 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Mar 06, 2024						
Condition of Sample	Contained in two amber glass bottles, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	32	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	19	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	17	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.4	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	30.0	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	744	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	7	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banphit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.

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

P/O :

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

TESTING

No.0042

Lot ID: 244520

Date Received : Mar 06, 2024

Date Reported : Mar 14, 2024

Report Number : 2884645-1

Page 2 of 2

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

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

Remark :

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

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515498514
Project Name : Water Testing
Project Location : Map Ta Phut_PU (PPTL)

TESTING
No.0042
Lot ID: 2429400
Date Received : Apr 03, 2024
Date Reported : Apr 11, 2024
Report Number : 2937330-1

Page 1 of 2

Sample Number 2429400-1
Sampled Date Apr 03, 2024 9:00 AM
Sample Description Wastewater
Location H-304
Date Analysis Commenced Apr 03, 2024
Condition of Sample Contained in two glass vials, two amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	32	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	16	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	14	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.5	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	33.1	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	828	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.

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

P/O : 4515498514

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

TESTING

No.0042

Lot ID: 2429400

Date Received : Apr 03, 2024

Date Reported : Apr 11, 2024

Report Number : 2937330-1

Page 2 of 2

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

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

Remark :

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Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.

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

P/O : 4515498514

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

Lot ID: 2429400

Date Received : Apr 03, 2024

Date Reported : Apr 11, 2024

Report Number : 2937330-2

Page 1 of 1

Sample Number	2429400-1
Sampled Date	Apr 03, 2024 9:00 AM
Sample Description	Wastewater
Location	H-304
Date Analysis Commenced	Apr 04, 2024
Condition of Sample	Contained in two 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							
Total Organic Carbon	mg/L	0.01	0.1	11.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

Remark :

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Approved by

Siriluk P.

Siriluk Bunnak
Section Head

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2442738

Date Received : May 02, 2024

Date Reported : May 10, 2024

Report Number : 2967788-1

Client : Dow Chemical Thailand Ltd.

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

P/O : 4515498514

Project Name : Water Testing

Project Location : Map Ta Phut_PU (PPTL)

Page 1 of 2

Sample Number	2442738-1						
Sampled Date	May 02, 2024 8:54 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	May 02, 2024						
Condition of Sample	Contained in one amber glass bottle, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	60	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	14	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	13	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	37.0	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	548	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banachit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Chamon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ก-9442

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Life Sciences

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.

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

P/O : 4515498514

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

TESTING

No.0042

Lot ID: 2442738

Date Received : May 02, 2024

Date Reported : May 10, 2024

Report Number : 2967788-1

Page 2 of 2

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

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

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

Technical Management

N. Banphit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.

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

P/O : 4515498514

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

Lot ID: 2442738

Date Received : May 02, 2024

Date Reported : May 10, 2024

Report Number : 2967788-2

Page 1 of 1

Sample Number	2442738-1						
Sampled Date	May 02, 2024 8:54 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	May 06, 2024						
Condition of Sample	Contained in one amber glass bottle, two glass vials and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	20.6	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Surawit Narapong , Thanasoun Namakunna

Remark :

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Approved by

Siriluk P.

Siriluk Bunnak
Section Head

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515498514
Project Name : Water Testing
Project Location : Map Ta Phut_PU (PPTL)

TESTING
No.0042
Lot ID: 2455754
Date Received : Jun 11, 2024
Date Reported : Jun 19, 2024
Report Number : 2994869-1

Page 1 of 2

Sample Number 2455754-1
Sampled Date Jun 11, 2024 11:15 AM
Sample Description Wastewater
Location H-304
Date Analysis Commenced Jun 11, 2024
Condition of Sample Contained in two glass vials, two amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	26	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	13	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	11	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	31.9	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	304	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

Photchana S.

Photchana Seeda
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9446

Approved by

D. Changchon.

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

TESTING

No.0042

Lot ID: 2455754

Date Received : Jun 11, 2024

Date Reported : Jun 19, 2024

Report Number : 2994869-1

Client : Dow Chemical Thailand Ltd.

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

P/O : 4515498514

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

Page 2 of 2

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

Sampling By : Wanlop Hunchainaow ทะเบียนเลขที่ ๖-323-๖-9457 , Pattarapol Sawangjaitam ทะเบียนเลขที่ ๖-204-๖-0002

Remark :

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

Technical Management

Photchana S.

Photchana Seeda

Scientist (4)

ทะเบียนเลขที่ ๖-323-๖-9446

Approved by

D. Changchon.

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.

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

P/O : 4515498514

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

Lot ID: 2455754

Date Received : Jun 11, 2024

Date Reported : Jun 19, 2024

Report Number : 2994869-2

Page 1 of 1

Sample Number	2455754-1
Sampled Date	Jun 11, 2024 11:15 AM
Sample Description	Wastewater
Location	H-304
Date Analysis Commenced	Jun 12, 2024
Condition of Sample	Contained in two 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							
Total Organic Carbon	mg/L	0.01	0.1	7.60	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

Remark :

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Approved by

Suwimon C.

Suwimon Chairuangwut
Scientist (3)

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Analysis / Test Report

TESTING

No.0042

Lot ID: 23146704

Date Received : Jan 10, 2024

Date Reported : Jan 19, 2024

Report Number : 2872796-1 C2

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Page 1 of 2

Sample Number	23146704-1						
Sampling Date	Jan 10, 2024 10:15 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Jan 10, 2024						
Condition of Sample	Contained in two amber glass bottles, six glass vials and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	31	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	16	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	13	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.3	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	32.9	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	952	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banongkit

Narumon Banhongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

TESTING

No.0042

Lot ID: 23146704

Date Received : Jan 10, 2024

Date Reported : Jan 19, 2024

Report Number : 2872796-1 C2

Page 2 of 2

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

Sampling By : Sansoen Khuiyoksui , Thanasoun Namakunna

Remark :

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Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 23146704

Date Received : Jan 10, 2024

Date Reported : Jan 19, 2024

Report Number : 2872796-3 C2

Page 1 of 1

Sample Number	23146704-1						
Sampling Date	Jan 10, 2024 10:15 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Jan 11, 2024						
Condition of Sample	Contained in two amber glass bottles, six glass vials and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	12.7	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Sansoen Khuiyoksui , Thanasoun Namakunna

Remark :

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Approved by

Sawitree N.

Sawitree Noisangiam
Manager

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Analysis / Test Report

TESTING

No.0042

Lot ID: 23147860

Date Received : Feb 07, 2024

Date Reported : Feb 16, 2024

Report Number : 2873655-1 C2

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Page 1 of 2

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-จ-9442

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Life Sciences

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

TESTING

No.0042

Lot ID: 23147860

Date Received : Feb 07, 2024

Date Reported : Feb 16, 2024

Report Number : 2873655-1 C2

Page 2 of 2

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

Sampling By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

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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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4501177470
Project Name : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 23147860

Date Received : Feb 07, 2024
Date Reported : Feb 16, 2024
Report Number : 2873655-3 C2

Page 1 of 1

Sample Number	23147860-1						
Sampling Date	Feb 07, 2024 10:38 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Feb 08, 2024						
Condition of Sample	Contained in six glass vials, two amber glass bottles and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	9.96	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

Remark :

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

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Approved by

Siriluk P.

Siriluk Puenggang
Section Head

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Life Sciences

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Analysis / Test Report

TESTING
No.0042

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 244504

Date Received : Mar 06, 2024
Date Reported : Jun 25, 2024
Report Number : 2884612-1 C2

Page 1 of 2

Sample Number	244504-1						
Sampled Date	Mar 06, 2024 10:12 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Mar 06, 2024						
Condition of Sample	Contained in six glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	28	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	17	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	17	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.2	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	33.4	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	848	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-ก-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ก-9442

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

TESTING

No.0042

Lot ID: 244504

Date Received : Mar 06, 2024

Date Reported : Jun 25, 2024

Report Number : 2884612-1 C2

Page 2 of 2

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

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

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

TESTING
No.0009

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 244504

Date Received : Mar 06, 2024
Date Reported : Jun 25, 2024
Report Number : 2884612-3 C2

Page 1 of 1

Sample Number 244504-1
Sampled Date Mar 06, 2024 10:12 AM
Sample Description Wastewater
Location Outfall
Date Analysis Commenced Mar 07, 2024
Condition of Sample Contained in six glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	13.5	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampled By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

Remark :

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

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Approved by

Nanthawadee Somboon
Specialist 2

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Analysis / Test Report

TESTING
No.0042

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4501177470
Project Name : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 2429380

Date Received : Apr 03, 2024
Date Reported : Apr 11, 2024
Report Number : 2937271-1 C2

Page 1 of 2

Sample Number	2429380-1						
Sampling Date	Apr 03, 2024 10:14 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Apr 03, 2024						
Condition of Sample	Contained in six glass vials, one amber glass bottle and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	34	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	15	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	14	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	6.6	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	34.0	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	872	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banphit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

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Analysis / Test Report

TESTING

No.0042

Lot ID: 2429380

Date Received : Apr 03, 2024

Date Reported : Apr 11, 2024

Report Number : 2937271-1 C2

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Page 2 of 2

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

Sampling By : Wanlop Hunchainaw , Pattarapol Sawangjaitam

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

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 2429380

Date Received : Apr 03, 2024

Date Reported : Apr 11, 2024

Report Number : 2937271-3 C2

Page 1 of 1

Sample Number	2429380-1						
Sampling Date	Apr 03, 2024 10:14 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Apr 04, 2024						
Condition of Sample	Contained in six glass vials, one amber glass bottle and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	11.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

Remark :

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

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Approved by

Sawitree N.

Sawitree Noisangiam
Manager

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Analysis / Test Report

TESTING
No.0042

Lot ID: 2442696

Date Received : May 02, 2024

Date Reported : May 10, 2024

Report Number : 2967712-1 C2

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Page 1 of 2

Sample Number	2442696-1						
Sampling Date	May 02, 2024 9:48 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	May 02, 2024						
Condition of Sample	Contained in two amber glass bottles, six glass vials and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	13	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	10	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.2	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	34.3	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	824	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banphit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Chanchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

TESTING

No.0042

Lot ID: 2442696

Date Received : May 02, 2024

Date Reported : May 10, 2024

Report Number : 2967712-1 C2

Page 2 of 2

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

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

Sampling By : Surawit Narapong , Thanasoun Namakunna

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4501177470
Project Name : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 2442696

Date Received : May 02, 2024
Date Reported : May 10, 2024
Report Number : 2967712-3 C2

Page 1 of 1

Sample Number	2442696-1						
Sampling Date	May 02, 2024 9:48 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	May 03, 2024						
Condition of Sample	Contained in two amber glass bottles, six glass vials and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	12.7	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

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

Sampling By : Surawit Narapong , Thanasoun Namakunna

Remark :

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

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Approved by

Sawitree N.

Sawitree Noisangiam
Manager

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)

TESTING
No.0042
Lot ID: 2455651
Date Received : Jun 05, 2024
Date Reported : Jun 25, 2024
Report Number : 2994634-1 C2

Page 1 of 2

Sample Number 2455651-1
Sampled Date Jun 05, 2024 10:54 AM
Sample Description Wastewater
Location Outfall
Date Analysis Commenced Jun 05, 2024
Condition of Sample Contained in two amber glass bottles, six glass vials and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	39	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	21	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	18	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C		-	-	8.1	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	35.0	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	752	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

Thanita K.

Thanita Kulsuriwong

Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Chumma

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

TESTING

No.0042

Lot ID: 2455651

Date Received : Jun 05, 2024

Date Reported : Jun 25, 2024

Report Number : 2994634-1 C2

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4515759206

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Page 2 of 2

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

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

Remark :

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

Technical Management

Thanita K.

Thanita Kulsuriwong

Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Chamon.

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515759206
Project Name : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)

TESTING
No.0009
Lot ID: 2455651
Date Received : Jun 05, 2024
Date Reported : Jun 25, 2024
Report Number : 2994634-3 C2

Page 1 of 1

Sample Number 2455651-1
Sampled Date Jun 05, 2024 10:54 AM
Sample Description Wastewater
Location Outfall
Date Analysis Commenced Jun 06, 2024
Condition of Sample Contained in two amber glass bottles, six glass vials and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon *	mg/L	0.01	0.1	16.9	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampled By : Wanlop Hunchainaow , Pattarapol Sawangjaitam

Remark :

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

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

Approved by

Siriluk P.

Siriluk Bunnak
Section Head

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ภาคผนวก ค-4

ระดับเสียงโดยทั่วไป



Analysis / Test Report

TESTING
No.0042

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515493615
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2417677
Date Received : Jun 10, 2024
Date Reported : Jun 13, 2024
Report Number: 3023236-1

Page 1 of 1

Sample Number 2417677-1
Parameter Noise (Leq 24 hrs.)
Location บริเวณริมรั้วโครงการฝั่งตะวันออก (GPS 47P 0733919, 1404606)
Measurement Date Jun 04 - Jun 05, 2024
Measurement by Jittakorn Sriwasa
Sound Level meter Serial No. 1222723

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
05:00 PM - 06:00 PM	64.0	69.5	63.7
06:00 PM - 07:00 PM	64.1	67.4	63.7
07:00 PM - 08:00 PM	64.9	69.1	64.4
08:00 PM - 09:00 PM	64.4	70.1	63.8
09:00 PM - 10:00 PM	64.6	68.0	64.0
10:00 PM - 11:00 PM	64.6	69.4	64.1
11:00 PM - 12:00 AM	65.0	67.8	64.3
12:00 AM - 01:00 AM	64.9	67.1	64.3
01:00 AM - 02:00 AM	65.1	67.3	64.6
02:00 AM - 03:00 AM	64.0	68.2	63.2
03:00 AM - 04:00 AM	64.8	69.5	63.8
04:00 AM - 05:00 AM	65.4	71.4	64.6
05:00 AM - 06:00 AM	65.9	68.8	65.4
06:00 AM - 07:00 AM	66.4	76.9	65.6
07:00 AM - 08:00 AM	66.4	75.6	65.9
08:00 AM - 09:00 AM	66.4	72.9	65.9
09:00 AM - 10:00 AM	65.8	68.6	65.2
10:00 AM - 11:00 AM	64.8	66.9	64.4
11:00 AM - 12:00 PM	65.3	73.6	64.7
12:00 PM - 01:00 PM	65.2	67.2	64.7
01:00 PM - 02:00 PM	65.0	67.1	64.5
02:00 PM - 03:00 PM	65.0	68.7	64.3
03:00 PM - 04:00 PM	64.7	67.8	64.2
04:00 PM - 05:00 PM	64.3	70.0	63.8

Leq Average 24 hrs. (dB(A)) 65.1
Lmax (dB(A)) 76.9
L90 (dB(A)) 64.3
Ldn (dB(A)) 71.6
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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Analysis / Test Report



TESTING
No.0042

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4515493615

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2417677

Date Received : Jun 10, 2024

Date Reported : Jun 13, 2024

Report Number: 3023237-1

Page 1 of 1

Sample Number 2417677-2
Parameter Noise (Leq 24 hrs.)
Location บริเวณเริ่มรั้วโครงการฝั่งตะวันออก (GPS 47P 0733919, 1404606)
Measurement Date Jun 05 - Jun 06, 2024
Measurement by Jittakorn Sriwasa
Sound Level meter Serial No. 1222723

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
05:00 PM - 06:00 PM	64.2	70.2	63.7
06:00 PM - 07:00 PM	64.4	67.8	63.9
07:00 PM - 08:00 PM	64.5	74.3	63.9
08:00 PM - 09:00 PM	64.0	68.4	63.3
09:00 PM - 10:00 PM	64.5	68.5	63.8
10:00 PM - 11:00 PM	64.4	69.0	63.6
11:00 PM - 12:00 AM	64.3	72.0	63.3
12:00 AM - 01:00 AM	64.3	70.9	63.3
01:00 AM - 02:00 AM	64.8	71.3	64.0
02:00 AM - 03:00 AM	65.4	68.0	64.7
03:00 AM - 04:00 AM	65.7	69.5	65.1
04:00 AM - 05:00 AM	65.6	68.4	64.9
05:00 AM - 06:00 AM	65.9	71.0	65.2
06:00 AM - 07:00 AM	65.7	70.5	65.1
07:00 AM - 08:00 AM	65.7	69.3	65.1
08:00 AM - 09:00 AM	65.1	70.0	64.6
09:00 AM - 10:00 AM	64.8	68.5	64.3
10:00 AM - 11:00 AM	64.5	67.1	63.8
11:00 AM - 12:00 PM	65.6	69.3	64.9
12:00 PM - 01:00 PM	65.8	67.9	65.4
01:00 PM - 02:00 PM	65.6	68.4	65.2
02:00 PM - 03:00 PM	65.0	68.6	64.6
03:00 PM - 04:00 PM	65.6	68.9	65.0
04:00 PM - 05:00 PM	65.2	68.2	64.7

Leq Average 24 hrs. (dB(A)) 65.1
Lmax (dB(A)) 74.3
L90 (dB(A)) 64.6
Ldn (dB(A)) 71.6
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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Analysis / Test Report

TESTING
No.0042

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515493615
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2417677
Date Received : Jun 10, 2024
Date Reported : Jun 13, 2024
Report Number: 3023238-1

Page 1 of 1

Sample Number 2417677-3
Parameter Noise (Leq 24 hrs.)
Location บริเวณเริ่มรั้วโครงการฝั่งตะวันออก (GPS 47P 0733919, 1404606)
Measurement Date Jun 06 - Jun 07, 2024
Measurement by Jittakorn Sriwasa
Sound Level meter Serial No. 1222723

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
05:00 PM - 06:00 PM	64.7	69.1	64.2
06:00 PM - 07:00 PM	64.2	67.3	63.5
07:00 PM - 08:00 PM	64.2	70.3	63.7
08:00 PM - 09:00 PM	64.3	70.3	63.6
09:00 PM - 10:00 PM	64.7	68.5	64.0
10:00 PM - 11:00 PM	64.2	68.1	63.6
11:00 PM - 12:00 AM	65.7	68.6	65.1
12:00 AM - 01:00 AM	65.6	67.8	65.1
01:00 AM - 02:00 AM	65.7	70.4	65.2
02:00 AM - 03:00 AM	65.7	69.1	65.2
03:00 AM - 04:00 AM	65.9	68.9	65.3
04:00 AM - 05:00 AM	65.8	69.4	65.4
05:00 AM - 06:00 AM	65.8	70.9	65.4
06:00 AM - 07:00 AM	66.0	68.4	65.6
07:00 AM - 08:00 AM	66.8	70.6	66.4
08:00 AM - 09:00 AM	66.4	68.4	66.0
09:00 AM - 10:00 AM	66.5	70.5	66.0
10:00 AM - 11:00 AM	65.5	74.6	64.9
11:00 AM - 12:00 PM	64.9	69.4	64.4
12:00 PM - 01:00 PM	64.2	66.7	63.5
01:00 PM - 02:00 PM	63.9	67.7	63.4
02:00 PM - 03:00 PM	64.3	70.6	63.7
03:00 PM - 04:00 PM	64.1	68.6	63.4
04:00 PM - 05:00 PM	64.6	69.2	63.9

Leq Average 24 hrs. (dB(A)) 65.2
Lmax (dB(A)) 74.6
L90 (dB(A)) 64.4
Ldn (dB(A)) 71.9
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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ภาคผนวก ค-5

ระดับเสียงในสถานประกอบการ



Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O :

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2417676

Date Received : Mar 06, 2024

Date Reported : Mar 12, 2024

Report Number: 2911560-1

Page 1 of 1

Sample Number 2417676-1
Parameter Noise (Leq 8 hrs.)
Location บริเวณเครื่องทำความเย็น (MRU)
Measurement Date Mar 04, 2024
Measurement by Kantaphon Maneesampan

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:50 AM - 10:50 AM	83.6	95.2	82.8
10:50 AM - 11:50 AM	86.8	99.1	86.0
11:50 AM - 12:50 PM	87.0	88.4	86.6
12:50 PM - 01:50 PM	87.2	88.9	86.7
01:50 PM - 02:50 PM	87.1	88.6	86.6
02:50 PM - 03:50 PM	85.9	87.7	85.3
03:50 PM - 04:50 PM	85.6	87.0	85.1
04:50 PM - 05:50 PM	86.5	88.2	86.0

Leq Average 8 hrs. (dB(A))

86.3

Lmax (dB(A))

99.1

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย

ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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S:\Reports_Air Noise.rpt (1:20PM)



Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4515493615
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2471433

Date Received : Jun 25, 2024

Date Reported : Jun 27, 2024

Report Number: 3032700-1

Page 1 of 1

Sample Number 2471433-1
Parameter Noise (Leq 8 hrs.)
Location บริเวณเครื่องทำความเย็น (MRU)
Measurement Date Jun 24, 2024
Measurement by Jittakorn Sriwasa

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:24 AM - 10:24 AM	87.2	93.5	86.4
10:24 AM - 11:24 AM	87.6	98.6	86.6
11:24 AM - 12:24 PM	86.5	88.2	85.9
12:24 PM - 01:24 PM	86.1	88.7	85.5
01:24 PM - 02:24 PM	84.3	87.4	83.9
02:24 PM - 03:24 PM	85.2	87.3	84.7
03:24 PM - 04:24 PM	85.4	88.3	84.9
04:24 PM - 05:24 PM	85.3	86.8	84.9

Leq Average 8 hrs. (dB(A))

86.1

Lmax (dB(A))

98.6

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย

ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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ภาคผนวก ค-6

คุณภาพอากาศในสถานประกอบการ



Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O :

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2417674

Date Received : Mar 06, 2024

Date Reported : Mar 14, 2024

Report Number : 2911555-1

Page 1 of 1

Sample Number 2417674-1
Sampled Date Mar 04, 2024
Sample Description Air Quality
Location Under Reactor
Date Analysis Commenced Mar 07, 2024
Condition of Sample Drawn into four sorbent tubes, refrigerated
Barometric Pressure 758 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
1,3-Butadiene	09:40 AM - 11:40 AM	ppm	-	0.05	<0.05	1	NIOSH (1994), 1024	MOL	Bangkok
Acrylic acid	09:40 AM - 10:40 AM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok
Acrylonitrile	09:40 AM - 11:40 AM	ppm	-	0.05	<0.05	2	NIOSH (1994), 1604	MOL	Bangkok
Styrene	09:40 AM - 11:40 AM	ppm	-	0.05	<0.05	100	In - house method : STM 04-032 based on NIOSH Manual of Analytical Methods, 4th ed., NMAM, method 1501, issue 3, 2003 (Include sampling)	MOL	Bangkok

Guideline :

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

Sampled By : Sathapron Thakarn

Remark :

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

Approved by

Orawan R.

Orawan Rakhyong
Scientist (3)

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

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ภาคผนวก ง

ใบรับรองการสอบเทียบเครื่องมือ



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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Stack	VOC (Butadiene)	Console Control Unit	BKK_FS0527	31-Jan-24	30-Jul-24	6
Stack	VOC (Butadiene)	Pitot Tube	BKK_FS0531	31-Jan-24	31-Jul-24	6
Stack	VOC (Butadiene)	Flue gas Analyzer	RYG_FS0563	26-Jan-24	25-Jan-25	12
Stack	VOC (Butadiene)	DRYCAL FLOWMETER	BKK_FS1347	18-Aug-23	18-Aug-24	12
Stack	VOC (Butadiene)	GC-MSD	BKK_EN0119	18-Apr-23	18-Oct-24	18
Stack	Oxides of Nitrogen	Console Control Unit	BKK_FS0527	31-Jan-24	30-Jul-24	6
Stack	Oxides of Nitrogen	Pitot Tube	BKK_FS0531	31-Jan-24	31-Jul-24	6
Stack	Oxides of Nitrogen	Flue gas Analyzer	RYG_FS0563	26-Jan-24	25-Jan-25	12
Stack	Oxides of Nitrogen	Vacuum Gauge	RYG_FS0332	30-Mar-23	30-Sep-24	18
Stack	Oxides of Nitrogen	SPECTROPHOTOMETER	RYG_EN0037	18-Sep-23	18-Mar-25	18
Stack	Total Suspended Particulate	Console Control Unit	BKK_FS0527	31-Jan-24	30-Jul-24	6
Stack	Total Suspended Particulate	Pitot Tube	BKK_FS0531	31-Jan-24	31-Jul-24	6
Stack	Total Suspended Particulate	Flue gas Analyzer	RYG_FS0563	26-Jan-24	25-Jan-25	12
Stack	Total Suspended Particulate	Digital Balance	RYG_EN0003	22-Feb-24	22-Feb-25	12
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0183	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0295	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	Digital Balance	RYG_EN0001	22-Feb-24	22-Feb-25	12
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0455	4-Jan-24	4-Jul-24	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0264	4-Jan-24	4-Jul-24	6
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0329	18-Aug-23	18-Feb-25	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0089	19-Jan-23	19-Jul-24	18
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0215	20-Sep-23	20-Sep-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0622	22-Jan-24	21-Jan-25	12
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0215	20-Sep-23	20-Sep-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0019	22-Jan-24	21-Jan-25	12
Noise	Leq 24 hrs	Sound Calibrator	RYG_FS0215	20-Sep-23	20-Sep-24	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0022	25-Jan-24	24-Jan-25	12
Workplace	Acrylonitrile	DRYCAL FLOWMETER	BKK_FS1347	18-Aug-23	18-Aug-24	12
Workplace	Acrylonitrile	GC-FID	BKK_EN0126	21-Apr-23	21-Oct-24	18
Workplace	Acrylic Acid	DRYCAL FLOWMETER	BKK_FS1347	18-Aug-23	18-Aug-24	12
Workplace	Acrylic Acid	HPLC	BKK_FL0034	16-Jan-24	16-Jan-25	18
Workplace	Butadiene	DRYCAL FLOWMETER	BKK_FS1347	18-Aug-23	18-Aug-24	12
Workplace	Butadiene	GC-FID	BKK_EN0126	21-Apr-23	21-Oct-24	18
Workplace	Styrene Monomer	DRYCAL FLOWMETER	BKK_FS1347	18-Aug-23	18-Aug-24	12
Workplace	Styrene Monomer	GC-MSD	BKK_EN0119	18-Apr-23	18-Oct-24	18
Rayong Lab	Temperature	pH meter	RYG_FS0596	3-Jul-23	2-Jul-24	12
Rayong Lab	Total Suspended Solids	Electronic Balance	RYG_EN0002	22-Feb-24	22-Feb-25	12
Rayong Lab	Total Suspended Solids	Hot Air Oven	RYG_EN0010	21-Mar-24	21-Sep-25	18
Rayong Lab	pH at 25 °C	pH meter	RYG_EN0183	19-Jan-24	19-Jan-25	12
Rayong Lab	Oil & Grease	Electronic Balance	RYG_EN0002	22-Feb-24	22-Feb-25	12
Rayong Lab	Oil & Grease	Hot Air Oven	RYG_EN0213	21-Mar-24	21-Mar-25	12
Rayong Lab	Oil & Grease	Water Bath	RYG_EN0061	21-Mar-24	21-Sep-25	18
Rayong Lab	BOD	DO meter with Sensor	RYG_EN0032	24-Jul-23	24-Jan-25	18
Rayong Lab	BOD	Incubator	RYG_EN0154	29-May-23	29-Nov-24	18
Rayong Lab	COD	Spectrophotometer	RYG_EN0037	18-Sep-23	18-Mar-25	18
Water Lab	Total Organic carbon	TOC Analyzer	BKK_EN0066	10-Nov-23	10-Nov-24	12

CONSOLE CONTROL UNIT CALIBRATION TEST REPORT



Calibration of Date 31-Jun-24
 Next Cal Date 30-Jul-24
 Barometric Pressure (mmHg) 754
 Relative Humidity (%) 53.0
 Temperature (C°) 27.0

Console Control Motor Data

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

Reference Dry Gas Meter Data

Reference Dry Gas Meter ID BKK_0529
 Serial No. 1637609
 Correction Factor (Y) 1.0000
 Next Calibration Date 9-Jun-24

ΔH (mm. H ₂ O)	Θ Degrees	Reference Dry Gas Meter Calibration					Console Control Drygas Meter							Dry Gas Meter Correction Factor (Y)	Onfile Calibration Factor ΔH ₀
		V _m (Liters)			T ₁ (°C)	V _m (Liters)			T ₁ (°C)	T ₂ (°C)	Avg T _m (°C)				
		Final	Initial	Total		Final	Initial	Total							
15	11.62	150.00	0.00	150.00	31.0	602227.0	602282.0	145.00	30.0	30.0	30.0	1.0209	41.9111		
25	6.51	150.00	0.00	150.00	31.0	602356.0	602741.0	145.00	30.0	30.0	30.0	1.0243	41.9067		
50	6.38	150.00	0.00	150.00	31.0	602539.0	602994.0	145.00	31.0	31.0	31.0	1.0205	41.9165		
80	5.04	150.00	0.00	150.00	31.0	602696.0	602561.0	145.00	31.0	31.0	31.0	1.0208	41.9127		
120	4.12	150.00	0.00	150.00	31.0	602881.0	602716.0	145.00	31.0	31.0	31.0	1.0141	42.0117		
												Avg:	1.0207	41.9018	

Ratio of reading of reference to dry gas meter: tolerance for individual values ± 0.02 from average.
 ΔH₀: Orifice pressure differential that equates to 21.24 in of air @ 25 C and 750 mm of mercury - mmH₂O. tolerance for individual values ± 5.00 from average.
 Procedure: 42 CFR 63 APP A METH SEC 5.3 & 7

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

Approved by: Nattapol Jengwareewong
 (Mr. Nattapol Jengwareewong)
 RYG Field Services Specialist (1)
 4200017-1 (Date: 30-Jun-24) 1000-0001-0000

Stopwatch ID No. : RYG_FS0540
 Model : F808
 Serial No. : E18061
 Calibration Date : 9 Dec 22
 Certificate No. : E-2009018
 Dry Gas Meter No. : BKK_FS0527
 Model : XC-5/2-V
 Serial No. : 1508053

Run No.	Time Actual (m:ss.ms)	Time Reading (m:ss)	Diff. (ms)	Diff. (min)
1	5:00:03	5:00	3	0.00005
2	5:00:09	5:00	8	0.00013
3	5:00:09	5:00	9	0.00015
4	5:00:11	5:00	11	0.00018
5	5:00:05	5:00	5	0.00008
6	5:00:06	5:00	6	0.00010
7	5:00:06	5:00	6	0.00010
8	5:00:08	5:00	8	0.00013
9	5:00:09	5:00	9	0.00015
10	5:00:07	5:00	7	0.00012
Average				0.00012
SD				0.00004

Calibrate by: Saksit Phaisanphisit
 Mr. Saksit Phaisanphisit
 RYG Field Service Scientist (4)
 Approved by: Nattapol Jengwareewong
 Mr. Nattapol Jengwareewong
 RYG Field Service Specialist (1)



DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date :	31 Jan 24	Ambient Temperature (°C)	27
Calibration sheet No. :	C-310124-BKK_FS0527	Relative Humidity (%) :	53
Digital Temperature ID :	BKK_FS0527	Reference Temperature ID	BKK_FS1144
Serial No. :		Serial No. :	201090006013
Model :	XC-572-V	Model :	Digicon-CC-VT-MS
		Next Calibrate :	14 Aug 24

Location	Reference Temperature °C	Digital Temperature °C	Error °C	MPE	Pass / Fail
Stack	0	0	0	±3	Pass
	25	25	0	±3	Pass
	50	50	0	±3	Pass
	100	100	0	±3	Pass
	150	150	0	±3	Pass
	200	200	0	±3	Pass
	250	250	0	±3	Pass
Probe	300	300	0	±3	Pass
	500	501	1	±3	Pass
	100	101	1	±3	Pass
	120	121	1	±3	Pass
	140	141	1	±3	Pass
	100	101	-	±3	-
	120	121	-	±3	-
Oven	140	142	-	±3	-
	100	102	2	±3	Pass
	120	121	1	±3	Pass
Filter	140	141	1	±3	Pass
	0	1	1	±3	Pass
	10	9	-1	±3	Pass
Exit	20	20	0	±3	Pass
	0	-1	-1	±3	Pass
	25	24	-1	±3	Pass
Meter	50	48	-2	±3	Pass
	0	-1	-1	±3	Pass
	25	25	0	±3	Pass
AUX	50	50	0	±3	Pass

MPE : (Maximum permissible error of measurement) ค่าความผิดพลาดสูงสุดของเครื่องมือวัด

Calibrated by : Saksit Phaisanphiset

Mr. Saksit Phaisanphiset
RYG Field Services Scientist (4)

Approved by : Nathapol Jengwareewong

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

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



PROBE NOZZLE DIAMETER CALIBRATION DATA SHEET

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

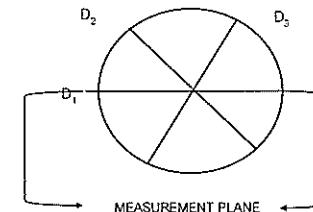
Nozzle ID #	Nozzle Diameter (cm.)			Hi - Lo ΔD	(D ₁ + D ₂ + D ₃) / 3 D _{avg}
	D ₁	D ₂	D ₃		
1	0.316	0.318	0.316	0.002	0.317
2	0.480	0.475	0.474	0.006	0.476
3	0.635	0.635	0.635	0.000	0.635
4	0.791	0.792	0.791	0.001	0.791
5	0.950	0.952	0.951	0.002	0.951
6	1.088	1.080	1.089	0.009	1.086
7	1.270	1.270	1.270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

Where :

D₁, D₂, D₃ = Three different nozzle diameters at 60 degrees to each other, each measured the nearest 0.025 mm.

ΔD = Maximum distance between any two diameters, must be ≤ 0.100 mm.

D_{avg} = (D₁ + D₂ + D₃) / 3



Calibrated by : Saksit Phaisanphiset

(Mr. Saksit Phaisanphiset)
Field Scientist (4)

Approved by : Nathapol Jengwareewong

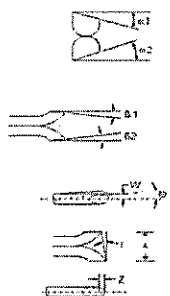
(Mr.Nathapol Jengwareewong)
Field Specialist (1)

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



Type S Pitot Tube Calibration

Date Calibration 31-Jan-24 Due Date 31-Jul-24
Pitot ID BKK_FS0531 Inclinator ID 8KK_FS1131
Pitot SN - Vernier ID RYG_FS0539



Parameter	Value	Allowable Range	Check
$\alpha 1$	0.6	$-10^\circ < \alpha 1 < +10^\circ$	OK
$\alpha 2$	1.4	$-10^\circ < \alpha 2 < +10^\circ$	OK
$\beta 1$	-2.3	$-5^\circ < \beta 1 < +5^\circ$	OK
$\beta 2$	-0.5	$-5^\circ < \beta 2 < +5^\circ$	OK
γ	-1.1	-	-
θ	1.3	-	-
$Z = A \tan \gamma$	-0.017	$Z \leq 0.125''$	OK
$W = A \tan \theta$	0.020	$W \leq 0.031''$	OK
Dt	0.311	0.188" to 0.375"	OK
A/2Dt	1.415	$1.05 \leq A/2Dt \leq 1.5$	OK
A	0.88	$2.1Dt \leq A \leq 3Dt$	OK

Certify that pitot tube/probe meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube certification fact of 0.84. See 40 CFR Pt. 60, App. A, EPA Method 2.

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

Approved By: Nattapol Jengwareewong
(Mr. Nattapol Jengwareewong)
RYG Field Services Specialist (1)

FORM NO. F06-124 REVISION NO. 0 ISSUE DATE: 25/12/23



Calibration Certificate



Certificate No: G 670052
Date of Issue: 26-Jan-24

Instrument description : Flue Gas Analyzer
Instrument model : Testo 350 New
Control unit serial no. : 03580098/1121
Instrument serial no. : 62985047/1121
ID no. or control no. : RYG_FS0563
Manufacturer : Testo SE & Co. KGaA
Probe description : -
Probe model : -
Probe serial no. : -
Customer name : ALS LABORATORY GROUP (THAILAND) CO., LTD.
Customer address : 104 Phatthanaikan 40, Phatthanaikan Road, Khwaeng Phatthanaikan, Khet Suan Luang Bangkok, 10250 Thailand
Total pages of certificate : 2 Pages
Receiving no. : L-240266
Receiving date : 24-Jan-24
Parameter of calibration : Gas Calibration (Oxygen 2.50, 10.04, 21.02 %vol, Carbon Monoxide 80.14, 302.1, 1003 ppm, Nitrogen Dioxide 30.34, 80.96, 201.9 ppm, Nitric Oxide 30.01, 151.5, 322.5 ppm, Sulphur Dioxide 50.36, 100.8, 600.8 ppm)
Condition of UUC. : Used
Ambient condition : All of the Measurement were carried out the stabilized laboratory
Temperature : $23 \pm 5^\circ\text{C}$
Humidity : $55 \pm 15\% \text{RH}$
Calibration place : 17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Lakso, Bangkok 10210
Calibration procedure no. : This instrument was calibrated by comparison with Standard gas mixture according to calibration Work Instruction no. WI-CL-28-C

The calibration certificate expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.
This certificate is applied only to item under test Environmental condition.
This Calibration Certificate may not be reproduced other than in full except with the permission of the issuing laboratory.
Calibration certificates without signature and seal not valid and The results relate only to the items tested/calibrated.
This calibration certificate documents are traceability to national standards, which realize measurement according to the International System of Units (SI).

Date of calibration : 26-Jan-24

Kwanchai K.
Mr. Kwanchai Khamdoug
Calibration Technician

D. Muttar
Mrs. Nongluck Wongsettee
Technical Manager

FM-CL-09-C Rev.8

Page 1 of 2

Issued Date 26/02/24

Entech Industrial Solution Co., Ltd.

17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Lakso, Bangkok 10210 THAILAND Tel: 0-2779-8888 Calibration@entech.co.th
Tax ID: 0105536035591 www.entech.co.th

Certificate No.: G 670052

Standard References (Table 1)

Standard	Certificate No.	Vendor	Due date
Oxygen (O ₂) 2.50 % Vol	2412/23	Linde	27-Aug-27
Oxygen (O ₂) 10.04 % Vol	CG-0153-21	Nimt	18-Nov-26
Oxygen (O ₂) 21.02 % Vol	CG-0041-22	Nimt	10-Feb-27
Carbon monoxide (CO) 80.14 ppm	CG-0040-22	Nimt	14-Feb-27
Carbon monoxide (CO) 302 ppm	1915/23	Linde	16-Jun-25
Carbon monoxide (CO) 1003 ppm	2584/23	Linde	10-Sep-25
Nitrogen Dioxide (NO ₂) 30.34 ppm	2703/22	Linde	22-Aug-24
Nitrogen Dioxide (NO ₂) 80.96 ppm	3240/21	Linde	26-Jun-24
Nitrogen Dioxide (NO ₂) 201.9 ppm	1975/23	Linde	17-Jul-25
Nitric Oxide (NO) 30.01 ppm	CG-0014-23	Nimt	19-Feb-25
Nitric Oxide (NO) 151.5 ppm	0161/23	Linde	22-Jan-25
Nitric Oxide (NO) 322.5 ppm	1974/23	Linde	17-Jul-25
Sulphur Dioxide (SO ₂) 50.36 ppm	2004/23	Linde	17-Jul-25
Sulphur Dioxide (SO ₂) 100.8 ppm	3507/22	Linde	09-Nov-24
Sulphur Dioxide (SO ₂) 600.8 ppm	2003/23	Linde	17-Jul-25

Measured room conditions

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

Calibration conditions

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

Calibration Results (Without adjustment) (Table 2)

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

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

End of Report



MesaLabs



NVLAP Lab Code 200661-0
Calibration

Calibration Certificate

Certificate No. 551422

Sold To:

Product 200-510M Defender 510 Medium Flow

Serial No. 208345

Cal. Date 18-Aug-2023

All calibrations are performed in accordance with ISO 17025 at Mesa Laboratories, Inc., 12100 W. 6th Ave, Lakewood, CO 80228, an ISO 17025:2017 accredited laboratory through NVLAP. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

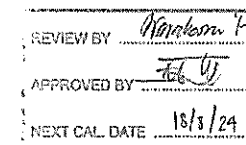
As Received Calibration Data

Technician Aeron Schwartz Lab. Pressure 620.1 mmHg
Lab. Temperature 23.5 °C

Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Received
4523.09 ccm	4519.02 ccm	0.09%	1.00%	In Tolerance
999.43 ccm	999.31 ccm	0.01%	1.00%	In Tolerance
245.22 ccm	245.88 ccm	-0.27%	1.00%	In tolerance

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_B00_24	205307	25-May-2023	25-May-2024





As Shipped Calibration Data

Certificate No	551422	Lab. Pressure	618.8 mmHg	
Technician	Xiem Ly	Lab. Temperature	24.2 °C	
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Shipped
4516.61 ccm	4515.56 ccm	0.02%	1.00%	In Tolerance
1000.67 ccm	1000.67 ccm	0.02%	1.00%	In Tolerance
249.84 ccm	249.93 ccm	-0.04%	1.00%	In Tolerance

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	100439	14-Sep-2022	14-Sep-2023

Calibration Notes

The expanded uncertainty of flow has a coverage factor of $k = 2$ for a confidence interval of approximately 95%.

Flow testing is in accordance with our test number MP-00672 with an expanded uncertainty of 0.27% using high-purity nitrogen or filtered laboratory air.

Traceability to the International System of Units (SI) is verified by accreditation to ISO/IEC 17025 by NVLAP under NVLAP Code 200661-0.

Technician Notes:

By:

Xiem Ly

Xiem Ly
Production Technician II

Approved By:

Norma Aragon

Norma Aragon
QC Inspector

Mesa Laboratories, Inc. certifies that the above instrument meets or exceeds published specifications, and that the calibration results in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Calibration results are in compliance with ISO/IEC 17025:2017. Calibrations process has a Test Uncertainty Ratio (TUR) of 4:1 or greater. Any Pass/Fail determination is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only.



Calibration Certificate

Certificate No. 561587
Product 200-510L Defender 510 Lcw Flow
Serial No. 130026
Cal. Date 25-Sep-2023

Sold To:

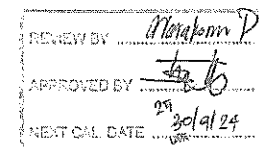
All calibrations are performed in accordance with ISO 17025 at Mesa Laboratories, Inc., 12100 W. 6th Ave, Lakewood, CO 80228, an ISO 17025:2017 accredited laboratory through NVLAP. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

As Received Calibration Data

Technician	Aaron Schwartz		Lab. Pressure	616.1 mmHg
			Lab. Temperature	24 °C
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Received
0 ccm	456.41 ccm	-100.0%	1.00%	Out of Tolerance
0 ccm	101.19 ccm	-100.0%	1.00%	Out of Tolerance
0 ccm	30.35 ccm	-100.0%	1.00%	Out of Tolerance

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_10	103743	25-Jan-2023	25-Jan-2024





As Shipped Calibration Data

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

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_10	103743	25-Jan-2023	25-Jan-2024

Calibration Notes

The expanded uncertainty of flow has a coverage factor of $k = 2$ for a confidence interval of approximately 95%.

Flow testing is in accordance with our test number MP-00672 with an expanded uncertainty of 0.27% using high-purity nitrogen or filtered laboratory air.

Traceability to the International System of Units (SI) is verified by accreditation to ISO/IEC 17025 by NVLAP under NVLAP Code 200661-0.

Technician Notes:

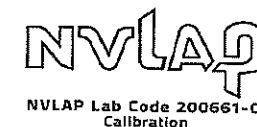
By:

Approved By:

Aaron Schwartz
Assembler I

David Thomas
Quality Engineer

Mesa Laboratories, Inc. certifies that the above instrument meets or exceeds published specifications, and that the calibration results in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Calibration results are in compliance with ISO/IEC 17025:2017. Calibrations process has a Test Uncertainty Ratio (TUR) of 4:1 or greater. Any Pass/Fail determination is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only.



Calibration Certificate

Certificate No. 561588
Product 200-510M Defender 510 Medium Flow
Serial No. 151114
Cal. Date 30-Sep-2023

Sold To:

All calibrations are performed in accordance with ISO 17025 at Mesa Laboratories, Inc., 12100 W. 6th Ave, Lakewood, CO 80228, an ISO 17025:2017 accredited laboratory through NVLAP. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

As Received Calibration Data

Technician	Xiem Ly		Lab. Pressure	616.8 mmHg
			Lab. Temperature	25.8 °C
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Received
0 ccm	4499.86 ccm	-100.0%	1.00%	Out of Tolerance
0 ccm	997.38 ccm	-100.0%	1.00%	Out of Tolerance
0 ccm	250.32 ccm	-100.0%	1.00%	Out of Tolerance

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	117991	16-Aug-2023	16-Aug-2024

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



As Shipped Calibration Data

Certificate No	561588	Lab. Pressure	616.2 mmHg	
Technician	Xiem Ly	Lab. Temperature	26.1 °C	
Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Shipped
4495.74 ccm	4494.43 ccm	0.05%	1.00%	In Tolerance
997.03 ccm	997.16 ccm	-0.01%	1.00%	In Tolerance
249.84 ccm	250.5 ccm	-0.26%	1.00%	In Tolerance

Mesa Laboratories Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML_800_24	117991	09-Dec-2022	05-Dec-2023

Calibration Notes

The expanded uncertainty of flow has a coverage factor of $k = 2$ for a confidence interval of approximately 95%.
Flow testing is in accordance with our test number MP-00672 with an expanded uncertainty of 0.27% using high-purity nitrogen or filtered laboratory air.
Traceability to the International System of Units (SI) is verified by accreditation to ISO/IEC 17025 by NVLAP under NVLAP Code 200661-0.

Technician Notes:

By:

Xiem Ly

Xiem Ly
Production Technician II

Approved By:

Norma Aragon

Norma Aragon
QC Inspector

Mesa Laboratories, Inc. certifies that the above instrument meets or exceeds published specifications, and that the calibration results in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Calibration results are in compliance with ISO/IEC 17025:2017. Calibrations process has a Test Uncertainty Ratio (TUR) of 4:1 or greater. Any Pass/Fail determination is made without taking measurement uncertainty into account and is based on UUT performance against required tolerance only.

Certificate of Calibration

Customer

Name : ALS Laboratory Group Thailand Co., Ltd.
Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok
10250

Certificate No : 24-AFM-018 Rev.1

Request No : Req-2024-0043

Unit Under Calibration Details

Measurement Item : Air Flow Meter
Manufacturer : Bios
Model : Defender 510-L
Serial Number : 206695
ID : BKK_FS1346

Sensor Model : -

Sensor Serial Number : -

Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : 23 °C ± 0.3 °C
Humidity : 55 %RH ± 20 %RH
Barometric Pressure : 1013 hPa ± 10 hPa
Received Date : 3 January 2024
Calibration Date : 29 January 2024

Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	12 July 2024
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	12 July 2024
Temperature meter	GT 11	08000057	Oreborn	27 February 2024
Pressure meter	CPG2-403	41600KDU/651882	TPA	9 November 2024

Traceability :

This Certificate is traceable to SI Unit through Sensidyne A2LA Accreditation No. 3943.01

Note :

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

This Certificate was issued to replace to Calibration Certificate No. 24-AFM-018

Calibration By : *ME*
Mr. Noppadon Luangrat
Service Calibration Engineer

Approved By : *Msy*
Mr. Pachi Mathavorn
Calibration Engineer Supervisor

Issue Date : 1 February 2024

Certificate No : 24-AFM-018 Rev.1

Request No : Req-2024-0043

Result of Calibration : Without Adjustment

Temperature (°C)	Pressure (kPa)	STD (mL/min)	UUC (mL/min)	Error (mL/min)	Uncertainty (mL/min)
25.00	101.66	20	20.148	0.1	1.3
25.00	101.67	100	99.409	-0.6	2.8
24.90	101.63	199	197.46	-1.5	5.6
25.00	101.61	300	298.15	-1.8	8.4
24.90	101.60	399	400.13	1	11
24.90	101.59	480	478.02	-2.0	6.8

Note

STD : Standard UUC : Unit Under Calibration

- UUC Reference Condition : At atmospheric pressure and room temperature condition
- Flow Rate was corrected for non-standard operating condition by using equation :

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

where Q = Flow Rate P = Absolute Pressure T = Absolute Temperature
Meas = Measurement Condition ref = Standard Condition

* Indicates not accredited

End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev.01 Issue date 25/01/24

Certificate of Calibration

Customer

Certificate No : 24-AFM-033

Name : ALS Laboratory Group Thailand Co., Ltd.

Request No : Req-2024-0241

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

Unit Under Calibration Details

Measurement Item : Primary Flow Calibrator

Manufacturer : Bios

Model : Defender 510-1.

Sensor Model : -

Serial Number : 130027

Sensor Serial Number : -

ID : RYG_FS0208

Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : 23 °C ± 3 °C

Humidity : 55 %RH ± 20 %RH

Barometric Pressure : 1013 hPa ± 10 hPa

Received Date : 31 January 2024

Calibration Date : 13 February 2024

Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator


Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	12 July 2024
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	12 July 2024
Temperature meter	GT 11	08000057	Qrebon	27 February 2024
Pressure meter	CPG2400	41000KDU/651882	TPA	9 November 2024


Traceability :

This Certificate is traceable to SI Unit through Sensidyne A2LA Accreditation No. 3943.01

Note :

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibration By : 
Mr. Noppakorn Luangart
Service Calibration Engineer

Approved By : 
Mr. Pacit Mathayom
Calibration Engineer Supervisor
Issue Date : 13 February 2024

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev.01 Issue date 25/01/24

Certificate No : 24-AFM-033

Request No : Req-2024-0241

Result of Calibration : Without Adjustment

Temperature	Pressure	STD	UUC	Error	Uncertainty
(°C)	(kPa)	(cc/min)	(cc/min)	(cc/min)	(cc/min)
24.50	101.26	20	19.965	0.0	1.3
24.20	101.25	101	100.50	-0.5	2.8
24.00	101.31	200	199.13	-0.9	5.6
23.90	101.42	301	303.56	2.6	8.4
24.10	101.41	401	404.57	4	11
24.10	101.49	480	483.81	3.8	7.0

Note STD : Standard UUC : Unit Under Calibration
- UUC Reference Condition : At atmospheric pressure and room temperature condition
- Flow Rate was corrected for non-standard operating condition by using equation :

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

where Q = Flow Rate P = Absolute Pressure T = Absolute Temperature
Meas = Measurement Condition ref = Standard Condition

* Indicates non accredited

End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev 01 Issue date 25/01/24

Certificate of Calibration

Customer

Name : ALS Laboratory Group Thailand Co., Ltd.

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

Unit Under Calibration Details

Measurement Item : Primary Flow Calibrator

Manufacturer : Bios

Model : Defender 510-M

Serial Number : 129958

ID : RYG_FS0209

Location of Calibration : LAB 4 AIR VELOCITY METER

Calibration Environment and Details

Temperature : 23 °C ± 3 °C

Humidity : 55 %RH ± 20 %RH

Barometric Pressure : 1013 hPa ± 10 hPa

Received Date : 31 January 2024

Calibration Date : 13 February 2024

Calibration Procedure : In-house method CP-AFM-01 by Comparison technique with Standard Primary Flow Calibrator


Reference Standard	Model	Serial Number	Traceable	Due Calibration
Air Flow Meter	Gilibrator 3 Low flow	18501010006	Sensidyne	12 July 2024
Air Flow Meter	Gilibrator 3 Standard flow	19031011003	Sensidyne	12 July 2024
Temperature meter	GT 11	08000057	Orebon	27 February 2024
Pressure meter	CPG2400	41000KDU/651882	TPA	9 November 2024


Traceability :

This Certificate is traceable to SI Unit through Sensidyne A2LA Accreditation No. 3943.01

Note :

The reported uncertainty is based on standard uncertainty multiplied by the Coverage Factor $k = 2$, providing a level of confidence approximately 95 %.

Calibration By : 
Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : 
Mr. Pait Mathivorn
Calibration Engineer Supervisor
Issue Date : 13 February 2024

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev 01 Issue date 25/01/24



Certificate No : 24-AFM-032

Request No : Req-2024-0240

Result of Calibration : Without Adjustment

Temperature (°C)	Pressure (kPa)	STD (cc/min)	UUC (cc/min)	Error (cc/min)	Uncertainty (cc/min)
23.80	101.89	95	100.13	5.1	2.8
23.90	101.71	501	513.93	12.9	7.2
24.18	101.62	1006	1019.3	13	14
24.00	101.81	1997	2023.0	26	29
24.10	101.87	2999	3035.5	37	45
24.60	102.00	3944	3991.8	48	59
24.60	102.08	4739	4790.5	52	72

Note STD : Standard UUC : Unit Under Calibration
 - UUC Reference Condition : At atmospheric pressure and room temperature condition
 - Flow Rate was corrected for non-standard operating condition by using equation :

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

where Q = Flow Rate P = Absolute Pressure T = Absolute Temperature
 Meas = Measurement Condition ref = Standard Condition

* Indicates non accredited

End of Certificate

The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co., Ltd.

FM-708-AFM-01 Rev.01 Issue date 25/01/24

BKK_EN0119

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Agilent CrossLab Compliance Services

Certificate of System Qualification

GC-OQ + GCMS-OQ

REVIEW BY Suchada P.
 APPROVED BY Thanyarat P.
 NEXT CAL. DATE 18 Oct 24

System ID: GM-2
 Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.
 Organization Location: 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250
 Date: April 18, 2023 3:15:25 PM
 EQP Name: Agilent Recommended , Agilent Recommended
 EQP Revision: GC.02.51, GCMS.02.51
 Overall Qualification Status: Pass

System Inspection and Basic Safety and Operation

Name: 7890
 Setpoint Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status
 Pass

Inlet Pressure Accuracy

Name: 7890
 Front MMI
 Setpoint Status: Pass
 Setpoint Actual
 Inlet Pressure: 25.0 psi 25.0 psi
 Accuracy: 0.0 psi
 Agilent Recommended: <= 1.2

Overall Inlet Pressure Accuracy Test Status
 Pass

GC Oven Temperature Accuracy

Name: 7890

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

Setpoint Status: **Pass**

Zone: **Oven**

Setpoint/Actual

Temperature: **230.0** **230.1** °C

Accuracy: **0.1** °C

Agilent Recommended: **>= -1.0** % setpoint in K **(-5.0)** °C)
<= 1.0 % setpoint in K **(5.0)** °C)

Setpoint Status: **Pass**

Zone: **Oven**

Setpoint/Actual

Temperature: **100.0** **100.4** °C

Accuracy: **0.4** °C

Agilent Recommended: **>= -1.0** % setpoint in K **(-3.7)** °C)
<= 1.0 % setpoint in K **(3.7)** °C)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: **7890**

Setpoint Status: **Pass**

Setpoint/Average

Temperature: **100.0** **100.4** °C

Stability: **0.0** °C

Agilent Recommended: **<= 0.5**

Overall GC Oven Temperature Stability Test Status

Pass

Log Amp

Tested Combination1 **Front MMI / External SQ**

Name: **5975C Inert XL with TAD**

Setpoint Status: **Pass**

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

Overall Log Amp Test Status

Pass

RFPA

Tested Combination1 **Front MMI / External SQ**

Name: **5975C Inert XL with TAD**

Setpoint Status: **Pass**

Amu: **1050** m/z Drift After Five Minutes: **4** mV RFPA Voltage: **441** mV

Agilent Recommended: **>= -100** and **<= 100** **<= 1100**

Overall RFPA Test Status

Pass

Tune EI

Tested Combination1 **Front MMI / External SQ**

Name: **5975C Inert XL with TAD**

Setpoint Status: **Pass**

Filament: **1**

Setpoint Status: **Pass**

Filament: **2**

Overall Tune EI Test Status

Pass

Scouting Run

Tested Combination1 **Front MMI / External SQ**

Injection Tower

Name: **7693A**

Source: **EI - Inert**

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

Setpoint Status:

Completed

Injection Volume on Column:

1.0 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:

456

Agilent Recommended:

>= 320

Source:

EI - Inert

Filament:

2

Setpoint Status:

Pass

Signal to Noise:

2034

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:

1.66 %

Retention Time RSD:

0.04 %

Agilent Recommended:

<= 5.00

<= 1.00

Overall Injection Precision Test Status

Pass

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

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

Mass Ratio

Abundance's

RSD:

1.66 %

Agilent Recommended:

<= 5.00

0.39 %

<= 5.00

Pass

Pass

Overall Mass Ratio Precision Test Status

Pass

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

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 Combination 1

Injection Technique	Injection Tower
Inlet	Front
Detector	External
LTM Included?	No

Sampler 1

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

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

Sampler 2

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

Mainframe 1

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

Inlet 1

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

Detector 1

Manufacturer	Agilent Technologies
Name	Mass Spectrometer
Type	Mass Spectrometer
Location	External

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

Mass Spectrometer 1

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

MS EI Source 1

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

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

Electronic Signature

Purpose

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

Details

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

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

User Name: supasak.nimsongtham
ResName: SCG1115HRCSystem ID: GM-2
Print Date: April 18, 2023 3:15:30 PM

ALS GM2 Transaction log :

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

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

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User Name: supasak.nimsongtham
ResName: SCG1115HRCSystem ID: GM-2
Print Date: April 18, 2023 3:15:30 PM

ALS CM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:17:28 PM	Start	Execution	Inlet Pressure Accuracy - Front MMH - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
April 18, 2023 2:17:33 PM	End	Execution	Inlet Pressure Accuracy - Front MMH - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
April 18, 2023 2:17:36 PM	Start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 18, 2023 2:18:00 PM	Audit	Data	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
April 18, 2023 2:18:01 PM	End	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
April 18, 2023 2:18:03 PM	Start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 18, 2023 2:18:10 PM	Audit	Data	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
April 18, 2023 2:18:22 PM	End	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
April 18, 2023 2:18:44 PM	Start	Execution	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None

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

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User Name: supasak.nimsonghiam
 Hostname: SCG1115HKC

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

ALS GM2 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:19:31 PM	Audit	Data	GC Oven Temperature Stability - 7890; - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
April 18, 2023 2:19:33 PM	End	Execution	GC Oven Temperature Stability - 7890; - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Run Count : 1
April 18, 2023 2:19:35 PM	Start	Execution	Log Amp - 5975C Inert XL with TAD SQ; - Source: EI - Inert	None
April 18, 2023 2:19:45 PM	End	Execution	Log Amp - 5975C Inert XL with TAD SQ; - Source: EI - Inert	Run Count : 1
April 18, 2023 2:19:49 PM	Start	Execution	RFPFA - 5975C Inert XL with TAD SQ; - Source: EI - Inert	None
April 18, 2023 2:32:54 PM	End	Execution	RFPFA - 5975C Inert XL with TAD SQ; - Source: EI - Inert	Run Count : 1
April 18, 2023 2:32:57 PM	Start	Execution	Tune EI - 5975C Inert XL with TAD SQ; - Source: EI - Inert Filament 1 (Qualitative - No setpoints associated)	None
April 18, 2023 2:34:05 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ; - Source: EI - Inert Filament 1 (Qualitative - No setpoints associated)	Run Count : 1
April 18, 2023 2:34:07 PM	Start	Execution	Tune EI - 5975C Inert XL with TAD SQ; - Source: EI - Inert Filament 2 (Qualitative - No setpoints associated)	None
April 18, 2023 2:34:20 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ; - Source: EI - Inert Filament 2 (Qualitative - No setpoints associated)	Run Count : 1

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

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User Name: supasak.nimsonghiam
 Hostname: SCG1115HKC

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

ALS GM2 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:34:23 PM	Start	Execution	Scouting Run - Injection Tower, Front MM, SQ; - Source: - EI - Inert- Part of GCMS System Preparation	None
April 18, 2023 2:34:56 PM	Audit	Data	Scouting Run - Injection Tower, Front MM, SQ; - Source: - EI - Inert- Part of GCMS System Preparation	Data files Path: EAGM-2 DQ2023SNF1_001.D\\DATA, MS
April 18, 2023 2:35:12 PM	End	Execution	Scouting Run - Injection Tower, Front MM, SQ; - Source: - EI - Inert- Part of GCMS System Preparation	Run Count : 1
April 18, 2023 2:35:13 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MM, SQ; - Source: EI - Inert using Filament 1 - L: >= 320	None
April 18, 2023 2:35:24 PM	Audit	Data	Signal to Noise EI - Injection Tower, Front MM, SQ; - Source: EI - Inert using Filament 1 - L: >= 320	Data files Path: EAGM-2 DQ2023SNF1_001.D\\DATA, MS
April 18, 2023 2:35:45 PM	End	Execution	Signal to Noise EI - Injection Tower, Front MM, SQ; - Source: EI - Inert using Filament 1 - L: >= 320	Run Count : 1
April 18, 2023 2:35:47 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MM, SQ; - Source: EI - Inert using Filament 2 - L: >= 320	None
April 18, 2023 2:35:52 PM	Start	Execution	Injection Precision - Injection Tower, Front MM, SQ; - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	None

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

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User Name: supasek.nimsongtham
Hostname: SCG1115HKC

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

ALS GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:38:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MM, SQ:- Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PMRP002.D\DATA.MS
April 18, 2023 2:39:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MM, SQ:- Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PMRP003.D\DATA.MS
April 18, 2023 2:39:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MM, SQ:- Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PMRP004.D\DATA.MS
April 18, 2023 2:39:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MM, SQ:- Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PMRP005.D\DATA.MS
April 18, 2023 2:39:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MM, SQ:- Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PMRP006.D\DATA.MS
April 18, 2023 2:39:21 PM	Audit	Data	Injection Precision - Injection Tower, Front MM, SQ:- Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PMRP007.D\DATA.MS
April 18, 2023 2:39:42 PM	End	Execution	Injection Precision - Injection Tower, Front MM, SQ:- Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Run Count : 1
April 18, 2023 2:39:45 PM	Start	Execution	Mass Ratio Precision - Injection Tower, Front MM, SQ:- Source: EI - Inert - L (RSD): <= 5.00%	None

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

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User Name: supasek.nimsongtham
Hostname: SCG1115HKC

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

ALS GM2 Transaction log :

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

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

Page 15 / 16

User Name: supasakrimsongtham
Hostname: SCG1115HKC

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

ALS GM2 Transaction Log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:58:38 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MMU, GC: - Source: EI - Inert using Filament 2 - L: >= 320	None
April 18, 2023 2:57:00 PM	Audit	Data	Data Manager	Data Manager was in a data verification state but the user chose to start over
April 18, 2023 2:57:16 PM	Audit	Data	Signal to Noise EI - Injection Tower, Front MMU, GC: - Source: EI - Inert using Filament 2 - L: >= 320	Data File Path: EXGIA-2 QC2023\SNF2_003.D\DATA.MS
April 18, 2023 2:57:59 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MMU, GC: - Source: EI - Inert using Filament 2 - L: >= 320	None
April 18, 2023 2:58:05 PM	End	Execution	Signal to Noise EI - Injection Tower, Front MMU, GC: - Source: EI - Inert using Filament 2 - L: >= 320	Run Count: 1
April 18, 2023 3:01:14 PM	End	Qualification	Session	OQ
April 18, 2023 3:01:14 PM	Start	Reporting	Session	None
April 18, 2023 3:14:47 PM	Audit	Reporting	Session	Report Generated: Certificate

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

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CALIBRATION LABORATORY Co., LTD.

210-11, 11, 55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladpheno, Bangkok 10250
Tel. 02-578-0353-4 Fax 02-578-2872 www.cal-lab.com E-mail: sales@cal-lab.com



CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE : VACUUM GAUGE
MANUFACTURER : QUALITYWELL
MODEL / TYPE : N/A
SERIAL NO. : YG01[RYG_FS0332]
CLID. NO. : 212300695
JOB CONTROL NO. : 230329034806

REVIEW BY: *Markon P.*
APPROVED BY: *[Signature]*
NEXT CAL. DATE: *30/9/24*

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

DATE OF RECEIVED : 29 March 2023

DATE OF ISSUED : 31 March 2023

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

Calibrated By : Sittipong Pimdee
Calibration Engineer

[Signature]

Approved By : Mongkol Yotsoontorn
Authorized Signatory
31 March 2023



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

Certificate No. Q23034806

F3-011-04/01-12

page 1 of 3





CALIBRATION LABORATORY Co.,LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel: 02-578-0353-4 Fax: 02-578-2572 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



REPORT OF CALIBRATION

FOR

NOMENCLATURE : VACUUM GAUGE
MANUFACTURER : QUALITYWELL
MODEL / TYPE : N/A
SERIAL NO. : VG01(RYG_FS0332)
DATE OF CALIBRATION : 30 March 2023

ENVIRONMENT CONDITIONS :

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

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

PROCEDURE USED :

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

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

REFERENCE STANDARD USED :

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

TRACEABILITY :

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

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

UNCERTAINTY :

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

Certificate No. Q23034806

F3-011-04/01-12

page 2 of 3



CALIBRATION LABORATORY Co.,LTD.

2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel: 02-578-0353-4 Fax: 02-578-2572 www.cal-laboratory.com E-mail:sale@cal-laboratory.com



CONDITION OF CALIBRATION ITEM : GOOD

MEASUREMENT RESULTS : (X) without adjustment () adjustment

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

CALIBRATION DATA

CORRECTION OF PRESSURE

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

Uncertainty of measurement = 0.05 inHg

Transmitting fluid : Air.

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

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

End of Certificate

Certificate No. Q23034806

F3-011-04/01-12

page 3 of 3





Certificate of Calibration

Equipment: SPECTROPHOTOMETER
Model: DR6000
Serial No. (or ID.): 1627845 (RYG_EN0037)
Manufacturer: HACH
Condition: In Condition

Certificate No.: C06230441
Issued Date: 19 September 2023
Job No.: WO-00005382
Page: 1 of 3

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

Environment Condition: Temperature 23.9 °C ± 0.2
Humidity 65.3 %RH ± 1.4

REVIEW BY *Mr. Nattapat Rungueang*
APPROVED BY *D. ...*
NEXT CAL DATE 18/3/25

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

Calibration By: Mr.Nattapat Rungueang

Calibration Date: 18 September 2023

The Method used: In house method, CAL-WI-24, base on ASTM E 275-08 and ASTM E 387-04

Traceability: This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Sarna Scientific Limited.

The standard for Wavelength Certificate No. 111583 and 111584

The standard for Photometric Certificate No. 9114984 and 111588

The standard for Stray light Certificate No. 111586 and 111585

The standard for Spectral resolution Certificate No. 111587

Mr. Nattapat Rungueang
(Mr. Nattapat Rungueang)
Person in charge

Mr. Nitinun Srihawan
(Mr. Nitinun Srihawan)
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

บริษัท ดีเคเอส อีเซีย จำกัด

DKSH Technology Limited

2533 สุขุมวิท 102/20 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10260

Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/certification-thailand

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CAL-FM-C06-15: 12 Sep 2022



Certificate No.: C06230441 Page 2 of 3

Calibration Results:

Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 2 nm and UUC at 2 nm

Standard Wavelength	Unit Under Calibration	Correction	Uncertainty
418.61	418.3	0.31	0.13
536.66	536.6	0.06	0.13
637.88	638.3	-0.32	0.13
748.48	748.7	-0.22	0.13
807.03	807.4	-0.37	0.13

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.2930	0.289	0.0040	0.0045
	0.5168	0.519	-0.0022	0.0045
	1.0288	1.029	0.0008	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.2867	0.283	0.0037	0.0045
	0.5073	0.509	-0.0017	0.0045
	1.0083	1.007	0.0013	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.2516	0.250	0.0016	0.0045
	0.4595	0.462	-0.0025	0.0045
	0.9334	0.933	0.0004	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.2461	0.245	0.0011	0.0045
	0.4652	0.466	-0.0008	0.0045
	0.9468	0.946	0.0008	0.0045
590 nm	0.0000	0.000	0.0000	0.0045
	0.2594	0.259	0.0004	0.0045
	0.5040	0.505	-0.0010	0.0045
	1.0032	1.002	0.0012	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.2579	0.257	0.0009	0.0045
	0.4971	0.497	0.0001	0.0045
	0.9720	0.971	0.0010	0.0045

บริษัท ดีเคเอส อีเซีย จำกัด

DKSH Technology Limited

2533 สุขุมวิท 102/20 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10260

Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/certification-thailand

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CAL-FM-C06-15: 12 Sep 2022



Certificate No.: C06230441 Page 3 of 3

Calibration Results:
Without Adjustment

Photometric Accuracy (Absorbance)				
Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
235 nm	0.0000	0.000	0.0000	0.0080
	0.7355	0.737	-0.0015	0.0080
257 nm	0.0000	0.000	0.0000	0.0080
	0.8574	0.857	0.0004	0.0080
313 nm	0.0000	0.000	0.0000	0.0080
	0.2854	0.280	-0.0036	0.0080
350 nm	0.0000	0.000	0.0000	0.0080
	0.6374	0.637	0.0004	0.0080
Stray light *				
Standard: cut-off	UUC: Wavelength (nm)	UUC: Transmission (%)	Absorbance (A)	
260.62 +/- 0.11 nm	260.6	1.3	1.886	
391.44 +/- 0.11 nm	391.4	1.3	1.886	
Spectral Resolution *				
Nominal Concentration 0.02 % v/v	Peak	Trough	Ratio	SBW
Standard Wavelength (nm)	268.66	266.69	1.38	2.00
UUC: Wavelength (nm)	268.2	266.1		
Std Absorbance (A)	0.4566	0.2780		
Absorbance (A)	0.413	0.300		

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

The End of Certificate

บริษัท ดีเคเอสเอช (ประเทศไทย) จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangkok 10260, Thailand
Phone: +66 2639 7000 Email: info.asia@dksh.com Website: www.dksh.com/thailand-thailand

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CAL-FM-C06-15: 12 Sep 2022



ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: WO-00005382

ชนิดเครื่องมือ: SPECTROPHOTOMETER รุ่น: DR6000

หมายเลขเครื่อง: 1627845

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
18 Sep 2023			18 Sep 2023		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
		General			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิตช์ ปิด – เปิด เครื่อง (On-Off Switch)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		Spectrophotometer			
<input type="checkbox"/>	<input type="checkbox"/>	6. แรงดันไฟฟ้า (Battery Backup) >= 2.5 VDC	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. ความยาวคลื่น (Wavelength Check)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. แหล่งกำเนิดแสง (UV < 3,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	9.2 Hours
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. แหล่งกำเนิดแสง (Visible < 5,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	741.5 Hours
<input checked="" type="checkbox"/>	<input type="checkbox"/>	11. ช่องวัดหลายตัวอย่าง (Carousel Module)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		pH Meter and Conductivity Meter			
<input type="checkbox"/>	<input type="checkbox"/>	12. อิเล็กโทรด (Electrode and Connection Cable)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	13. ระดับสารละลายใน Electrode (Level KCl)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	15. ขาจับอิเล็กโทรด (Stand)	<input type="checkbox"/>	<input type="checkbox"/>	
		Turbidimeter			
<input type="checkbox"/>	<input type="checkbox"/>	16. ค่าความขุ่นที่ต่ำสุด (No Sample)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	17. ระดับการส่องสว่างของแสง (>= 2.5 ไม่นเกิน 3.0)	<input type="checkbox"/>	<input type="checkbox"/>	
		Automatic titrator			
<input type="checkbox"/>	<input type="checkbox"/>	18. สภาพ Piston Burettes	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	19. Function Rinsing and Dosing	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	<input type="checkbox"/>	<input type="checkbox"/>	

เพิ่มเต็ม/ช่องแคบ : *656.1nm=656.1nm

*486.0nm=485.5nm

Mr.Nattapat Rungruang
Service Engineer

บริษัท ดีเคเอสเอช (ประเทศไทย) จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10260
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Delivering Growth - In Asia and Beyond.

CAL-FM-R31-03: 20 Jun 2022

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8381-6, e-mail: service.thailand@sartorius.com



NSC-TISI-TIS 17023
CALIBRATION 0426

SARTORIUS

Certificate of Calibration

REVIEW BY Manitole
APPROVED BY D. K.
NEXT CAL DATE 12/02/2025

Model Number : MSU224S-100-DU Certificate No. : 24BCI0073
Description : Analytical Balance Issued Date : Friday, February 23, 2024
Serial Number : 0031709552 Reference No. : 229196
ID No. : RYG_EN0003
Manufacturer : Sartorius Page No. : 1 of 2

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

Calibrated Place : ALS Laboratory Group (Thailand) Co., Ltd.(Balance Room)
616/10 Moo 5 T.Maenam Khu, A.Pluek Daeng, Rayong 21140, Thailand.

Calibrated By : Mr.Chonchai Inthana Calibration Procedure No. : This calibration was conducted by
Using in-house calibration procedure number (WI-003)
Based on UKAS LAB 14 : 2019

Metrological data : Ambients Conditions:
Capacity : 220 g Readability : 0.0001 g Temperature : 23.7 °C ± 5.0 °C

Humidity : 62.0 % RH ± 10.0 % RH
Pressure : ±

Reasons for calibration

☐ New Installation ☐ Service / Repaired ☒ Re-calibration/ Maintenance

Equipment Condition: ☒ Good Operate ☐ Fair

Measurement Method UKAS Publication Ref :Lab 14

The measurement uncertainty stated is the expended uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM). The calibration certificate documents the traceability to National Standards, which realise the unit of measurement according to the International Standard System of Units (SI). Report of Tolerance came form list of Sartorius Metrological Specifications.

Traceability:

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 5000g E2,YCS011-522-00	TCS	M2308197S	23-Aug-2025
MHB-382SD	Humidity/Barometer/Temp Lutron MHB-382SD	DKSH	C19231845	23-Aug-2024

This certificate relate and apply this equipment only.
This certificate may not be reproduced other than in full except with the prior written approval of the Verification Operation Division
Sartorius (Thailand) Co., Ltd.

Mr.chonchai inthana(Technical Manager)



SOP FM 33 03 February 2022

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8381-6 Fax: +66 2643-6367, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

Model Number : MSU224S-100-DU Certificate No. : 24BCI0073
Description : Analytical Balance Issued Date : Friday, February 23, 2024
Serial Number : 0031709552 Reference No. : 229196
ID No. : RYG_EN0003
Manufacturer : Sartorius Page No. : 2 of 2

Calibration Results : Without Adjustment

Repeatability

The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.

Nominal Value : (Low Load)	20.0000	200.0001
20 g	20.0000	200.0000
Tolerance	20.0001	200.0001
0.0001 g	20.0000	200.0001
	20.0000	200.0001
Nominal Value : (High Load)	20.0000	200.0001
200 g	19.9999	200.0001
Tolerance	20.0000	200.0000
0.0001 g	20.0000	200.0000
	20.0000	200.0001
Standard Deviation	0.00005	0.00005

Eccentricity (Off-center loading error)

The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).

Nominal value :	100	g
Tolerance	0.0004	g
		Difference
	1	—
	2	0.0000
	3	-0.0001
	4	0.0000
	5	0.0001
	6	-

Linearity

The linearity, also called linearity error. Describes the deviation of the characteristic curve of a weighing instrument from the linear slope.

Nominal Value	Conventional Mass Value	Displayed Value	Deviation	Uncertainty
(g)	(g)	(g)	(g)	(g)
0.01	0.0100	0.0100	0.0000	0.00013
0.1	0.1000	0.1000	0.0000	0.00013
0.5	0.5000	0.5000	0.0000	0.00013
1	1.0000	1.0000	0.0000	0.00013
5	5.0000	5.0000	0.0000	0.00013
10	10.0000	10.0000	0.0000	0.00013
20	20.0000	20.0000	0.0000	0.00013
50	50.0000	50.0000	0.0000	0.00024
100	100.0000	99.9999	-0.0001	0.00018
200	200.0000	199.9999	-0.0001	0.00029

End of Report.

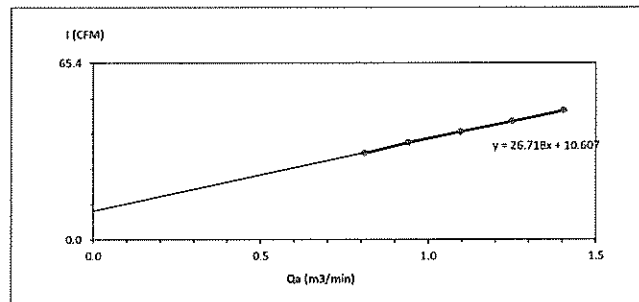
SOP FM 33 03 February 2022



High Volume Air Sampler Calibration Worksheet

Project Site : Siam Styrene Monomer Co., Ltd. Barometric Pressure (mm Hg) : 751
 Calibrate Location : บ้านนาบตาพุด (โรงงานผลิตสไตรีน
สุภาพคานคตาพุด) Temperature (°C) : 31
 Calibrate Date : 9-Jun-24 High Volume ID : RYG_FS0183
 Calibration Sheet No. : C-090624-RYG_FS0183 High Volume Model : TE-5009X
 Calibrator ID : RYG_FS0205 High Volume S/N : 4791
 Calibrator Model : TE-S028A Calibrator Slope : 0.95561
 Calibrator S/N : 1166 Calibrator Intercept : -0.02266

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



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

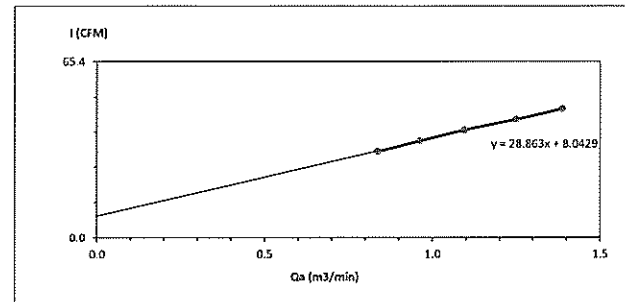
Approved by : นพปอง จันทราน
 (Mr. Noppong Juntarapan)
 Enviro Field Coordinator Scientist (3)



High Volume Air Sampler Calibration Worksheet

Project Site : Siam Styrene Monomer Co., Ltd. Barometric Pressure (mm Hg) : 751
 Calibrate Location : บ้านนาบตาพุด Temperature (°C) : 31
 Calibrate Date : 9-Jun-24 High Volume ID : RYG_FS0295
 Calibration Sheet No. : C-090624-RYG_FS0295 High Volume Model : TE-5009X
 Calibrator ID : RYG_FS0205 High Volume S/N : 5502
 Calibrator Model : TE-S028A Calibrator Slope : 0.95561
 Calibrator S/N : 1166 Calibrator Intercept : -0.02266

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I: Chart (CFM)	Linear Regression
1	1.5	0.838	32	Slope: 28.8633 Intercept: 8.0429 Correlation Coefficient: 0.9994
2	2.0	0.964	36	
3	2.6	1.096	40	
4	3.4	1.250	44	
5	4.2	1.387	48	



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

Approved by : นพปอง จันทราน
 (Mr. Noppong Juntarapan)
 Enviro Field Coordinator Scientist (3)

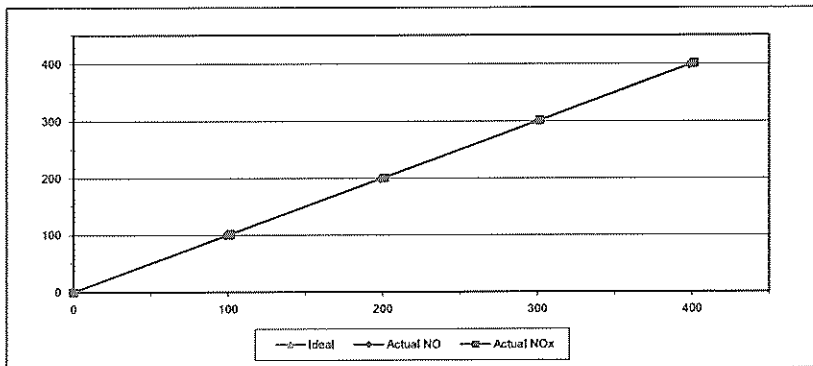
SOP FM 33 03 February 2022



MULTIPOINT CALIBRATION REPORT

Calibration Date 4-Jan-24 Equipment Name NOx Analyzer
Manufacturer HORIBA Model APNA-370
Serial No. ALP0V0WY Equipment ID RYG_FS0455
Calibrator Manufacturer Teledyne API Model 700
Serial No. 947
Std. Gas Concentration (PPM) 55.88 Cylinder No. GN0027222
Cylinder Pressure (psi) 1800 Certified By Airgas Inc.
Certified Date 9-Feb-22 Expired Date 9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	98.60	-1.40	-1.40	101.60	1.60	1.60
2	200.00	198.80	-1.20	-0.60	201.20	1.20	0.60
3	300.00	301.00	1.00	0.33	301.80	1.80	0.60
4	400.00	398.50	-1.50	-0.38	401.30	1.30	0.33
AVERAGE (%)				-0.39			0.64



Calibrated By

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

Approved By

(Mr.Sarayuth Jitranont)
Assistant General Manager

ALS Laboratory Group

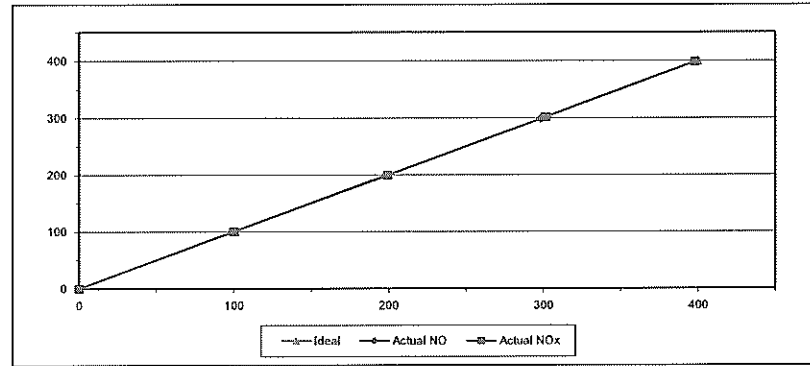
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date 4-Jan-24 Equipment Name NOx Analyzer
Manufacturer HORIBA Model APNA-370
Serial No. 8G314J3K Equipment ID RYG_FS0264
Calibrator Manufacturer Teledyne API Model 700
Serial No. 947
Std. Gas Concentration (PPM) 55.88 Cylinder No. GN0027222
Cylinder Pressure (psi) 1800 Certified By Airgas Inc.
Certified Date 9-Feb-22 Expired Date 9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.05	0.05	0.05	0.10	0.10	0.10
1	100.00	99.20	-0.80	-0.80	100.10	0.10	0.10
2	200.00	198.50	-1.50	-0.75	199.30	-0.70	-0.35
3	300.00	298.60	-1.40	-0.47	301.50	1.50	0.50
4	400.00	398.20	-1.80	-0.45	398.00	-2.00	-0.50
AVERAGE (%)				-0.48			-0.03



Calibrated By

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

Approved By

(Mr.Sarayuth Jitranont)
Assistant General Manager

ALS Laboratory Group

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



JIRANATEE ASSOCIATES CO., LTD.

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E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

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

Airspeed measurement laboratory
Calibration services department.

REVIEW BY: *Harabon P*
APPROVED BY: *[Signature]*
NEXT CAL DATE: 18/2/25

Certificate Number

CWS-003-66

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Cup anemometer
MANUFACTURER : Novalyne
MODEL/TYPE : Sensor: WS-02F
Data logger: 200-WS-25LB
SERIAL NUMBER : Sensor: WSD-AS190
Data logger: AS190
ID NUMBER : RYG_FS0329
CONDITION AS-RECEIVED : Used Item
CUSTOMER : AIS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand.

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

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

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

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

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

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:
☒ Mr. Sorawit Thachulazid
☐ Miss Jitraporn Kertsomphol



Approved signatory:

Mr. Porinya Booncharoen
Calibration Department Manager

Remarks:

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

Calibration procedure:

The cup anemometer was calibrated against Standard air velocity transducer model: B455-12 and pitot tube with precision differential pressure meter model: DPM1500 in an open test section of Eiffel-type wind tunnel with 900 cm² cross test section area. The WI-CL-007 based on IEC 61400-12-1, Wind energy generation systems - Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:

This certificate provides a traceability of the measurement to recognized the national standards, and to realization of the international system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0057-21 and MW-0056-22

Uncertainty of Measurement:

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

Page 2 of 2 Pages

MEASUREMENT RESULTS^{*}

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

V_{ref} (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	V_{meas} (m/s)	Error (m/s)	U (k=2) (m/s)
1.032	24.10	24.30	0.9	-0.1	0.31
2.095	24.54	24.30	1.9	-0.2	0.31
3.006	24.08	24.30	2.9	-0.1	0.31
4.210	24.04	24.30	4.0	-0.2	0.31
5.00	23.78	24.30	4.9	-0.1	0.31
5.97	23.82	24.30	5.9	-0.1	0.31
7.01	23.78	24.30	6.9	-0.1	0.31
8.13	24.00	24.30	8.0	-0.1	0.31
9.07	23.82	24.30	9.0	-0.1	0.31
10.07	23.90	24.30	9.9	-0.1	0.31
11.13	23.84	24.30	11.1	0.0	0.31
12.13	23.80	24.30	12.0	-0.1	0.31
13.19	23.82	24.30	13.1	0.0	0.31
14.24	23.74	24.30	14.1	-0.1	0.31
15.20	23.80	24.30	15.1	0.0	0.33
16.26	23.74	24.30	16.1	-0.2	0.31

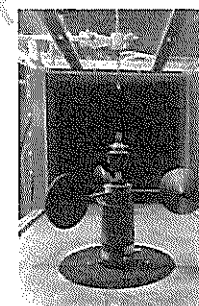
Remark:

^{*} Calibration results only count for the tested circumstances and environmental conditions during which calibration took place

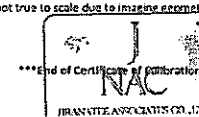
¹ Velocity of standard

² Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP



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



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



JIRANATEE ASSOCIATES CO., LTD.

Jiranatee Associates Co., Ltd.
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Tel : +6628680812
Mobile : +66967993453
E-mail : jnac_calibration@jiranatee.com
Web site : www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
MSC-TIS-TIS 17025
CALIBRATION 0267

Air speed measurement laboratory
Calibration services department.

Certificate Number

CWD-003-66

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Wind Direction Sensor
MANUFACTURER : Novallna
MODEL/TYPE : Sensor: WS-02F
Data logger: 200-WS-251B
SERIAL NUMBER : Sensor: WSD-AS190
Data logger: AS193
ID NUMBER : RYG_F50329
CONDITION AS-RECEIVED : Used Item
CUSTOMER : AIS laboratory group (Thailand) Co., Ltd.
104 Phatthanalan 40, Phatthanalan Rd, Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand.

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

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follows:

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

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

CALIBRATION CONDITION : Wind tunnel cross-section area¹ 500 cm²
Win direction frontal area² 129 cm²
Diameter of mounting pipe³ - mm
Blockage ratio of test object⁴ 0.143 [-]

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:
☒ Mr. Saravit Thaisriat
☐ Miss Jitraporn Lertkumpol



Approved signatory:

Mr. Parinya Booncharoen
Calibration Department Manager

Footnote:
¹ Include cross-section area of the wind tunnel
² Projected cross-section area of the tested object include mounting pipe
³ Diameter of mounting pipe
⁴ Ratio "a"/"A"

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

Certificate Number

CWD-003-66

Page 2 of 2 Pages

MEASUREMENT RESULTS¹

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

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

Remarks:

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

² Direction of standard

³ Direction of Unit Under Calibration

End of Certificate of Calibration





JIRANATEE ASSOCIATES CO., LTD.

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Mobile: +662 6393453
E-mail: jnac-calibration@jiranatee.com
Website: www.jiranatee.com

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

Air speed measurement laboratory
Calibration services department.

APPROVED BY: *Nirakorn P.*
19/7/24

Certificate Number

CL-011-66

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Wind Direction Sensor
MANUFACTURER : Novolynt
MODEL/TYPE : Sensor: WS-02F
Data logger: 200-WS-25DL
SERIAL NUMBER : Sensor: -
Data logger: A4587
ID NUMBER : RYG_FSD089
CONDITION AS-RECEIVED : Used Item
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand.

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

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follows:

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

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

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

Preconditioning : 24 hours at ambient conditions.

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:

- ☒ Mr. Soravit Thongkiet
☐ Miss Jitiraporn Lertkarnthol

Approved signatory:

Mr. Parinya Booncharoen
Calibration Department Manager

Remarks:

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

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

Certificate Number

CL-011-66

Page 2 of 2 Pages

MEASUREMENT RESULTS¹

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

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

Remarks:

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

² Direction of standard

³ Direction of Unit Under Calibration

End of Certificate of Calibration



JIRANATEE ASSOCIATES CO., LTD.

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E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

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

Air speed measurement laboratory
Calibration services department

Certificate Number

CL-011-66

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM : Cup anemometer
MANUFACTURER : Novallux
MODEL/TYPE : Sensor: WS-02F
Data logger: 200-WS-25DL
SERIAL NUMBER : Sensor: -
Data logger: AA987
ID NUMBER : RYG_F50089
CONDITION AS-RECEIVED : Used item
CUSTOMER : ALS laboratory group (Thailand) co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand.

RECEIVED DATE : 16 Jun 2023
MEASUREMENT DATE : 18 Jun 2023
ISSUE DATE : 20 Jun 2023

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

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

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

CALIBRATION CONDITIONS : Wind tunnel cross-section area¹ 900 cm²
Win direction frontal area 100 cm²
Diameter of mounting pipe² - mm
Blockage ratio of test object³ 0.111 [-]

Preconditioning : 24 hours at ambient conditions.

Measurement Condition : The average values during measurement are (23.5) °C, (52.8) %RH and (1014.1) hPa.

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:

☒ Mr. Sorawat Thachulad
☐ Miss Jittrachorn Witsornsilphol

Approved signatory:

Mr. Parinya Booncharoen
Calibration Department Manager

Remarks:

¹ Nozzle cross-section area of the wind tunnel
² Projecting cross-section area of the tested object include mounting pipe
³ Diameter of mounting pipe
⁴ Ratio $\frac{A_o}{A_t}$

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

Certificate Number

CL-011-66

Page 2 of 2 Pages

MEASUREMENT RESULTS⁵

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

V_{ref} ⁶ (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	V_{ref} ⁷ (m/s)	Error (m/s)	U (k=2) (m/s)
0.983	23.50	23.45	0.8	-0.2	0.17
2.035	23.44	23.45	1.9	-0.1	0.16
3.049	23.50	23.45	2.9	-0.2	0.19
4.136	23.50	23.45	3.9	-0.2	0.20
5.01	23.40	23.45	4.9	-0.1	0.18
6.00	23.50	23.45	5.9	-0.1	0.19
7.07	23.40	23.45	7.0	-0.1	0.19
8.18	23.50	23.45	8.0	-0.2	0.19
9.10	23.26	23.45	9.0	-0.3	0.20
10.09	23.44	23.45	9.9	-0.1	0.21
11.15	23.30	23.45	11.0	-0.1	0.21
12.14	23.42	23.45	12.0	-0.1	0.25
13.20	23.22	23.45	13.1	-0.1	0.26
14.25	23.34	23.45	14.1	-0.1	0.24
15.24	23.24	23.45	15.0	-0.3	0.26
16.31	23.24	23.45	16.1	-0.2	0.24

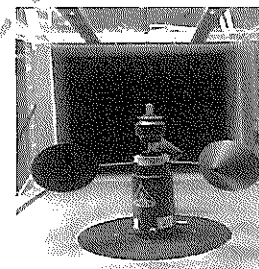
Remarks:

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

⁶ Velocity of standard

⁷ Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP



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

End of Certificate of Calibration

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Tel.0-2435-8800 Fax.0-2433-1679 e-mail:cal-center@sithiporn.com http://www.sithiporn.com



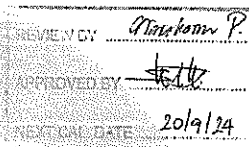
MSC-TSI-TIS 17025
CALIBRATION 6394

Cert. No. : ACC23029

Pages : 1 of 3

Calibration Certificate

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



Condition As Found : GOOD

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

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

Received Date : 07 SEPTEMBER 2023
Calibration Date : 20 SEPTEMBER 2023
Date of Issue : 20 SEPTEMBER 2023

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchurai
(Thanakul Petchurai)

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QF-TS12-04-04-020664

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Continuation of Calibration Certificate

Cert. No. : ACC23029

Job No. : VC66AC0100

Pages : 2 of 3

Calibration Procedure : CP-AC-03

Calibration Method :

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

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

Condition of this result of calibration :

1. Reference Standard Instruments :

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

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

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

3.1 National Institute of Metrology (Thailand).

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

QF-TS12-04-04-020664

T. Petchurai

Continuation of Calibration Certificate

Cert. No. : ACC23029
Job No. : VC66AC0100
Pages : 3 of 3

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Acceptance limit (dB)
94	94.1	0.10	0.14	0.40

2. Frequency

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

3. Total distortion

Measured value (%)	Uncertainty (%)	Acceptance limit (%)
1.70	0.10	3.0

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

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Tel. +66 2433 8231 Email : calibration@sithiporn.com



Cert. No. : ACL24077
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-2S
Serial No. : 00920831 / 22191 / 22220
ID No. : RYG_FS0622

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 \pm 3) °C
Pressure : (101.3 \pm 3) kPa
Relative Humidity : (50.0 \pm 20) %

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

Calibrated by : Nathakorn Pisutpaisan

Approved by :

Thanakul Petchurai
(Thanakul Petchurai)

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Cert. No. : ACL24077
 Job No. : VC67AC0054
 Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).

The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anchoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-23	07-FEB-24
Waveform Generator	33511B	MY52302742	EF-0010-23	07-FEB-24
Digital Multimeter	33461A	MY53220104	EEL-BP 30/0266	13-FEB-24
Digital Multimeter	33461A	MY53220076	EEL-BP 29/0266	13-FEB-24
Digital Multimeter	34461A	MY60024273	EEL-BP 31/0266	14-FEB-24
Programmable Attenuator	MAT-1070	62100114	EF-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KA1	34560495	AA-3002-23	14-FEB-24

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

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

3.1 National Institute of Metrology (Thailand).

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

T. Retin

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Cert. No. : ACL24077
 Job No. : VC67AC0054
 Pages : 3 of 8

Summary of Measurement Result :

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

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Job No. : VC67AC0054
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	94.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
13.8

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

Frequency Weighting	Measured value (dB)
A - weight	8.7
C - weight	13.7
Flat	19.6

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	0.1	0.2	0.2	± 1.0
1000	0.2	0.2	0.2	± 0.7
8000	0.4	0.5	0.5	+ 1.5, - 2.5

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Job No. : VC67AC0054
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±1.0
125	0.1	0.1	0.0	±1.0
250	0.0	0.0	0.0	±1.0
500	0.0	0.0	0.0	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.1	0.1	+ 1.5, - 2.5
16000	0.0	-1.2	-1.2	+ 2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

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

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7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	53.9	-0.1	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	38.9	-0.1	±0.8
34.0	33.9	-0.1	±0.8
30.0	29.9	-0.1	±0.8
29.0	28.9	-0.1	±0.8
28.0	27.9	-0.1	±0.8
27.0	26.9	-0.1	±0.8
26.0	25.9	-0.1	±0.8
25.0	24.9	-0.1	±0.8

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Job No. : VC67AC0054
Pages : 7 of 8

8. Level linearity including the level range control

Range	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.0 ; -3.0
	2	8	117.0	117.0	0.0	1.0 ; -1.5
	200	800	134.0	134.1	0.1	±0.5
Slow	2	8	108.0	108.0	0.0	1.0 ; -3.0
	200	800	127.6	127.6	0.0	±0.5
SEL	0.25	1	99.0	98.9	-0.1	1.0 ; -3.0
	2	8	108.0	108.0	0.0	1.0 ; -1.5
	200	800	128.0	128.0	0.0	±0.5

10. Peak C sound level

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

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

7. Peter

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Job No. : VC67AC0054
Pages : 8 of 8

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

T. Petchurai

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Cert. No. : ACL24074
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-S2 / 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,
KHAENG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

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

Calibrated by : Nathakorn Pisupaisan

Approved by :

T. Petchurai
(Thanakul Petchurai)

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Cert. No. : ACL24074
 Job No. : VC67AC0054
 Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).

The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-23	07-FEB-24
Waveform Generator	33511B	MY52302742	EF-0010-23	07-FEB-24
Digital Multimeter	33461A	MY53220104	EEL.BP 30/0266	13-FEB-24
Digital Multimeter	33461A	MY53220076	EEL.BP 29/0266	13-FEB-24
Digital Multimeter	34461A	MY60024273	EEL.BP 31/0266	14-FEB-24
Programmable Attenuator	MAT-1070	62100114	EF-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KA1	34560495	AA-3002-23	14-FEB-24

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

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

3.1 National Institute of Metrology (Thailand).

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

Signature

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Cert. No. : ACL24074
 Job No. : VC67AC0054
 Pages : 3 of 8

Summary of Measurement Result :

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

Signature

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Cert. No. : ACL24074
Job No. : VC67AC0054
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
17.0

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

Frequency Weighting	Measured value (dB)
A - weight	10.8
C - weight	17.0
Flat	22.7

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	0.4	0.4	0.4	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-1.4	-1.4	-1.3	±5.0

G. Peter

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Cert. No. : ACL24074
Job No. : VC67AC0054
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

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

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	94.1	0.1	± 0.3

G. Peter

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Cert. No. : ACL24074
Job No. : VC67AC0054
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7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.1	0.1	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.0	0.0	± 1.1
26.0	26.0	0.0	± 1.1
25.0	25.0	0.0	± 1.1

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8. Level linearity including the level range control

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

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	108.0	0.0	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

10. Peak C sound level

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

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

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Cert. No. : ACL24074
Job No. : VC67AC0054
Pages : 8 of 8

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.5	89.5	0.0	±1.5

12. High level stability

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

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

End of Calibration Certificate

T. Petchurai

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Cert. No. : ACL24094
Pages : 1 of 8

Calibration Certificate

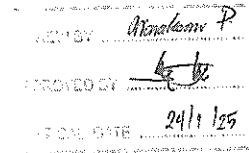
Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamplifier NH-24
Serial No.: 01222723 / 143841 / 22770
ID No.: RYG_FS0022

Condition As Found : GOOD

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

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

Received Date : 19 JANUARY 2024
Calibration Date : 25-26 JANUARY 2024
Date of Issue : 29 JANUARY 2024



Calibrated by : Nathakorn Pisutpaisan

Approved by : *T. Petchurai*
(Thanakul Petchurai)

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

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Cert. No. : ACL24094
Job No. : VC67AC0058
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by follow on IEC-61672-3 (2013) Standard for sound level meter (SLM).

The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

For tests results of each items were made by observation of each instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0009-23	07-FEB-24
Waveform Generator	33511B	MY52302742	EF-0010-23	07-FEB-24
Digital Multimeter	33461A	MY53220104	EEL.BP 30/0266	13-FEB-24
Digital Multimeter	33461A	MY53220076	EEL.BP 29/0266	13-FEB-24
Digital Multimeter	34461A	MY60024273	EEL.BP 31/0266	14-FEB-24
Programmable Attenuator	MAT-1070	62100114	EF-0011-23	08-FEB-24
Condenser Microphone	4180	2977900	AA-1001-23	14-FEB-24
Measuring Amplifier	NA-42KAI	34560495	AA-3002-23	14-FEB-24

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

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

3.1 National Institute of Metrology (Thailand).

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

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Cert. No. : ACL24094
Job No. : VC67AC0058
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Summary of Measurement Result :

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

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Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.98)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.8

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

Frequency Weighting	Measured value (dB)
A - weight	12.0
C - weight	18.4
Flat	24.1

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			Acceptance Limits
	Flat	C-weight	A-weight	
125	0.4	0.4	0.4	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	0.7	0.8	0.7	±5.0

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4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

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

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

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

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7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.1	0.1	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.2	0.2	± 1.1
25.0	25.1	0.1	± 1.1

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Job No. : VC67AC0058
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8. Level linearity including the level range control

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

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

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

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	132.9	-0.1	±2.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

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11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.8	89.6	-0.2	±1.5

12. High level stability

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

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

End of Calibration Certificate

T. Petch

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Certificate of System Qualification

GC-OQ

REVIEW BY	<i>Finde V.</i>
APPROVED BY	<i>Tangtorn M.</i>
NEXT CAL. DATE	01 Oct 24

System ID: CN11461066
Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.
Organization Location: 104 Soi 40 Phatthanakan Rd, Khwang Suan Luang, Khet Suan Luang, Bangkok 10250

Date: April 21, 2023 3:28:38 PM
EQP Name: AgilentRecommended
EQP Revision: GC.02.52
Overall Qualification Status: Pass

CDS Logon Verification - GC

Logon: Saenguthai Tarak

Overall CDS Logon Verification - GC Test Status

Pass

System Inspection and Basic Safety and Operation

Name: 7890

Setpoint Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status

Pass

Inlet Pressure Decay

Name: 7890
Front SSL

Setpoint Status: Pass

Pressure: 25.0 psi

Pressure Change: -0.1 psi /5 minutes

Agilent Recommended: ≥ -2.0 and ≤ 0.5

Date: April 21, 2023 3:28:38 PM
System ID: CN11461066

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Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name:

7890

Front SSL

Setpoint Status:

Pass

Inlet Pressure: Setpoint Actual
25.0 psi 25.2 psi

Accuracy: 0.2 psi

Agilent Recommended: ≤ 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Decay

Name:

7890

Back SSL

Setpoint Status:

Pass

Pressure: 25.0 psi

Pressure Change: 0.0 psi /5 minutes

Agilent Recommended: ≥ -2.0 and ≤ 0.5

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name:

7890

Back SSL

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

Setpoint Status:

Pass

Inlet Pressure: Setpoint Actual
25.0 psi 24.8 psi

Accuracy: 0.2 psi

Agilent Recommended: ≤ 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

Detector Flow Accuracy

Name:

7890

Front FID

Setpoint Status:

Pass

Flow Type:

Fuel

Setpoint: 30.0 mL/min Measured Flow: 28.9 mL/min

Accuracy: 1.1 mL/min

Agilent Recommended: ≤ 10.0 % setpoint (3.0 mL/min)

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

Setpoint Status:

Pass

Flow Type:

Oxidizer

Setpoint: 400.0 mL/min Measured Flow: 400 mL/min

Accuracy: 0.0 mL/min

Agilent Recommended: ≤ 10.0 % setpoint (40.0 mL/min)

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

Setpoint Status:

Pass

Flow Type:

Makeup

Setpoint: 25.0 mL/min Measured Flow: 24.9 mL/min

Accuracy: 0.1 mL/min

Agilent Recommended: ≤ 10.0 % setpoint (2.5 mL/min)

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

Overall Detector Flow Accuracy Test Status

Pass

Detector Flow Accuracy

Name:

7890

Back FID

Setpoint Status:

Pass

Flow Type:

Fuel

Setpoint:

30.0 mL/min

Measured Flow:

30.7 mL/min

Accuracy:

0.7 mL/min

Agilent Recommended:

<=

10.0

% setpoint

(3.0

mL/min)

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

Setpoint Status:

Pass

Flow Type:

Oxidizer

Setpoint:

400.0 mL/min

Measured Flow:

399 mL/min

Accuracy:

1.0 mL/min

Agilent Recommended:

<=

10.0

% setpoint

(40.0

mL/min)

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

Setpoint Status:

Pass

Flow Type:

Makeup

Setpoint:

25.0 mL/min

Measured Flow:

24.6 mL/min

Accuracy:

0.4 mL/min

Agilent Recommended:

<=

10.0

% setpoint

(2.5

mL/min)

Limit is percentage of setpoint or 0.5 mL/minute, whichever is largest.

Overall Detector Flow Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name:

7890

Date:

April 21, 2023 3:26:38 PM

System ID:

CN11461066

Setpoint Status:

Pass

Zone:

Oven

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)

Setpoint Status:

Pass

Zone:

Oven

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)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name:

7890

Setpoint Status:

Pass

Temperature:

100.0

100.8833

°C

Stability:

0.1

°C

Agilent Recommended:

<=

0.5

Overall GC Oven Temperature Stability Test Status

Pass

Scouting Run

Tested Combination 1

Front

SSL

/ Front

FID

Name:

7693A

Date:

April 21, 2023 3:26:38 PM

System ID:

CN11461066

Setpoint Status:

Completed

Injection Volume on Column:

1.0 μ L

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination1

Front

SSL

/ Front

FID

Name:

7890

Setpoint Status:

Pass

Base Signal:

22.7 pA

ASTM Noise

pA

0.06

<= 0.10

Drift

pA/Hr

0.05

<= 2.50

Agilent Recommended:

Status:

Pass

Pass

Overall Noise and Drift Test Status

Pass

Injection Precision

Tested Combination1

Front

SSL

/ Front

FID

Name:

7693A

Setpoint Status:

Pass

Injection Volume on Column:

1.0 μ L

Area RSD:

0.32 %

Retention Time RSD:

0.67 %

Agilent Recommended:

<= 3.00

<= 1.00

Overall Injection Precision Test Status

Pass

Signal to Noise

Date: April 21, 2023 3:26:38 PM
System ID: CN11461056

Tested Combination1

Front

SSL

/ Front

FID

Name:

7890

Setpoint Status:

Pass

Signal to Noise:

721755

Agilent Recommended:

>= 300000

Overall Signal to Noise Test Status

Pass

Scouting Run

Tested Combination2

Back

SSL

/ Back

FID

Name:

7693A

Setpoint Status:

Completed

Injection Volume on Column:

1.0 μ L

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination2

Back

SSL

/ Back

FID

Name:

7890

Setpoint Status:

Pass

Base Signal:

22.6 pA

ASTM Noise

pA

0.07

<= 0.10

Drift

pA/Hr

0.09

<= 2.50

Agilent Recommended:

Status:

Pass

Pass

Date: April 21, 2023 3:26:38 PM
System ID: CN11461056

Overall Noise and Drift Test Status

Pass

Injection Precision

Tested Combination2	Back	SSL	/ Back	FID
Name:	7693A			
Setpoint Status:	Pass			
Injection Volume on Column:	1.0	uL		
Area RSD:	1.28	%	Retention Time RSD:	0.83 %
Agilent Recommended:	<= 3.00		<= 1.00	

Overall Injection Precision Test Status

Pass

Signal to Noise

Tested Combination2	Back	SSL	/ Back	FID
	Injection Tower			
Name:	7890			
Setpoint Status:	Pass			
Signal to Noise:	2404398			
Agilent Recommended:	>= 300000			

Overall Signal to Noise Test Status

Pass

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

Instrument Details

Purpose

This section describes the as found system configuration.

Details

System

System ID	CN11461066
Manufacturer	Agilent Technologies
Name	7890
Flow Data Input	Manual Data
Temperature Data Input	Manual Data or Other Data Logging

Tested Combination1

Injection Technique	Injection Tower
Sampler Identifier	Sampler 2
Inlet	Front
Detector	Front
LTM Included?	No

Tested Combination2

Injection Technique	Injection Tower
Sampler Identifier	Sampler 3
Inlet	Back
Detector	Back
LTM Included?	No

Sampler 1

Manufacturer	Agilent Technologies
Type	Tray
Name	7693A
Model Number	G4514A
Serial Number	CN15380030
Firmware Revision	A.11.01
Vial Heater	Not installed

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

Sampler 2

Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN16280128
Firmware Revision	A.10.09
Usage	Sample Injection
Location	Front
Syringe Volume (µL)	10

Sampler 3

Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN10340103
Firmware Revision	A.10.09
Usage	Sample Injection
Location	Back
Syringe Volume (µL)	10

Mainframe 1

Manufacturer	Agilent Technologies
Name	7890
Model Number	G3440A
Serial Number	CN11461066
Firmware Revision	Version 4.27
Oven Type	Standard

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

Inlet 1

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

Inlet 2

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

Detector 1

Manufacturer	Agilent Technologies
Name	7890
Type	FID
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Front
Makeup Gas	Nitrogen

Detector 2

Manufacturer	Agilent Technologies
Name	7890
Type	FID
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Back
Makeup Gas	Nitrogen

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

Electronic Signature

Purpose

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Details

Full Name of Signer: Saenguthai Tarak
Logged On User Name: saenguthai.tarak@non.agilent.com
Signature Creation Date: April 21, 2023
Reason for Signature: Executed protocol and published this original version of document

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Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

User Name: saenguthai.tarak
Hostname: LAPTOP-CQ35KQMV

System ID: CN11461066
Print Date: April 21, 2023 3:26:40 PM

GC-6_BXG_EN0127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:21:33 AM	Audit	SessionCreated	Session	None
April 21, 2023 11:21:36 AM	Start	Configuration	Session	None
April 21, 2023 11:21:39 AM	Audit	Entitlement	Licensing	User is Nonpaying and does not require an unlock code
April 21, 2023 11:22:04 AM	Audit	ExpLoaded	Session	EQP details for primary technique [GC] - File path: [ProtocolPacks/GC/Configuration/02.52/GC-02.52.eqp], EQP File Name: [GC-02.52.eqp], EQP Name: [AgilentRecommended]Protocol Revision [GC-02.52]
April 21, 2023 11:22:09 AM	End	Configuration	Session	None
April 21, 2023 11:22:14 AM	Start	Qualification	Session	OQ
April 21, 2023 11:22:14 AM	Start	Execution	CD5 Logon Verification - GC : • Qualitative test	None
April 21, 2023 11:23:14 AM	End	Execution	CD5 Logon Verification - GC : • Qualitative test	Run Count : 1
April 21, 2023 11:23:16 AM	Start	Execution	System Inspection and Basic Safety and Operation - 7890 - Qualitative Test - No setpoints associated	None
April 21, 2023 11:23:35 AM	End	Execution	System Inspection and Basic Safety and Operation - 7890 - Qualitative Test - No setpoints associated	Run Count : 1
April 21, 2023 11:23:37 AM	Start	Execution	Init Pressure Decay - Front SGL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

User Name: saenguthal.larak
Hostname: LAPTOP-QQ3SK0M4

System Id: CN11461066
Print Date: April 21, 2023 3:26:48 PM

GC-6_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:24:01 AM	End	Execution	Inlet Pressure Decay - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	Run Count : 1
April 21, 2023 11:24:04 AM	Start	Execution	Inlet Pressure Accuracy - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
April 21, 2023 11:24:08 AM	End	Execution	Inlet Pressure Accuracy - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
April 21, 2023 11:24:11 AM	Start	Execution	Inlet Pressure Decay - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None
April 21, 2023 11:24:43 AM	End	Execution	Inlet Pressure Decay - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	Run Count : 1
April 21, 2023 11:24:45 AM	Start	Execution	Inlet Pressure Accuracy - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
April 21, 2023 11:24:51 AM	End	Execution	Inlet Pressure Accuracy - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
April 21, 2023 11:24:53 AM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:25:20 AM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:25:25 AM	End	Execution	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count : 1

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Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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User Name: saenguthal.larak
Hostname: LAPTOP-QQ3SK0M4

System Id: CN11461066
Print Date: April 21, 2023 3:26:48 PM

GC-6_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:25:26 AM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:25:40 AM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:25:42 AM	End	Execution	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:25:44 AM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:26:01 AM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:26:04 AM	End	Execution	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:26:05 AM	Start	Execution	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:26:19 AM	Audit	Data	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:26:22 AM	End	Execution	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:26:24 AM	Start	Execution	Detector Flow Accuracy - Back FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:26:38 AM	Audit	Data	Detector Flow Accuracy - Back FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry

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Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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User Name: seenguthaLarak
Hostname: LAPTOP-CQ3SKDMV

System ID: CN11451066
Print Date: April 21, 2023 3:25:40 PM

GC-6_BKK_EN8127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:26:43 AM	End	Execution	Detector Flow Accuracy - Back FID: - Type: Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count: 1
April 21, 2023 11:26:45 AM	Start	Execution	Detector Flow Accuracy - Back FID: - Type: Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:27:01 AM	Audit	Data	Detector Flow Accuracy - Back FID: - Type: Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:27:05 AM	End	Execution	Detector Flow Accuracy - Back FID: - Type: Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count: 1
April 21, 2023 11:27:07 AM	Start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 239.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 21, 2023 11:27:33 AM	Audit	Data	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 239.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
April 21, 2023 11:27:35 AM	End	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 239.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count: 1
April 21, 2023 11:27:37 AM	Start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 21, 2023 11:27:54 AM	Audit	Data	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry

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Date: April 21, 2023 3:26:38 PM
System ID: CN11451066

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User Name: seenguthaLarak
Hostname: LAPTOP-CQ3SKDMV

System ID: CN11451066
Print Date: April 21, 2023 3:26:40 PM

GC-6_BKK_EN8127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:27:57 AM	End	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count: 1
April 21, 2023 11:27:59 AM	Start	Execution	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None
April 21, 2023 11:28:07 AM	Audit	Data	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
April 21, 2023 11:28:10 AM	End	Execution	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Run Count: 1
April 21, 2023 11:28:12 AM	Start	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID: - Part of System Preparation - No limits associated	None
April 21, 2023 11:30:27 AM	Audit	Data	GC Scouting Run - Injection Tower, Front SSL, Front FID: - Part of System Preparation - No limits associated	Data File Path: C:\Users\Public\Documents\GC- 6_BKK_EN8127_ALS_2023-04-20\GC-6 _2023-2023-04-20 16-35-05F_SC01.D\FID1A.e h
April 21, 2023 11:31:04 AM	End	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID: - Part of System Preparation - No limits associated	Run Count: 1
April 21, 2023 11:31:07 AM	Start	Execution	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	None

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System ID: CN11451066

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User Name: saenguthalLarak
Hostname: LAPTOP-CQ35KQMV

System ID: CN11461066
Print Date: April 21, 2023 3:26:48 PM

GC-6_EKK_EN0127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:31:43 AM	Audit	Data	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Data files Path : C:\Users\Public\Documents\C hemStation\3Data\GC-6 _ALS_2023-04-20\GC-6 _2023 2023-04-20 14-36-08\FID-01-005F.D\FID 1A.ch
April 21, 2023 11:32:00 AM	End	Execution	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Run Count : 1
April 21, 2023 11:32:03 AM	Start	Execution	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	None
April 21, 2023 11:32:23 AM	Start	Execution	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	None
April 21, 2023 11:33:45 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\C hemStation\3Data\GC-6 _ALS_2023-04-20\GC-6 _2023 2023-04-20 14-36-08\FID-01-013F.D\FID 1A.ch
April 21, 2023 11:33:45 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\C hemStation\3Data\GC-6 _ALS_2023-04-20\GC-6 _2023 2023-04-20 14-36-08\FID-01-014F.D\FID 1A.ch

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Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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User Name: saenguthalLarak
Hostname: LAPTOP-CQ35KQMV

System ID: CN11461066
Print Date: April 21, 2023 3:26:48 PM

GC-6_EKK_EN0127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\C hemStation\3Data\GC-6 _ALS_2023-04-20\GC-6 _2023 2023-04-20 14-36-08\FID-01-015F.D\FID 1A.ch
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\C hemStation\3Data\GC-6 _ALS_2023-04-20\GC-6 _2023 2023-04-20 14-36-08\FID-01-016F.D\FID 1A.ch
April 21, 2023 11:33:59 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\C hemStation\3Data\GC-6 _ALS_2023-04-20\GC-6 _2023 2023-04-20 14-36-08\FID-01-017F.D\FID 1A.ch
April 21, 2023 11:33:59 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\C hemStation\3Data\GC-6 _ALS_2023-04-20\GC-6 _2023 2023-04-20 14-36-08\FID-01-018F.D\FID 1A.ch
April 21, 2023 11:35:00 AM	End	Execution	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Run Count : 1
April 21, 2023 11:35:04 AM	Start	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID: - Detector FID - L: >= 300000	None

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Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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User Name: saenguthai.larak
Hostname: LAPTOP-CQ3SKOMV

System ID: CN11461066
Print Date: April 21, 2023 3:29:40 PM

GC-6_BXK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:29:28 AM	Audit	Data	Signal to Noise - Injection Tower, Front SSL, Front FID; - Detector FID - L: >= 300000	Data File Path : C:\Users\Public\Documents\hemStation\3\Data\IQQ_GC-6_ALS_2023-04-20\IQQ_GC-6_2023-2023-04-20_14-29-40SN_FrontFID1A.ch
April 21, 2023 11:30:00 AM	End	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID; - Detector FID - L: >= 300000	Run Count : 1
April 21, 2023 11:30:03 AM	Start	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID; - Part of System Preparation - No limits associated	None
April 21, 2023 11:30:26 AM	Audit	Data	GC Scouting Run - Injection Tower, Back SSL, Back FID; - Part of System Preparation - No limits associated	Data File Path : C:\Users\Public\Documents\hemStation\3\Data\IQQ_GC-6_ALS_2023-04-20\IQQ_GC-6_2023-04-20_14-30-26SC_BackFID2B.ch
April 21, 2023 11:37:00 AM	End	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID; - Part of System Preparation - No limits associated	Run Count : 1
April 21, 2023 11:27:02 AM	Start	Execution	Noise and Drift - Back FID; - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	None

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Date: April 21, 2023 3:26:39 PM
System ID: CN11461066

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User Name: saenguthai.larak
Hostname: LAPTOP-CQ3SKOMV

System ID: CN11461066
Print Date: April 21, 2023 3:28:40 PM

GC-6_BXK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:30:00 AM	Audit	Data	Noise and Drift - Back FID; - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Data File Path : C:\Users\Public\Documents\hemStation\3\Data\IQQ_GC-6_ALS_2023-04-20\IQQ_GC-6_2023-2023-04-20_14-30-00ND-01-005B_BackFID2B.ch
April 21, 2023 11:30:23 AM	End	Execution	Noise and Drift - Back FID; - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Run Count : 1
April 21, 2023 11:30:32 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID; - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	None
April 21, 2023 11:30:51 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID; - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	None
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID; - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data File Path : C:\Users\Public\Documents\hemStation\3\Data\IQQ_GC-6_ALS_2023-04-20\IQQ_GC-6_2023_Pre 2023-04-21 10-37-32Pre11-004B_BackFID2B.ch
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID; - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data File Path : C:\Users\Public\Documents\hemStation\3\Data\IQQ_GC-6_ALS_2023-04-20\IQQ_GC-6_2023_Pre 2023-04-21 10-37-32Pre11-005B_BackFID2B.ch

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Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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User Name: saengulhaLarak
Hostname: LAPTOP-CQ3SKQWV

System Id: CN11461066
Print Date: April 21, 2023 3:26:40 PM

GC-6_BKK_EN0127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path: C:\Users\Public\Documents\C hemStation\3\Data\IQ_GC-6 _ALS_2023-04-20\IQ_GC-6 _2023_Pre 2023-04-21 10-37-32Pre11-006B.D\FID 28.ch
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path: C:\Users\Public\Documents\C hemStation\3\Data\IQ_GC-6 _ALS_2023-04-20\IQ_GC-6 _2023_Pre 2023-04-21 10-37-32Pre11-007B.D\FID 28.ch
Apr 21, 2023 11:40:21 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path: C:\Users\Public\Documents\C hemStation\3\Data\IQ_GC-6 _ALS_2023-04-20\IQ_GC-6 _2023_Pre 2023-04-21 10-37-32Pre11-008B.D\FID 28.ch
April 21, 2023 11:40:21 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path: C:\Users\Public\Documents\C hemStation\3\Data\IQ_GC-6 _ALS_2023-04-20\IQ_GC-6 _2023_Pre 2023-04-21 10-37-32Pre11-009B.D\FID 28.ch
April 21, 2023 11:41:29 AM	End	Execution	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Run Count: 1
April 21, 2023 11:41:33 AM	Start	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID: - Detector FID - L: >= 300000	None

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Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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User Name: saengulhaLarak
Hostname: LAPTOP-CQ3SKQWV

System Id: CN11461066
Print Date: April 21, 2023 3:26:40 PM

GC-6_BKK_EN0127_ALS Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:42:22 AM	Audit	Data	Signal to Noise - Injection Tower, Back SSL, Back FID: - Detector FID - L: >= 300000	Data files Path: C:\Users\Public\Documents\C hemStation\3\Data\IQ_GC-6 _ALS_2023-04-20\IQ_GC-6 _2023_Pre 2023-04-20 14-36-08SN_Back.D\FID28.ch
April 21, 2023 11:42:50 AM	End	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID: - Detector FID - L: >= 300000	Run Count: 1
April 21, 2023 11:42:53 AM	End	Qualification	Session	OQ
April 21, 2023 11:42:53 AM	Start	Reporting	Session	None
April 21, 2023 12:01:47 PM	Audit	AccClosed	Session	None
April 21, 2023 3:18:07 PM	Audit	AccRestarted	Session	None
April 21, 2023 3:18:10 PM	Audit	SessionReloaded	Session	None
April 21, 2023 3:18:31 PM	Start	Qualification	Session	OQ
April 21, 2023 3:20:59 PM	Audit	AccRestarted	Session	None
April 21, 2023 3:21:00 PM	Audit	SessionReloaded	Session	None
April 21, 2023 3:21:07 PM	Start	Qualification	Session	OQ
April 21, 2023 3:26:45 PM	Audit	Reporting	Session	Report Generated: Certificate

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Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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ARCHEMICA

Certificate of Calibration

HPLC_U-3000 ID#690 (BKK_FL0034)

This certificate is to verify that instrument below are calibrated
by *Archemica Lab Co.,Ltd.*

DGP-3600SD	S/N : 8107412
WPS-3000TSL	S/N : 8107446
TCC-3000SD	S/N : 6006552
DAD-3000	S/N : 8107298

For

ALS Laboratory Group (Thailand) Co.,Ltd



Operator Signature: _____ Date: 16-17/Jan/2024

(Mr. Supanut Phunpatum)

Test Engineer



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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TEL. 0-2717-3000-29 FAX. 0-2719-9484



Cert.No.: 23CH830
Page.: 1 of 3

Certificate of Calibration

Equipment :	pH Meter
Manufacturer :	Mettler Toledo
Model :	Seven2Go S2
Serial No. :	C221115514
ID No. :	RYG_FS0596
Condition As-Received:	Used Item
Received Date :	30 June 2023
Calibration Date :	03 July 2023
Reference :	2306-0984DSC-6
Submitted by :	ALS Laboratory Group (Thailand) Co.,Ltd. Rayong Branch 616/10 Moo 5, T.Meenam Khu, A.Pluakdaeng, Rayong 21140, Thailand

Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In - house method :
- CP-CH5 by direct measurement with standard
voltage calibrator and direct measurement with
certified reference material (CRM)
- CP-CH8 by comparison with standard thermometer

Calibrated by : Warakorn Lerngagtrakul

Approved by : _____
Approved Signatory

(/) Malee Bulkruea
() Saithip Meangmai
() Warakorn Lerngagtrakul

Issue Date : 6 July 2023

The Uncertainties are for a confidence probability of approximately 95%

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

A 0055863



Cert.No.: 23CH830
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	22E2769	24 Aug 2023
2) Ref. Standard Thermometer	4982054	110RC044	22H1306	27 Oct 2023

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	863832	28 Dec 2024
pH 6.986	CPA chem	863833	28 Dec 2023
pH 10.010	CPA chem	863835	28 Dec 2023

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : mV Measurement

Performing standard curve by Fluke at pH (4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (\pm mV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter S/N.: C221115514	4.00	177.48	178	4.00	0.58	2.00
	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-178	10.00	0.58	2.00

Malu.

a 1169603



Cert.No.: 23CH830
Page.: 3 of 3

Calibration Results

Function : pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (\pm)	Coverage factor k
pH Electrode S/N.: 2465853	4.008	4.01	182	0.0085	2.05
	6.986	6.99	10	0.0099	2.00
	10.010	10.01	-169	0.0095	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLab®Expert Go-ISM
- Serial No. : 2465853

Dimension of probe;

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

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (\pm °C)	Coverage factor k
25.0	25.003	25.2	0.197	0.13	2.00
30.0	30.002	30.2	0.198	0.13	2.00

Remark : - UUC* = Unit Under Calibration

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

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Malu.

a 1169602

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2043 6361-6, e-mail: service.thailand@sartorius.com



NSC-TISI-TIS 17025
CALIBRATION 0426

SARTORIUS

Certificate of Calibration

REVIEW BY Thavitell
APPROVED BY D. [Signature]
NEXT CAL. DATE 02/02/2025

Model Number : MSE224S-100-DU Certificate No. : 24BCI0069
Description : Analytical Balance Issued Date : Friday, February 23, 2024
Serial Number : 0026207038 Reference No. : 229196
ID No. : RYG_EN0002
Manufacturer : Sartorius Page No. : 1 of 2

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

Calibrated Place : ALS Laboratory Group (Thailand) Co., Ltd.(Balance Room)
616/10 Moo 5 T.Maenam Khu, A.Pluakdaeng, Rayong.21140, Thailand.

Calibrated By : Mr.Chonchai Inthana Calibration Procedure No. : This calibration was conducted by
Using in-house calibration procedure number (WI-003)
Based on UKAS LAB 14 : 2019

Metrological data : Ambients Conditions:
Capacity : 220 g Readability : 0.0001 g Temperature : 24.2 °C ± 5.0 °C
Humidity : 57.0 % RH ± 10.0 % RH
Pressure : ±

Reasons for calibration
☐ New Installation ☐ Service / Repair ☒ Re-calibration/ Maintenance
Equipment Condition: ☒ Good Operate ☐ Fair

Measurement Method UKAS Publication Ref :Lab 14

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM). The calibration certificate documents the traceability to National Standards, which realise the unit of measurement according to the International Standard System of Units (SI). Report of Tolerance came from list of Sartorius Metrological Specifications.

Traceability:

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 5000g E2,YCS011-522-00	TCS	M2308197S	23-Aug-2025
MHB-382SD	Humidity/Barometer/Temp. Lulron MHB-382SD	DKSH	C19231845	23-Aug-2024

This certificate relate and apply this equipment only.
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Sartorius (Thailand) Co., Ltd.

Mr.chonchai Inthana(Technical Manager)



SOP FM 33 03 February 2022

Sartorius (Thailand) Co., Ltd.

129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2043 6361-6 Fax: +66 2043-6367, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

Model Number : MSE224S-100-DU Certificate No. : 24BCI0069
Description : Analytical Balance Issued Date : Friday, February 23, 2024
Serial Number : 0026207038 Reference No. : 229196
ID No. : RYG_EN0002
Manufacturer : Sartorius Page No. : 2 of 2

Calibration Results : Without Adjustment

Repeatability

The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.

Nominal Value : (Low Load)	20.0000	199.9999
20 g	20.0000	200.0000
Tolerance	20.0001	200.0000
0.0001 g	20.0000	199.9999
	20.0001	200.0000
Nominal Value : (High Load)	19.9999	200.0000
200 g	20.0000	200.0000
Tolerance	20.0000	199.9999
0.0001 g	19.9999	200.0001
	19.9999	200.0000
Standard Deviation	0.00007	0.00006

Eccentricity (Off-center loading error)

The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).

Nominal value :	100	g
Tolerance	0.0004	g
		Difference
	1	-
	2	-0.0001
	3	-0.0001
	4	0.0000
	5	-0.0001
	6	-

Linearity

The linearity, also called linearity error. Describes the deviation of the characteristic curve of a weighing instrument from the linear slope.

Tolerance 0.0002 g

Nominal Value	Conventional Mass Value	Displayed Value	Deviation	Uncertainty
(g)	(g)	(g)	(g)	(g)
0.01	0.0100	0.0100	0.0000	0.00018
0.05	0.0500	0.0500	0.0000	0.00018
0.1	0.1000	0.1000	0.0000	0.00018
0.5	0.5000	0.5000	0.0000	0.00018
1	1.0000	1.0000	0.0000	0.00018
5	5.0000	5.0000	0.0000	0.00018
10	10.0000	10.0000	0.0000	0.00018
20	20.0000	20.0000	0.0000	0.00024
50	50.0000	49.9999	-0.0001	0.00019
100	100.0000	100.0000	0.0000	0.00023
200	200.0000	199.9999	-0.0001	0.00032

End of Report.

SOP FM 33 03 February 2022



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TEL.0-2717-3000-29 FAX.0-2719-9484



Certificate of Calibration

Cert. No.: 24TM632

Page : 1 of 3

Equipment : Hot Air Oven

Manufacturer : Memmert

Model : UFE 500

Serial No. : G511.1572

ID No. : RYG_EN0010

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

Location : Oven Room

Received Order : 21 March 2024

Calibration Date : 21 March 2024

Ambient Temperature : $(26 \pm 10) ^\circ\text{C}$

Relative Humidity : $(50 \pm 30) \%$

Calibrated by : Man Pattanapongpaiboon

Approved by :

() Pornthippa Tameyakul

() Unnopphol Harachai

(✓) Suwit Imjai

Issue Date : 22 March 2024

REVIEW BY *Thanitak*

APPROVED BY *D. J. J. J.*

NEXT CAL. DATE: 21/09/25

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : Hot Air Oven

Condition As-Received : Used Item

Reference : 2403-0563QC-1

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY57013711	23LM115	TPA	11 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This certification is traceable to the International System of Unit.

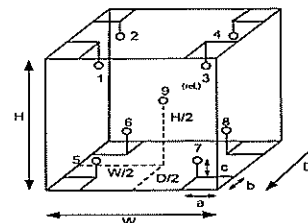
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	27	27
REL.Humid. (%)	57	59
AC Supply (Volt)	222	224



Probe Installation Details : Dimension of Chamber :

a = 5.0 cm	D = 0.40 m
b = 5.0 cm	W = 0.56 m
c = 5.0 cm	H = 0.48 m
	Capacity = 0.11 m ³

Ref. Std. ID No.: @ Calibration Point		
Position :	(180) °C	(104) °C
1	18-18TC-01	18-18RTD-01
2	18-18TC-02	18-18RTD-02
3	18-18TC-03	18-18RTD-03
4	18-18TC-04	18-18RTD-04
5	18-18TC-05	18-18RTD-05
6	18-18TC-06	23-18RTD-06
7	18-18TC-07	18-18RTD-07
8	18-18TC-08	22-18RTD-08
9 (ref.)	18-18TC-09	18-18RTD-09



Equipment : Hot Air Oven
 Condition As-Received : Used Item
 Reference : 2403-0563OC-1
 Result of Calibration :- (') Without Adjustment
 Function of UUC* : Temperature Source
 Fresh air setting : Close

Cert. No.: 24TM632
 Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
104.0	104.0	104.0	0.051	0.59	0.62	2
180.0	180.0	180.0	0.15	1.3	1.7	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	Position									
	1	2	3	4	5	6	7	8	9 (ref.)	
104.0	103.921	103.786	103.757	103.759	103.950	103.817	104.213	103.672	103.673	0.42
180.0	179.614	179.270	179.145	179.599	180.001	180.423	180.293	180.629	179.429	1.1

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

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

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

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

UUC* : Unit Under Calibration

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

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

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Cert.No.: 24CH96
 Page.: 1 of 3

Certificate of Calibration

Equipment : pH Meter
 Manufacturer : Mettler Toledo
 Model : SevenCompact S220
 Serial No. : C104059460
 ID No. : RYG_EN0183
 Condition As-Received: Used Item
 Received Date : 18 January 2024
 Calibration Date : 19 January 2024
 Reference : 2401-0579DSC-2
 Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
 616/10 Moo 5, T.Maenam Khu,
 A.Pluakdaeng, Rayong 21140, Thailand

Ambient Temperature : (25 ± 2.5) °C
 Relative Humidity : (50 ± 15) %
 Calibration Procedure : In - house method :
 - CP-CH5 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)
 - CP-CH8 by comparison with temperature standard

REVIEW BY	<i>N. Banjit</i>
APPROVED BY	<i>[Signature]</i>
NEXT CAL. DATE	19/01/25

Calibrated by : Warakorn Lemgagtrakul

Approved by : *[Signature]*
 Approved Signatory

(✓) Saithip Meangmai
 () Warakorn Lemgagtrakul
 () Ponpan Paipim

Issue Date : 24 January 2024

The Uncertainties are for a confidence probability of approximately 95%

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

A 0062854



Cert.No.: 24CH96
Page.: 2 of 3

Condition of this calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	23E2802	27 Aug 2024
2) Ref. Standard Thermometer	4982054	110RC044	23I908	26 July 2024

This certification is traceable to the International System of Unit maintained through:-

- Technology Promotion Association (Thailand-Japan)

2. Certified Reference Materials : The measurement results are traceable to SI through CPA chem Ltd.,
ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	940102	27 Nov 2025
pH 6.986	CPA chem	940104	02 Nov 2024
pH 9.997	CPA chem	940106	02 Nov 2024

3. This certificate is valid only to the item calibrated on date and place of calibration.

Calibration Results

Function : mV Measurement

Performing standard curve by Fluke at pH (4,7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (\pm mV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter S/N.: C104059460	4.000	177.48	177.4	4.000	0.058	2.00
	7.000	0.00	0.0	7.000	0.058	2.00
	10.000	-177.48	-177.5	10.000	0.058	2.00

Santhip

a 1198287



Cert.No.: 24CH96
Page.: 3 of 3

Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4.01,7.00,10.01)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (\pm)	Coverage factor k
pH Electrode S/N.: 3225367	4.008	4.013	176.0	0.0054	2.07
	6.986	6.983	2.2	0.0084	2.00
	9.997	9.996	-174.1	0.0065	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLab®Expert Pro-ISM

- Serial No. : 3225367

Dimension of probe

- Length : 120 mm.

- Diameter : 12 mm.

- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (\pm °C)	Coverage factor k
25.0	25.001	25.2	0.199	0.13	2.00

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

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Santhip

a 1198288



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Certificate of Calibration

Certificate No. : 24E289
Page : 1 of 2

Equipment : pH Meter
Manufacturer: Mettler Toledo
Model : SevenCompact S220
Serial No.: C104059450
ID No.: RYG_EN0183

Condition As-Received: Used Item
Received Date: 18 January 2024
Calibration Date: 23 January 2024

Reference: 2401-0579DSC Submitted by: ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 10) %
618/10 Moo 5, T.Maenam Khu, A.Piaskdaeng,
Rayong 21140, Thailand

Procedure used: Calibration were conducted using calibration procedure No. CP-E17 According to EURAMET cg-15.

Condition of this result of calibration

1. Reference standards Instruments :

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Multi-Product Calibrator	5500A	5315011	E2U23C0035	29 May 2024

2. This result of calibration was made on requested at the point specified by customer.

3. The certificate is valid only to the item calibrated on date and place of calibration.

4. This Certification is traceable to the International System of Unit maintained through:-

-NA Caltechnologies Co., Ltd., ANAB Accredited No. Calibration AC-2658

Calibrated by : Wutthareeporn Wongchulitkrane
Issue Date : 24 January 2024

Approved Signatory :

[] Phalinee Prabpaipai
[x] Nuntawat Khamchai
[] Pongsagorn Boonyaporn

0333296



Cert. No.: 24E289

Page: 2 of 2

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

Function:	DC voltage measurement	Range:	2000 mV	
	Standard Value	UUC* Reading	Error	Uncertainty
	(mV)	(mV)	(mV)	(± μV)
	-200.0000	-200.0	0.0	68
	-150.0000	-150.0	0.0	65
	-100.0000	-100.0	0.0	63
	-50.0000	-50.0	0.0	61
	0.0000	0.0	0.0	58
	50.0000	50.0	0.0	61
	100.0000	99.9	-0.1	63
	150.0000	149.9	-0.1	65
	200.0000	199.9	-0.1	68

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95 %

UUC* = Unit Under Calibration.

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1198963



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Certificate of Calibration

Cert. No.: 24TM634
Page : 1 of 3

Equipment : Hot Air Oven
Manufacturer : Memmert
Model : UF 110
Serial No. : B423.0853
ID No. : RYG_EN0213

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

Location : Oven Room

Received Order : 21 March 2024
Calibration Date : 21 - 22 March 2024
Ambient Temperature : $(26 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$

Calibrated by : Man Pattanapongpaiboon

Approved by :

Approved Signatory

() Pomthippa Tameyakul
() Unnopphol Harachai
(✓) Suwit Imjai

Issue Date : 23 March 2024

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2403-0563OC-3
Procedure Used :-

Cert. No.: 24TM634

Page : 2 of 3

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY57013711	23LM115	TPA	11 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This certification is traceable to the International System of Unit.

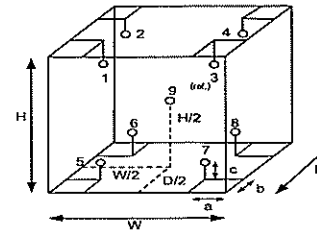
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	27	27
REL.Humid. (%)	59	59
AC Supply (Volt)	224	223



Probe Installation Details : Dimension of Chamber :

a = 5.0 cm	D = 0.40 m
b = 5.0 cm	W = 0.56 m
c = 5.0 cm	H = 0.48 m
	Capacity = 0.11 m ³

Ref. Std. ID No.: @ Calibration Point		
Position :	(180) °C	(104) °C
1	18-18TC-01	18-18RTD-01
2	18-18TC-02	18-18RTD-02
3	18-18TC-03	18-18RTD-03
4	18-18TC-04	18-18RTD-04
5	18-18TC-05	18-18RTD-05
6	18-18TC-06	23-18RTD-06
7	18-18TC-07	18-18RTD-07
8	18-18TC-08	22-18RTD-08
9 (ref.)	18-18TC-09	18-18RTD-09



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2403-0563OC-3
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 24TM634
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
104.0	104.0	104.0	0.065	0.52	0.90	2
180.0	180.0	180.0	0.20	1.2	2.0	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	Position									
	1	2	3	4	5	6	7	8	9 (ref.)	
104.0	104.169	103.506	103.898	103.712	103.772	103.730	104.289	103.805	103.798	0.42
180.0	180.701	179.239	179.935	179.999	180.127	180.138	180.895	179.313	180.211	1.1

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

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

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

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

UUC* : Unit Under Calibration

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

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

-o0o-



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TEL.0-2717-3000-29 FAX.0-2719-9484



Certificate of Calibration

Cert. No.: 24TM635
Page : 1 of 3

Equipment : Water Bath

Manufacturer : Memmert

Model : WNB22

Serial No. : L513.0648

ID No. : RYG_EN0061

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

Location : Wet Chemistry Lab

Received Order : 21 March 2024

Calibration Date : 21 March 2024

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Man Pattanapongpaiboon

Approved by :

() Pomthippa Tameyakul

() Unnopphol Harachai

(✓) Suwit Imjai

Issue Date : 23 March 2024

REVIEW BY *Thanitak*
APPROVED BY *D. J. J. J.*
NEXT CAL DATE **21/09/25**

Approved Signatory

The Uncertainties are for a confidence probability of approximately 95%

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



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2403-0563OC-4
Procedure Used :-

Cert. No.: 24TM635
Page : 2 of 3

Calibration were conducted using in-house calibration procedure CP-OT04 Based on ASTM E715 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Data Acquisition	MY57013711	23LM115	TPA	11 Jul 2024

2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This certification is traceable to the International System of Unit.

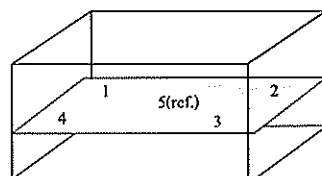
Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Heat transfer medium used : Water

	Environmental		AC Voltage Supply
	(°C)	(%R.H.)	
Beginning of Calibration	25	55	222
Finished of Calibration	25	57	223



Front

Position :	Ref. Std. ID No.:
1	4803988-001
2	4803988-002
3	4803988-003
4	4803988-004
5(ref.)	4803988-005



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2403-0563OC-4

Cert. No.: 24TM635
Page : 3 of 3

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)					Uncertainty (± °C)
			Position					
			1	2	3	4	5 (ref.)	
85.0	85.0	85.0	84.428	84.424	84.489	84.507	84.477	0.18

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Coverage Factor k
85.0	0.19	0.11	2

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

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

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

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

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


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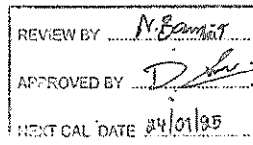


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Cert.No.: 23TW168
Page.: 1 of 2

Certificate of Testing

Equipment : DO Meter
Manufacturer : YSI
Model : 5000-115V
Serial No. : 15E102796
ID No. : RYG_EN0032
Received Date : 21 July 2023
Test Date : 24 July 2023
Reference : 2307-0713DSC-1
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.
Rayong Branch
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng,
Rayong 21140, Thailand
Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method
Tested by : Walalak Sinthean
Approved by : 
Approved Signatory
() Malee Bulkruea
(✓) Saitthip Meangmai
() Warakorn Lemgagtrakul
Issue Date : 26 July 2023



B 0320211



Cert.No.: 23TW168
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :

This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1) Burette	-	130BU10	23CG1172	22 Mar 2025
2) Balance	1126143764	140RC004	22MM50	20 Sep 2023

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No.: 15E100454

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.18	8.17	0.0055

This report was certified only for the instrument we tested. It is allowable to use for study the system efficiency, The environmental impact control and present to organization it may concerned intend to use for advertising and referral purpose is prohibited. This report may not be reproduced other in full, without written approval of the laboratory

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a 1172155



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TEL. 0-2717-3000-29 FAX 0-2719-9484



Cert. No.: 23LM125
Page.: 1 of 2

Certificate of Calibration

Equipment : DO Meter with Sensor
Manufacturer : YSI
Model : 5000-115V
Serial No. : 15E102796
ID No. : RYG_EN0032
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.
Rayong Branch
616/10 Moo 5 T. Maenam Khu, A. Pluakdaeng,
Rayong 21140 Thailand
Location : TPA On Site Calibration Laboratory
Received Order : 25 July 2023
Calibrated Date : 27 July 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Preecha Hlahib

Approved by : 
Approved Signatory

() Pornthippa Tameyakul
() Malee Butkruea
✓ Suwit Imjai

Issue Date : 31 July 2023

The Uncertainties are for a confidence probability of approximately 95%

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

A 0053616



Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2307-0713DSC-2

Cert. No.: 23LM125
Page.: 2 of 2

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	2188080	2211285	TPA	21 Oct 2023

2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This certification is traceable to the International System of Unit.

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 1228475367

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
20.00	100	20.011	19.91	-0.101	0.15	2.00

UUC* : Unit Under Calibration

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

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a 1159515



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES J: EQUIPMENT CALIBRATION AND TESTING SERVICES
5544 PATTANAKARN ROAD SOI 18, SUAN LUANG, SUAN LUANG BANGKOK 10250
TEL: 0-2717-3900-29 FAX: 0-2719-6484



Cert. No.: 23TM962
Page : 1 of 3

Certificate of Calibration

Equipment : Low Temp. incubator
Manufacturer : Memmert
Model : IPP750
Serial No. : V818.0084
ID No. : RYG_EN0154
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.
(Rayong Branch)
616/10 Moo 5 T: Maenam Khu,
A. Piuakdaeng, Rayong 21140 Thailand
Location : BOD Room
Received Order : 29 May 2023
Calibration Date : 29 May 2023
Ambient Temperature : $(26 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$
Calibrated by : Men Pattansongpaiboon

Approved by :

Approved Signatory

() Pornthippa Tameyakul
() Malee Bulkruea
(x) Suwit Imjai

Issue Date : 7 June 2023

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the head of Corporate Services J : Equipment Calibration and Testing Services

A 0054967



Equipment : Low Temp. incubator
Condition As-Received : Used Item
Reference : 2305-0898OC-2
Procedure Used :-

Cert. No.: 23TM962

Page : 2 of 3

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY57013711	22LM93	02 Jul 2023

2. This certificate is valid only to the item calibrated on date and place of calibration.

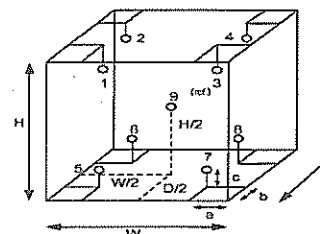
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	23	23
REL.Humid. (%)	54	56
AC Supply (Volt)	223	222



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

Position :	Ref. Std. ID No.:
1	18-18RTD-01
2	18-18RTD-02
3	18-18RTD-03
4	18-18RTD-04
5	18-18RTD-05
6	18-18RTD-10
7	18-18RTD-07
8	22-18RTD-08
9 (ref.)	18-18RTD-09

a 1165130



Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2305-08980C-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 23TM962
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	20.0	0.019	0.72	1.0	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
20.0	19.547	19.760	19.487	19.529	19.408	20.139	20.112	20.406	20.116	0.30

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

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

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

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

UUC* : Unit Under Calibration

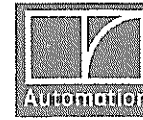
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

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Unit

a 1165129



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Prachinburi : 665 M.10, Thatum, Srimahaphota, Prachinburi [T. 037-203-880]

MTOC : L-1113/2023

Report No. : ALS-799/02

ASI Maintenance Report

Instrument : Automatic Sample Injector Measuring : Vial 40 mL
Model : ASI-L Place of Installation : -
Serial No. : H57415200799 Department : LABORATORY
Manufacture : Shimadzu

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

Date of Maintenance : 10 / 11 / 2023

Ambient Condition : Temperature 26.0 ± 5 °C

: Humidifier 60 ± 15 %RH

REVIEW BY	<i>Vichula N.</i>
APPROVED BY	<i>Sinluk P.</i>
NEXT CAL DATE	<i>10/11/24</i>

Maintenance By : *Peerapong Sangpan*
(Mr. Peerapong Sangpan)
Technician

Approved By : *N. Phongsomsak*
(Mr. Nipon Phongsomsak)
Technician Manager

User Name : *Sinluk P.*
(Mr.)

SHIMADZU ANALYZER
1/3



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Prachinburi : 669 M.10, Thatum, Srirachaphoth, Prachinburi [T. 037-209-890]

MTOC : L-1113/2023

Report No. : ALS-799/02

Maintenance Sheet

Customer : ALS Laboratory

Date : 10 / 11 / 2023

Model : ASI-L

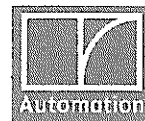
Serial No. H57415200799

Item	Carry out maintenance work	Result	Exchange	Comment
1.	Arm Drive section	O.K.		
	Check Arm Drive Belt for wear and tension	O.K.		
	Check grease of Screw Arm Drive	O.K.		
2.	Rinse pump (only ASI-V 24mL, 40mL)	O.K.		
	Check pump rate(>40mL/min)	O.K.		
	Check pump and tube connection for leakage	O.K.		
	Check if outlet flow is in proper condition	O.K.		
3.	Check and if necessary exchange consumable, Maintenance parts	O.K.		See appropriate list of maintenance parts
4.	Check Stirrer [When Installed]	O.K.		
5.	Verify ASI function via mechanical check	O.K.		

Inspection by :

Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

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2/3



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Prachinburi : 669 M.10, Thatum, Srirachaphoth, Prachinburi [T. 037-209-890]

MTOC : L-1113/2023

Report No. : ALS-799/02

List of Consumable, Maintenance parts

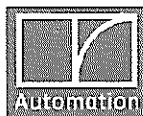
Pos.	Part Number	Part Name	Result	Exchange	Recommended Interval
1.	017-27021-01	Grease Paste, Lubricant 100g	O.K.	√	1 time per year
2.	032-22661-02	Belt, 60S2m596, Arm Drive	O.K.		1 time per year
3.	034-03067-02	Spring, F-642, Arm Drive	O.K.		Depending on condition
4.	042-00405-11	Pump Head, for ASI Rinse Pump (only ASI-V 24mL, 40mL)	O.K.		After 300 h of operating
5.	638-41448-01	Std. Needle Type1 24mL, 40mL* (for tube 2, 1x1, 6), [Sparge needle]	N/A		Depending on condition
6.	638-41448-02	Std. Needle Type1 125mL* (for tube 2, 1x1, 6)	N/A		Depending on condition
7.	631-41660-03	Flare Pipe 2x1,5x700mm* (for Standard Needle Type1 24mL, 40mL, 125mL)	N/A		Depending on condition (may cut to origin length 600mm)
8.	638-41450-01	Needle for Suspended Particles,* 0,8mm (only ASI-V 24mL, 40mL)	N/A		Depending on condition
9.	638-41450-01	Std. Needle Type2 125mL* (for tube 1,4x0,9)	N/A		Depending on condition
10.	638-41472-01	Std. Needle Type2 24mL, 40mL* (for tube 1,4x0,9)	O.K.		Depending on condition
11.	631-41660-02	Flare Pipe 1,4x0,9x600mm* (for Suspended + Needle Type2)	O.K.		Depending on condition
12.	638-41449-01	Double Needle , only 24mL, 40mL (simultaneous sparge type)*	N/A		Depending on condition
13.	631-41660-01	Flare Pipe 1,1x0,6x600mm* (for Double Needle 24mL, 40mL)	N/A		Depending on condition

*Note: needed parts depending on installed needle types!

Inspection by :

Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

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3/3



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Prachinburi : 688 M.10, Thatum, Srimahaphote, Prachinburi [T. 037-209-880]

MTOC : L-1112/2023

Report No. : ALS-416/02

TOC-L Maintenance Report

Instrument : Total Organic Carbon Analyzer Measuring : TC 0 ~ 30000 mg/L
Model : TOC-LCSH Place of Installation : -
Serial No. : H54425300416 Department : LABORATORY
Manufacture : Shimadzu

Customer : ALS Laboratory Group (Thailand) Co.,Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaen Suan Luang, Khot Suan Luang,
Bangkok 10250 Thailand

Date of Maintenance : 10 / 11 / 2023

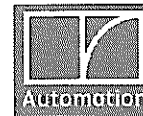
Ambient Condition : Temperature $26.0 \pm 5^\circ\text{C}$
: Humidifier $60 \pm 15\% \text{RH}$

Maintenance By : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

Approved By : N. Pong
(Mr. Nipon Phungsomsak)
Technician Manager

User Name : Sintuk P.
()

SHIMADZU ANALYZER
1/4



Automation Service Co.,Ltd.

Head Office : 629,928/1 Soi Pattanakarn 30,
Pattanakarn Road, Suanluang, Bangkok
Tel: 02-319-9994 Fax: 02-319-9596
www.automation.co.th

Sales & Service Center
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Lamphun : 122/5 M.4, Ban Kiang, Muang, Lamphun [T. 053-581-876]
Prachinburi : 688 M.10, Thatum, Srimahaphote, Prachinburi [T. 037-209-880]

MTOC : L-1112/2023

Report No. : ALS-416/02

Maintenance Sheet

Customer : ALS Laboratory Date : 10 / 11 / 2023
Model : TOC-LCSH Serial No. H54425300416

Item	Carry out maintenance work	Result	Exchange	Comment
1.	Check functionality of the device			
	Check furnace temperature (Standard cat. 680°C / for TN cat. 720°C)	O.K.		
	Check dehumidifier temperature (1°C)	O.K.		
	Check the entire flow line related to leakage	O.K.		
	Check baseline status (OK)	O.K.		
	Check carrier gas pressure ($200 \pm 10 \text{ kPa}$)	O.K.		
	Check carrier gas flow rate (150 mL/min)	O.K.		
2.	Tubes			
	Check all tubing for contamination, if necessary clean them	O.K.		
	Check all tubing for tight connection	O.K.		
3.	Container and Drainage			
	Fill up humidifier with pure water to max. level	O.K.		
	Check filling of dilution water and acid container	O.K.		
	Rinse Drain Pot, after wards refill again with pure water	O.K.		
	Check if outlet flow is in proper conditions	O.K.		
4.	TC and IC Injection			
	Clean injector Block	O.K.		
	Check injector Block for wear	O.K.		
	Check injection tube adjustment	O.K.		
	Check injection for leakage	O.K.		
	Check injection for clogging	O.K.		
5.	IC Measurement (N-type)			
	Check acidification in syringe			
	Check sparging in syringe			
6.	Eye check of 8-Port valve, for sample residues or moist spots that indicate possible leakage	O.K.		
7.	Check and if necessary exchange consumable, Maintenance parts	O.K.		See list of consumable, maintenance parts

Inspection by : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

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2/4



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MTOC : L-1112/2023

Report No. : ALS-416/02

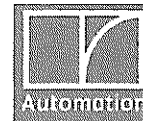
Item	Carry out maintenance work	Result	Exchange	Comment
8.	Due to instrument condition, clean the instrument inside and outside.	O.K.		
9.	After checking the system and exchanging of consumable and maintenance parts a new 1-3 point calibration have to be done.	O.K.		Addition test 1.
10.	After wards the calibration perform check sample measurement.	O.K.		Addition test 2.

Addition test

Test no.	Test conditions	Meas. value	Result
1.	Calibration TC standard solution at 0, 0.1, 0.5, 1, 5, 10, 20 Injection volume 50 µL No. of measurement 2 times (Max.3)		Attachment : ALS-416/02 Page 1/4 - 2/4
	Criteria : $R^2 = 0.995$ or more	1.0000	Pass
2.	Measurement of reagent water and TC standard solution at 5.0 mg/L injection volume 50 µL No. of measurement 2 times (Max.3) and calculate accuracy by <u>Meas. of TC standard - Meas. of Reagent water</u>		Attachment : ALS-416/02 Page 3/4 - 4/4
	Criteria : Accuracy %Recovery 10% or less	5.112 - 0.1493 = 4.9627 ppm	Pass

Inspection by : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

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3/4



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MTOC : L-1112/2023

Report No. : ALS-416/02

List of Consumable, Maintenance parts

Pos.	Part Number	Part Name	Result	Exchange	Recommended interval
1.	036-11209-84	O-ring, 4D P10A (Viton , for TC,IC Sllder)	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 : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

SHIMADZU ANALYZER
4/4

TOC-Control L Report

2023-11-10 00:01 PM 7:24h

Instrument Information

Instrument Options
Catalyst

TOC-ASTIC Unit
Regular Sensitivity

Cal. Curve

Sample Name
Sample ID
Cal. Curve
Status

Unlabeled
Unlabeled
TC 0.1 - 20 ppm TOC 11-10-17-34-04-04
Completed

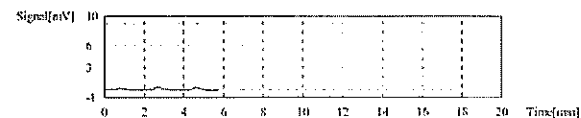
Standard

Conc: 0.000mg/L

Peak	Area	Height	Width	Time
1	0.0452	0.0452	0.0000	11/10/2023 12:43:12 PM
2	0.0513	0.0513	0.0000	11/10/2023 12:43:27 PM
3	0.0572	0.0572	0.0000	11/10/2023 12:43:37 PM

Acid Add.
Mean Area
SD Area
CV Area

0.000%
0.0431
0.00771
0.51%

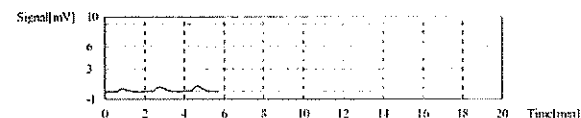


Conc: 0.1000mg/L

Peak	Area	Height	Width	Time
1	1.210	1.210	0.0000	11/10/2023 12:54:28 PM
2	1.464	1.464	0.0000	11/10/2023 12:54:37 PM
3	1.459	1.459	0.0000	11/10/2023 12:54:45 PM

Acid Add.
Mean Area
SD Area
CV Area

0.000%
1.922
0.02839
4.46%

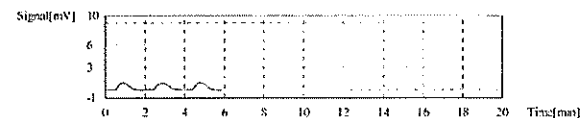


Conc: 0.6000mg/L

Peak	Area	Height	Width	Time
1	3.144	3.144	0.0000	11/10/2023 1:06:31 PM
2	3.599	3.599	0.0000	11/10/2023 1:06:32 PM
3	3.587	3.587	0.0000	11/10/2023 1:06:35 PM

Acid Add.
Mean Area
SD Area
CV Area

0.000%
5.325
0.05547
3.42%



Conc: 1.000mg/L

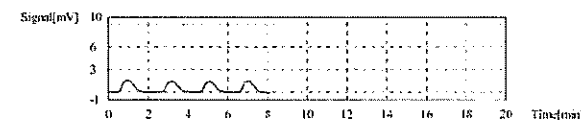
TOC-Control L Report

2023-11-10 00:01 PM 7:24h

Peak	Area	Height	Width	Time
1	6.414	6.414	0.0000	11/10/2023 1:14:59 PM
2	5.439	5.439	0.0000	11/10/2023 1:14:59 PM
3	5.786	5.786	0.0000	11/10/2023 1:15:32 PM
4	5.384	5.384	0.0000	11/10/2023 1:26:52 PM

Acid Add.
Mean Area
SD Area
CV Area

0.000%
5.522
0.00839
1.60%

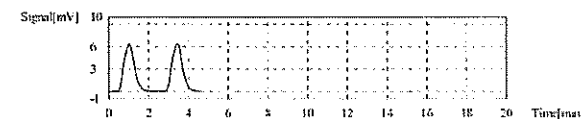


Conc: 5.000mg/L

Peak	Area	Height	Width	Time
1	33.15	33.15	0.0000	11/10/2023 1:28:36 PM
2	25.13	25.13	0.0000	11/10/2023 1:30:34 PM

Acid Add.
Mean Area
SD Area
CV Area

0.000%
23.19
0.05057
0.21%

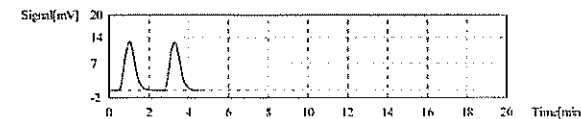


Conc: 10.00mg/L

Peak	Area	Height	Width	Time
1	45.67	45.67	0.0000	11/10/2023 1:37:51 PM
2	45.26	45.26	0.0000	11/10/2023 1:39:36 PM

Acid Add.
Mean Area
SD Area
CV Area

0.000%
45.47
0.7599
0.64%

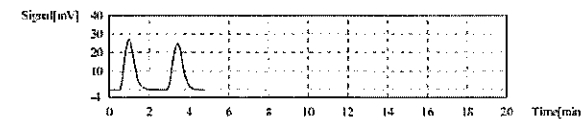


Conc: 20.00mg/L

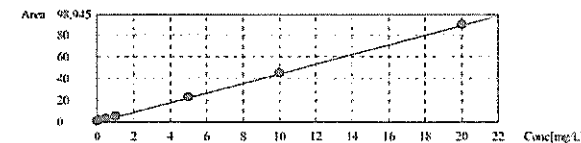
Peak	Area	Height	Width	Time
1	90.55	90.55	0.0000	11/10/2023 1:43:12 PM
2	89.35	89.35	0.0000	11/10/2023 1:43:58 PM

Acid Add.
Mean Area
SD Area
CV Area

0.000%
89.54
0.8455
0.64%



Slope: 4.438
Intercept: 0.000
r^2: 1.0000
RSE(%): N/A
Zero Shift: Yes



TOC-Control L Report

2023-11-19 00:00 PM 7:30s

Instrument Information

Instrument Options
Catalyst

TOC-ASIRIC Unit
Regular Screen/Kit

Sample

Sample Name
Sample ID
Origin
Status
Chk. Result

W. S.
Undistd
TC 0.1-20 ppm cal
Completed

Unknown	TC	1.00	TC 0.1-20 ppm
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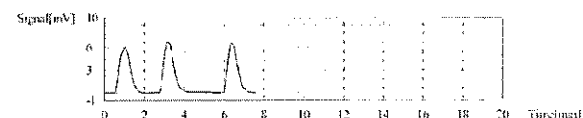
1 Det

Anal. TC

Area	Height	Width	Height	Area	Height	Width	Height	Area	Height	Width	Height	Area	Height	Width	Height	Area	Height	Width	Height
22.46	5.61	0.01	0.01	TC 0.1-20 ppm	2023-11-10-12-19-01	11-10-2023 15:51:17													
23.80	5.60	0.01	0.01	TC 0.1-20 ppm	2023-11-10-12-19-01	11-10-2023 15:51:17													
23.82	5.14	0.01	0.01	TC 0.1-20 ppm	2023-11-10-12-19-01	11-10-2023 15:51:17													

Mean Area
Mean Conc.

22.46
5.112 mg/L



TOC-Control L Report

2023-11-19 00:00 PM 7:30s

Instrument Information

Instrument Options
Catalyst

TOC-ASIRIC Unit
Regular Screen/Kit

Sample

Sample Name
Sample ID
Origin
Status
Chk. Result

Water
Undistd
TC 0.1-20 ppm cal
Completed

Unknown	TC	1.00	TC 0.1-20 ppm
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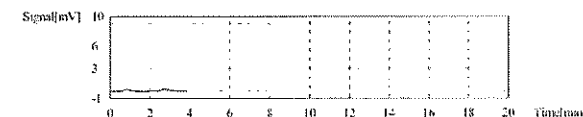
1 Det

Anal. TC

Area	Height	Width	Height	Area	Height	Width	Height	Area	Height	Width	Height	Area	Height	Width	Height	Area	Height	Width	Height
0.033	0.14	0.01	0.01	TC 0.1-20 ppm	2023-11-10-12-19-01	11-10-2023 15:51:17													
0.043	0.15	0.01	0.01	TC 0.1-20 ppm	2023-11-10-12-19-01	11-10-2023 15:51:17													

Mean Area
Mean Conc.

0.0626
0.1452 mg/L



ภาคผนวก จ

สำเนาหนังสือใบอนุญาตขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน



ที่ อก ๐๓๓๐(๑)/ ๑ ๖ ๑ ๖ ๘

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒ ๐ พฤศจิกายน ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๔ สิงหาคม ๒๕๖๖

- สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ แผ่น
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๓ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐
ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด
ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ ๑๘๑ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูล
หรือวัสดุที่ไม่ใช่แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กันยายน ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ
กรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีระ จันทะโรจกิจ)

นักวิทยาศาสตร์เชี่ยวชาญ วิทยาการสารสนเทศ

ผู้อำนวยการกองวิจัยและเคมภัณฑ์และเครื่องมือวัด

ปฏิบัติราชการตามมอบหมายกรมโรงงานอุตสาหกรรม

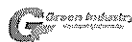
กองวิจัยและเคมภัณฑ์และเครื่องมือวัด

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๑๔

ไปรษณีย์อิเล็กทรอนิกส์ sarabak@diw.mail.go.th



"อุตสาหกรรมก้าวหน้า ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



สิ่งที่ส่งมาด้วย ๑

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๒๐๔
ที่ อก ๐๓๓๐(๑)/ ๑ ๖ ๑ ๖ ๘ ลงวันที่ ๒ ๐ พฤศจิกายน ๒๕๖๖

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

- | | |
|--------------------------------|----------------------------|
| ๑) นางสาวพาพร จันทร์เปล่ง | ทะเบียนเลขที่ ๖-๒๐๔-ก-๐๐๐๑ |
| ๒) นางสาวชินนัย โภมารกุล ณ นคร | ทะเบียนเลขที่ ๖-๒๐๔-ก-๐๐๐๒ |
| ๓) นายศรายุทธ จิตตานนท์ | ทะเบียนเลขที่ ๖-๒๐๔-ก-๐๐๐๓ |
| ๔) นางสาวกนกกร แอนก | ทะเบียนเลขที่ ๖-๒๐๔-ก-๐๐๐๔ |
| ๕) นายสุริยา สอนแก้ว | ทะเบียนเลขที่ ๖-๒๐๔-ก-๐๐๐๕ |
| ๖) นายวิชาญ ชุมหรีด | ทะเบียนเลขที่ ๖-๒๐๔-ก-๐๐๐๖ |

3/10/2567

เอกสารแนบท้ายหนังสือรับข้ออาญาขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท แอลแอล แลบลอรัล กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ๑๖ ๑ ๖ ๘ ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

จ. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๘๑ ราย

๑) นายภาณุวัฒน์ กิตติคุณวัฒน์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๑
๒) นายภัทรพล สว่างใจธรรม	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๒
๓) นายนาธิป เทือกชัยคำ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๓
๔) นายศิริโชค หงษ์ประสม	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๔
๕) นายณัฐวุฒิ ดั่งแพง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๕
๖) นางสาวจินดา ไชยธรรม	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๖
๗) นางสาวสาวิตรี น้อยเสงี่ยม	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๗
๘) นางสาวชนัญญาอุจน์ อิ่มชม	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๘
๙) นางสาวนรินทร์ สายแสง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๐๙
๑๐) นางสาวนันทวี สมบูรณ์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๐
๑๑) นางสาวศรัณยา เกลิมฮ้างรงค์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๑
๑๒) นางสาวธัญญธร มงคลจิรวุฒิ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๒
๑๓) นางสาวศิริลักษณ์ บุนนาค	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๓
๑๔) นายณพพงศ์ จันทร์พันธุ์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๔
๑๕) นายบรรณเศรษฐ์ โกมลาลัย	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๕
๑๖) นายอินวา จริยา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๖
๑๗) นางสาวเกศรินทร์ แก้วมัน	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๗
๑๘) นางสาวสุวิมล ชัยเรืองวุฒิ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๘
๑๙) นางสาวสุชาดา ธรรมถาวร	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๑๙
๒๐) นางสาวเบญจมา ชัยเดชธนกุล	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๐
๒๑) นางสาวศศิธร หมูสวัสดิ์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๑
๒๒) นางสาวเสาวลักษณ์ ภูนาอำพร	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๒
๒๓) นายอภิสิทธิ์ สิงหา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๓
๒๔) นายศักดิ์สิทธิ์ ไพศาลพิสุทธิ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๔
๒๕) ว่าที่ร้อยตรีหญิง พรรณิกา จำเจริญ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๕
๒๖) นางจิตตา คำแก้ว	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๖
๒๗) นางสาวอรพรรณ รักยง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๗
๒๘) นางสาวนพรัตน์ แยมกรานต์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๘
๒๙) นายจุลเดช วารินทร์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๒๙
๓๐) นางสาวกาญจนา ร้องคำ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๐
๓๑) นายพรมณ์ ศรีปัดเนตร	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๑
๓๒) นายอุทิศ อุณสิน	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๒
๓๓) ว่าที่ร้อยตรี เฉลิมเกียรติ อมรศรีเสริม	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๓
๓๔) นางสาววริยา สร้างนา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๔
๓๕) นายอนุพงศ์ รัตนศรีประเสริฐ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๕

วิภา

๓๖) นางสาวจุฑารัตน์...

๓๖) นางสาวจุฑารัตน์ โอนสันเทียะ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๖
๓๗) นางสาวจารุวรรณ พิมพ์อิกฤติยา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๗
๓๘) นางสาวปรารถนาทิพย์ กิจไพศาลศักดิ์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๘
๓๙) นางสาวเดือนใจ ทางกลาง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๓๙
๔๐) นางสาวจิราพร ศิริเวช	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๐
๔๑) นายวรารักษ์ ผู้กรักษ์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๑
๔๒) นายพนง วิริยะสหกิจ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๒
๔๓) นายธนิศ เจนจบ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๓
๔๔) นายคณิศร จำเพชร	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๔
๔๕) นายภูวิช พรหมสะอาด	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๕
๔๖) นายอนเดช ไกศาพิพัฒน์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๖
๔๗) นายชวฤทธิ์ วงษ์จันทร์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๗
๔๘) นายอาทิตย์ ศรีเสน	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๘
๔๙) นายเจตตินทร์ คงศักดิ์ไทย	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๔๙
๕๐) นายจรัส บุญยัง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๐
๕๑) นายธนาธิปไตย เอนก	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๑
๕๒) นายอภิวัฒน์ ทุมหนู	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๒
๕๓) นางสาวสุภาวัญญา มาก	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๓
๕๔) นางสาวพัทธพร ขวาลสมบูรณ์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๔
๕๕) นางสาวอติมา บุญเพ็ง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๕
๕๖) นางสาวภาณุมาศ นามวัฒน์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๖
๕๗) นางสาวอุไรรัตน์ ทังสร้างแป้น	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๗
๕๘) นายธีรวัฒน์ ปางสุข	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๘
๕๙) นายอิทธิพล ยะโส	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๕๙
๖๐) นายประพนธ์ วรรณชัย	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๐
๖๑) นายชยธร ทวงทิพย์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๑
๖๒) นางสาวกนกวรรณ จันทบาล	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๒
๖๓) นายสิทธิโชค ธงเงิน	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๓
๖๔) นางสาววรรณใจ ใจบุญ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๔
๖๕) นางสาวพรรณธิดา ทุมคง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๕
๖๖) นายณวกิธร ศรีวิริยะ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๖
๖๗) นายสุวิชา ทองอ่อน	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๗
๖๘) นายวิญญู บุญตะนัย	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๘
๖๙) นายสมบูรณ์ บุตรจันทร์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๖๙
๗๐) นายวิวัฒน์ ไชยชนะรา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๐
๗๑) นายณฤเบศน์ เพิ่มพูน	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๑
๗๒) นายจิรณัฐ ขาวละออ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๒
๗๓) นายอัสนี นามบุรี	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๓
๗๔) นายอัศวเรศ จ่อสา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๔

วิภา

๗๕) นายประเสริฐ...

๙๕) นายประเสริฐ สุระขันธุ์
๙๖) นายบุญล จันทรเนียม
๙๗) นายพิรพงษ์ ทองคุณปรีดา
๙๘) นายบุญพล ทองบุญ
๙๙) นายอนุวัฒน์ ม่วงแพ
๑๐๐) นายเจตศราวุฒิ ปัตตะมะ
๑๐๑) นายภานุพงษ์ สายวรรณ
๑๐๒) นายพิชัย บุญยงค์
๑๐๓) นายภาณุพงศ์ โอมวงศ์
๑๐๔) นายสามารถ คู่มปถิ
๑๐๕) นายสัญญาชัย โกศลวิธาน
๑๐๖) นายณัฐวุฒิ ศรีประเสริฐ
๑๐๗) นายขวัญชัย นาคหอม
๑๐๘) นายพงษ์ธร ชัยทิพย์
๑๐๙) นายสิทธิโชค หาดสีดา
๑๑๐) นายอนาคาร อินสุตา
๑๑๑) นางสาววรรณิษา ขาดวันชัย
๑๑๒) นางสาวพิมพ์ตะวัน มีนากุล
๑๑๓) นางสาวเพชรรัตน์ สิงห์สมบุญ
๑๑๔) นางสาวชญานิษฐ์ พรหมจันทร์
๑๑๕) นายกิตติ หวีราช
๑๑๖) นายจักริน หมั่นวิชา
๑๑๗) นายฉัตรชัย สุขเปี้ย
๑๑๘) นายณรณนที สีทองคำ
๑๑๙) นายศุภพล สมนอก
๑๒๐) นายทักษ์ดนัย อุบลศรี
๑๒๑) นายธนศร นามะคุณณา
๑๒๒) นายธิตินันท์ บัวแดง
๑๒๓) นายณนทชัย อุปลัมภ
๑๒๔) นายณัฐพล คุณสุทธิ
๑๒๕) นายณัฏฐวัฒน์ สาริน
๑๒๖) นายปิยะนัฐ พลมะศรี
๑๒๗) นายพงศ์สิริ โสมเขียว
๑๒๘) นายพีรพัฒน์ คำคำ
๑๒๙) นายภาณุพงศ์ นาคิย์
๑๓๐) นายมงคล ผลาทิพย์
๑๓๑) นายสิรินันท์ ทองอัน
๑๓๒) นายอนนชา ทันสมัย
๑๓๓) นายอดิศักดิ์ ผอโน

ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๔
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๖
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๗
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๘
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๗๙
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๐
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๑
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ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๕
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๘๖
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ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๐๙๙
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๐
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ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๒
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๓
ทะเบียนเลขที่ ๖-๒๐๔-จ-๐๑๐๔
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รวม

๑๑๔) นายอนันต์ชัย...

๑๑๕) นายอนันต์ชัย วิสุม
๑๑๖) นายวรุตม์ ตีนัก
๑๑๗) นายแสงตะวัน นตะลัด
๑๑๘) นายอุทัยพงศ์ รัตนะ
๑๑๙) นายชัยณัฐ ไชยชนะ
๑๒๐) นายวิศรุต ศรีธรรมมา
๑๒๑) นายณนทกร เผือกผ่อง
๑๒๒) นายกำชัย สุทธะ
๑๒๓) นางสาวณัฐกรณีย์ บุญตะนัย
๑๒๔) นางสาวพัชรินทร์ แสนสรวัย
๑๒๕) นายไพโรจน์ เปี่ยมพิมาย
๑๒๖) นางสาวศุภมาส ทองมาก
๑๒๗) นางสาวลลิตา จิตรสว่าง
๑๒๘) นางสาวชนิษา เล็กภูเขียว
๑๒๙) นางสาวกฤติมาพร คำมีแก่น
๑๓๐) นางสาวสกุลรัตน์ ภาคภูมิ
๑๓๑) นางสาวไพรินทร์ ศรีรูป
๑๓๒) นางสาวทิพนันท์ คุยปัญญา
๑๓๓) นางสาวสาธิตา ปานทอง
๑๓๔) นางสาวอริสา ทองนวล
๑๓๕) นางสาวอรุณ คำคอง
๑๓๖) นางสาวจุฑาภรณ์ สุนทรสนาน
๑๓๗) นางสาวอัญชลี คำจันทร์
๑๓๘) นายบุญฤทธิ์ เอี่ยมเทศ
๑๓๙) นางสาวสุภาวดี ปันมยุรา
๑๔๐) นางสาวหาฤดี คุณบาน
๑๔๑) นางสาวจิราเจต พองดา
๑๔๒) นางสาวอารยา มีชัย
๑๔๓) นางสาววิชุดา นาคผจญ
๑๔๔) นางสาวนันทิยา จันทะสุน
๑๔๕) นายกิตติพงษ์ แซ่ลี
๑๔๖) นายอนุวัติ ภูถวิล
๑๔๗) นายธีรพล แสงทอง
๑๔๘) นายศักดิ์ทิพัฒน์ บุญมั่น
๑๔๙) นายรัฐวิทย์ งามอุไร
๑๕๐) นายชัยณรงค์ ศรีประเสริฐ
๑๕๑) นางสาวอัจฉราวรรณ สอนสนอง
๑๕๒) นางสาวณัฐพร สิงหา
๑๕๓) นายกัมเบศ แหม่นไค

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รวม

๑๕๓) นางสาวอุบล...

๑๕๓) นางสาวอุบล เดิกศิริ
๑๕๔) นางสาวมโนรัตน์ ทองบุตร
๑๕๕) นายภาคภูมิ แทนไทย
๑๕๖) นางสาวสุภาณัฐ เมล่งทอง
๑๕๗) นางสาวพรทิศา สาดานนท์
๑๕๘) นายเอกวิทย์ วันทะนา
๑๕๙) นายไทรเมณฑล ทิพย์วรรณ
๑๖๐) นายจิรเมธ ประเสริฐศิริพงษ์
๑๖๑) นายจิรายุส เกษมสุข
๑๖๒) นายจิรศักดิ์ ศรีวิชัย
๑๖๓) นายณัฐกฤษณ์ สะพานแก้ว
๑๖๔) นายบุรณศักดิ์ ปะที
๑๖๕) นายบัณฑิตวิชัย เสมอทรัพย์
๑๖๖) นายพิษณุพงษ์ ไซยา
๑๖๗) นายภัทรพงษ์ มณฑาทอง
๑๖๘) นายสันต์ ตรีนกุล
๑๖๙) นายภาณุเดช เพชรอุค
๑๗๐) นายอนุกุล วิไลแสง
๑๗๑) นายภัทรพงษ์ มีสุข
๑๗๒) นางสาวนุชรี สีละทีป
๑๗๓) นางสาวสุภาวดี โกศลนาม
๑๗๔) นางสาวอรณิชา เวียนคำ
๑๗๕) นางสาวพรเพ็ญ ขอบสอน
๑๗๖) นางสาววันวิสา ขอนพิกุล
๑๗๗) นางสาวอรรพรรณ เถาว์ทอง
๑๗๘) นางสาวอัยยิณ เมอร์วิณณ์
๑๗๙) นางสาววิสรา คุยครอง
๑๘๐) นายวุฒิกร ศิริวรรณ
๑๘๑) นางสาวจารุวรรณ กระจำพันธุ์

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Signature

เอกสารแนบท้ายหนังสือรับข้ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๒๐๔
ที่ ๖๐๓๑๐(๑)/ ๖ ๖ ๑ ๖ ๘ ลงวันที่ ๒๐ พฤศจิกายน ๒๕๖๖

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๗๔ รายการ

น้ำเสีย จำนวน ๖๐ รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldicarb	High-Performance Liquid Chromatographic Method ⁽⁴⁾
2	Aldicarb Sulfone	High-Performance Liquid Chromatographic Method ⁽⁴⁾
3	Aldicarb Sulfoxide	High-Performance Liquid Chromatographic Method ⁽⁴⁾
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
5	Arsenic	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
6	Barium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
7	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
8	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
9	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
10	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
11	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method ⁽⁴⁾ 2) 5-Day BOD Test, Membrane Electrode Method ⁽⁴⁾
12	Carbaryl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
13	Carbofuran	High-Performance Liquid Chromatographic Method ⁽⁴⁾
14	Cadmium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
15	Chemical Oxygen Demand	1) Closed Reflux, Colorimetric Method ⁽⁴⁾ 2) Closed Reflux, Titrimetric Method ⁽⁴⁾
16	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
17	Chromium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
18	Color	ADMI Weighted-Ordinate Spectrophotometric Method ⁽⁴⁾

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
19	Copper	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
20	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
21	2,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
22	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	2,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
24	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
25	2,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
26	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
27	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
28	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
29	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
30	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
31	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
32	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
33	Formaldehyde	Distillation, Colorimetric Method ⁽³⁾
34	Free Chlorine	1) DPD Ferrous Titrimetric Method ⁽⁴⁾ 2) DPD Colorimetric Method ⁽⁴⁾
35	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
36	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
37	Hexavalent Chromium	Colorimetric Method ⁽⁴⁾
38	3-Hydroxycarbofuran	High-Performance Liquid Chromatographic Method ⁽⁴⁾
39	Lead	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾

40 Manganese...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
40	Manganese	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
41	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass spectrometric Method ⁽⁴⁾
42	Methiocarb	High-Performance Liquid Chromatographic Method ⁽⁴⁾
43	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
44	Methomyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
45	Nickel	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ⁽⁴⁾ 2) Soxhlet Extraction Method ⁽⁴⁾
47	Oxamyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
48	Propoxur	High-Performance Liquid Chromatographic Method ⁽⁴⁾
49	pH	Electrometric Method ⁽⁴⁾
50	Phenols	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾
51	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
52	Sulfide	Iodometric Method ⁽⁴⁾
53	Temperature	Laboratory and Field Methods ⁽⁴⁾
54	Total Dissolved Solids	Dried at 180 °C ⁽⁴⁾
55	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ⁽⁴⁾
56	Total Phosphorous	Digestion, Colorimetric Method ⁽⁴⁾
57	Total Suspended Solids	Dried from 103-105 °C ⁽⁴⁾
58	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
59	Trivalent Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ⁽⁴⁾
60	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁴⁾

น้ำดื่ม...

น้ำใต้ดิน จำนวน 126 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
8	Barium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
13	Benzoic Acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
15	Benzo[g,h,i]perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

18 Bis(2-ethylhexyl)phthalate...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ⁽⁴⁾
35	Chromium (VI)	Colorimetric Method ⁽⁴⁾

36 Chrysene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
37	Cyanide	Distillation, Colorimetric Method ⁽⁵⁾
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
39	DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
40	DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
41	DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
43	Di-n-Butyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
47	3,3-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

56 1,3-Dichloropropene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
57	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
58	Diethyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
63	Di-n-octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
69	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
70	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
74	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
75	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

76 γ-HCH...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
76	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
81	Lead	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
83	Mercury	1) Digestion, Cold Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
84	Methanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
86	Methyl bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
87	Methylene chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
89	2-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...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB 1242 - PCB 1248 - PCB 1254 - PCB 1260	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
98	pH	Electrometric Method ⁽⁴⁾
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
100	Phenol	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾ 3) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
102	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
103	Silver	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
109	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,25)

110 TPH (C₈-C₁₆)...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
110	TPH (C ₈ -C ₁₆)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(9,22)
111	TPH (C ₁₆ -C ₃₅)	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(9,22)
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁴⁾
120	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
121	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
122	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
123	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
124	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
126	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁴⁾

อากาศเสีย...

อากาศเสีย (ปล่องระบาย) จำนวน 28 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾
2	Arsenic	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾ 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾
3	Beryllium	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾ 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾
4	Cadmium	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾ 1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾
5	Carbon Monoxide	1) Instrumental Analyzer Method ⁽⁵⁾ 2) Sampling Bag Non-Dispersive Infrared Method ⁽⁵⁾
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾ 2) Isokinetic Sampling, Ion Chromatographic Method ⁽⁵⁾
7	Chromium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
8	Cobalt	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
9	Copper	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾ 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁵⁾
10	Cresol	Adsorption Sampling, Gas Chromatographic Method ⁽⁵⁾
11	Dioxins	Isokinetic Sampling ⁽⁵⁾
12	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾ 2) Isokinetic Sampling, Ion Chromatographic Method ⁽⁵⁾
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾ 2) Isokinetic Sampling, Ion Chromatographic Method ⁽⁵⁾
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁽⁵⁾

15 Lead...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	Lead	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
16	Manganese	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
17	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[5] 2) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^[5]
18	Nickel	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
19	Opacity	Ringelmann's Method ^[2]
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ^[5] 2) Absorption Sampling, Alkaline Permanganate/Colorimetric Method ^[5] 3) Instrumental Analyzer Method ^[5]
21	Selenium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
22	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Instrumental Analyzer Method ^[5]
23	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5]
24	Tellurium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
25	Tin	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
26	Total Suspended Particulate	1) Isokinetic Sampling, Gravimetric Method ^[5] 2) Paired Train, Isokinetic Sampling, Gravimetric Method ^[5]

27 Vanadium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Vanadium	1) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[5]
28	Xylene	Adsorption Sampling, Gas Chromatographic Method ^[5]

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,26] 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,26] 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,26]
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,17]
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,17]
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,17] 3) Digestion, Inductively Coupled Plasma Method ^[7,16] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,17]

5 Beryllium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
9	Chromium (II)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1,6,16,19) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1,6,17,19) 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,16,19) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,17,19)

10 Chromium (VI)...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method ^(1,6,19) 2) Alkaline Digestion, Colorimetric Method ^(8,19)
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26)

2) Soxhlet...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Dieldrin	2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26) 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)

22 Mercury...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(1,6,20) 2) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^(1,6,30) 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁰⁾ 4) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽³⁰⁾ 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ⁽²¹⁾
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic /Mass Spectrometric Method ^(11,26)
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26) 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic /Mass Spectrometric Method ^(11,26)
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
27	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(11,26)

- 2-Chlorobiphenyl...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	<ul style="list-style-type: none"> - 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5-Trichlorobiphenyl - 2,4',5-Trichlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl Pentachlorophenol 	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26) Electrometric Method ^(23,24) 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
29	pH	
30	Selenium	

31 Silver...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,26) 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,26) 3) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,26)
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)
35	Zinc	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,16) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,17) 3) Digestion, Inductively Coupled Plasma Method ^(7,16) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,17)

ดิน...

ดิน จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
2	Acetone	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25) 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ⁽¹³⁾
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
4	Anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
8	Barium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
9	Benz(a)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25) <i>sm</i>

11 Benzo(b)fluoranthene

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	Benzo(b)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
12	Benzo(k)fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
13	Benzoic acid	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
14	Benzo(a)pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
15	Benzo(g,h,i)perylene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
17	Bis(2-chloroethyl)ether	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
18	Bis(2-ethylhexyl)phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
21	Butanol	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
22	Butyl Benzyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26) <i>sm</i>

23 Cadmium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
24	Carbazole	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
28	p-Chloroaniline	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
32	2-Chlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,16,19) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,17,19)
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^(8,19)

36 Chrysene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
36	Chrysene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
37	Cyanide	Extraction, Distillation, Colorimetric Method ^(27,28,29)
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
39	DDD	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
40	DDE	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
41	DDT	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
42	Dibenz(a,h)anthracene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
43	Di-n-Butyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
47	3,3-Dichlorobenzidine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)

49 1,2-Dichloroethane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
53	2,4-Dichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
58	Diethyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
59	2,4-Dimethylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
60	2,4-Dinitrophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
61	2,4-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
62	2,6-Dinitrotoluene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)

63 Di-n-Octyl Phthalate...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
63	Di-n-Octyl Phthalate	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
67	Fluoranthene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
68	Fluorene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
70	Heptachlor epoxide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
73	n-Hexane	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25) 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ⁽¹³⁾

73 n-Hexane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
74	α -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
75	β -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
76	γ -HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
77	Hexachlorocyclopentadiene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
78	Hexachloroethane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
79	Indeno(1,2,3-cd)pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
80	Isophorone	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
81	Lead	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽²⁰⁾ 2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry ⁽²¹⁾ 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽³⁰⁾

84 Methanol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25) 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^(13,25)
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
88	2-methylphenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
89	2-Methylnaphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
91	Naphthalene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
93	Nitrobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
94	N-Nitrosodiphenylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
95	N-Nitrosodi-n-propylamine	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)

96 Polychlorinated biphenyls (PCBs)

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4,6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
97	Pentachlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
98	Phenanthrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)

99 Phenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
99	Phenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
100	Pyrene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
101	Selenium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
102	Silver	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
103	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
108	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
109	TPH (C ₈ -C ₁₆)	1) Automate Extraction, Gas Chromatographic Method ^(11,22) 2) Solvent Extraction, Gas Chromatographic Method ^(12,22) 3) Ultrasonic Extraction, Gas Chromatographic Method ^(22,31)
110	TPH (C ₁₆ -C ₃₅)	1) Automate Extraction, Gas Chromatographic Method ^(11,22) 2) Solvent Extraction, Gas Chromatographic Method ^(12,22) 3) Ultrasonic Extraction, Gas Chromatographic Method ^(22,31)
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)

115 2,4,5-Trichlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
115	2,4,5-Trichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
116	2,4,6-Trichlorophenol	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(10,26) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(11,26)
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
121	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
122	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
123	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(15,25)
125	Zinc	1) Digestion, Inductively Coupled Plasma Method ^(7,16) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,17)

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ที่ กอ ๐๓๑๐/๑/ ๔๔ ๑ ๒ ๑

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๕ เมษายน ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๙ มีนาคม ๒๕๖๗

ตามคำขอที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓ ราย

- | | |
|--------------------------|----------------------------|
| ๑) นางสาวพรรณริตา พุ่มคง | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๖๕ |
| ๒) นายกำชัย สุทธิระ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๒๑ |
| ๓) นางสาวศุภรดา ปันมยุรา | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๓๘ |

๒. ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑๒ ราย

- | | |
|-----------------------------|----------------------------|
| ๑) นางสาวฐานิดา กลิ่นเขียว | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๓๒ |
| ๒) นางสาวกัญญ์กิสสร สายคำ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๓๓ |
| ๓) นางสาวณัฐนันท์ กันทะวงศ์ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๓๔ |
| ๔) นายอำนาจ วงษาเคน | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๓๕ |
| ๕) นายฤกษ์พล ปัญญาวงศ์ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๓๖ |
| ๖) นายณชากร ทรัพย์ชา | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๓๗ |
| ๗) นายวัชรินทร์ ผ่องสามสวน | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๓๘ |
| ๘) นายณัฐพงศ์ โสภ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๓๙ |
| ๙) นายศักรินทร์ ปานเพ็ง | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๔๐ |
| ๑๐) นายณัฐพล ขุ่มชื่น | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๔๑ |
| ๑๑) นายธนา สุพาพันธ์ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๔๒ |
| ๑๒) นายบวรกร แก้วพงษ์ชา | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๑๔๓ |

อนึ่ง หนังสือฉบับนี้...

- ๒ -

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๒ กันยายน ๒๕๖๕

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายพรยศ กัตถ์กรอง)

รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๑ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๑๙๔

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ที่อก ๐๓๓๐(๓)/ ๖๔๗๐

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๘ มิถุนายน ๒๕๖๕

เรื่อง ขันทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๔ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามที่หนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำ
ห้องปฏิบัติการวิเคราะห์ และรายการสารมลพิษที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป
(ประเทศไทย) จำกัด ขันทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ๖-๓๒๓ สถานที่ตั้งเลขที่
๖๒๖/๑๐ หมู่ที่ ๕ ตำบลแม่บัวคำ อำเภอปลวกแดง จังหวัดระยอง โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายเคช ช้างชน	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๔๒
๒) นางวิลาวัณย์ บริรักษ์	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๔๓
๓) นายสุพจน์ สลามเค๊ะ	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๔๔

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นางสาวณัฐมล บรรจงกิจ	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๔๕
๒) นางพจนา สีดา	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๔๖
๓) นางสาวธนิตา กุลสุริวงศ์	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๔๗
๔) นายพิทยา ทองแดง	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๔๘
๕) นางชลธิชา สุนงกษ	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๔๙
๖) ว่าที่ ร.ต.รณชัย ม่วงมา	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๕๐
๗) นายวรวิวัฒน์ หับพา	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๕๑
๘) นายศักดิ์นรินทร์ จรัสกาย	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๕๒
๙) นายสุรศักดิ์ สาชิน	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๕๓
๑๐) นางสาวเพชรคุณ ภาณุदानนท์	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๕๔
๑๑) นายสถาพร ถาแก้ว	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๕๕
๑๒) นายสุทธศักดิ์รังค์ โชคปิตินันท์	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๕๖

๑๓) นายวัลลภ...

-๒-


๑๓) นายวัลลภ หันไชยเนาว์	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๕๗
๑๔) นางสาวนาถิ์ เจริญตระกูล	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๕๘
๑๕) นางสาวนิตา ผลุจจิตต์	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๕๙
๑๖) นายธนະสิทธิ์ วงศ์ไชย	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๖๐
๑๗) นายชัยนุสรณ์ เลิศนันท์กุลชัย	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๖๑
๑๘) นายสังจา เพ็ชรแสง	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๖๒
๑๙) นายกันตกร มณีสัมพันธ์	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๖๓
๒๐) นางสาวจันทิพย์ โกเมนชนะ	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๖๔
๒๑) นายธารินทร์ ออภิจินดา	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๖๕
๒๒) นายศุภณัฐ พิสัยพันธ์	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๖๖
๒๓) นายศุภชัย วงศ์สุริยฉาย	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๖๗
๒๔) นายปฐมพงศ์ กรสรศักดิ์	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๖๘
๒๕) นายไสว ดันโพธิ์	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๖๙
๒๖) นางสาวกิตติยา สัญญาอริยาภรณ์	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๗๐
๒๗) นางสาวเจษฎาพร ศรีบุญเรือง	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๗๑
๒๘) นางสาวมธุรินทร์ สิงห์เงา	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๗๒
๒๙) นางสาวอริศราธิ์น ศิริมงคลโร	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๗๓
๓๐) นายพิพัฒน์ นิกิตร์เศรษฐ์	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๗๔
๓๑) นายศิริวิทย์ เรืองสม	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๗๕
๓๒) นายปารามศ สัตยาคุณ	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๗๖
๓๓) นายณนุภาพ ธรรมสโร	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๗๗
๓๔) นางสาวศุภรัตน์ โสจันทร์	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๗๘
๓๕) นายพชรกร อินทรเสนา	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๗๙
๓๖) นายทิวากร เขื่อนมาก	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๘๐
๓๗) นายอนุรักษ ทองจรรจกดา	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๘๑
๓๘) นายอภิชาติ วิลาศ	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๘๒
๓๙) นายจรัสระวี ศรีรักษา	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๘๓
๔๐) นายประสานมิตร เขื่อนเพชร	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๘๔
๔๑) นายภาณุวัฒน์ วังบง	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๘๕
๔๒) นายสันติ ชัยชนะ	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๘๖
๔๓) นายสิทธิชัย แก้วเกตุ	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๘๗
๔๔) นายทินกร กุลชาติ	ทะเบียนเลขที่ ๖-๓๒๓-๖-๔๔๘๘

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนไว้วิเคราะห์ในน้ำเสีย จำนวน ๑๔ รายการ
อากาศเสีย (ปล่องระบาย) จำนวน ๘ รายการ และน้ำใต้ดิน จำนวน ๓ รายการ รวมทั้งสิ้นจำนวน ๒๕ รายการ
ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้มีอายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นางจันทา เตชะธรรมา)

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๒๘ มิ.ย. ๒๕๖๔

กองวิจัยและเตือนภัยมลพิษโรงงาน
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๘๐๕ ๙๐๖๓-๓
ไปรษณีย์อิเล็กทรอนิกส์ info.gdv.maeil.go.th

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๓๒๓

ที่ อก ๐๓๑๐(๓)/ ๖๔ ๗๐

ลงวันที่ ๒๘ มิถุนายน ๒๕๖๔

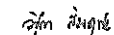
ขอข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ

น้ำเสีย จำนวน 14 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method ⁽²⁾ 2) 5-Day BOD Test, Azide Modification Method ⁽²⁾
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method ⁽²⁾ 2) Closed Reflux, Colorimetric Method ⁽²⁾ 3) Closed Reflux, Titrimetric Method ⁽²⁾
3	Color	ADMI Weighted – Ordinate Spectrophotometric Method ⁽²⁾
4	Cyanide	Distillation, Colorimetric Method ⁽²⁾
5	Formaldehyde	Distillation, Colorimetric Method ⁽¹⁾
6	Free Chlorine	DPD-Ferrous Titrimetric Method ⁽²⁾
7	Oil and Grease	Liquid-Liquid Partition-Gravimetric Method ⁽²⁾
8	pH	Electrometric Method ⁽²⁾
9	Phenols	1) Distillation, Chloroform Extraction Method ⁽²⁾ 2) Distillation, Direct Photometric Method ⁽²⁾
10	Sulfide	ZnS Precipitation, Iodometric Method ⁽²⁾
11	Temperature	Laboratory and Field Method ⁽²⁾
12	Total Dissolved Solids	Dried at 180 °C ⁽²⁾
13	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ⁽²⁾
14	Total Suspended Solids	Dried at 103-105 °C ⁽²⁾

อากาศเสีย (ปล่องระบาย) จำนวน 7 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Carbon Monoxide	1) Sampling Bag, Non-Dispersive Infrared Method ⁽⁵⁾ 2) Instrumental Analyzer Method ⁽⁶⁾
2	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁽³⁾
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⁾



(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]

แนบได้คืน จำนวน 3 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method ^[2]
2	pH	Electrometric Method ^[2]
3	Phenols	Distillation, Direct Photometric Method ^[2]

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วิภา วัฒนกุล
(นางสาววิภา วัฒนกุล)
ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก กองวิจัยและเตือนภัยมลพิษโรงงาน กรมโรงงานอุตสาหกรรม โทร ๐ ๓๘๐๔ ๗๐๖๓-๓

สำเนา

ที่ ออก ๐๓๒๐/ ๖๐๔๓

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๒ มี.ค. ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนแปลงบุคลากร ของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๔ มีนาคม ๒๕๖๖

ตามหนังสืออ้างอิงถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอลำลูกเกด จังหวัดระยอง ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

ก. ให้อยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ ราย

- | | |
|------------------------------|----------------------------|
| ๑) นางสาวเจษฎาพร ศรีบุญเรือง | ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๗๑ |
| ๒) นางสาวสุวิมลพร สิงห์ใจ | ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๗๒ |
| ๓) นางสาววันวิดา ผดุงจิตต์ | ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๔๔ |
| ๔) นายศุภณัฐ พิสัยพันธ์ | ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๖๖ |
| ๕) นายสิทธิชัย แก้วเกตุ | ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๘๗ |

ข. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๒ ราย

- | | |
|------------------------------|----------------------------|
| ๑) นายณัฐพงษ์ เท่งขาวนา | ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๐๑ |
| ๒) นางสาวกัญญ์พรคนธ์ รักดี | ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๐๒ |
| ๓) นางสาวจุฬารัตน์ สีทองกลาง | ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๐๓ |
| ๔) นางสาวจิตสุภา ประเทืองสุข | ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๐๔ |
| ๕) นายสรเสริญ ค่อยกลุ่ย | ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๐๕ |
| ๖) นายณัฐวุฒิ ออมพรมราช | ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๐๖ |
| ๗) นายจักรกร สีวะลา | ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๐๗ |
| ๘) นายสิขวิชญ์ สุวรรณรัตน์ | ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๐๘ |
| ๙) นายสิทธิพันธ์ เสนาชีว | ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๐๙ |
| ๑๐) นายอนุวัฒน์ เตมะ | ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๑๐ |
| ๑๑) นายสุรวิทย์ นราพงษ์ | ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๑๑ |
| ๑๒) นายอดิศักดิ์ ตะริศนุญ | ทะเบียนเลขที่ ๖-๓๒๓-จ-๐๐๑๒ |

อนึ่ง...

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ที่ อก ๐๓๑๐(๓)/๖๔๗๐ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๔ คือในวันที่ ๒๘ มิถุนายน ๒๕๖๗ ทั้งนี้ สามารถยื่นคำขอผ่าน
ระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรมตาม QR Code ท้ายหนังสือนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายทวี อำพาพันธ์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๔ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ einw@dlw.mail.go.th



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์



ที่ อก ๐๓๑๐/๒๕๖๕๔๗

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๐ พ.ย. ๒๕๖๗

เรื่อง เปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๕ ตุลาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู่ อำเภอปลวกแดง
จังหวัดระยอง ขอเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย)
จำกัด เพิ่มขอบข่ายสารมลพิษที่วิเคราะห์ในน้ำเสีย จำนวน ๑๓ รายการ และน้ำใต้ดิน ๓ รายการ ความสิ่งที่ส่ง
มาด้วย

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์
เอกชนที่ อก ๐๓๑๐(๓)/๖๔๗๐ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๔ คือในวันที่ ๒๘ มิถุนายน ๒๕๖๗ ทั้งนี้ สามารถ
ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายทวี อำพาพันธ์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๔ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ einw@dlw.mail.go.th



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๓๒๓
ที่ อก ๐๓๒๐/๑๕๖๕๗ ลงวันที่ ๑๐ มี.ย. ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๖ รายการ
น้ำเสีย จำนวน 13 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method
2	Chemical Oxygen Demand	2) 5-Day BOD Test, Azide Modification Method 1) Open Reflux, Titrimetric Method 2) Closed Reflux, Colorimetric Method 3) Closed Reflux, Titrimetric Method
3	Color	ADMI Weighted-Ordinate Spectrophotometric Method
4	Cyanide	Distillation, Colorimetric Method
5	Free Chlorine	DPD Ferrous Titrimetric Method
6	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method
7	pH	Electrometric Method
8	Phenols	1) Distillation, Chloroform Extraction Method 2) Distillation, Direct Photometric Method
9	Sulfide	ZnS Precipitation, Iodometric Method
10	Temperature	Field Method
11	Total Dissolved Solids	Dried at 180 °C
12	Total Kjeldahl Nitrogen	Semi-Macro Kjeldahl Method
13	Total Suspended Solids	Dried at 103-105 °C

น้ำใต้ดิน จำนวน 3 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method
2	pH	Electrometric Method
3	Phenols	Distillation, Direct Photometric Method

เอกสารอ้างอิง

APHA, AWWA, WEF. Standard Methods for the Examination of Water and
Wastewater. 24th ed. Washington, DC : APHA, 2023




ที่ อก ๐๓๒๐/ ๕ ๖ ๐๐ 1

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๕ พฤษภาคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๐ มีนาคม ๒๕๖๗

ตามคำขอ ที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้คู อำเภอลำลูกนาง
จังหวัดระยอง ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑ ราย

นางสาวเพชรคุณ ภาณุคานนท์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๕๔

๒. ให้เพิ่มเจ้าหน้าที่ห้องปฏิบัติการวิเคราะห์เอกชน จำนวน ๑๕ ราย

๑) นายณัฐพล เจียงวรวงศ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๓๓

๒) นายชานนท์ บุญชื่น ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๓๔

๓) นายณัฐกานต์ วงศ์อินทร์อยู่ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๓๕

๔) นายอานนท์ โพธิ์พระทอง ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๓๖

๕) นายณัฏฐพล แก้วกลาง ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๓๗

๖) นายศุภณัฐ ทัฬหีพันธ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๓๘

๗) นายวสันต์ คินันต์ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๓๙

๘) นายวิญญู นิมาภักดิ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๔๐

๙) นายศุภณัฐ สกฤตดิสมศักดิ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๔๑

๑๐) นายเอกชัย ถิ่นทอง ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๔๒

๑๑) นายพงษ์เทพ สิริธิเลาะ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๔๓

๑๒) นายทินกร กุมภาชี ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๔๔

๑๓) นางสาวนันทิยา บุญจรรย์ ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๔๕

๑๔) นายสิทธิชัย ยันนิมา ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๔๖

๑๕) นางสาวภาณิน พลอดทอง ทะเบียนเลขที่ ว-๓๒๓-จ-๐๐๑๔๗



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



- ๒ -

อนึ่ง หนังสือฉบับนี้จะส่งอายุพร้อมหนังสืออาญาขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ในวันที่ ๒๗ มิถุนายน ๒๕๖๗

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายพรเมศร์ กลั่นกาหลง)

รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๕ ต่อ ๕๐๐๑-๒

ไปรษณีย์อิเล็กทรอนิกส์ eiw@diw.mail.go.th



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