

ภาคผนวก ค

ใบรับรองผลการตรวจวิเคราะห์คุณภาพสิ่งแวดล้อม

ภาคผนวก ค-1

คุณภาพอากาศจากแหล่งกำเนิด



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: 2321250

Date Received : Sep 19, 2023

Date Reported : Oct 02, 2023

Report Number: 2577452-1

TESTING
No.0042

Page 1 of 2

Sample Number 2321250-1
Sampled Date Sep 19, 2023
Sample Description Emission from Stationary Source
Location Boiler (47P 0733747, 1404498)
Date Analysis Commenced Sep 20, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one plastic bottle, one amber plastic bottle and one sorbent tube, refrigerated

Stack Description									
Ambient Pressure	756	mmHg	Diameter	0.99	m	Oxygen	7.6	%	
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	8.5	%	
Type of Process	Combustion		Stack Temperature	170	°C	Gas Velocity	6.0	m/s	
Type of Fuel	Natural Gas		Moisture	11.72	%	Flow Rate (Actual O2)	9800	Nm3/hr	

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 % O ₂ at 7.6 % O ₂	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Sulfur dioxide *	02:20 PM - 02:50 PM	ppm	-	2.0	<2.0	<2.0	60	United States Environmental Protection Agency, EPA Method 6	Rayong
Total Suspended Particulate	02:20 PM - 03:08 PM	mg/m3	-	0.5	<0.5	<0.5	320	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)
โทรศัพท์ 3-323-4-9447

Approved by

D. J. J.

Dej Changchon
Senior Manager
โทรศัพท์ 3-323-4-9442

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S:\Reports_Air Stack_O2_2GL.rpt (9:49AM)



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: 2321250

Date Received : Sep 19, 2023

Date Reported : Oct 02, 2023

Report Number: 2577452-1

TESTING
No.0042

Page 2 of 2

Sample Number 2321250-1
Sampled Date Sep 19, 2023
Sample Description Emission from Stationary Source
Location Boiler (47P 0733747, 1404498)
Date Analysis Commenced Sep 20, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one plastic bottle, one amber plastic bottle and one sorbent tube, refrigerated

Stack Description									
Ambient Pressure	756	mmHg	Diameter	0.99	m	Oxygen	7.6	%	
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	8.5	%	
Type of Process	Combustion		Stack Temperature	170	°C	Gas Velocity	6.0	m/s	
Type of Fuel	Natural Gas		Moisture	11.72	%	Flow Rate (Actual O2)	9800	Nm3/hr	

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Sulfur dioxide *	02:20 PM - 02:50 PM	g/s	-	-	0.003	-	-	Calculated	Rayong
Total Suspended Particulate *	02:20 PM - 03:08 PM	g/s	-	-	<0.001	-	-	Calculated	Rayong

Sampled By : Kantaphon Maneesampan , Natthawut Duangpang

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

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Thanita Kulsuriwong
Scientist (4)
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Approved by

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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 : 4514144337
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2321250
Date Received : Sep 19, 2023
Date Reported : Oct 02, 2023
Report Number: 2577452-2

Page 1 of 2

Sample Number 2321250-1
Sampled Date Sep 19, 2023
Sample Description Emission from Stationary Source
Location Boiler (47P 0733747, 1404498)
Date Analysis Commenced Sep 21, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one plastic bottle, one amber plastic bottle and one sorbent tube, refrigerated

Stack Description									
Ambient Pressure	756	mmHg	Diameter	0.99	m	Oxygen	7.6	%	
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	8.5	%	
Type of Process	Combustion		Stack Temperature	170	°C	Gas Velocity	6.0	m/s	
Type of Fuel	Natural Gas		Moisture	11.72	%	Flow Rate (Actual O2)	9800	Nm3/hr	

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 % O ₂	Result at 7.6 % O ₂	Method	Testing Location
Air Testing								
1,3-Butadiene	02:30 PM - 02:45 PM	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

Saranya C.

Saranya Chalermthamrong
Scientist (4)

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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 : 4514144337
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2321250
Date Received : Sep 19, 2023
Date Reported : Oct 02, 2023
Report Number: 2577452-2

Page 2 of 2

Sample Number 2321250-1
Sampled Date Sep 19, 2023
Sample Description Emission from Stationary Source
Location Boiler (47P 0733747, 1404498)
Date Analysis Commenced Sep 21, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one plastic bottle, one amber plastic bottle and one sorbent tube, refrigerated

Stack Description									
Ambient Pressure	756	mmHg	Diameter	0.99	m	Oxygen	7.6	%	
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	8.5	%	
Type of Process	Combustion		Stack Temperature	170	°C	Gas Velocity	6.0	m/s	
Type of Fuel	Natural Gas		Moisture	11.72	%	Flow Rate (Actual O2)	9800	Nm3/hr	

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Method	Testing Location
Air Testing							
1,3-Butadiene	02:30 PM - 02:45 PM	g/s	-	-	<0.003	Calculated	Bangkok

Sampled By : Kantaphon Maneesampan , Natthawut Duangpang

Remark :

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

Approved by

Saranya C.

Saranya Chalermthamrong
Scientist (4)

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Analysis / Test Report

Client : Siam 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: 2321223
Date Received : Sep 19, 2023
Date Reported : Sep 28, 2023
Report Number : 2577429-1

Page 1 of 1

Sample Number : 2321223-1
Sample Description : Emission from Stationary Source
Location : Boiler (GPS 47P 0733747, 1404498)
Measurement Date : Sep 19, 2023

		Stack Description			
Ambient Temperature	30 °C	Diameter	0.99 m	Oxygen	7.56 %
Ambient Pressure	756 mmHg	Shape	Circle	Carbon dioxide	8.51 %
Type of Process	Combustion	Stack Temperature	170 °C	Gas Velocity	5.99 m/s
Type of Fuel	Natural Gas	Moisture	11.77 %	Flow Rate	9807 Nm ³ /hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)	
				at Actual O ₂	At 7% O ₂
1	02:20 PM - 02:40 PM	7.41	8.61	76.13	78.46
2	02:41 PM - 03:01 PM	7.39	8.60	76.94	79.17
3	03:02 PM - 03:22 PM	7.87	8.30	73.59	78.49
Average (ppm)		7.56	8.51	75.55	78.71
Guideline ^{1/} (ppm)				-	200
Guideline ^{2/} (ppm)				106.28	-
Result (mg/Nm ³)				142.14	148.08
Emission Rate at Actual O ₂ (g/s)				0.3872	
Method				US EPA Method 7E	

Sampled By : Sathaporn Thakarn

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 Latex Plant, Approval Letter No. Tor Sor 1009/13107 dated December 30, 2004 (B.E. 2547)

Technical Management

Wichan Choonharat
Wichan Choonharat
Manager
เบอร์โทรศัพท์ 2-204-6113

Approved by

Sarayuth Jitranont
Sarayuth Jitranont
Assistant General Manager
เบอร์โทรศัพท์ 2-204-4702

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ภาคผนวก ค-2

คุณภาพอากาศในบรรยากาศ



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



TESTING
No.0042

Lot ID: 23106858
Date Received : Sep 23, 2023
Date Reported : Jan 04, 2024
Report Number: 2773591-1C7

Page 1 of 1

Sample Description Air Quality
Location บ้านฉางประจักษ์ (โรงพยาบาลส่งเสริมสุขภาพตำบลตากวน) (GPS 47P 0735531, 1402769)
Date Analysis Commenced Sep 25, 2023
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)
23106858-4	Sep 17 - Sep 18, 2023	0.013	756	31
23106858-5	Sep 18 - Sep 19, 2023	0.014	756	30
23106858-6	Sep 19 - Sep 20, 2023	0.034	756	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 : Sitpawit Suwannarat

Approved by

Thanita K.

Thanita Kulsuriwong
Scientist (4)

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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: 23106850
Date Received : Sep 26, 2023
Date Reported : Sep 30, 2023
Report Number: 2773586-1C7

Page 1 of 1

Sample Description Air Quality
Location บ้านฉางประจักษ์ (โรงพยาบาลส่งเสริมสุขภาพตำบลตากวน) (GPS 47P 0735531, 1402769)
Parameter Nitrogen dioxide (ppm)
Measurement Date Sep 14, 2023 - Sep 21, 2023
Measurement by Sitpawit Suwannarat

Time	23106850-1 Sep 14, 2023	23106850-2 Sep 15, 2023	23106850-3 Sep 16, 2023	23106850-4 Sep 17, 2023	23106850-5 Sep 18, 2023	23106850-6 Sep 19, 2023	23106850-7 Sep 20, 2023
11:00 AM - 12:00 PM	0.010	0.004	0.006	0.010	0.009	0.007	0.007
12:00 PM - 01:00 PM	0.001	0.003	0.004	0.008	0.007	0.007	0.015
01:00 PM - 02:00 PM	0.002	0.003	0.004	0.005	0.006	0.006	0.011
02:00 PM - 03:00 PM	0.003	0.004	0.005	0.004	0.007	0.007	0.009
03:00 PM - 04:00 PM	0.004	0.004	0.006	0.005	0.005	0.006	0.008
04:00 PM - 05:00 PM	0.004	0.004	0.005	0.005	0.007	0.007	0.006
05:00 PM - 06:00 PM	0.004	0.004	0.004	0.006	0.006	0.008	0.007
06:00 PM - 07:00 PM	0.005	0.008	0.005	0.006	0.008	0.010	0.008
07:00 PM - 08:00 PM	0.005	0.006	0.011	0.008	0.011	0.015	0.010
08:00 PM - 09:00 PM	0.007	0.011	0.012	0.014	0.013	0.015	0.014
09:00 PM - 10:00 PM	0.010	0.017	0.014	0.013	0.014	0.016	0.013
10:00 PM - 11:00 PM	0.011	0.014	0.010	0.012	0.012	0.021	0.012
11:00 PM - 12:00 AM	0.012	0.009	0.008	0.009	0.008	0.016	0.014
12:00 AM - 01:00 AM	0.010	0.005	0.007	0.008	0.007	0.010	0.009
01:00 AM - 02:00 AM	0.008	0.005	0.008	0.007	0.008	0.009	0.010
02:00 AM - 03:00 AM	0.008	0.006	0.009	0.010	0.008	0.014	0.008
03:00 AM - 04:00 AM	0.008	0.008	0.007	0.008	0.007	0.009	0.013
04:00 AM - 05:00 AM	0.007	0.006	0.004	0.005	0.005	0.013	0.008
05:00 AM - 06:00 AM	0.005	0.005	0.006	0.008	0.007	0.011	0.011
06:00 AM - 07:00 AM	0.008	0.003	0.010	0.010	0.009	0.013	0.006
07:00 AM - 08:00 AM	0.008	0.004	0.013	0.010	0.015	0.016	0.010
08:00 AM - 09:00 AM	0.011	0.008	0.016	0.015	0.017	0.010	0.013
09:00 AM - 10:00 AM	0.011	0.019	0.021	0.018	0.015	0.014	0.020
10:00 AM - 11:00 AM	0.006	0.009	0.012	0.012	0.009	0.011	0.013
Average	0.007	0.007	0.009	0.009	0.009	0.011	0.011
1hr - Maximum	0.012	0.019	0.021	0.018	0.017	0.021	0.020
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

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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 : 4514144337
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 23106855
Date Received : Sep 26, 2023
Date Reported : Oct 03, 2023
Report Number : 2773588-1 C7

Page 1 of 2

Sample Number : 23106855-1 to 7
Parameter : Wind Speed / Wind Direction
Location : บ้านอ่าวประจักษ์ (โรงพยาบาลส่งเสริมสุขภาพตำบลตากวน) (GPS 47P 0735531, 1402769)
Sampling Date : Sep 14 - Sep 21, 2023
Sampling by : Sitpawit Suwannarat

Time	Sep 14 - Sep 15, 2023			Sep 15 - Sep 16, 2023			Sep 16 - Sep 17, 2023			Sep 17 - Sep 18, 2023			Sep 18 - Sep 19, 2023			Sep 19 - Sep 20, 2023			Sep 20 - Sep 21, 2023		
	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	79.0	E	0.3	157.0	SSE	1.3	60.0	ENE	2.1	118.0	ESE	1.0	76.0	ENE	0.6	106.0	ESE	0.6	175.0	S
12:00 PM - 01:00 PM	0.3	0.0	N	0.3	72.0	ENE	1.0	0.0	N	0.7	101.0	E	0.9	108.0	ESE	0.4	105.0	ESE	1.3	174.0	S
01:00 PM - 02:00 PM	0.3	90.0	E	1.0	170.0	S	1.0	102.0	ESE	2.3	111.0	ESE	0.5	108.0	ESE	0.3	97.0	E	0.3	175.0	S
02:00 PM - 03:00 PM	1.1	115.0	ESE	1.2	95.0	E	1.9	90.0	E	0.8	99.0	E	0.3	87.0	E	0.8	125.0	SE	0.3	175.0	S
03:00 PM - 04:00 PM	0.8	81.0	E	1.0	58.0	ENE	0.6	158.0	SSE	0.2	-	-	0.4	160.0	SSE	0.5	81.0	E	0.5	179.0	S
04:00 PM - 05:00 PM	0.5	0.0	N	0.7	60.0	ENE	0.4	0.0	N	1.1	74.0	ENE	0.6	156.0	SSE	0.3	166.0	SSE	0.3	179.0	S
05:00 PM - 06:00 PM	1.5	81.0	E	1.3	146.0	SE	0.3	149.0	SSE	0.4	120.0	ESE	0.4	105.0	ESE	0.4	166.0	SSE	0.6	179.0	S
06:00 PM - 07:00 PM	0.5	206.0	SSW	1.7	80.0	E	1.0	55.0	NE	3.3	103.0	ESE	0.5	111.0	ESE	0.9	179.0	S	0.8	209.0	SSW
07:00 PM - 08:00 PM	1.3	53.0	NE	3.2	76.0	ENE	0.5	0.0	N	1.3	0.0	N	0.3	117.0	ESE	0.5	151.0	SSE	0.3	227.0	SW
08:00 PM - 09:00 PM	3.5	94.0	E	0.6	99.0	E	1.0	85.0	E	1.9	101.0	E	0.6	83.0	E	1.5	137.0	SE	1.8	0.0	N
09:00 PM - 10:00 PM	1.0	112.0	ESE	1.0	0.0	N	2.0	92.0	E	0.5	120.0	ESE	2.9	115.0	ESE	0.1	-	-	0.6	55.0	NE
10:00 PM - 11:00 PM	2.5	78.0	ENE	0.5	131.0	SE	1.4	87.0	E	1.3	130.0	SE	1.3	88.0	E	1.5	128.0	SE	0.9	129.0	SE
11:00 PM - 12:00 AM	5.5	102.0	ESE	1.9	144.0	SE	1.0	103.0	ESE	0.6	103.0	ESE	2.1	107.0	ESE	1.4	76.0	ENE	0.7	155.0	SSE
12:00 AM - 01:00 AM	2.2	75.0	ENE	2.0	81.0	E	3.1	106.0	ESE	0.3	128.0	SE	0.7	103.0	ESE	0.3	119.0	ESE	2.2	0.0	N
01:00 AM - 02:00 AM	2.8	106.0	ESE	1.3	121.0	ESE	1.9	127.0	SE	2.1	116.0	ESE	1.0	110.0	ESE	0.2	-	-	0.9	0.0	N
02:00 AM - 03:00 AM	0.9	103.0	ESE	4.0	58.0	ENE	0.8	124.0	SE	0.5	86.0	E	0.3	108.0	ESE	0.6	149.0	SSE	0.4	230.0	SW
03:00 AM - 04:00 AM	0.4	110.0	ESE	3.9	99.0	E	0.3	105.0	ESE	2.2	84.0	E	0.7	132.0	SE	1.1	108.0	ESE	0.6	202.0	SSW
04:00 AM - 05:00 AM	0.9	64.0	ENE	2.4	119.0	ESE	0.8	100.0	E	0.7	105.0	ESE	0.3	89.0	E	0.9	177.0	S	0.3	209.0	SSW
05:00 AM - 06:00 AM	0.6	86.0	E	0.6	0.0	N	2.3	94.0	E	0.3	128.0	SE	0.3	108.0	ESE	0.5	152.0	SSE	0.4	213.0	SSW
06:00 AM - 07:00 AM	1.9	137.0	SE	2.2	82.0	E	1.3	0.0	N	0.3	154.0	SSE	0.8	111.0	ESE	0.3	174.0	S	0.3	214.0	SW
07:00 AM - 08:00 AM	1.2	0.0	N	3.8	109.0	ESE	0.8	127.0	SE	0.5	104.0	ESE	0.3	132.0	SE	0.6	175.0	S	0.5	213.0	SSW
08:00 AM - 09:00 AM	0.3	163.0	SSE	1.5	90.0	E	1.3	127.0	SE	0.3	194.0	SSW	0.5	101.0	E	0.3	175.0	S	0.8	215.0	SW
09:00 AM - 10:00 AM	0.6	0.0	N	2.2	112.0	ESE	4.3	100.0	E	0.6	139.0	SE	0.3	99.0	E	0.5	175.0	S	0.7	214.0	SW
10:00 AM - 11:00 AM	0.5	191.0	S	0.3	104.0	ESE	2.9	92.0	E	0.9	111.0	ESE	0.3	113.0	ESE	0.4	175.0	S	0.7	0.0	N

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayuth Jitranont
Assistant General Manager

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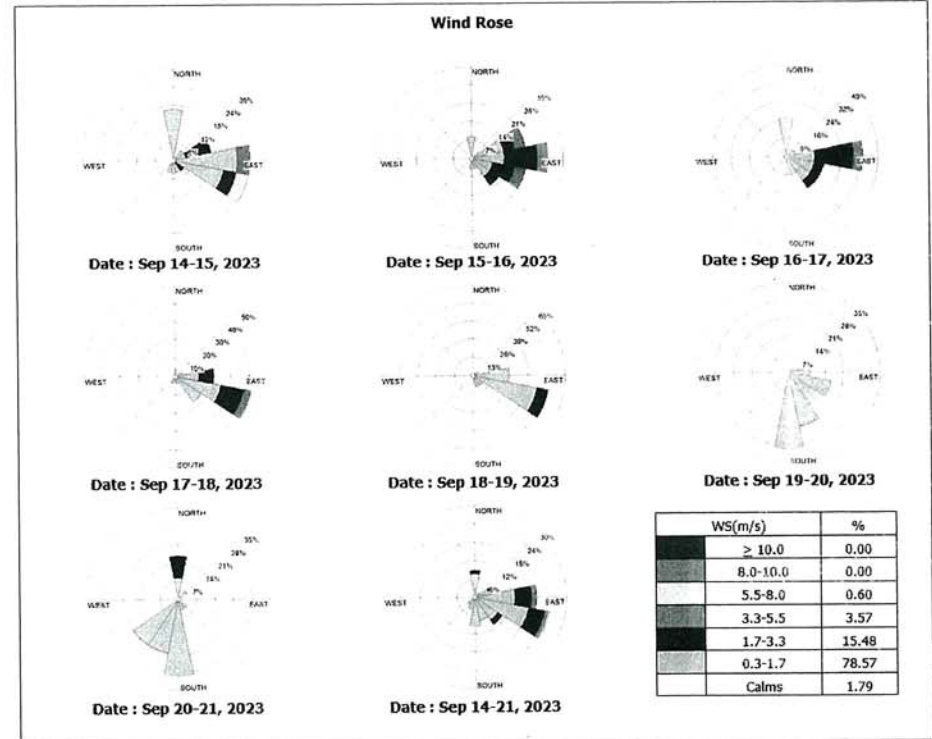


Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4514155377
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 23106855
Date Received : Sep 26, 2023
Date Reported : Oct 03, 2023
Report Number : 2773588-1 C7

Page 2 of 2



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Assistant General 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



TESTING
No.0042
Lot ID: 23106861
Date Received : Sep 23, 2023
Date Reported : Jan 04, 2024
Report Number: 2773597-1C7

Page 1 of 1

Sample Description	Air Quality			
Location	บ้านนาหว้า (GPS 47P 0735346, 1406705)			
Date Analysis Commenced	Sep 25, 2023			
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)
23106861-4	Sep 17 - Sep 18, 2023	0.017	756	31
23106861-5	Sep 18 - Sep 19, 2023	0.017	756	30
23106861-6	Sep 19 - Sep 20, 2023	0.043	756	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 : Sitpawit Suwannarat

Approved by

Thanita K.

Thanita Kulsuriwong
Scientist (4)

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6506-83 / EMAIL



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: 23106851
Date Received : Sep 26, 2023
Date Reported : Sep 30, 2023
Report Number: 2773587-1C7

Page 1 of 1

Sample Description	Air Quality						
Location	บ้านนาหว้า (GPS 47P 0735346, 1406705)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Sep 14, 2023 - Sep 21, 2023						
Measurement by	Sitpawit Suwannarat						
Time	23106851-1 Sep 14, 2023	23106851-2 Sep 15, 2023	23106851-3 Sep 16, 2023	23106851-4 Sep 17, 2023	23106851-5 Sep 18, 2023	23106851-6 Sep 19, 2023	23106851-7 Sep 20, 2023
10:00 AM - 11:00 AM	0.013	0.016	0.015	0.017	0.019	0.018	0.016
11:00 AM - 12:00 PM	0.014	0.018	0.015	0.017	0.017	0.016	0.015
12:00 PM - 01:00 PM	0.014	0.017	0.015	0.018	0.018	0.017	0.014
01:00 PM - 02:00 PM	0.010	0.016	0.015	0.017	0.017	0.015	0.014
02:00 PM - 03:00 PM	0.010	0.018	0.015	0.017	0.017	0.015	0.013
03:00 PM - 04:00 PM	0.015	0.018	0.016	0.015	0.016	0.014	0.014
04:00 PM - 05:00 PM	0.018	0.018	0.017	0.014	0.017	0.014	0.015
05:00 PM - 06:00 PM	0.012	0.020	0.020	0.017	0.020	0.016	0.016
06:00 PM - 07:00 PM	0.009	0.017	0.025	0.019	0.008	0.017	0.016
07:00 PM - 08:00 PM	0.013	0.015	0.024	0.020	0.012	0.024	0.024
08:00 PM - 09:00 PM	0.012	0.012	0.020	0.020	0.014	0.025	0.024
09:00 PM - 10:00 PM	0.013	0.010	0.018	0.006	0.011	0.022	0.010
10:00 PM - 11:00 PM	0.011	0.014	0.010	0.010	0.011	0.010	0.011
11:00 PM - 12:00 AM	0.008	0.013	0.014	0.008	0.006	0.010	0.012
12:00 AM - 01:00 AM	0.010	0.012	0.011	0.006	0.007	0.011	0.010
01:00 AM - 02:00 AM	0.012	0.014	0.007	0.005	0.007	0.012	0.008
02:00 AM - 03:00 AM	0.013	0.009	0.008	0.006	0.009	0.009	0.011
03:00 AM - 04:00 AM	0.010	0.010	0.010	0.007	0.008	0.011	0.012
04:00 AM - 05:00 AM	0.008	0.008	0.008	0.007	0.008	0.011	0.014
05:00 AM - 06:00 AM	0.012	0.013	0.004	0.011	0.007	0.023	0.007
06:00 AM - 07:00 AM	0.012	0.014	0.019	0.017	0.015	0.027	0.008
07:00 AM - 08:00 AM	0.013	0.015	0.018	0.018	0.017	0.023	0.007
08:00 AM - 09:00 AM	0.013	0.016	0.018	0.019	0.019	0.020	0.011
09:00 AM - 10:00 AM	0.014	0.016	0.018	0.020	0.019	0.017	0.009
Average	0.012	0.015	0.015	0.014	0.013	0.017	0.013
1hr - Maximum	0.018	0.020	0.025	0.020	0.020	0.027	0.024
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

Approved by

Orawan R.

Orawan Rakyoung
Scientist (3)

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6506-83 / EMAIL



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: 23106856
Date Received :Sep 26, 2023
Date Reported :Oct 03, 2023
Report Number :2773590-1 C7

Page 1 of 2

Sample Number : 23106856-1 to 7
Parameter : Wind Speed / Wind Direction
Location : บ้านนาหว้า (GPS 47P 0735346, 1406705)
Sampling Date : Sep 14 - Sep 21, 2023
Sampling by : Sitpawit Suwannarat

Time	Sep 14 - Sep 15, 2023		Sep 15 - Sep 16, 2023		Sep 16 - Sep 17, 2023		Sep 17 - Sep 18, 2023		Sep 18 - Sep 19, 2023		Sep 19 - Sep 20, 2023		Sep 20 - Sep 21, 2023	
	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	0.3	33.0	NNE	0.3	38.0	NE	0.9	190.0	S	2.0	89.0	E	1.2	244.0
11:00 AM - 12:00 PM	0.3	92.0	E	0.8	52.0	NE	0.6	144.0	SE	1.7	7.0	N	0.6	195.0
12:00 PM - 01:00 PM	0.5	11.0	N	0.3	222.0	SW	1.8	112.0	ESE	1.4	207.0	SSW	0.3	125.0
01:00 PM - 02:00 PM	0.3	157.0	SSE	0.3	80.0	E	0.5	228.0	SW	0.6	237.0	WSW	0.5	166.0
02:00 PM - 03:00 PM	0.6	1.0	N	0.4	106.0	ESE	1.5	85.0	E	0.9	101.0	E	0.3	33.0
03:00 PM - 04:00 PM	0.6	206.0	SSW	0.7	157.0	SSE	2.3	179.0	S	1.0	208.0	SSW	1.2	9.0
04:00 PM - 05:00 PM	0.7	155.0	SSE	0.6	66.0	ENE	0.3	116.0	ESE	0.5	217.0	SW	0.3	255.0
05:00 PM - 06:00 PM	0.3	69.0	ENE	0.8	109.0	ESE	0.6	252.0	WSW	1.3	47.0	NE	0.6	30.0
06:00 PM - 07:00 PM	0.3	249.0	WSW	0.6	123.0	ESE	0.5	254.0	WSW	1.9	81.0	E	0.9	229.0
07:00 PM - 08:00 PM	0.5	56.0	NE	0.5	83.0	E	0.3	96.0	E	1.7	231.0	SW	1.2	239.0
08:00 PM - 09:00 PM	2.4	218.0	SW	0.9	238.0	WSW	0.3	244.0	WSW	1.5	188.0	S	0.3	244.0
09:00 PM - 10:00 PM	1.3	17.0	NNE	5.3	37.0	NE	0.6	1.0	N	0.6	61.0	ENE	1.7	196.0
10:00 PM - 11:00 PM	0.6	248.0	WSW	2.1	107.0	ESE	1.3	0.0	N	1.2	151.0	SSE	1.3	183.0
11:00 PM - 12:00 AM	1.5	111.0	ESE	0.5	59.0	ENE	0.8	190.0	S	1.2	173.0	S	0.6	192.0
12:00 AM - 01:00 AM	3.4	173.0	S	1.2	197.0	SSW	1.4	43.0	NE	3.0	71.0	ENE	0.3	246.0
01:00 AM - 02:00 AM	0.3	85.0	E	1.6	9.0	N	0.8	122.0	ESE	0.9	20.0	NNE	0.9	6.0
02:00 AM - 03:00 AM	1.3	27.0	NNE	1.5	106.0	ESE	1.5	82.0	E	1.2	41.0	NE	1.3	35.0
03:00 AM - 04:00 AM	0.7	72.0	ENE	2.0	228.0	SW	0.3	241.0	WSW	2.3	204.0	SSW	0.6	147.0
04:00 AM - 05:00 AM	2.2	176.0	S	2.8	249.0	WSW	0.4	212.0	SSW	1.6	235.0	SW	0.5	229.0
05:00 AM - 06:00 AM	0.8	146.0	SE	0.6	16.0	NNE	1.2	46.0	NE	0.5	115.0	ESE	0.3	119.0
06:00 AM - 07:00 AM	1.6	243.0	WSW	1.8	130.0	SE	1.3	47.0	NE	0.3	9.0	N	0.3	9.0
07:00 AM - 08:00 AM	0.3	164.0	SSE	0.4	30.0	NNE	1.4	18.0	NNE	0.3	195.0	SSW	0.7	128.0
08:00 AM - 09:00 AM	0.5	171.0	S	0.5	185.0	S	1.6	68.0	ENE	0.3	54.0	NE	1.3	106.0
09:00 AM - 10:00 AM	0.6	87.0	E	1.4	129.0	SE	2.8	10.0	N	0.5	8.0	N	1.6	52.0

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Sarayuth Jitranont
Assistant General Manager

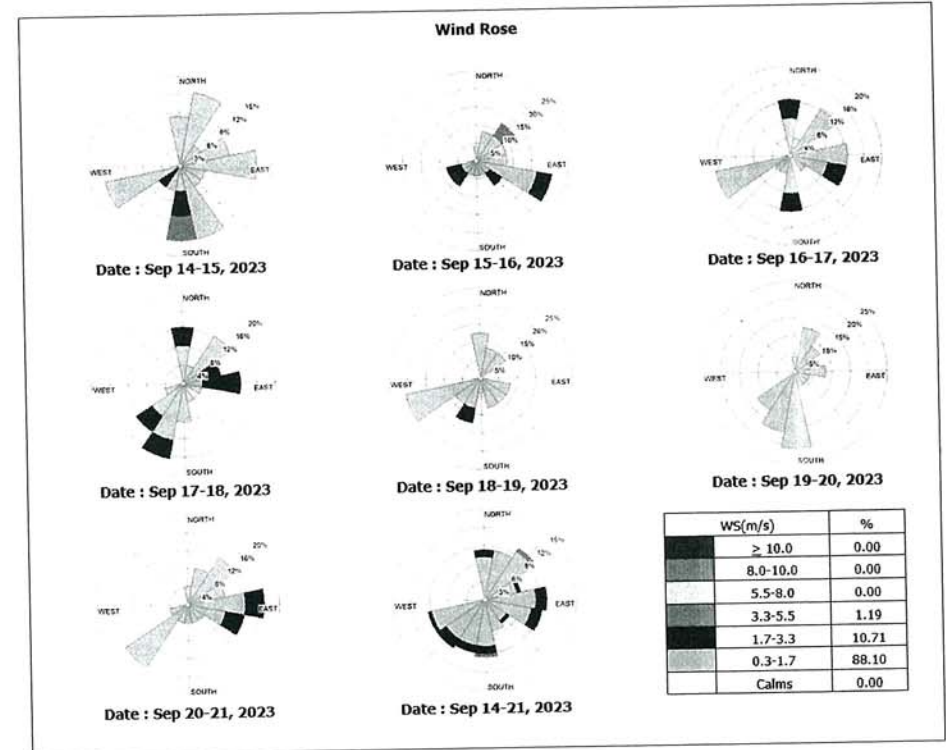


Analysis / Test Report

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: 23106856
Date Received :Sep 26, 2023
Date Reported :Oct 03, 2023
Report Number :2773590-1 C7

Page 2 of 2



Approved by

Sarayuth Jitranont
Assistant General Manager

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ภาคผนวก ค-3

คุณภาพน้ำ



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 : 4514144155

Project Name : Water Testing

Project Location : Map Ta Phut_PU (PPTL)



TESTING
No.0042

Lot ID: 2374956

Date Received : Jul 10, 2023

Date Reported : Jul 18, 2023

Report Number : 2698918-1

Page 1 of 2

Sample Number	2374956-1						
Sampled Date	Jul 10, 2023 10:15 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Jul 10, 2023						
Condition of Sample	Contained in two glass vials, one amber glass bottle 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	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	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	16	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease *	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C *		-	-	7.3	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	-	-	30.2	≤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	372	≤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	20	≤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 Banchoangkit
Supervisor

หมายเลขโทรศัพท์ 323-9-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

หมายเลขโทรศัพท์ 323-9-9442

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S:\Reports\AL_GL_rpt (11-33AP)



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 : 4514144155

Project Name : Water Testing

Project Location : Map Ta Phut_PU (PPTL)



TESTING
No.0042

Lot ID: 2374956

Date Received : Jul 10, 2023

Date Reported : Jul 18, 2023

Report Number : 2698918-1

Page 2 of 2

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Sansoen Khuyoksui หมายเลขโทรศัพท์ 323-9-0005 , Thanasoun Namakunna หมายเลขโทรศัพท์ 204-9-8592

Remark :

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

Technical Management

N. Banphit

Narumon Banchoangkit
Supervisor

หมายเลขโทรศัพท์ 323-9-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

หมายเลขโทรศัพท์ 323-9-9442

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S:\Reports\AL_GL_rpt (11-33AP)



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 : 4514144155
Project Name : Water Testing
Project Location : Map Ta Phut_PU (PPTL)

Lot ID: 2374956
Date Received : Jul 10, 2023
Date Reported : Jul 18, 2023
Report Number : 2698918-2

Page 1 of 1

Sample Number	2374956-1						
Sampled Date	Jul 10, 2023 10:15 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Jul 12, 2023						
Condition of Sample	Contained in two glass vials, one amber glass bottle 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	8.80	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

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

Approved by

Nant Somb

Nanthawadee Somboon
Specialist 1

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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 : 4514144155
Project Name : Water Testing
Project Location : Map Ta Phut_PU (PPTL)

TESTING
No.0042
Lot ID: 2387465
Date Received : Aug 02, 2023
Date Reported : Aug 10, 2023
Report Number : 2728725-1

Page 1 of 2

Sample Number	2387465-1						
Sampled Date	Aug 02, 2023 10:00 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Aug 02, 2023						
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	2.5	≤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	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	21	≤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	-	-	32.1	≤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	298	≤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. Banthongkit

Narumon Banchongkit
Supervisor
โทรศัพท์ 323-9-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
โทรศัพท์ 323-9-9442

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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 : 4514144155
Project Name : Water Testing
Project Location: Map Ta Phut_PU (PPTL)



TESTING
No.0042

Lot ID: 2387465
Date Received : Aug 02, 2023
Date Reported : Aug 10, 2023
Report Number : 2728725-1

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 : Chainusorn Lertnanthakunchai ทะเบียนเลขที่ 7-323-9-9461 , Pattarapol Sawangjaitam ทะเบียนเลขที่ 7-204-9-0002

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.



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 : 4514144155
Project Name : Water Testing
Project Location: Map Ta Phut_PU (PPTL)

Lot ID: 2387465
Date Received : Aug 02, 2023
Date Reported : Aug 10, 2023
Report Number : 2728725-2

Page 1 of 1

Sample Number	2387465-1						
Sampled Date	Aug 02, 2023 10:00 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Aug 04, 2023						
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	9.07	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 : Chainusorn Lertnanthakunchai , Pattarapol Sawangjaitam

Remark :

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

Technical Management

N. Banongkit

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ 7-323-9-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ 7-323-9-9442

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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 : 4514144155

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)



TESTING

No.0042

Lot ID: 23101142

Date Received : Sep 12, 2023

Date Reported : Sep 20, 2023

Report Number : 2759384-1

Page 1 of 2

Sample Number	23101142-1						
Sampled Date	Sep 12, 2023 9:55 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Sep 12, 2023						
Condition of Sample	Contained in two glass vials, one amber glass bottle 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	44	≤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	23	≤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	21	≤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	-	-	30.2	≤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	760	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banongkit

Narumon Banhongkit
Supervisor
ทะเบียนเลขที่ 7-323-ก-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ 7-323-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 : 4514144155

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)



TESTING

No.0042

Lot ID: 23101142

Date Received : Sep 12, 2023

Date Reported : Sep 20, 2023

Report Number : 2759384-1

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 : Tanasit Wongsachai ทะเบียนเลขที่ 7-323-ก-9460 , Thanasoun Namakunna ทะเบียนเลขที่ 7-204-ก-8592

Remark :

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

Technical Management

N. Banongkit

Narumon Banhongkit
Supervisor
ทะเบียนเลขที่ 7-323-ก-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ 7-323-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 : 4514144155
Project Name : Water Testing
Project Location : Map Ta Phut_PU (PPTL)

Lot ID: 23101142
Date Received : Sep 12, 2023
Date Reported : Sep 20, 2023
Report Number : 2759384-2

Page 1 of 1

Sample Number	23101142-1
Sampled Date	Sep 12, 2023 9:55 AM
Sample Description	Wastewater
Location	H-304
Date Analysis Commenced	Sep 14, 2023
Condition of Sample	Contained in two glass vials, one amber glass bottle 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	14.1	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 : Tanasit Wongsachai , Thanasoun Namakunna

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

Approved by

Swimon 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 : 4514144155
Project Name : Water Testing
Project Location : Map Ta Phut_PU (PPTL)



TESTING
No.0042

Lot ID: 23111809
Date Received : Oct 04, 2023
Date Reported : Oct 12, 2023
Report Number : 2787417-1

Page 1 of 2

Sample Number	23111809-1
Sampled Date	Oct 04, 2023 9:45 AM
Sample Description	Wastewater
Location	H-304
Date Analysis Commenced	Oct 04, 2023
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	9	≤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	8	≤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 *	-	-	-	7.1	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	-	-	28.6	≤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	82	≤3000	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2550 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
โทรศัพท์ ๖-323-๙-9445

Approved by

D. Changchon
Dej Changchon
Senior Manager
โทรศัพท์ ๖-323-๙-9442

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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 : 4514144155
Project Name : Water Testing
Project Location : Map Ta Phut_PU (PPTL)



TESTING
No.0042

Lot ID: 23111809
Date Received : Oct 04, 2023
Date Reported : Oct 12, 2023
Report Number : 2787417-1

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 23111809-1) is 20.3 mg/L

Sampling By : Chainusorn Lertnanthakunchai โทร 09-323-9-9461 , Pattarapol Sawangjaitam โทร 09-323-9-0002

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.



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 : 4514144155
Project Name : Water Testing
Project Location : Map Ta Phut_PU (PPTL)

Lot ID: 23111809

Date Received : Oct 04, 2023
Date Reported : Oct 12, 2023
Report Number : 2787417-2

Page 1 of 1

Sample Number	23111809-1
Sampled Date	Oct 04, 2023 9:45 AM
Sample Description	Wastewater
Location	H-304
Date Analysis Commenced	Oct 06, 2023
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	3.00	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 23111809-1) is 20.3 mg/L

Sampling By : Chainusorn Lertnanthakunchai , Pattarapol Sawangjaitam

Remark :

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

Technical Management

N. Banthit

Narumon Banchongkit
Supervisor
โทร 09-323-9-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
โทร 09-323-9-9442

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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 : 4514144155

Project Name : Water Testing

Project Location : Map Ta Phut_PU (PPTL)



TESTING
No.0042

Lot ID: 23125162

Date Received : Nov 01, 2023

Date Reported : Nov 09, 2023

Report Number : 2817733-1

Page 1 of 2

Sample Number	23125162-1
Sampled Date	Nov 01, 2023 10:10 AM
Sample Description	Wastewater
Location	H-304
Date Analysis Commenced	Nov 01, 2023
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	<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	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 *	-	-	-	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	-	-	28.9	≤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	198	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

N. Banongkit

Narumon Banchongkit
Supervisor
โทร: 09-09445

Approved by

D. Changchon

Dej Changchon
Senior Manager
โทร: 09-09442

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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 : 4514144155

Project Name : Water Testing

Project Location : Map Ta Phut_PU (PPTL)



TESTING
No.0042

Lot ID: 23125162

Date Received : Nov 01, 2023

Date Reported : Nov 09, 2023

Report Number : 2817733-1

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 23125162-1) is 22.5 mg/L

Sampling By : Sansoen Khuiyokrai โทร: 09-0005, Thanasoun Namakunna โทร: 09-8592

Remark :

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

Technical Management

N. Banongkit

Narumon Banchongkit
Supervisor
โทร: 09-09445

Approved by

D. Changchon

Dej Changchon
Senior Manager
โทร: 09-09442

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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 : 4514144155
Project Name : Water Testing
Project Location: Map Ta Phut_PU (PPTL)

Lot ID: 23125162
Date Received : Nov 01, 2023
Date Reported : Nov 08, 2023
Report Number : 2817733-2

Page 1 of 1

Sample Number	23125162-1						
Sampled Date	Nov 01, 2023 10:10 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Nov 02, 2023						
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	4.96	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 : Sansoen Khuiyoksui , Thanasoun Namakunna

Remark :

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

Approved by

Siriluk P.
Siriluk Puengpang
Section Head

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 : Dow Chemical Thailand Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4514144155
Project Name : Water Testing
Project Location: Map Ta Phut_PU (PPTL)

TESTING
No.0042
Lot ID: 23136426
Date Received : Dec 06, 2023
Date Reported : Dec 14, 2023
Report Number : 2843038-1

Page 1 of 2

Sample Number	23136426-1						
Sampled Date	Dec 06, 2023 9:05 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Dec 06, 2023						
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	41	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	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	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 *		-	-	8.8	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	-	-	29.3	≤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	448	≤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
โทรศัพท์ 0-323-9-9445

Approved by

D. Chumon
Dej Changchon
Senior Manager
โทรศัพท์ 0-323-9-9442

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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 : 4514144155

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)



TESTING
No.0042

Lot ID: 23136426

Date Received : Dec 06, 2023

Date Reported : Dec 14, 2023

Report Number : 2843038-1

Page 2 of 2

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

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

Remark :

- LOD : Limit of Detection
- "<" : 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.



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 : 4514144155

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

Lot ID: 23136426

Date Received : Dec 06, 2023

Date Reported : Dec 13, 2023

Report Number : 2843038-2

Page 1 of 1

Sample Number	23136426-1					
Sampled Date	Dec 06, 2023 9:05 AM					
Sample Description	Wastewater					
Location	H-304					
Date Analysis Commenced	Dec 07, 2023					
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
Water Testing						
Total Organic Carbon	mg/L	0.01	0.1	13.7	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B

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

Sampling By : Sansoen Khuiyoksui , Thanasoun Namakunna

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ร-323-ก-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ร-323-ก-9442

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Approved by

Siriluk P.

Siriluk Puengpang
Section Head

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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 : 4514144337
Project Name : Water Testing
Project Location : Map Ta Phut_Latex (SSLC)



TESTING
No.0042

Lot ID: 23101128
Date Received : Sep 12, 2023
Date Reported : Sep 20, 2023
Report Number : 2759369-1

Page 1 of 2

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	42	≤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	34	≤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	33	≤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	-	-	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	716	≤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
โทร 09-9445-3233

Approved by

D. Chumou

Dej Changchon
Senior Manager
โทร 09-9442-3233

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7780-612 EMAIL



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 : Water Testing
Project Location : Map Ta Phut_Latex (SSLC)



TESTING
No.0042

Lot ID: 23101128
Date Received : Sep 12, 2023
Date Reported : Sep 20, 2023
Report Number : 2759369-1

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 : Tanasit Wongsachai โทร 09-9460-323, Thanasoun Namakunna โทร 09-8592-204

Remark :

- LOD : Limit of Detection
- "<" : 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. Banphit

Narumon Banchongkit
Supervisor
โทร 09-9445-3233

Approved by

D. Chumou

Dej Changchon
Senior Manager
โทร 09-9442-3233

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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 : 4514144337

Project Name : Water Testing

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 23101128

Date Received : Sep 12, 2023

Date Reported : Sep 20, 2023

Report Number : 2759369-2

Page 1 of 1

Sample Number	23101128-1						
Sampled Date	Sep 12, 2023 9:20 AM						
Sample Description	Wastewater						
Location	H-306						
Date Analysis Commenced	Sep 14, 2023						
Condition of Sample	Contained in two glass vials, one amber glass bottle 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	12.6	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 : Tanasit Wongsachai , Thanasoun Namakunna

Remark :

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

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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 : 4514144337

Project Name : Water Testing

Project Location : Map Ta Phut_Latex (SSLC)



TESTING

No.0042

Lot ID: 23136387

Date Received : Dec 06, 2023

Date Reported : Dec 14, 2023

Report Number : 2843011-1

Page 1 of 2

Page 1 of 2

Sample Number	23136387-1						
Sampled Date	Dec 06, 2023 8:55 AM						
Sample Description	Wastewater						
Location	H-306						
Date Analysis Commenced	Dec 06, 2023						
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	46	≤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	27	≤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	24	≤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 *		-	-	7.2	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	-	-	34.6	≤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	884	≤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	8	≤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
หมายเลขโทรศัพท์ 3-323-9-9445

Approved by

D. Chumon

Dej Changchon
Senior Manager
หมายเลขโทรศัพท์ 3-323-9-9442

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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 : 4514144337
Project Name : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)



TESTING
No.0042

Lot ID: 23136387
Date Received : Dec 06, 2023
Date Reported : Dec 14, 2023
Report Number : 2843011-1

Page 2 of 2

Guideline : Effluent standard for factories, industrial estate and industrial park set by Notification of the Ministry of Natural Resource and Environment and effluent standard for factories and industrial park set by Notification of The Ministry of Industry dated June 07, B.E.2560 (2017).
Sampling By : Sansoen Khuiyoksui โทร 09-323-4-0005, Thanasoun Namakunna โทร 09-204-4-8592

Remark :

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



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 : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 23136387
Date Received : Dec 06, 2023
Date Reported : Dec 13, 2023
Report Number : 2843011-2

Page 1 of 1

Sample Number	23136387-1					
Sampled Date	Dec 06, 2023 8:55 AM					
Sample Description	Wastewater					
Location	H-306					
Date Analysis Commenced	Dec 07, 2023					
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
Water Testing						
Total Organic Carbon	mg/L	0.01	0.1	12.5	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B

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

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

โทร 09-323-4-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
โทร 09-323-4-9442

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Approved by

Siriluk P.

Siriluk Puengpang
Section Head

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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 : 4514144337
Project Name : Water Testing
Project Location : Map Ta Phut_Latex (SSLC)



TESTING
No.0042

Lot ID: 23101140
Date Received : Sep 20, 2023
Date Reported : Sep 28, 2023
Report Number : 2759377-1

Page 1 of 2

Page 1 of 1

Sample Number	23101140-1						
Sampled Date	Sep 20, 2023 9:35 AM						
Sample Description	Wastewater						
Location	H-307						
Date Analysis Commenced	Sep 20, 2023						
Condition of Sample	Contained in two glass vials, one amber glass bottle 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	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	15	≤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	-	-	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	108	≤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 Banphongkit
Supervisor
โทร: 09-323-9-9445

Approved by

D. Chumou

Dej Changchon
Senior Manager
โทร: 09-323-9-9442

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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 : 4514144337
Project Name : Water Testing
Project Location : Map Ta Phut_Latex (SSLC)



TESTING
No.0042

Lot ID: 23101140
Date Received : Sep 20, 2023
Date Reported : Sep 28, 2023
Report Number : 2759377-1

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 23101140-1) is 18.6 mg/L

Sampling By : Wanlop Hunchainaw โทร: 09-323-9-9457, Thanasoun Namakunna โทร: 09-204-9-8592

Remark :

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

Technical Management

N. Banphit

Narumon Banphongkit
Supervisor
โทร: 09-323-9-9445

Approved by

D. Chumou

Dej Changchon
Senior Manager
โทร: 09-323-9-9442

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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 : 4514144337
Project Name : Water Testing
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 23101140
Date Received : Sep 20, 2023
Date Reported : Sep 27, 2023
Report Number : 2759377-2

Page 1 of 1

Sample Number	23101140-1						
Sampled Date	Sep 20, 2023 9:35 AM						
Sample Description	Wastewater						
Location	H-307						
Date Analysis Commenced	Sep 22, 2023						
Condition of Sample	Contained in two glass vials, one amber glass bottle 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	6.51	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 Hunchainaw , Thanasoun Namakunna

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

Approved by

Suwimon C.
Suwimon Chairuangwut
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
P/O : 4514144337
Project Name : Water Testing
Project Location : Map Ta Phut_Latex (SSLC)



TESTING
No.0042

Lot ID: 23136390

Date Received : Dec 06, 2023
Date Reported : Dec 14, 2023
Report Number : 2843019-1

Page 1 of 2

Sample Number	23136390-1						
Sampled Date	Dec 06, 2023 9:15 AM						
Sample Description	Wastewater						
Location	H-307						
Date Analysis Commenced	Dec 06, 2023						
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	10	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	9	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Oil & Grease *	mg/L	-	3	<3	≤5	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C *		-	-	8.3	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	-	-	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	100	≤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. Banongkit

Narumon Banchongkit
Supervisor
หมายเลขโทรศัพท์ ๖-323-๙-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
หมายเลขโทรศัพท์ ๖-323-๙-9442

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 : 4514144337
Project Name : Water Testing
Project Location : Map Ta Phut_Latex (SSLC)



TESTING
No.0042
Lot ID: 23136390
Date Received : Dec 06, 2023
Date Reported : Dec 14, 2023
Report Number : 2843019-1

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 23136390-1) is 13.1 mg/L

Sampling By : Sansoen Khuiyoksui รหัสพนักงาน 323-9-0005, Thanasoun Namakunna รหัสพนักงาน 204-9-8592

Remark :

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



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 : Water Testing
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 23136390
Date Received : Dec 06, 2023
Date Reported : Dec 13, 2023
Report Number : 2843019-2

Page 1 of 1

Sample Number : 23136390-1
Sampled Date : Dec 06, 2023 9:15 AM
Sample Description : Wastewater
Location : H-307
Date Analysis Commenced : Dec 07, 2023
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	3.53	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor
รหัสพนักงาน 323-9-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
รหัสพนักงาน 323-9-9442

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Approved by

Siriluk P.

Siriluk Puengpang
Section Head

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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: 2374966

Date Received : Jul 05, 2023

Date Reported : Jul 14, 2023

Report Number : 2698945-1 C2

Page 1 of 2

Sample Number	2374966-1					
Sampling Date	Jul 05, 2023 10:55 AM					
Sample Description	Wastewater					
Location	Outfall					
Date Analysis Commenced	Jul 05, 2023					
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
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
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
Color (at Original pH)	ADMI	-	5	12	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F
Color (at pH 7.0)	ADMI	-	5	12	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F
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
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)
Temperature *	Degree C	-	-	34.5	≤40	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	780	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C
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

Technical Management

N. Banongkit

Naumon Banchongkit
Supervisor
ทะเบียนเลขที่ ๖-323-๙-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ ๖-323-๙-9442

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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: 2374966

Date Received : Jul 05, 2023

Date Reported : Jul 14, 2023

Report Number : 2698945-1 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 : Pathompong Kornasat, 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. Banongkit

Naumon Banchongkit
Supervisor
ทะเบียนเลขที่ ๖-323-๙-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ ๖-323-๙-9442

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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: 2374966
Date Received : Jul 05, 2023
Date Reported : Jul 14, 2023
Report Number : 2698945-3 C2

Page 1 of 1

Sample Number	2374966-1						
Sampling Date	Jul 05, 2023 10:55 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Jul 05, 2023						
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	12.5	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).
Sampling By : Pathompong Kornasawat, Thanasoun Namakunna

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



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: 2387806
Date Received : Aug 02, 2023
Date Reported : Aug 11, 2023
Report Number : 2729290-1 C2

Page 1 of 2

Sample Number	2387806-1						
Sampling Date	Aug 02, 2023 10:58 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Aug 02, 2023						
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	36	≤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	12	≤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 *	-	-	-	8.0	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	-	-	33.0	≤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	552	≤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
โทรศัพท์ 0-323-9-9445

Approved by

D. Chumon

Dej Changchon
Senior Manager
โทรศัพท์ 0-323-9-9442

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Approved by

Chanatt L.

Chanattagarn Imchom
Section Head

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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: 2387806
Date Received : Aug 02, 2023
Date Reported : Aug 11, 2023
Report Number : 2729290-1 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 : Chainusorn Lertnanthakunchai, 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.



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: 2387806
Date Received : Aug 02, 2023
Date Reported : Aug 11, 2023
Report Number : 2729290-3 C2

Page 1 of 1

Sample Number	2387806-1					
Sampling Date	Aug 02, 2023 10:58 AM					
Sample Description	Wastewater					
Location	Outfall					
Date Analysis Commenced	Aug 04, 2023					
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
Water Testing						
Total Organic Carbon	mg/L	0.01	0.1	12.3	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B

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 : Chainusorn Lertnanthakunchai, Pattarapol Sawangjaitam

Remark :

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

Technical Management

N. Banongkit

Narumon Banchongkit
Supervisor
โทรศัพท์ ๖-323-๙-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
โทรศัพท์ ๖-323-๙-9442

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Approved by

Siriluk P.

Siriluk Puengpang
Section Head

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6506-102/ EMBL

6506-102/ EMBL



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: 23101147
Date Received : Sep 06, 2023
Date Reported : Sep 18, 2023
Report Number : 2759393-1 C2

Page 1 of 2

Sample Number	23101147-1
Sampling Date	Sep 06, 2023 10:25 AM
Sample Description	Wastewater
Location	Outfall
Date Analysis Commenced	Sep 06, 2023
Condition of Sample	Contained in one BOD bottle, six glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Physical Property	Yellow, some odour, solid and no turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	37	≤120	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	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 *		-	-	8.1	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	-	-	33.3	≤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	876	≤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 3-323-9-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ 3-323-9-9442

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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: 23101147
Date Received : Sep 06, 2023
Date Reported : Sep 18, 2023
Report Number : 2759393-1 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 Hunchainaw ทะเบียนเลขที่ 3-323-9-9457, Thanasoun Namakunna ทะเบียนเลขที่ 3-204-9-8592

Remark :

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

Technical Management

N. Banphit

Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ 3-323-9-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
ทะเบียนเลขที่ 3-323-9-9442

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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: 23101147
Date Received : Sep 06, 2023
Date Reported : Sep 15, 2023
Report Number : 2759393-3 C2

Page 1 of 1

Sample Number	23101147-1						
Sampling Date	Sep 06, 2023 10:25 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Sep 07, 2023						
Condition of Sample	Contained in one BOD bottle, six glass vials, three amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Physical Property	Yellow, some odour, solid and no turbid						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
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 Hunchanaow, Thanasoun Namakunna

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

Approved by

Savitree N.
Savitree 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 : 4501177470
Project Name : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)

TESTING
No.0042
Lot ID: 23111853
Date Received : Oct 04, 2023
Date Reported : Oct 24, 2023
Report Number : 2787450-1 C2

Page 1 of 2

Sample Number	23111853-1						
Sampling Date	Oct 04, 2023 10:47 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Oct 04, 2023						
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	<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	10	≤300	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	8	≤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	-	-	29.3	≤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	216	≤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
โทรศัพท์ 0-323-9-9445

Approved by

D. Chongchon
Dej Chongchon
Senior Manager
โทรศัพท์ 0-323-9-9442

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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: 23111853

Date Received : Oct 04, 2023

Date Reported : Oct 24, 2023

Report Number : 2787450-1 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 23111853-1) is 20.48 mg/L.

Sampling By : Chainusorn Lertnathakunchai

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.



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: 23111853

Date Received : Oct 04, 2023

Date Reported : Oct 24, 2023

Report Number : 2787450-3 C2

Page 1 of 1

Sample Number	23111853-1						
Sampling Date	Oct 04, 2023 10:47 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Oct 05, 2023						
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	3.44	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 23111853-1) is 20.48 mg/L.

Sampling By : Chainusorn Lertnathakunchai

Remark :

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

Technical Management

N. Banthongkit

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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Approved by

Sawitree N.

Sawitree Naisangiam
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 : 4501177470
Project Name : Water Testing
Project Location : Map Ta Phut_Latex (SSLC)

TESTING
No.0042
Lot ID: 23125166
Date Received : Nov 01, 2023
Date Reported : Nov 09, 2023
Report Number : 2817750-1 C2

Page 1 of 2

Sample Number	23125166-1						
Sampling Date	Nov 01, 2023 11:15 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Nov 01, 2023						
Condition of Sample	Contained in one amber glass bottle, 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	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	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 *		-	-	8.0	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	-	-	32.0	≤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	764	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

Technical Management

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Narumon Banchongkit
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โทรศัพท์ 0-323-3-9445

Approved by

D. Changchon

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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: 23125166
Date Received : Nov 01, 2023
Date Reported : Nov 09, 2023
Report Number : 2817750-1 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 Khuiyoksu, Thanasoun Namakunna

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor
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Approved by

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Dej Changchon
Senior 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 : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 23125166

Date Received : Nov 01, 2023

Date Reported : Nov 09, 2023

Report Number : 2817750-3 C2

Sample Number	23125166-1							Page 1 of 1
Sampling Date	Nov 01, 2023 11:15 AM							
Sample Description	Wastewater							
Location	Outfall							
Date Analysis Commenced	Nov 02, 2023							
Condition of Sample	Contained in one amber glass bottle, 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	9.89	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok	

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

Sampling By : Sansoen Khuiyoksui, Thanasoun Namakunna

Remark :

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

Approved by

Sawitree N.

Sawitree Noisangiam
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 : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)



TESTING

No.0042

Lot ID: 23136102

Date Received : Dec 06, 2023

Date Reported : Jan 03, 2024

Report Number : 2842940-1 C2

Page 1 of 2

Sample Number	23136102-1						
Sampling Date	Dec 06, 2023 10:15 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Dec 06, 2023						
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	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	12	≤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 *		-	-	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	-	-	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	844	≤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. Banngkit

Narumon Banchongkit

Supervisor

โทรศัพท์ 323-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

โทรศัพท์ 323-9442

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6506-102/ EMAIL



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: 23136102
Date Received : Dec 06, 2023
Date Reported : Jan 03, 2024
Report Number : 2842940-1 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 Khuiyoksul , 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.



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: 23136102
Date Received : Dec 06, 2023
Date Reported : Jan 03, 2024
Report Number : 2842940-3 C2

Page 1 of 1

Sample Number	23136102-1						
Sampling Date	Dec 06, 2023 10:15 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Dec 07, 2023						
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	11.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Remark :

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

Technical Management

N. Banongkit

Narumon Banchongkit
Supervisor
โทรศัพท์ 0-323-9-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager
โทรศัพท์ 0-323-9-9442

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Approved by

Chanatt L.

Chanattagarn Imchom
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 : 4514144337

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2388621

Date Received : Aug 22, 2023

Date Reported : Aug 28, 2023

Report Number: 2756966-1

Page 1 of 1

Sample Number 2388621-1
Parameter Noise (Leq 24 hrs.)
Location บริเวณรั้วโครงการสิ่งตะวันออก (GPS 47P 0733919, 1404606)
Measurement Date Aug 16 - Aug 17, 2023
Measurement by Saknarin Jaraskay
Sound Level meter Serial No. 597168

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	64.2	77.8	63.3
11:00 AM - 12:00 PM	63.7	70.4	62.9
12:00 PM - 01:00 PM	62.9	70.3	62.2
01:00 PM - 02:00 PM	63.9	77.8	63.0
02:00 PM - 03:00 PM	62.5	71.1	61.7
03:00 PM - 04:00 PM	63.6	71.0	62.9
04:00 PM - 05:00 PM	63.6	67.8	62.8
05:00 PM - 06:00 PM	63.6	73.4	62.9
06:00 PM - 07:00 PM	63.0	68.0	62.2
07:00 PM - 08:00 PM	61.5	75.9	60.7
08:00 PM - 09:00 PM	62.8	71.3	62.0
09:00 PM - 10:00 PM	63.4	70.1	62.8
10:00 PM - 11:00 PM	63.7	67.2	63.2
11:00 PM - 12:00 AM	64.5	69.6	63.7
12:00 AM - 01:00 AM	64.6	72.7	63.8
01:00 AM - 02:00 AM	64.5	72.5	63.5
02:00 AM - 03:00 AM	64.0	68.6	63.2
03:00 AM - 04:00 AM	63.3	77.0	62.4
04:00 AM - 05:00 AM	64.1	71.7	63.4
05:00 AM - 06:00 AM	64.9	70.2	64.2
06:00 AM - 07:00 AM	64.3	70.8	63.6
07:00 AM - 08:00 AM	63.8	68.0	63.1
08:00 AM - 09:00 AM	63.6	72.7	62.9
09:00 AM - 10:00 AM	62.6	73.2	61.6

Leq Average 24 hrs. (dB(A)) 63.7
Lmax (dB(A)) 77.8
L90 (dB(A)) 62.9
Ldn (dB(A)) 70.5
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดระดับเสียงการรบกวน 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 : 4514144337

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2388621

Date Received : Aug 22, 2023

Date Reported : Aug 28, 2023

Report Number: 2756967-1

Page 1 of 1

Sample Number 2388621-2
Parameter Noise (Leq 24 hrs.)
Location บริเวณรั้วโครงการสิ่งตะวันออก (GPS 47P 0733919, 1404606)
Measurement Date Aug 17 - Aug 18, 2023
Measurement by Saknarin Jaraskay
Sound Level meter Serial No. 597168

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	63.8	76.8	62.8
11:00 AM - 12:00 PM	63.8	69.6	63.2
12:00 PM - 01:00 PM	63.7	73.1	63.1
01:00 PM - 02:00 PM	64.1	75.8	63.3
02:00 PM - 03:00 PM	64.8	75.6	64.2
03:00 PM - 04:00 PM	64.9	73.7	64.2
04:00 PM - 05:00 PM	64.9	71.8	64.2
05:00 PM - 06:00 PM	65.6	75.1	65.0
06:00 PM - 07:00 PM	66.4	72.9	65.7
07:00 PM - 08:00 PM	66.0	73.6	65.4
08:00 PM - 09:00 PM	66.2	71.8	65.5
09:00 PM - 10:00 PM	66.0	70.4	65.3
10:00 PM - 11:00 PM	66.1	70.0	65.5
11:00 PM - 12:00 AM	66.3	71.9	65.7
12:00 AM - 01:00 AM	66.3	69.4	66.0
01:00 AM - 02:00 AM	66.6	72.4	65.8
02:00 AM - 03:00 AM	66.5	69.5	65.4
03:00 AM - 04:00 AM	66.4	69.9	65.2
04:00 AM - 05:00 AM	66.0	72.5	65.3
05:00 AM - 06:00 AM	65.9	68.9	65.0
06:00 AM - 07:00 AM	65.7	72.7	64.4
07:00 AM - 08:00 AM	65.0	69.7	64.1
08:00 AM - 09:00 AM	65.2	71.4	64.1

Leq Average 24 hrs. (dB(A)) 65.6
Lmax (dB(A)) 76.8
L90 (dB(A)) 62.9
Ldn (dB(A)) 72.5
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดระดับเสียงการรบกวน 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 : 4514144337
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2388621
Date Received : Aug 22, 2023
Date Reported : Aug 28, 2023
Report Number: 2756968-1

Page 1 of 1

Sample Number : 2388621-3
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณรั้วโครงการฝั่งตะวันออก (GPS 47P 0733919, 1404606)
Measurement Date : Aug 18 - Aug 19, 2023
Measurement by : Saknarin Jaraskay
Sound Level meter : Serial No. 597168

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	64.4	69.0	63.7
11:00 AM - 12:00 PM	64.0	69.1	63.4
12:00 PM - 01:00 PM	64.5	71.2	63.8
01:00 PM - 02:00 PM	64.8	75.8	64.0
02:00 PM - 03:00 PM	64.9	72.4	64.2
03:00 PM - 04:00 PM	65.2	73.1	64.4
04:00 PM - 05:00 PM	65.0	71.3	64.2
05:00 PM - 06:00 PM	65.5	71.3	64.7
06:00 PM - 07:00 PM	65.2	69.4	64.5
07:00 PM - 08:00 PM	66.0	69.7	65.2
08:00 PM - 09:00 PM	66.2	73.8	65.6
09:00 PM - 10:00 PM	66.5	72.4	65.8
10:00 PM - 11:00 PM	66.4	72.3	65.7
11:00 PM - 12:00 AM	66.3	70.3	65.3
12:00 AM - 01:00 AM	65.9	77.1	65.4
01:00 AM - 02:00 AM	66.0	74.3	65.0
02:00 AM - 03:00 AM	65.6	73.0	65.3
03:00 AM - 04:00 AM	65.8	75.1	64.8
04:00 AM - 05:00 AM	65.4	70.8	64.7
05:00 AM - 06:00 AM	65.3	72.1	64.9
06:00 AM - 07:00 AM	65.5	73.0	65.0
07:00 AM - 08:00 AM	65.7	78.4	64.7
08:00 AM - 09:00 AM	65.4	76.8	64.4
09:00 AM - 10:00 AM	65.3		
Leq Average 24 hrs. (dB(A))	65.5	78.4	64.7
Lmax (dB(A))			
L90 (dB(A))			
Ldn (dB(A))	72.2		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการรบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
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 : 4514144337
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2388620
Date Received : Aug 18, 2023
Date Reported : Aug 24, 2023
Report Number: 2731367-1

Page 1 of 1

Sample Number	2388620-1		
Parameter	Noise (Leq 8 hrs.)		
Location	บริเวณเครื่องทำความเย็น (MRU)		
Measurement Date	Aug 17, 2023		
Measurement by	Saknarin Jaraskay		
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:52 AM - 09:52 AM	81.2	83.4	80.8
09:52 AM - 10:52 AM	81.0	83.1	80.6
10:52 AM - 11:52 AM	81.1	82.1	80.7
11:52 AM - 12:52 PM	80.3	82.1	79.4
12:52 PM - 01:52 PM	79.6	80.8	79.3
01:52 PM - 02:52 PM	79.5	80.6	79.3
02:52 PM - 03:52 PM	80.8	85.5	79.4
03:52 PM - 04:52 PM	81.0	82.3	80.7
Leq Average 8 hrs. (dB(A))	80.6		
Lmax (dB(A))		85.5	
Standard (dB(A))	90	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัยในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖			



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: 23113446
Date Received : Nov 22, 2023
Date Reported : Nov 27, 2023
Report Number: 2790037-1

Page 1 of 1

Sample Number	23113446-1		
Parameter	Noise (Leq 8 hrs.)		
Location	บริเวณเครื่องทำความเย็น (MRU)		
Measurement Date	Nov 22, 2023		
Measurement by	Pipat Nipatsed		
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:35 AM - 09:35 AM	87.2	91.1	86.1
09:35 AM - 10:35 AM	86.8	89.5	85.9
10:35 AM - 11:35 AM	84.7	87.4	82.7
11:35 AM - 12:35 PM	85.7	89.3	82.9
12:35 PM - 01:35 PM	87.6	89.2	86.1
01:35 PM - 02:35 PM	87.2	90.6	86.2
02:35 PM - 03:35 PM	86.4	87.5	86.0
03:35 PM - 04:35 PM	86.1	87.2	85.7
Leq Average 8 hrs. (dB(A))	86.5		
Lmax (dB(A))		91.1	
Standard (dB(A))	90	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรฐานการคุ้มครองความปลอดภัยในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖			

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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ภาคผนวก ค-6

คุณภาพอากาศในสถานประกอบการ



Analysis / Test Report

Client : Siam 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: 23113443

Date Received : Nov 22, 2023

Date Reported : Nov 30, 2023

Report Number : 2790026-1

Page 1 of 1

Sample Number 23113443-1
Sampled Date Nov 22, 2023
Sample Description Air Quality
Location Under Reactor
Date Analysis Commenced Nov 23, 2023
Condition of Sample Drawn into four sorbent tubes, refrigerated
Barometric Pressure 757 mmHg
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
1,3-Butadiene	09:00 AM - 11:00 AM	ppm	-	0.05	<0.05	1	NIOSH (1994), 1024	MOL	Bangkok
Acrylic Acid	09:00 AM - 11:00 AM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok
Acrylonitrile	09:00 AM - 11:00 AM	ppm	-	0.05	<0.05	2	NIOSH (1994), 1604	MOL	Bangkok
Styrene	09:00 AM - 11:00 AM	ppm	-	0.05	<0.05	100	Based on NIOSH (2003), 1501	MOL	Bangkok

Guideline :

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

Sampled By : Natthapon Jiengwareewong

Remark :

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

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

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

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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 (CEMs)	Oxides of Nitrogen	Analyzer , System calibration, Star	-	-	-	-
Stack	VOC (Butadiene)	Console Control Unit	BKK_FS0518	13-Jul-23	13-Jan-24	6
Stack	VOC (Butadiene)	Pitot Tube	BKK_FS0472	13-Jul-23	13-Jan-24	6
Stack	VOC (Butadiene)	GC-MSD	BKK_EN0119	18-Apr-23	18-Oct-24	18
Stack	Total Suspended Particulate	Console Control Unit	BKK_FS0518	13-Jul-23	13-Jan-24	6
Stack	Total Suspended Particulate	Pitot Tube	BKK_FS0472	13-Jul-23	13-Jan-24	6
Stack	Total Suspended Particulate	Digital Balance	RYG_EN0003	1-Mar-23	1-Mar-24	12
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0186	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0665	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	Digital Balance	RYG_EN0001	1-Mar-23	1-Mar-24	12
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0261	1-Jul-23	1-Jan-24	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0551	1-Jul-23	1-Jan-24	6
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0089	19-Jan-23	19-Jul-24	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0085	19-Jun-23	19-Dec-24	18
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0496	17-Jan-23	17-Jan-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0612	12-Oct-22	12-Oct-23	12
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0213	26-Jan-23	26-Jan-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0437	19-Oct-23	19-Oct-24	12
Noise	Leq 24 hrs	Sound Calibrator	RYG_FS0496	17-Jan-23	17-Jan-24	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0438	7-Sep-22	7-Sep-23	12
Workplace	Acrylonitrile	Field Rotameter	BKK_FS1044	5-Jan-23	5-Apr-23	3
Workplace	Acrylonitrile	Field Rotameter	BKK_FS1006	2-Oct-23	2-Jan-24	3
Workplace	Acrylonitrile	GC-FID	BKK_EN0126	21-Apr-23	21-Oct-24	18
Workplace	Acrylic Acid	Field Rotameter	BKK_FS1044	5-Jan-23	5-Apr-23	3
Workplace	Acrylic Acid	Field Rotameter	BKK_FS1006	2-Oct-23	2-Jan-24	3
Workplace	Acrylic Acid	HPLC	BKK_FL0083	2-Jun-22	2-Dec-23	18
Workplace	Butadiene	Field Rotameter	BKK_FS1044	5-Jan-23	5-Apr-23	3
Workplace	Butadiene	Field Rotameter	BKK_FS1006	2-Oct-23	2-Jan-24	3
Workplace	Butadiene	GC-FID	BKK_EN0126	21-Apr-23	21-Oct-24	18
Workplace	Styrene Monomer	Field Rotameter	BKK_FS1044	5-Jan-23	5-Apr-23	3
Workplace	Styrene Monomer	Field Rotameter	BKK_FS1006	2-Oct-23	2-Jan-24	3
Workplace	Styrene Monomer	GC-MSD	BKK_EN0119	18-Apr-23	18-Oct-24	18
Rayong Lab	Temperature	pH meter	RYG_FS0574	3-Apr-23	3-Apr-24	12
Rayong Lab	Total Suspended Solids	Electronic Balance	RYG_EN0002	1-Mar-23	1-Mar-24	12
Rayong Lab	Total Suspended Solids	Hot Air Oven	RYG_EN0010	20-Oct-22	20-Apr-24	18
Rayong Lab	pH at 25 °C	pH meter	RYG_EN0183	27-Feb-23	27-Feb-24	12
Rayong Lab	Oil & Grease	Electronic Balance	RYG_EN0002	1-Mar-23	1-Mar-24	12
Rayong Lab	Oil & Grease	Hot Air Oven	RYG_EN0006	20-Oct-22	20-Apr-24	18
Rayong Lab	Oil & Grease	Water Bath	RYG_EN0061	20-Oct-22	20-Apr-24	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	11-May-23	11-May-24	12



Lot No. 2321223-1

ANALYZER CALIBRATION DATA

Client : Siam Synthetic Latex Co.,Ltd. Location : Boiler
Date : 19 Sep 23 Test Operator : Sathaporn.T

O₂ ANALYZER
Model : TELEDYNE API 200EH Serial No. : 735
Span (%) : 25

	Cylinder Value (%)	Initial Analyzers Calibration Response (%)	Final Analyzers Calibration Response (%)	Difference (Percent of Span)
Zero Gas	0.00	0.01	0.02	0.04
Low-Level Gas	8.04	8.05	8.06	0.04
Span Gas	16.00	16.01	16.02	0.04

NO_x ANALYZER
Model : TELEDYNE API 200EH Serial No. : 735
Span (ppm) : 100

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.01	0.02	0.01
Low-Level Gas	54.96	54.95	54.95	0.00
Span Gas	82.51	82.50	82.49	0.01

CO ANALYZER
Model : TELEDYNE API 300EM Serial No. : 425
Span (ppm) : 100

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.02	0.03	0.01
Low-Level Gas	54.84	54.83	54.82	0.01
Span Gas	79.74	79.73	79.73	0.00

Calibrated by

Sathaporn.T

(Mr.Sathaporn Thakaew)

Environmental Field Scientist (3)

FORM NO.: F 06-052 REVISION NO.: 2 ISSUE DATE: 3/06/19

ALS Laboratory Group



Lot No. 2321223-1

SYSTEM CALIBRATION BIAS AND DRIFT DATA

Client : Siam Synthetic Latex Co.,Ltd. Location : Boiler
Date : 19 Sep 23 Test Operator : Sathaporn.T

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

	O ₂ Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.01	0.03	0.08	0.03	0.08	0.00
Upscale Gas	16.01	16.02	0.04	16.04	0.12	0.08

NO_x ANALYZER
Cylinder Conc. (ppm) : 82.51 Span (ppm) : 100

	NO _x Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.01	0.02	0.01	0.03	0.02	0.01
Upscale Gas	82.50	82.46	0.04	82.46	0.04	0.00

CO ANALYZER
Cylinder Conc. (ppm) : 79.74 Span (ppm) : 100

	CO Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.02	0.02	0.00	0.03	0.01	0.01
Upscale Gas	79.73	79.71	0.02	79.71	0.02	0.00

Calibrated by

Sathaporn.T

(Mr.Sathaporn Thakaew)

Environmental Field Scientist (3)

FORM NO.: F 06-052 REVISION NO.: 2 ISSUE DATE: 3/06/19

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EMISSION TEST RESULT

Client	Siam Synthetic Latex Co.,Ltd.	Run #	1
Date	19 Sep 23	Location	Boiler
Start Time	14:20	Test Operator	Sethaporn.T
SO ₂ Analyzer Model	-	Finish Time	14:40
NO _x /O ₂ Analyzer Model	TELEDYNE API 200EH	Serial No.	-
CO/CO ₂ Analyzer Model	TELEDYNE API 300EM	Serial No.	735
		Serial No.	425

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
14:20	7.67	8.69	72.73	-	1.16	
14:21	7.29	8.79	75.03	-	1.24	
14:22	7.16	8.78	78.24	-	1.35	
14:23	7.17	8.72	78.86	-	1.34	
14:24	7.23	8.66	78.40	-	1.29	
14:25	7.33	8.45	77.63	-	1.17	
14:26	7.52	8.50	76.31	-	1.18	
14:27	7.64	8.36	75.21	-	1.12	
14:28	7.73	8.39	74.24	-	1.10	
14:29	7.78	8.36	73.76	-	1.12	
14:30	7.86	8.37	73.38	-	1.17	
14:31	7.77	8.45	73.05	-	1.14	
14:32	7.74	8.53	73.11	-	1.19	
14:33	7.61	8.65	73.80	-	1.25	
14:34	7.50	8.58	74.82	-	1.16	
14:35	7.44	8.72	75.49	-	1.21	
14:36	7.16	8.83	76.49	-	1.25	
14:37	6.98	8.72	78.28	-	1.20	
14:38	6.99	8.81	79.84	-	1.31	
14:39	7.02	8.79	80.19	-	1.34	
14:40	7.09	8.69	79.81	-	1.37	
Average	7.41	8.61	76.13	-	1.22	

Sethaporn.T

(Mr.Sethaporn Thakaew)

Environmental Field Scientist (3)



EMISSION TEST RESULT

Client	Siam Synthetic Latex Co.,Ltd.	Run #	2
Date	19 Sep 23	Location	Boiler
Start Time	14:41	Test Operator	Sethaporn.T
SO ₂ Analyzer Model	-	Finish Time	15:01
NO _x /O ₂ Analyzer Model	TELEDYNE API 200EH	Serial No.	-
CO/CO ₂ Analyzer Model	TELEDYNE API 300EM	Serial No.	735
		Serial No.	425

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
14:41	7.16	8.71	79.17	-	1.29	
14:42	7.26	8.60	78.48	-	1.21	
14:43	7.44	8.58	77.19	-	1.27	
14:44	7.49	8.48	76.16	-	1.15	
14:45	7.57	8.58	75.63	-	1.18	
14:46	7.54	8.41	75.37	-	1.12	
14:47	7.55	8.61	75.48	-	1.19	
14:48	7.45	8.83	75.94	-	1.18	
14:49	7.15	8.65	77.37	-	1.24	
14:50	7.25	8.70	78.77	-	1.27	
14:51	7.31	8.57	78.77	-	1.27	
14:52	7.43	8.59	77.56	-	1.29	
14:53	7.43	8.62	77.00	-	1.33	
14:54	7.39	8.63	76.62	-	1.29	
14:55	7.37	8.54	76.69	-	1.32	
14:56	7.48	8.37	76.45	-	1.21	
14:57	7.65	8.52	75.70	-	1.25	
14:58	7.54	8.51	75.63	-	1.23	
14:59	7.45	8.73	75.90	-	1.36	
15:00	7.18	8.70	77.33	-	1.42	
15:01	7.15	8.63	78.43	-	1.41	
Average	7.39	8.60	76.94	-	1.26	

Sethaporn.T

(Mr.Sethaporn Thakaew)

Environmental Field Scientist (3)



EMISSION TEST RESULT

Client	Siam Synthetic Latex Co.,Ltd.	Run #	3
Date	19 Sep 23	Location	Boiler
Start Time	15:02	Test Operator	Sathaporn.T
SO ₂ Analyzer Model	-	Finish Time	15:22
NO _x /O ₂ Analyzer Model	TELEDYNE API 200EH	Serial No.	-
CO/CO ₂ Analyzer Model	TELEDYNE API 300EM	Serial No.	735
		Serial No.	425

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
15:02	7.29	8.45	78.76	-	1.26	
15:03	7.46	8.53	77.52	-	1.30	
15:04	7.56	8.52	76.22	-	1.29	
15:05	7.56	8.51	75.61	-	1.26	
15:06	7.68	8.31	75.07	-	1.23	
15:07	7.77	8.55	74.46	-	1.33	
15:08	7.52	8.52	74.73	-	1.28	
15:09	7.51	8.41	76.11	-	1.32	
15:10	7.64	8.47	76.41	-	1.23	
15:11	7.69	8.53	75.57	-	1.27	
15:12	7.53	8.46	75.35	-	1.22	
15:13	7.63	8.25	75.55	-	1.17	
15:14	7.84	8.19	74.64	-	1.21	
15:15	8.02	8.24	73.10	-	1.03	
15:16	8.11	8.12	71.73	-	0.99	
15:17	8.21	8.13	70.96	-	0.80	
15:18	8.32	8.08	69.90	-	0.82	
15:19	8.41	8.02	69.26	-	0.67	
15:20	8.50	7.98	68.55	-	0.72	
15:21	8.52	8.02	67.91	-	0.69	
15:22	8.44	8.00	67.99	-	0.69	
Average	7.87	8.30	73.59	-	1.09	

Sathaporn.T

(Mr.Sathaporn Thakaw)

Environmental Field Scientist (3)



ANALYZER CALIBRATION DATA

Lot No. 2321223-1

Client	Siam Synthetic Latex Co.,Ltd.	Location	Boiler
Date	19 Sep 23	Test Operator	Sathaporn.T
O ₂ ANALYZER			
Model	TELEDYNE API 200EH	Serial No.	725
Span (%)	25		

	Cylinder Value (%)	Initial Analyzers Calibration Response (%)	Final Analyzers Calibration Response (%)	Difference (Percent of Span)
Zero Gas	0.00	0.01	0.02	0.04
Low-Level Gas	8.04	8.05	8.06	0.04
Span Gas	16.00	16.01	16.02	0.04

NO _x ANALYZER			
Model	TELEDYNE API 200EH	Serial No.	725
Span (ppm)	100		

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.01	0.02	0.01
Low-Level Gas	54.96	54.95	54.95	0.00
Span Gas	82.51	82.50	82.49	0.01

CO ANALYZER			
Model	TELEDYNE API 300EM	Serial No.	425
Span (ppm)	100		

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.02	0.03	0.01
Low-Level Gas	54.84	54.83	54.82	0.01
Span Gas	79.74	79.73	79.73	0.00

Calibrated by

Sathaporn.T

(Mr.Sathaporn Thakaw)

Environmental Field Scientist (3)

FORM NO.: F 06-104 REVISION NO.: - ISSUE DATE: 3/06/19

ALS Laboratory Group

FORM NO.: F 06-062 REVISION NO.: 2 ISSUE DATE: 3/06/19

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Lot No. 2321223-1

SYSTEM CALIBRATION BIAS AND DRIFT DATA

Client : Siam Synthetic Latex Co.,Ltd. Location : Boiler
 Date : 19 Sep 23 Test Operator : Sathaporn.T

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

	O ₂ Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.01	0.03	0.08	0.03	0.08	0.00
Upscale Gas	16.01	16.02	0.04	16.04	0.12	0.08

NO_x ANALYZER : 82.51 Span (ppm) : 100
 Cylinder Conc. (ppm)

	NO _x Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.01	0.02	0.01	0.03	0.02	0.01
Upscale Gas	82.50	82.46	0.04	82.46	0.04	0.00

CO ANALYZER : 79.74 Span (ppm) : 100
 Cylinder Conc. (ppm)

	CO Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.02	0.02	0.00	0.03	0.01	0.01
Upscale Gas	79.73	79.71	0.02	79.71	0.02	0.00

Calibrated by

Sathaporn.T

(Mr.Sathaporn Thakarnw)

Environmental Field Scientist (3)

FORM NO.: F 06-104 REVISION NO.: - ISSUE DATE: 3/06/19

ALS Laboratory Group



CEMs Data

Client Name : Siam Synthetic Latex Co.,Ltd.
 Plant Name : SSLC

Date : 19 Sep 23
 Location : Boiler

Run No: 1 Time Base : 21 min							Run No: 2 Time Base : 21 min						
Date	Time	SO ₂ ppm	NO _x ppm	CO ppm	O ₂ Vol%	CO ₂ Vol%	Date	Time	SO ₂ ppm	NO _x ppm	CO ppm	O ₂ Vol%	CO ₂ Vol%
19 Sep 23	12:45	-	81.67	0.00	5.85	-	19 Sep 23	13:06	-	83.71	0.05	5.88	-
19 Sep 23	12:46	-	82.25	0.00	5.85	-	19 Sep 23	13:07	-	83.96	0.01	5.70	-
19 Sep 23	12:47	-	82.81	0.00	5.85	-	19 Sep 23	13:08	-	85.14	0.01	5.76	-
19 Sep 23	12:48	-	83.30	0.00	5.85	-	19 Sep 23	13:09	-	86.29	0.01	5.96	-
19 Sep 23	12:49	-	82.85	0.00	5.84	-	19 Sep 23	13:10	-	81.91	0.05	6.16	-
19 Sep 23	12:50	-	82.91	0.00	5.83	-	19 Sep 23	13:11	-	77.74	0.08	6.37	-
19 Sep 23	12:51	-	81.71	0.00	5.61	-	19 Sep 23	13:12	-	77.62	0.08	6.57	-
19 Sep 23	12:52	-	83.00	0.01	5.60	-	19 Sep 23	13:13	-	77.10	0.09	6.71	-
19 Sep 23	12:53	-	84.50	0.01	5.59	-	19 Sep 23	13:14	-	77.75	0.04	6.69	-
19 Sep 23	12:54	-	82.58	0.01	5.57	-	19 Sep 23	13:15	-	77.20	0.03	6.66	-
19 Sep 23	12:55	-	81.14	0.01	5.56	-	19 Sep 23	13:16	-	78.43	0.00	6.63	-
19 Sep 23	12:56	-	80.62	0.02	5.54	-	19 Sep 23	13:17	-	78.35	0.00	6.61	-
19 Sep 23	12:57	-	82.03	0.00	5.53	-	19 Sep 23	13:18	-	78.83	0.00	6.58	-
19 Sep 23	12:58	-	84.77	0.03	5.52	-	19 Sep 23	13:19	-	78.65	0.00	6.56	-
19 Sep 23	12:59	-	84.46	0.02	5.54	-	19 Sep 23	13:20	-	81.39	0.00	6.53	-
19 Sep 23	13:00	-	82.59	0.02	5.56	-	19 Sep 23	13:21	-	80.60	0.00	6.51	-
19 Sep 23	13:01	-	83.08	0.00	5.58	-	19 Sep 23	13:22	-	79.88	0.02	6.48	-
19 Sep 23	13:02	-	82.14	0.01	5.60	-	19 Sep 23	13:23	-	78.53	0.02	6.47	-
19 Sep 23	13:03	-	83.26	0.00	5.62	-	19 Sep 23	13:24	-	78.32	0.02	6.47	-
19 Sep 23	13:04	-	83.00	0.00	5.64	-	19 Sep 23	13:25	-	75.00	0.01	6.47	-
19 Sep 23	13:05	-	85.01	0.02	5.66	-	19 Sep 23	13:26	-	74.66	0.01	6.47	-
Max	-	-	85.01	0.02	5.66	-	Max	-	-	86.29	0.09	6.71	-
Avg	-	-	82.79	0.01	5.60	-	Avg	-	-	79.48	0.03	6.38	-
Run No: 3 Time Base : 21 min							Run No: 4 Time Base : 21 min						
Date	Time	SO ₂ ppm	NO _x ppm	CO ppm	O ₂ Vol%	CO ₂ Vol%	Date	Time	SO ₂ ppm	NO _x ppm	CO ppm	O ₂ Vol%	CO ₂ Vol%
19 Sep 23	13:27	-	76.15	0.00	6.48	-	19 Sep 23	13:48	-	74.81	0.16	7.14	-
19 Sep 23	13:28	-	77.14	0.00	6.48	-	19 Sep 23	13:49	-	74.07	0.17	7.08	-
19 Sep 23	13:29	-	77.07	0.02	6.48	-	19 Sep 23	13:50	-	71.88	0.17	7.02	-
19 Sep 23	13:30	-	77.59	0.01	6.48	-	19 Sep 23	13:51	-	72.64	0.13	6.95	-
19 Sep 23	13:31	-	76.70	0.03	6.49	-	19 Sep 23	13:52	-	73.64	0.10	6.90	-
19 Sep 23	13:32	-	77.78	0.01	6.49	-	19 Sep 23	13:53	-	73.81	0.18	6.93	-
19 Sep 23	13:33	-	77.82	0.04	6.55	-	19 Sep 23	13:54	-	72.54	0.18	6.95	-
19 Sep 23	13:34	-	76.29	0.06	6.66	-	19 Sep 23	13:55	-	70.69	0.24	6.98	-
19 Sep 23	13:35	-	73.53	0.09	6.76	-	19 Sep 23	13:56	-	71.18	0.13	7.01	-
19 Sep 23	13:36	-	73.02	0.05	6.87	-	19 Sep 23	13:57	-	70.64	0.10	7.04	-
19 Sep 23	13:37	-	74.34	0.01	6.97	-	19 Sep 23	13:58	-	69.76	0.08	7.06	-
19 Sep 23	13:38	-	74.00	0.04	7.08	-	19 Sep 23	13:59	-	70.39	0.12	7.09	-
19 Sep 23	13:39	-	72.38	0.06	7.19	-	19 Sep 23	14:00	-	70.31	0.15	7.12	-
19 Sep 23	13:40	-	71.36	0.14	7.29	-	19 Sep 23	14:01	-	70.35	0.16	7.15	-
19 Sep 23	13:41	-	70.47	0.21	7.40	-	19 Sep 23	14:02	-	70.32	0.36	7.17	-
19 Sep 23	13:42	-	70.02	0.29	7.50	-	19 Sep 23	14:03	-	71.11	0.20	7.18	-
19 Sep 23	13:43	-	71.07	0.13	7.46	-	19 Sep 23	14:04	-	70.58	0.23	7.20	-
19 Sep 23	13:44	-	73.68	0.09	7.39	-	19 Sep 23	14:05	-	71.18	0.21	7.21	-
19 Sep 23	13:45	-	74.47	0.08	7.33	-	19 Sep 23	14:06	-	70.60	0.23	7.22	-
19 Sep 23	13:46	-	75.05	0.08	7.27	-	19 Sep 23	14:07	-	70.79	0.31	7.24	-
19 Sep 23	13:47	-	75.91	0.08	7.20	-	19 Sep 23	14:08	-	70.45	0.31	7.25	-
Max	-	-	77.82	0.23	7.50	-	Max	-	-	74.81	0.31	7.25	-
Avg	-	-	74.56	0.07	6.94	-	Avg	-	-	71.51	0.18	7.09	-
Run No: 5 Time Base : 21 min							Run No: 6 Time Base : 21 min						
Date	Time	SO ₂ ppm	NO _x ppm	CO ppm	O ₂ Vol%	CO ₂ Vol%	Date	Time	SO ₂ ppm	NO _x ppm	CO ppm	O ₂ Vol%	CO ₂ Vol%
19 Sep 23	14:09	-	70.61	0.32	7.27	-	19 Sep 23	14:30	-	73.04	0.07	6.98	-
19 Sep 23	14:10	-	70.99	0.31	7.28	-	19 Sep 23	14:31	-	72.09	0.02	7.00	-
19 Sep 23	14:11	-	71.35	0.29	7.29	-	19 Sep 23	14:32	-	73.90	0.00	7.01	-
19 Sep 23	14:12	-	70.83	0.35	7.28	-	19 Sep 23	14:33	-	76.94	0.00	7.01	-
19 Sep 23	14:13	-	69.58	0.35	7.23	-	19 Sep 23	14:34	-	77.16	0.01	7.01	-
19 Sep 23	14:14	-	70.08	0.30	7.18	-	19 Sep 23	14:35	-	76.91	0.01	7.02	-
19 Sep 23	14:15	-	70.32	0.30	7.13	-	19 Sep 23	14:36	-	75.96	0.04	7.02	-
19 Sep 23	14:16	-	71.30	0.14	7.08	-	19 Sep 23	14:37	-	75.19	0.03	7.02	-
19 Sep 23	14:17	-	76.46	0.08	7.03	-	19 Sep 23	14:38	-	74.93	0.05	7.02	-
19 Sep 23	14:18	-	77.50	0.05	6.98	-	19 Sep 23	14:39	-	73.69	0.06	7.03	-
19 Sep 23	14:19	-	76.39	0.09	6.93	-	19 Sep 23	14:40	-	73.12	0.13	7.03	-
19 Sep 23	14:20	-	76.25	0.11	6.87	-	19 Sep 23	14:41	-	72.88	0.08	7.03	-
19 Sep 23	14:21	-	74.91	0.09	6.82	-	19 Sep 23	14:42	-	72.52	0.13	7.02	-
19 Sep 23	14:22	-	73.76	0.18	6.81	-	19 Sep 23	14:43	-	73.58	0.13	7.00	-
19 Sep 23	14:23	-	72.15	0.18	6.83	-	19 Sep 23	14:44	-	73.05	0.09	6.99	-
19 Sep 23	14:24	-	72.34	0.18	6.86	-	19 Sep 23	14:45	-	76.82	0.05	6.97	-
19 Sep 23	14:25	-	71.68	0.24	6.88	-	19 Sep 23	14:46	-	76.68	0.08	6.95	-
19 Sep 23	14:26	-	71.56	0.24	6.90	-	19 Sep 23	14:47	-	75.26	0.08	6.94	-
19 Sep 23	14:27	-	71.47	0.23	6.92	-	19 Sep 23	14:48	-	74.53	0.09	6.92	-
19 Sep 23	14:28	-	72.86	0.23	6.94	-	19 Sep 23	14:49	-	74.16	0.10	6.90	-
19 Sep 23	14:29	-	72.02	0.13	6.96	-	19 Sep 23	14:50	-	74.38	0.07	6.89	-
Max	-	-	77.50	0.35	7.29	-	Max	-	-	77.16	0.13	7.03	-
Avg	-	-	72.55	0.21	7.02	-	Avg	-	-	74.63	0.06	6.99	-



CEMs Data

Client Name Siam Synthetic Latex Co.,Ltd
Plant Name SSLCDate 19 Sep 23
Location Boiler

Run No: 7 Time Base : 21 min

Date	Time	SO2 ppm	NOx ppm	CO ppm	O2 Vol%	CO2 Vol%
19 Sep 23	14:51	-	74.63	0.09	8.87	-
19 Sep 23	14:52	-	72.22	0.12	8.87	-
19 Sep 23	14:53	-	73.00	0.11	8.87	-
19 Sep 23	14:54	-	73.58	0.11	8.87	-
19 Sep 23	14:55	-	74.16	0.14	8.87	-
19 Sep 23	14:56	-	75.53	0.03	8.87	-
19 Sep 23	14:57	-	77.32	0.07	8.87	-
19 Sep 23	14:58	-	75.65	0.05	8.86	-
19 Sep 23	14:59	-	73.27	0.10	8.86	-
19 Sep 23	15:00	-	72.99	0.10	8.86	-
19 Sep 23	15:01	-	73.15	0.10	8.87	-
19 Sep 23	15:02	-	72.24	0.23	8.93	-
19 Sep 23	15:03	-	71.69	0.17	7.60	-
19 Sep 23	15:04	-	73.85	0.10	7.06	-
19 Sep 23	15:05	-	74.79	0.16	7.13	-
19 Sep 23	15:06	-	73.50	0.14	7.19	-
19 Sep 23	15:07	-	72.09	0.14	7.26	-
19 Sep 23	15:08	-	74.02	0.14	7.32	-
19 Sep 23	15:09	-	73.58	0.14	7.39	-
19 Sep 23	15:10	-	71.73	0.27	7.46	-
19 Sep 23	15:11	-	69.58	0.31	7.51	-
Max		-	77.32	0.31	7.51	-
Avg		-	73.44	0.13	7.04	-

Run No: 9 Time Base : 21 min

Date	Time	SO2 ppm	NOx ppm	CO ppm	O2 Vol%	CO2 Vol%
19 Sep 23	15:33	-	67.56	0.73	7.65	-
19 Sep 23	15:34	-	67.53	0.68	7.88	-
19 Sep 23	15:35	-	67.46	0.77	7.91	-
19 Sep 23	15:36	-	67.26	0.71	7.93	-
19 Sep 23	15:37	-	67.67	0.82	7.96	-
19 Sep 23	15:38	-	66.55	0.87	7.98	-
19 Sep 23	15:39	-	67.29	1.04	8.01	-
19 Sep 23	15:40	-	68.66	0.97	8.03	-
19 Sep 23	15:41	-	67.40	0.91	8.05	-
19 Sep 23	15:42	-	67.39	0.83	8.07	-
19 Sep 23	15:43	-	67.14	0.93	8.08	-
19 Sep 23	15:44	-	67.32	0.93	8.10	-
19 Sep 23	15:45	-	66.93	0.88	8.11	-
19 Sep 23	15:46	-	66.75	1.06	8.13	-
19 Sep 23	15:47	-	67.00	0.97	8.14	-
19 Sep 23	15:48	-	66.81	0.97	8.16	-
19 Sep 23	15:49	-	66.33	1.25	8.17	-
19 Sep 23	15:50	-	65.76	0.97	8.19	-
19 Sep 23	15:51	-	68.38	0.81	8.19	-
19 Sep 23	15:52	-	66.99	1.07	8.18	-
19 Sep 23	15:53	-	66.38	1.07	8.18	-
Max		-	68.38	1.25	8.19	-
Avg		-	67.08	0.92	8.06	-

Run No: 11 Time Base : 21 min

Date	Time	SO2 ppm	NOx ppm	CO ppm	O2 Vol%	CO2 Vol%
19 Sep 23	16:15	-	72.07	0.26	7.15	-
19 Sep 23	16:16	-	72.91	0.26	7.17	-
19 Sep 23	16:17	-	72.84	0.25	7.20	-
19 Sep 23	16:18	-	72.13	0.32	7.22	-
19 Sep 23	16:19	-	70.21	0.37	7.25	-
19 Sep 23	16:20	-	73.04	0.43	7.27	-
19 Sep 23	16:21	-	73.74	0.47	7.30	-
19 Sep 23	16:22	-	73.49	0.44	7.28	-
19 Sep 23	16:23	-	73.76	0.44	7.26	-
19 Sep 23	16:24	-	75.08	0.32	7.24	-
19 Sep 23	16:25	-	75.28	0.34	7.22	-
19 Sep 23	16:26	-	74.87	0.31	7.20	-
19 Sep 23	16:27	-	75.39	0.24	7.17	-
19 Sep 23	16:28	-	76.80	0.29	7.15	-
19 Sep 23	16:29	-	76.20	0.27	7.13	-
19 Sep 23	16:30	-	77.36	0.22	7.11	-
19 Sep 23	16:31	-	76.57	0.29	7.09	-
19 Sep 23	16:32	-	76.89	0.21	7.05	-
19 Sep 23	16:33	-	78.52	0.18	7.00	-
19 Sep 23	16:34	-	79.70	0.14	6.96	-
19 Sep 23	16:35	-	78.49	0.19	6.92	-
Max		-	79.70	0.47	7.30	-
Avg		-	75.66	0.30	7.16	-

Run No: 8 Time Base : 21 min

Date	Time	SO2 ppm	NOx ppm	CO ppm	O2 Vol%	CO2 Vol%
19 Sep 23	15:12	-	69.67	0.40	7.54	-
19 Sep 23	15:13	-	68.33	0.51	7.56	-
19 Sep 23	15:14	-	67.75	0.61	7.59	-
19 Sep 23	15:15	-	66.89	0.76	7.61	-
19 Sep 23	15:16	-	66.27	0.87	7.64	-
19 Sep 23	15:17	-	66.08	0.86	7.66	-
19 Sep 23	15:18	-	66.50	0.85	7.68	-
19 Sep 23	15:19	-	66.27	0.89	7.71	-
19 Sep 23	15:20	-	66.40	0.67	7.73	-
19 Sep 23	15:21	-	66.19	0.90	7.75	-
19 Sep 23	15:22	-	65.75	1.20	7.76	-
19 Sep 23	15:23	-	65.70	1.14	7.76	-
19 Sep 23	15:24	-	66.42	1.10	7.76	-
19 Sep 23	15:25	-	65.87	1.12	7.77	-
19 Sep 23	15:26	-	66.27	1.15	7.77	-
19 Sep 23	15:27	-	66.21	1.12	7.78	-
19 Sep 23	15:28	-	66.36	0.97	7.78	-
19 Sep 23	15:29	-	68.10	0.65	7.79	-
19 Sep 23	15:30	-	70.09	0.61	7.79	-
19 Sep 23	15:31	-	68.83	0.51	7.80	-
19 Sep 23	15:32	-	69.75	0.54	7.83	-
Max		-	70.09	1.20	7.83	-
Avg		-	67.32	0.83	7.72	-

Run No: 10 Time Base : 21 min

Date	Time	SO2 ppm	NOx ppm	CO ppm	O2 Vol%	CO2 Vol%
19 Sep 23	15:54	-	65.39	1.31	8.18	-
19 Sep 23	15:55	-	66.47	0.98	8.17	-
19 Sep 23	15:56	-	67.06	0.74	8.17	-
19 Sep 23	15:57	-	70.46	0.65	8.17	-
19 Sep 23	15:58	-	68.27	0.86	8.16	-
19 Sep 23	15:59	-	66.16	1.17	8.16	-
19 Sep 23	16:00	-	65.79	0.70	8.16	-
19 Sep 23	16:01	-	71.39	0.28	7.54	-
19 Sep 23	16:02	-	75.29	0.17	7.14	-
19 Sep 23	16:03	-	75.64	0.13	7.13	-
19 Sep 23	16:04	-	74.74	0.18	7.12	-
19 Sep 23	16:05	-	73.19	0.26	7.11	-
19 Sep 23	16:06	-	70.79	0.36	7.11	-
19 Sep 23	16:07	-	70.42	0.51	7.10	-
19 Sep 23	16:08	-	68.96	0.49	7.09	-
19 Sep 23	16:09	-	68.00	0.50	7.08	-
19 Sep 23	16:10	-	70.54	0.37	7.08	-
19 Sep 23	16:11	-	72.47	0.25	7.07	-
19 Sep 23	16:12	-	74.88	0.20	7.08	-
19 Sep 23	16:13	-	73.00	0.30	7.10	-
19 Sep 23	16:14	-	70.73	0.32	7.13	-
Max		-	75.64	1.31	8.18	-
Avg		-	70.50	0.51	7.48	-

Run No: 12 Time Base : 21 min

Date	Time	SO2 ppm	NOx ppm	CO ppm	O2 Vol%	CO2 Vol%
19 Sep 23	16:36	-	77.83	0.22	6.87	-
19 Sep 23	16:37	-	76.76	0.21	6.83	-
19 Sep 23	16:38	-	77.26	0.16	6.79	-
19 Sep 23	16:39	-	79.31	0.13	6.74	-
19 Sep 23	16:40	-	80.49	0.08	6.70	-
19 Sep 23	16:41	-	80.64	0.10	6.65	-
19 Sep 23	16:42	-	80.54	0.14	6.61	-
19 Sep 23	16:43	-	79.43	0.14	6.56	-
19 Sep 23	16:44	-	79.01	0.12	6.51	-
19 Sep 23	16:45	-	80.84	0.07	6.46	-
19 Sep 23	16:46	-	81.72	0.11	6.41	-
19 Sep 23	16:47	-	80.26	0.11	6.36	-
19 Sep 23	16:48	-	75.84	0.16	6.31	-
19 Sep 23	16:49	-	75.23	0.12	6.26	-
19 Sep 23	16:50	-	80.10	0.04	6.21	-
19 Sep 23	16:51	-	81.43	0.04	6.16	-
19 Sep 23	16:52	-	79.05	0.05	6.18	-
19 Sep 23	16:53	-	77.71	0.07	6.20	-
19 Sep 23	16:54	-	77.11	0.04	6.22	-
19 Sep 23	16:55	-	78.74	0.05	6.23	-
19 Sep 23	16:56	-	79.12	0.04	6.25	-
Max		-	81.72	0.22	6.87	-
Avg		-	78.97	0.10	6.45	-



Reference Method Data

Client Name Siam Synthetic Latex Co.,Ltd
Plant Name SSLCDate 19 Sep 23
Location Boiler

Run No: 1 Time Base : 21 min

Date	Time	SO2 ppm	NOx ppm	CO ppm	O2 Vol%	CO2 Vol%
19 Sep 23	12:45	-	85.28	0.30	8.28	9.16
19 Sep 23	12:46	-	85.18	0.30	8.29	9.36
19 Sep 23	12:47	-	85.09	0.38	8.21	9.22
19 Sep 23	12:48	-	85.00	0.33	8.38	9.22
19 Sep 23	12:49	-	84.51	0.33	8.42	9.25
19 Sep 23	12:50	-	84.78	0.34	8.32	9.24
19 Sep 23	12:51	-	84.62	0.42	8.29	9.24
19 Sep 23	12:52	-	85.09	0.46	8.27	9.24
19 Sep 23	12:53	-	84.97	0.45	8.37	9.27
19 Sep 23	12:54	-	84.55	0.42	8.34	9.27
19 Sep 23	12:55	-	84.32	0.47	8.33	9.38
19 Sep 23	12:56	-	84.99	0.53	8.11	9.48
19 Sep 23	12:57	-	85.90	0.55	8.04	9.36
19 Sep 23	12:58	-	85.83	0.57	8.23	9.46
19 Sep 23	12:59	-	84.35	0.50	8.38	9.26
19 Sep 23	13:00	-	83.44	0.52	8.38	9.34
19 Sep 23	13:01	-	83.58	0.52	8.25	9.49
19 Sep 23	13:02	-	85.22	0.51	5.94	9.47
19 Sep 23	13:03	-	86.37	0.51	6.07	9.33
19 Sep 23	13:04	-	85.81	0.59	6.22	9.34
19 Sep 23	13:05	-	85.11	0.58	6.20	9.36
Max		-	86.37	0.59	6.42	9.49
Avg		-	84.93	0.46	8.25	9.31

Run No: 3 Time Base : 21 min

Date	Time	SO2 ppm	NOx ppm	CO ppm	O2 Vol%	CO2 Vol%
19 Sep 23	13:27	-	82.21	0.81	7.67	8.86
19 Sep 23	13:28	-	80.89	0.83	7.16	8.74
19 Sep 23	13:29	-	79.79	0.82	7.23	8.65
19 Sep 23	13:30	-	79.04	0.84	7.27	8.79
19 Sep 23	13:31	-	79.34	0.83	7.10	8.77
19 Sep 23	13:32	-	80.12	0.83	7.07	8.80
19 Sep 23	13:33	-	80.54	0.88	7.12	8.75
19 Sep 23	13:34	-	80.42	0.86	7.13	8.76
19 Sep 23	13:35	-	80.13	0.85	7.15	8.72
19 Sep 23	13:36	-	79.88	0.87	7.09	8.68
19 Sep 23	13:37	-	80.23	0.89	7.12	8.62
19 Sep 23	13:38	-	80.74	0.85	7.32	8.65
19 Sep 23	13:39	-	77.57	0.85	7.55	8.63
19 Sep 23	13:40	-	76.35	0.86	7.50	8.51
19 Sep 23	13:41	-	76.64	0.92	7.41	8.56
19 Sep 23	13:42	-	77.31	0.90	7.47	8.51
19 Sep 23	13:43	-	76.63	0.83	7.57	8.41
19 Sep 23	13:44	-	75.97	0.84	7.76	8.29
19 Sep 23	13:45	-	73.98	0.82	7.92	8.23
19 Sep 23	13:46	-	72.73	0.85	7.97	8.40
19 Sep 23	13:47	-	72.61	0.88	7.76	8.61
Max	-	-	82.21	0.96	7.87	8.86
Avg	-	-	78.17	0.86	7.37	8.61



Reference Method Data

Client Name Siam Synthetic Latex Co., Ltd.
Plant Name SSLCDate 19 Sep 23
Location Boiler

Run No: 7

Time Base : 21 min

Run No: 8

Time Base : 21 min

Date	Time	SO2 ppm	NOx ppm	CO ppm	O2 Vol%	CO2 Vol%
19 Sep 23	14:51	-	78.77	1.27	7.31	8.57
19 Sep 23	14:52	-	77.56	1.29	7.43	8.58
19 Sep 23	14:53	-	77.00	1.33	7.43	8.62
19 Sep 23	14:54	-	76.62	1.29	7.39	8.63
19 Sep 23	14:55	-	76.69	1.32	7.37	8.54
19 Sep 23	14:56	-	76.45	1.21	7.48	8.37
19 Sep 23	14:57	-	75.70	1.25	7.65	8.52
19 Sep 23	14:58	-	75.63	1.23	7.54	8.51
19 Sep 23	14:59	-	75.90	1.36	7.45	8.73
19 Sep 23	15:00	-	77.33	1.42	7.18	8.70
19 Sep 23	15:01	-	78.43	1.41	7.15	8.63
19 Sep 23	15:02	-	78.76	1.26	7.29	8.45
19 Sep 23	15:03	-	77.52	1.30	7.46	8.53
19 Sep 23	15:04	-	76.22	1.29	7.56	8.52
19 Sep 23	15:05	-	75.61	1.26	7.56	8.51
19 Sep 23	15:06	-	75.07	1.23	7.68	8.31
19 Sep 23	15:07	-	74.46	1.33	7.77	8.55
19 Sep 23	15:08	-	74.73	1.28	7.52	8.52
19 Sep 23	15:09	-	76.11	1.32	7.51	8.41
19 Sep 23	15:10	-	76.41	1.23	7.64	8.47
19 Sep 23	15:11	-	75.57	1.27	7.69	8.53
Max		-	78.77	1.42	7.77	8.73
Avg		-	76.50	1.29	7.48	8.54

Date	Time	SO2 ppm	NOx ppm	CO ppm	O2 Vol%	CO2 Vol%
19 Sep 23	15:33	-	68.84	0.96	8.30	8.10
19 Sep 23	15:34	-	70.02	1.11	8.25	8.17
19 Sep 23	15:35	-	71.05	1.10	8.20	8.20
19 Sep 23	15:36	-	71.02	0.92	8.17	8.02
19 Sep 23	15:37	-	70.44	0.94	8.39	8.11
19 Sep 23	15:38	-	69.56	0.79	8.39	7.97
19 Sep 23	15:39	-	69.16	0.85	8.40	8.04
19 Sep 23	15:40	-	69.22	0.80	8.32	8.07
19 Sep 23	15:41	-	69.27	0.78	8.38	7.98
19 Sep 23	15:42	-	69.15	0.66	8.43	8.02
19 Sep 23	15:43	-	68.83	0.60	8.47	7.96
19 Sep 23	15:44	-	68.53	0.62	8.54	7.96
19 Sep 23	15:45	-	68.44	0.71	8.46	8.07
19 Sep 23	15:46	-	68.80	0.81	8.48	8.06
19 Sep 23	15:47	-	69.01	0.79	8.43	8.03
19 Sep 23	15:48	-	68.90	0.82	8.46	8.12
19 Sep 23	15:49	-	68.89	0.71	8.42	8.00
19 Sep 23	15:50	-	68.64	0.70	8.47	8.00
19 Sep 23	15:51	-	68.65	0.69	8.49	8.10
19 Sep 23	15:52	-	68.61	0.58	8.44	7.92
19 Sep 23	15:53	-	68.11	0.64	8.65	8.06
Max		-	71.05	1.11	8.65	8.20
Avg		-	69.20	0.79	8.41	8.05

Run No: 11

Time Base : 21 min

Run No: 12

Time Base : 21 min

Date	Time	SO2 ppm	NOx ppm	CO ppm	O2 Vol%	CO2 Vol%
19 Sep 23	16:15	-	73.58	1.50	7.56	8.61
19 Sep 23	16:16	-	75.41	1.42	7.43	8.44
19 Sep 23	16:17	-	75.65	1.39	7.66	8.40
19 Sep 23	16:18	-	74.23	1.40	7.78	8.53
19 Sep 23	16:19	-	73.87	1.53	7.63	8.54
19 Sep 23	16:20	-	74.47	1.45	7.54	8.50
19 Sep 23	16:21	-	75.02	1.27	7.55	8.44
19 Sep 23	16:22	-	74.65	1.23	7.73	8.31
19 Sep 23	16:23	-	73.94	1.16	7.80	8.37
19 Sep 23	16:24	-	74.03	1.22	7.90	8.34
19 Sep 23	16:25	-	75.20	1.21	7.83	8.35
19 Sep 23	16:26	-	75.82	1.24	7.90	8.30
19 Sep 23	16:27	-	75.57	1.33	7.86	8.53
19 Sep 23	16:28	-	76.78	1.35	7.68	8.45
19 Sep 23	16:29	-	77.47	1.30	7.73	8.51
19 Sep 23	16:30	-	77.72	1.37	7.71	8.67
19 Sep 23	16:31	-	77.94	1.39	7.55	8.67
19 Sep 23	16:32	-	78.77	1.38	7.54	8.66
19 Sep 23	16:33	-	79.30	1.46	7.49	8.63
19 Sep 23	16:34	-	79.77	1.50	7.46	8.55
19 Sep 23	16:35	-	79.84	1.52	7.57	8.69
Max		-	79.94	1.53	7.93	8.69
Avg		-	76.16	1.36	7.67	8.50

Date	Time	SO2 ppm	NOx ppm	CO ppm	O2 Vol%	CO2 Vol%
19 Sep 23	16:36	-	79.70	1.52	7.41	8.78
19 Sep 23	16:37	-	80.48	1.42	7.27	8.81
19 Sep 23	16:38	-	81.56	1.40	7.19	8.65
19 Sep 23	16:39	-	81.75	1.43	7.36	8.64
19 Sep 23	16:40	-	81.23	1.52	7.45	8.56
19 Sep 23	16:41	-	80.00	1.52	7.54	8.63
19 Sep 23	16:42	-	79.76	1.62	7.38	8.71
19 Sep 23	16:43	-	80.92	1.57	7.20	8.61
19 Sep 23	16:44	-	82.63	1.55	7.14	8.61
19 Sep 23	16:45	-	83.32	1.53	7.07	8.77
19 Sep 23	16:46	-	83.43	1.53	7.14	8.78
19 Sep 23	16:47	-	83.03	1.60	7.25	8.73
19 Sep 23	16:48	-	82.36	1.55	7.24	8.90
19 Sep 23	16:49	-	82.62	1.53	7.03	8.92
19 Sep 23	16:50	-	83.68	1.53	7.02	8.82
19 Sep 23	16:51	-	83.68	1.56	7.21	8.56
19 Sep 23	16:52	-	77.28	1.58	7.48	8.74
19 Sep 23	16:53	-	78.15	1.64	7.21	9.15
19 Sep 23	16:54	-	83.53	1.50	6.75	8.98
19 Sep 23	16:55	-	83.82	1.62	6.76	8.87
19 Sep 23	16:56	-	83.08	1.60	6.94	8.86
Max		-	83.82	1.64	7.54	9.15
Avg		-	81.71	1.54	7.19	8.79

Airgas Specialty Gases
Airgas USA, LLC
6141 Easton Road
Bldg 2
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04NI99E15A021C Reference Number: 160-402020199-1
 Cylinder Number: CC709609 Cylinder Volume: 144.4 CF
 Laboratory: 124 - Plumsteadville - PA Cylinder Pressure: 2015 PSIG
 PGVP Number: A12021 Valve Outlet: 660
 Gas Code: CO,NO,NOX,SO2,BALN Certification Date: Feb 22, 2021

Expiration Date: Feb 22, 2029

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	55.00 PPM	54.96 PPM	G1	+/- 1.4% NIST Traceable	02/15/2021, 02/22/2021
CARBON MONOXIDE	55.00 PPM	54.84 PPM	G1	+/- 0.7% NIST Traceable	02/15/2021
NITRIC OXIDE	55.00 PPM	54.69 PPM	G1	+/- 1.1% NIST Traceable	02/15/2021, 02/22/2021
SULFUR DIOXIDE	55.00 PPM	55.55 PPM	G1	+/- 1.0% NIST Traceable	02/15/2021, 02/22/2021
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	14060753	CC434455	49.88 PPM CARBON MONOXIDE/NITROGEN	+/- 0.8%	Feb 13, 2026
PRM	12386	D685025	9.91 PPM AIR/NITROGEN DIOXIDE	2.0%	Feb 20, 2020
NTRM	200611-04	CC707968	49.82 PPM NITRIC OXIDE/NITROGEN	+/-1.0%	Feb 02, 2025
GMIS	124206889	CC323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN	2.1%	Aug 15, 2021
NTRM	0141709	KAL003190	49.67 PPM SULFUR DIOXIDE/NITROGEN	+/- 1.0%	Jun 20, 2022

The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet IS50 FTIR AUP2010245 CO	FTIR	Feb 04, 2021
Nicolet IS50 FTIR AUP2010245 NO	FTIR	Feb 11, 2021
Nicolet IS50 FTIR AUP2010245 NO2	FTIR	Feb 22, 2021
Nicolet IS50 FTIR AUP2010245 SO2	FTIR	Feb 18, 2021

Triad Data Available Upon Request

NOTES:

Gross Weight: 28.8 Kg

Net Weight: 4.8 Kg



Michael A. Hader
 Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04NI99E3HA0002 Reference Number: 160-402138465-1
Cylinder Number: ND11222 Cylinder Volume: 247.2 Cubic Feet
Laboratory: 124 - Plumsteadville - PA Cylinder Pressure: 2215 PSIG
PGVP Number: A12021 Valve Outlet: 680
Gas Code: CO,NO,NOX,SO2,BALN Certification Date: Jul 15, 2021

Expiration Date: Jul 15, 2029

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	80.00 PPM	82.51 PPM	G1	+/- 1.4% NIST Traceable	07/08/2021, 07/15/2021
CARBON MONOXIDE	80.00 PPM	79.74 PPM	G1	+/- 0.5% NIST Traceable	07/08/2021
NITRIC OXIDE	80.00 PPM	82.51 PPM	G1	+/- 1.4% NIST Traceable	07/08/2021, 07/15/2021
SULFUR DIOXIDE	80.00 PPM	79.76 PPM	G1	+/- 1.0% NIST Traceable	07/08/2021, 07/15/2021
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	11010130	KAL004536	97.31 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	Oct 04, 2022
PRM	12386	D685025	9.91 PPM AIR/NITROGEN DIOXIDE	2.0%	Feb 20, 2020
NTRM	200610-50	CC733426	98.61 PPM NITRIC OXIDE/NITROGEN	+/- 0.9%	Oct 06, 2026
GMIS	124206889	CC323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN	2.1%	Aug 15, 2021
NTRM	16010224	KAL003838	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Dec 23, 2021

The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet IS50 FTIR AUP2010245 CO	FTIR	Jun 24, 2021
Nicolet IS50 FTIR AUP2010245 NO	FTIR	Jul 01, 2021
Nicolet IS50 FTIR AUP2010245 NO2	FTIR	Jun 30, 2021
Nicolet IS50 FTIR AUP2010245 SO2	FTIR	Jul 09, 2021

Triad Data Available Upon Request

NOTES:

Gross Weight: 48.0 Kg
Net Weight: 7.8 Kg



Michael A. Kula
Approved for Release

THE LINDE GROUP

Linde

CERTIFICATE OF ANALYSIS

Customer Detail:
ALS Laboratory Group (Thailand)

Production Order Number: 90145553
Material Number: 478100-J-44
Certification Date: 07-Dec-2017
Expiry Date: 07-Dec-2025

Cylinder Description:
STEEL 47 L

The measurement of this reference material is traceable to SI through the reference standard which is traceable to Swiss National Standard of Mass. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA 600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1. The results are expressed on a mole/mole basis, unless otherwise specified. The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k=2, providing a level of confidence of approximately 95%.

Certificate Number:

3982/17

Analyst:

Cylinder Number:

14465

Nominal Cylinder Content:

6.520 M³

Approve:

Nominal Pressure:

145.0 Bar

Valve Outlet:

CGA 590 BRASS

To Re-Order Please Quote:
478100-J-44

Comment:

- It is recommended that this product be not used below 5% of actual contents or should not be used when its gas pressure is below 150psig
- Other impurities that detect by analytical condition of this mixture shall be report if it is more than 10% of minimum minor component
- Keep and use in well-ventilated and secure area.

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

15 ชั้น, อาคาร 10540 ถนนวิภาวดีรังสิต กม. 14 แขวงบางเขนเขต บางเขน กรุงเทพฯ 10540 โทร (66) 2338-6100 โทรสาร (66) 2338-6333
105 ชั้น, อาคาร 10540 ถนนวิภาวดีรังสิต กม. 14 แขวงบางเขนเขต บางเขน กรุงเทพฯ 10540 โทร (66) 2338-6100 โทรสาร (66) 2338-6333

Linde (Thailand) Public Company Limited

15th floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad Km. 6.5 Road, Bangnae Rangsee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333
Wellgrow Plant: 105 Moo 5, T.Bangnamak, A.Bangpakong, Chachoengsao 24180 Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

CERTIFICATE OF ANALYSIS

Analytical Result

Component	Request Concentration	Certified Concentration	Certified Uncertainty	Method	Assay Date
Oxygen In Nitrogen	16.0 %	16.0 %	± 1% relative	(2) I-PB-354	04-Dec-2017

Reference Standard used in Assay

Reference Standard	Cylinder No.	Concentration	Expired Date
Oxygen In Nitrogen	113553SG	9.976± 0.02 %	26-Mar-2018

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Servomex 4100 O2 Analyser	Paramagnetic	04-Dec-2017

Method of Analysis

- 1 Gas Chromatograph
- 2 Paramagnetic Oxygen Analyser
- 3 Electrochemical Oxygen Analyser
- 4 Electrochemical Moisture Analyser
- 5 Total Hydrocarbon Analyser
- 6 Other specified

Cylinder Number 94892
Production Order Number 90145554

Certification Date: 07-Dec-2017
Expiration Date: 07-Dec-2025

CONSOLE CONTROL UNIT CALIBRATION TEST REPORT



Calibration of Date : 13-Jul-23
Next Cal. Date : 13-Jan-24

Barometric Pressure (mmHg) : 752
Relative Humidity (%) : 56.6
Temperature (C°) : 31.0

Console Control Meter Data

Calibration No. : C-130723-BKK_FSS18
Dry Gas Meter ID : BKK_FSS0518
Serial No. : 1504025
Model No. : XC-572-V

Reference Dry Gas Meter Data

Reference Dry Gas Meter ID : BKK_FS0629
Serial No. : 1607009
Correction Factor (Y) : 1.0000
Next Calibration Date : 9 Dec 23

ΔH (mm.H ₂ O)	⊖ Minutes	Reference Dry Gas Meter Calibration				Console Control : Drygas Meter							Dry Gas Meter Correction Factor (Y)	Onfile Calibration Factor ΔH ₀
		Vr (Liters)			Tr (°C)	Vm (Liters)			Ti (°C)	To (°C)	Avg.Tm (°C)			
		Final	Initial	Total		Final	Initial	Total						
15	12.10	150.22	0.00	150.22	30.0	426310.0	426158.0	152.00	31.0	31.0	31.0	0.9901	44.9858	
25	9.32	150.20	0.00	150.20	30.0	426470.0	426317.0	153.00	31.0	31.0	31.0	0.9825	44.4940	
50	6.51	150.23	0.00	150.23	31.0	426632.0	426480.0	152.00	32.0	32.0	32.0	0.9868	43.5435	
100	4.59	150.40	0.00	150.40	31.0	426798.0	426646.0	152.00	32.0	32.0	32.0	0.9831	43.1951	
150	3.75	150.20	0.00	150.20	32.0	426973.0	426820.0	153.00	32.0	32.0	32.0	0.9675	43.6487	
Avg.												0.9820	43.9734	

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

ΔH₀ Orifice pressure differential that equals to 21.24 in of air @ 25 °C and 760 mm of mercury, mmH₂O ; tolerance for individual values ± 5.08 from average.

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

Calibrated by: Sakrit Phaisanphit
(Mr. Sakrit Phaisanphit)
Field Scientist(4)

Approved by: Nattapol Jengwarewong
(Mr. Nattapol Jengwarewong)
Field Specialist(1)

FORM F-01 01/01/2017 11/12/2017 2 REVISION DATE 11/12/2017



Pitot Tube Calibration Data

Pitot Tube Identification Number : BKK_FS0522 Calibration Date : 13 Jul 23
 Lab test duct Number : 258-1-13-01 Standard Pitot ID : BKK_FS0441
 Calibration Sheet No. : C-130723-BKK_FS0522 Cp Standard : 0.99

Type S Pitot Tube Coefficient Data					
	Type s pitot tube Leg A,B	Standard pitot tube (ΔP , mm.H ₂ O)	Type s pitot tube (ΔP , mm.H ₂ O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 2	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 3	A	12.00	16.80	0.845	-
	B	12.00	16.80	-	0.845
\bar{C}_p				0.842	0.842

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

$$\left[\bar{C}_p(A) - \bar{C}_p(B) \right] \text{ must BE } \leq 0.01$$

$$\sum [Cp(s) - Cp(A \text{ or } B)]$$

$$\text{Average deviation}(A \text{ or } B) = \frac{\sum}{3} \text{ must BE } \leq 0.01$$

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

Approved by Nattapol Jiengwareewong
 (Mr. Nattapol Jiengwareewong)
 Specialist (1)



Pitot Tube Calibration Data

Pitot Tube Identification Number : BKK_FS0523 Calibration Date : 13 Jul 23
 Lab test duct Number : 258-1-13-01 Standard Pitot ID : BKK_FS0441
 Calibration Sheet No. : C-130723-BKK_FS0523 Cp Standard : 0.99

Type S Pitot Tube Coefficient Data					
	Type s pitot tube Leg A,B	Standard pitot tube (ΔP , mm.H ₂ O)	Type s pitot tube (ΔP , mm.H ₂ O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 2	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 3	A	12.00	16.80	0.845	-
	B	12.00	16.80	-	0.845
\bar{C}_p				0.842	0.842

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

$$\left[\bar{C}_p(A) - \bar{C}_p(B) \right] \text{ must BE } \leq 0.01$$

$$\sum [Cp(s) - Cp(A \text{ or } B)]$$

$$\text{Average deviation}(A \text{ or } B) = \frac{\sum}{3} \text{ must BE } \leq 0.01$$

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

Approved by Nattapol Jiengwareewong
 (Mr. Nattapol Jiengwareewong)
 Specialist (1)



DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date : 13 Jul 23		Ambient Temperature (°C)		29	
Calibration sheet No. : C-130723-BKK_FS0519		Relative Humidity (%) :		60	
Digital Temperature ID BKK_FS0519		Reference Temperature ID		BKK_FS1144	
Serial No. : 1504025		Serial No. :		201090006013	
Model : XC-572-V		Model :		Digicon-CC-VT-MS	
		Next Calibrate :		14 Aug 24	
Location	Reference Temperature °C	Digital Temperature °C	Error °C	MPE	Pass / Fail
Stack	0	0	0	±3	Pass
	25	25	0	±3	Pass
	50	50	0	±3	Pass
	100	100	0	±3	Pass
	150	150	0	±3	Pass
	200	200	0	±3	Pass
	250	250	0	±3	Pass
	300	300	0	±3	Pass
Probe	500	500	0	±3	Pass
	100	100	0	±3	Pass
	120	120	0	±3	Pass
	140	140	0	±3	Pass
Oven	100	100	0	±3	Pass
	120	120	0	±3	Pass
	140	140	0	±3	Pass
Filter	100	100	0	±3	Pass
	120	120	0	±3	Pass
	140	140	0	±3	Pass
Exit	0	0	0	±3	Pass
	10	10	0	±3	Pass
	20	20	0	±3	Pass
Meter	0	0	0	±3	Pass
	25	25	0	±3	Pass
	50	50	0	±3	Pass
AUX	0	0	0	±3	Pass
	25	25	0	±3	Pass
	50	50	0	±3	Pass

MPE : (Maximum permissible error of measurement) ค่าความผิดพลาดสูงสุดของการวัดที่อนุญาต

Calibrated by : Saksit Phaisanphisit

Mr. Saksit Phaisanphisit
Field Scientist (4)

Approved by : Nattapol Jiengwareewong

Mr. Nattapol Jiengwareewong
Specialist (1)

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



PROBE NOZZLE DIAMETER CALIBRATION DATA SHEET

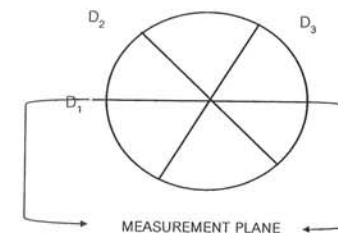
Calibration Date		13 Jul 23		Nozzle Set ID. :		BKK_FS0524	
Calibration Sheet No. : C-130723-BKK_FS0524				Vernier Caliper ID.:		BKK_FS1123	
Nozzle ID #	Nozzle Diameter (cm.)			Hi - Lo ΔD	$(D_1 + D_2 + D_3) / 3$ D_{avg}		
	D_1	D_2	D_3				
1	0.318	0.318	0.318	0.000	0.318		
2	0.472	0.474	0.475	0.003	0.474		
3	0.632	0.635	0.634	0.003	0.634		
4	0.792	0.792	0.792	0.000	0.792		
5	0.952	0.952	0.952	0.000	0.952		
6	1.091	1.110	1.092	0.019	1.098		
7	1.256	1.262	1.262	0.006	1.260		
8	1.601	1.598	1.600	0.003	1.600		

Where :

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

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

D_{avg} = (D₁ + D₂ + D₃) / 3



Calibrated by : Saksit Phaisanphisit

(Mr. Saksit Phaisanphisit)
Field Scientist (4)

Approved by : Nattapol Jiengwareewong

(Mr. Nattapol Jiengwareewong)
Field Specialist (1)

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



Pitot Tube Calibration Data

Pitot Tube Identification Number : BKK_FS0472 Calibration Date : 13 Jul 23
 Lab test duct Number : 258-1-13-01 Standard Pitot ID : BKK_FS0441
 Calibration Sheet No. : C-130723-BKK_FS0472 Cp Standard : 0.99

Type S Pitot Tube Coefficient Data

	Type s pitot tube Leg A,B	Standard pitot tube (ΔP , mm.H ₂ O)	Type s pitot tube (ΔP , mm.H ₂ O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 2	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 3	A	12.00	16.80	0.845	-
	B	12.00	16.80	-	0.845
\bar{C}_p				0.842	0.842

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

$$[Cp_{(A)} - Cp_{(B)}] \text{ must BE } \leq 0.01$$

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

Calibrated by

Saksit Phaisanphisut

(Mr. Saksit Phaisanphisut)

Field Scientist (4)

Approved by

Nattapol Jengwareewong

(Mr.Nattapol Jengwareewong)

Specialist (1)

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Agilent CrossLab Compliance Services

Certificate of System Qualification

GC-OQ + GCMS-OQ

REVIEW BY Suchada T.
 APPROVED BY Jengwareewong N.
 NEXT CAL. DATE 18 Oct 24

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

System Inspection and Basic Safety and Operation

Name: 7890
 Setpoint Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status

Pass

Inlet Pressure Accuracy

Name: 7890
 Front MMI
 Setpoint Status: Pass

	Setpoint	Actual
Inlet Pressure	25.0 psi	25.0 psi
Accuracy:		0.0 psi
Agilent Recommended:		<= 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 7890

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

Setpoint Status:

Zone:

Pass

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:

Zone:

Pass

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

Name:

Injection Tower

Source:

7693A
EI - InertDate: April 18, 2023 3:15:25 PM
System ID: GM-2

Setpoint Status:

Completed

Injection Volume on Column:

1.0 μ L

Overall Scouting Run Status

Completed

Signal to Noise EI

Tested Combination1	Front	MMI	/ External	SQ
Name:	5975C inert XL with TAD			

Source: EI - Inert Filament: 1

Setpoint Status: Pass

Signal to Noise: 456

Agilent Recommended: \geq 320

Source: EI - Inert Filament: 2

Setpoint Status: Pass

Signal to Noise: 2034

Agilent Recommended: \geq 320

Overall Signal to Noise EI Test Status

Pass

Injection Precision

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

Setpoint Status: Pass

Injection Volume on Column: 1.0 μ L

Area RSD: 1.66 % Retention Time RSD: 0.04 %

Agilent Recommended: \leq 5.00 \leq 1.00

Overall Injection Precision Test Status

Pass

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

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 μ L			

RSD:

Agilent Recommended:

Area Mass 1

Abundance's

1.66 %

 \leq 5.00

Pass

Mass Ratio

0.39 %

 \leq 5.00

Pass

Overall Mass Ratio Precision Test Status

Pass

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

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

Sampler 2

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

Mainframe 1

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

Inlet 1

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

Detector 1

Manufacturer	Agilent Technologies
Name	Mass Spectrometer
Type	Mass Spectrometer
Location	External

Mass Spectrometer 1

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

MS EI Source 1

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

Electronic Signature

Purpose

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

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

User Name: supasak.nimsongtham
Hostname: SCG1115HKC

System Id: GM-2
Print Date: April 18, 2023 3:15:36 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	Entitlement	Licensing	User Is FieldEngineer 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 [GcMs] - File path: [ProtocolPacks/GcMs/Configurations/02.51/GcMs.02.51.eqp], EQP File Name: [GcMs.02.51.eqp], EQP Name: [AgilentRecommended]
April 18, 2023 2:15:07 PM	End	Configuration	Session	None
April 18, 2023 2:15:11 PM	Start	Qualification	Session	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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User Name: supasak.nimsongtham
Hostname: SCG1115HKC

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

ALS GM2 Transaction log :

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

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

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

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User Name: supasak.nimsongtham
 Hostname: SCG1115HKC

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

ALS GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:19:31 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 2:19:36 PM	Start	Execution	Log Amp - 5975C Inert XL with TAD SQ: - Source: EI - Inert	None
April 18, 2023 2:19:46 PM	End	Execution	Log Amp - 5975C Inert XL with TAD SQ: - Source: EI - Inert	Run Count : 1
April 18, 2023 2:19:49 PM	Start	Execution	RFPA - 5975C Inert XL with TAD SQ: - Source: EI - Inert	None
April 18, 2023 2:32:54 PM	End	Execution	RFPA - 5975C Inert XL with TAD SQ: - Source: EI - Inert	Run Count : 1
April 18, 2023 2:32:57 PM	Start	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: - EI - Inert Filament 1 (Qualitative - No setpoints associated)	None
April 18, 2023 2:34:05 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: - EI - Inert Filament 1 (Qualitative - No setpoints associated)	Run Count : 1
April 18, 2023 2:34:07 PM	Start	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: - EI - Inert Filament 2 (Qualitative - No setpoints associated)	None
April 18, 2023 2:34:20 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: - EI - Inert Filament 2 (Qualitative - No setpoints associated)	Run Count : 1

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

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User Name: supasak.nimsongtham
 Hostname: SCG1115HKC

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

ALS GM2 Transaction log :

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

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

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User Name: supasak.nimsongtham
 Hostname: SCG1115HKC

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

ALS GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PIP_MRP002.D\DATA.MS
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PIP_MRP003.D\DATA.MS
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PIP_MRP004.D\DATA.MS
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PIP_MRP005.D\DATA.MS
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PIP_MRP006.D\DATA.MS
April 18, 2023 2:36:21 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PIP_MRP007.D\DATA.MS
April 18, 2023 2:36:42 PM	End	Execution	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Run Count : 1
April 18, 2023 2:38:45 PM	Start	Execution	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	None

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User Name: supasak.nimsongtham
 Hostname: SCG1115HKC

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

ALS GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:37:04 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PIP_MRP002.D\DATA.MS
April 18, 2023 2:37:04 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PIP_MRP003.D\DATA.MS
April 18, 2023 2:37:04 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PIP_MRP004.D\DATA.MS
April 18, 2023 2:37:04 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PIP_MRP005.D\DATA.MS
April 18, 2023 2:37:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PIP_MRP006.D\DATA.MS
April 18, 2023 2:37:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM-2 OQ2023\PMRP\PIP_MRP007.D\DATA.MS
April 18, 2023 2:37:17 PM	End	Execution	Mass Ratio Precision - Injection Tower, Front MMI, 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 MMI, 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

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

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User Name: supasak.nimsongham
Hostname: SCG111SHKC

System Id: GM-2
Print Date: April 18, 2023 3:15:39 PM

ALS GM2 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:56:38 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	None
April 18, 2023 2:57:00 PM	Audit	Data	DataManager	DataManager 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 MMI, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	Data files Path : E:\GM-2 OQ2023\ISNF2_003.D\DATA.MS
April 18, 2023 2:57:58 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	None
April 18, 2023 2:58:05 PM	End	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - 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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Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-6, e-mail: service.thailand@sartorius.com



SARTORIUS

NSC-TISI-TIS 17025
CALIBRATION 0426

Certificate of Calibration

REVIEW BY: *Thana*
APPROVED BY: *D. Chonchai*
NEXT CAL. DATE: 01/03/24

Model Number : MSE224S-100-DU Certificate No. : 23BC10115
Description : Analytical Balance Issued Date : Friday, March 03, 2023
Serial Number : 0031709552 Reference No. : 204833
ID No. : RYG_EN0003 Page No. : 1 of 2
Manufacturer : Sartorius
Customer Name : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)
616/10 Moo 5 T.Maenam Khu, A.Pluak Daeng, Rayong 21140, Thailand.
Calibrated Place : ALS Laboratory Group (Thailand) Co., Ltd.(Balance Room)
616/10 Moo 5 T.Maenam Khu, A.Pluak Daeng, Rayong 21140, Thailand.
Calibrated By : Mr.Chonchai Inthana Calibration Procedure No. : This calibration was conducted by
Calibration Date : Wednesday, March 01, 2023 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 : 23.0 °C ± 5.0 °C
Humidity : 56.0 % RH ± 10.0 % RH
Pressure : Equipment Condition: ☒ Good Operate ☐ Fair
Reasons for calibration
☐ New Installation ☐ Service / Repaired ☒ Re-calibration/ Maintenance

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	SPC-RT	C02212565	14-Sep-2023
MHB-382SD	Humidity/Barometer/Temp Lutron MHB-382SD	DKSH	C19220444	5-Sep-2023

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




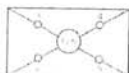


Certificate of Calibration

High Volume Air Sampler Calibration Worksheet

Model Number : MSE224S-100-DU
Description : Analytical Balance
Serial Number : 0031709552
ID No. : RYG_EN0003
Manufacturer : Sartorius
Certificate No. : 23BCI0115
Issued Date : Friday, March 03, 2023
Reference No. : 204833
Page No. : 2 of 2

Calibration Results : Without Adjustment

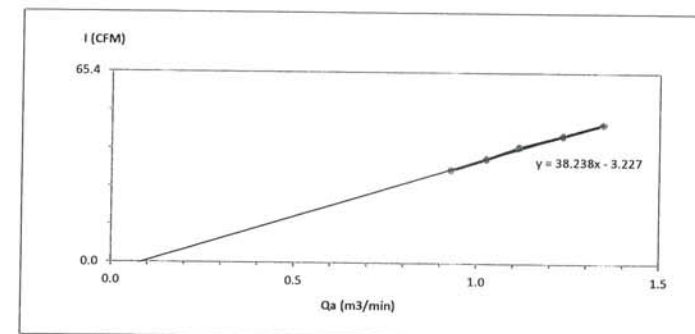
Repeatability			Eccentricity (Off-center loading error)		
The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.			The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).		
Nominal Value : (Low Load)	20.0000	200.0000	Nominal value :	100	g
20 g	20.0001	200.0000	Tolerance	0.0004	g
Tolerance	0.0001 g		 Difference		
	20.0000	200.0000			
	20.0000	200.0001			
Nominal Value : (High Load)	20.0001	200.0001			
200 g	20.0000	200.0001			
Tolerance	0.0001 g				
	20.0000	200.0001	 Difference		
	20.0000	200.0001			
	20.0000	200.0001			
	20.0000	200.0001			
	20.0000	200.0001			
	20.0000	200.0001			
Standard Deviation	0.00004	0.00005			

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	0.00013
0.05	0.0500	0.0500	0.0000	0.00013
0.1	0.1000	0.1000	0.0000	0.00013
0.5	0.5000	0.5000	0.0000	0.00014
1	1.0000	1.0000	0.0000	0.00014
5	5.0000	5.0000	0.0000	0.00014
10	10.0000	10.0000	0.0000	0.00014
20	20.0000	20.0000	0.0000	0.00024
50	50.0000	50.0000	0.0000	0.00015
100	100.0000	100.0000	0.0000	0.00019
200	200.0000	200.0001	0.0001	0.00032

End of Report.

Project Site : Siam Styrene Monomer Co., Ltd.
Calibrate Location : บ้านฉางประจักษ์ (โรงพยาบาลส่งเสริมสุขภาพตำบลฉางประจักษ์)
Calibrate Date : 14-Sep-23
Calibration Sheet No. : C-140923-RYG_FS0186
Calibrator ID : RYG_FS0206
Calibrator Model : TE-5028A
Calibrator S/N : 1543
Barometric Pressure (mm Hg) : 756
Temperature (°C) : 30
High Volume ID : RYG_FS0186
High Volume Model : TE-5009X
High Volume S/N : 4794
Calibrator Slope : 0.92345
Calibrator Intercept : -0.0095

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I: Chart (CFM)	Linear Regression
1	1.8	0.929	32	Slope : 38.2381 Intercept : -3.2270 Correlation Coefficient : 0.9984
2	2.2	1.026	36	
3	2.6	1.115	40	
4	3.2	1.236	44	
5	3.8	1.346	48	



Calibrated by : sitpawit.s
(Mr. Sitpawit Suwannarat)
Field Scientist(1)

Approved by : [Signature]
(Mr. Noppong Juntarupan)
Enviro Field Coordinator Scientist (3)

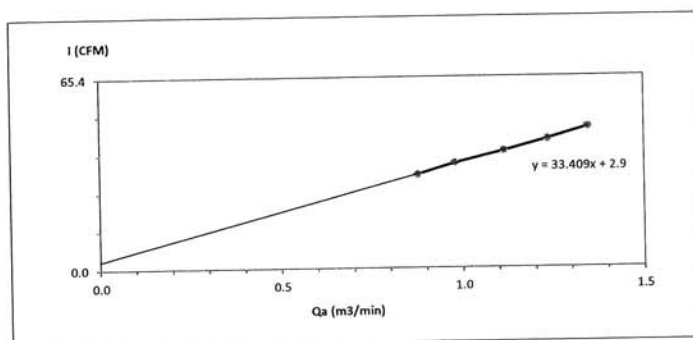


High Volume Air Sampler Calibration Worksheet

Project Site : Siam Styrene Monomer Co., Ltd.
 Calibrate Location : บ้านนาหวาด
 Calibrate Date : 14-Sep-23
 Calibration Sheet No.: C-140923-RYG_FS0665
 Calibrator ID: RYG_FS0206
 Calibrator Model: TE-5028A
 Calibrator S/N: 1543

Barometric Pressure (mm Hg) : 756
 Temperature (°C) : 30
 High Volume ID: RYG_FS0665
 High Volume Model: TE-5009X
 High Volume S/N: 6264
 Calibrator Slope: 0.92345
 Calibrator Intercept: -0.0095

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I : Chart (CFM)	Linear Regression
1	1.6	0.877	32	Slope : 33.4089 Intercept : 2.9000 Correlation Coefficient : 0.9992
2	2.0	0.979	36	
3	2.6	1.115	40	
4	3.2	1.236	44	
5	3.8	1.346	48	



Calibrated by sitpawit.s
 (Mr. Sitpawit Suwannarat)
 Field Scientist(1)

Approved by : [Signature]
 (Mr. Noppong Juntarupan)
 Enviro Field Coordinator Scientist (3)

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

Sartorius (Thailand) Co., Ltd.
 129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
 Tel: +66 2643 8361-6, e-mail: service.thailand@sartorius.com



SARTORIUS

Certificate of Calibration

REVIEW BY [Signature]
 APPROVED BY [Signature]
 NEXT CAL. DATE 01/03/24

Model Number : LA130S-F
 Description : Analytical Balance
 Serial Number : 25409664
 ID No. : RYG_EN0001
 Manufacturer : Sartorius

Certificate No. : 23BCI0110
 Issued Date : Friday, March 03, 2023
 Reference No. : 204833
 Page No. : 1 of 2

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

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

Calibrated By : Mr.Chonchai Inthana
 Calibration Date : Wednesday, March 01, 2023

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

Metrological data :
 Capacity : 150 g Readability : 0.0001 g

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

Ambients Conditions:
 Temperature : 24.2 °C ± 5.0 °C
 Humidity : 60.0 % RH ± 10.0 % RH
 Pressure : ±

Equipment Condition: ☒ Good Operate ☐ Fair

Measurement Method UKAS Publication Ref :Lab 14
 The measurement uncertainty stated is the expended uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM). The calibration certificate documents the traceability to National Standards, which realise the unit of measurement according to the International Standard System of Units (SI). Report of Tolerance came from list of Sartorius Metrological Specifications.

Traceability:

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 5000g E2.YCS011-522-00	SPC-RT	C02212565	14-Sep-2023
MHB-382SD	Humidity/Barometer/Temp Lutron MHB-382SD	DKSH	C19220444	5-Sep-2023

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

Mr.chonchai Inthana(Technical Manager)

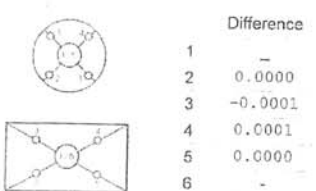
S
T
A
M
P

Certificate of Calibration

Model Number : LA130S-F
Description : Analytical Balance
Serial Number : 25409664
ID No. : RYG_EN0001
Manufacturer : Sartorius

Certificate No. : 23BCI0110
Issued Date : Friday, March 03, 2023
Reference No. : 204833
Page No. : 2 of 2

Calibration Results : Without Adjustment

Repeatability			Eccentricity (Off-center loading error)		
The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.			The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R75).		
Nominal Value : (Low Load)	10.0000	100.0001	Nominal value :	50	g
10 g	10.0000	100.0002	Tolerance	0.0004	g
Tolerance	10.0001	100.0001			
0.0001 g	10.0000	100.0000			
	9.9999	100.0002			
Nominal Value : (High Load)	10.0000	100.0001			
100 g	10.0001	100.0001			
Tolerance	10.0000	100.0001			
0.0001 g	9.9999	100.0002			
	9.9998	100.0001			
Standard Deviation	0.00009	0.00006			

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	0.00022	
0.05	0.0500	0.0500	0.0000	0.00023	
0.1	0.1000	0.1000	0.0000	0.00023	
0.5	0.5000	0.5000	0.0000	0.00023	
1	1.0000	1.0000	0.0000	0.00023	
2	2.0000	2.0000	0.0000	0.00022	
5	5.0000	5.0000	0.0000	0.00024	
10	10.0000	10.0001	0.0001	0.00023	
20	20.0000	20.0001	0.0001	0.00026	
100	100.0000	100.0002	0.0002		

End of Report.

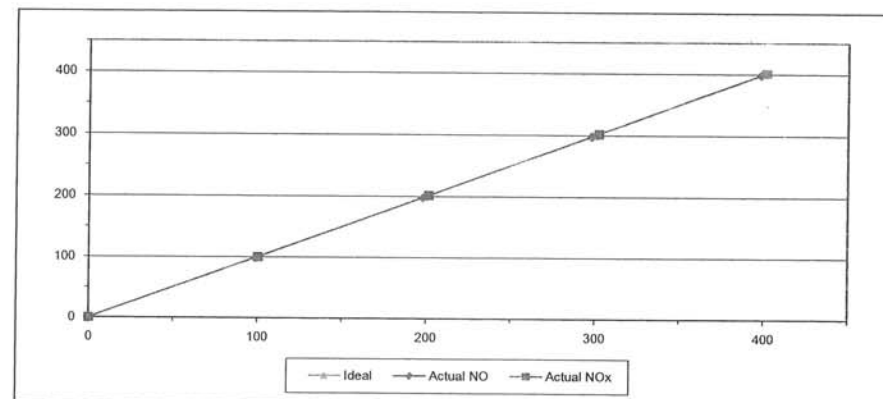


MULTIPOINT CALIBRATION REPORT

Calibration Date : 1-Jul-23
Manufacturer : HORIBA
Serial No. : SEEAW53E
Calibrator Manufacturer : Teledyne API
Serial No. : 947
Std. Gas Concentration (PPM) : 55.88
Cylinder Pressure (psi) : 1800
Certified Date : 9-Feb-22

Equipment Name : NOx Analyzer
Model : APNA-370
Equipment ID : RYG_FS0261
Model : 700
Cylinder No. : GN0027222
Certified By : Airgas Inc.
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	98.70	-1.30	-1.30	100.40	0.40	0.40
2	200.00	197.80	-2.20	-1.10	201.50	1.50	0.75
3	300.00	298.10	-1.90	-0.63	302.20	2.20	0.73
4	400.00	398.50	-1.50	-0.38	401.40	1.40	0.35
AVERAGE (%)				-0.66			0.47



Calibrated By

(Mr. Jirawat Sakam)

Field Environmental Scientist (3)

Approved By

(Mr. Sarayuth Jitranont)

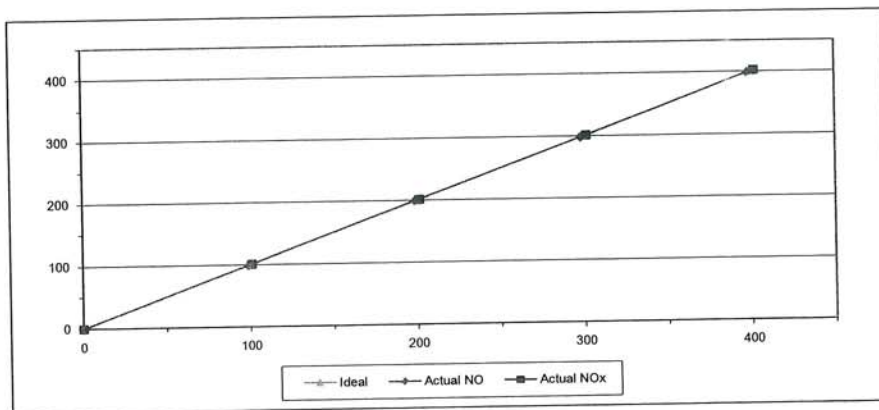
Assistant General Manager



MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-23	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	U8AOEAGK	Equipment ID	RYG_FS0551
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.00	-1.00	-1.00	101.00	1.00	1.00
2	200.00	198.50	-1.50	-0.75	201.30	1.30	0.65
3	300.00	298.40	-1.60	-0.53	301.50	1.50	0.50
4	400.00	398.20	-1.80	-0.45	402.00	2.00	0.50
AVERAGE (%)				-0.53			0.55



Calibrated By

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

Approved By

(Mr. Sarayuth Jitranont)
Assistant General Manager

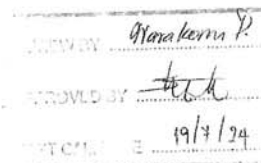


JIRANATEE ASSOCIATES CO., LTD.

Jiranatee Associates Co., Ltd.
63/14-15, 67/35-36
Petchkasem 7,7/1, Rd. Wattapra, Bangkokyai,
Bangkok 10600 (Thailand)
Tel: +6608680812
Mobile: +66863999453
E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TIS-TIS 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
MANUFACTURER
MODEL/TYPE

SERIAL NUMBER

ID NUMBER
CONDITION AS-RECEIVED
CUSTOMER

RECEIVED DATE
MEASUREMENT DATE
ISSUE DATE

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

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

PLACE OF CALIBRATION

Eiffel-type wind tunnel of Jiranatee Associates Co., Ltd.

CALIBRATION CONDITION

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

Preconditioning
Measurement Condition

24 hours at ambient conditions.
The average values during measurement are (24.1)°C, (54.3) %RH and (1015.2) hPa.

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:
☒ Mr. Sorawit Thattalad
☐ Miss Jitraporn Lertsomphol

Approved signatory:

Mr. Parinya Booncharoen
Calibration Department Manager

Remark:

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 ² to ¹

Calibration procedure:

The wind direction sensor was calibrated against Standard Rotary Encoder model AX400015 DM04-P3-S-U0 in an close test section of Eiffel-type wind tunnel with 900 cm² cross test section area. The WI-CL-008 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: DA-0043-22

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'

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

ALS Laboratory Group

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

MEASUREMENT RESULTS⁵

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'_{vec} Degree (°)	Error Degree (°)	$U (k=2)$ Degree (°)
5.03	0.000	0	0	0.58
	45.000	41	-4	0.68
	90.000	88	-2	0.74
	135.000	133	-2	0.58
	180.000	180	0	0.74
	225.000	228	3	0.74
	270.000	273	3	0.68
	315.000	316	1	0.74

Remark:

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

⁶ Direction of standard

⁷ Direction of Unit Under Calibration

End of Certificate of Calibration

Certificate Number

CL-011-66



JIRANATEE ASSOCIATES CO., LTD.

Jiranatee Associates Co., Ltd.
63/114-15, 67/35-56
Petchburi 7, 7/1, Rd. Wattana, Bangkok,
Bangkok 10600 (Thailand)
Tel: +6608608012
Mobile: +66863999453
E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

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

Air speed measurement laboratory
Calibration services department

Certificate Number

CL-011-66

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM
MANUFACTURER
MODEL/TYPE

: Cup anemometer
: Novalyne
: Sensor: WS-02F
: Data logger: 200-WS-25DL

SERIAL NUMBER

: Sensor: -
: Data logger: A4987

ID NUMBER

: RYG_FS0089

CONDITION AS-RECEIVED

: Used item

CUSTOMER

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

RECEIVED DATE

: 16 Jan 2023

MEASUREMENT DATE

: 18 Jan 2023

ISSUE DATE

: 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 ± 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 (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. Sorawit Thachalad
☐ Miss Jitragorn Laitonmpichol

Remark:

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 ² to ¹

Calibration procedure:

The cup anemometer was calibrated against Standard air velocity transducer model: B45502 and pitot tube with precision differential pressure meter model: DPM7500 in an open test section of Eiffel-type wind tunnel with 900 cm² cross test section area. The WI-CL-002 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-0052-21 and MW-0058-22

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"

Approved signatory:


Mr. Parinya Booncharoen
Calibration Department Manager

Certificate Number
CL-011-66

Jiranatee Associates Co., Ltd.
 63/14 15, 67/35-36
 Petchkasem 7/71, Rd Wattthapra, Bangkok
 Bangkok 10600 (Thailand)
 Tel: +6608680812
 Mobile: +66063999453
 E-mail: jnac-calibration@jiranatee.com
 Web site: www.jiranatee.com

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

Air speed measurement laboratory
 Calibration services department.

VIEW BY	Nana loom P
APPROVED BY	
CAL DATE	19/12/24

Certificate Number
CC-008-66

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

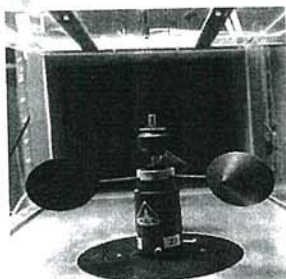
Remark:

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

² Velocity of standard

³ Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP



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

End of Certificate of Calibration

Page 1 of 2 Pages

MEASUREMENT ITEM

MANUFACTURER

MODEL/TYPE

SERIAL NUMBER

ID NUMBER

CONDITION AS-RECEIVED

CUSTOMER

RECEIVED DATE

MEASUREMENT DATE

ISSUE DATE

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

CALIBRATION CONDITIONS

Preconditioning

Measurement Condition

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:

- ☒ Mr. Sorawit Thachalad
☐ Miss Jitraporn Lertsomphol



Remark:

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 ¹ to ³

CERTIFICATE OF CALIBRATION

: Cup anemometer

: Novalynx

: Sensor: WS-02F

: Data logger: 200-WS-25DL

: Sensor: WSD-A4985

: Data logger: A4985

: RYG_FS0085

: Used item

: ALS laboratory group (Thailand) Co., Ltd.

: 104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,

: Khet Suan Luang, Bangkok 10250 Thailand.

: 16 Jun 2023

: 19 Jun 2023

: 19 Jun 2023

Calibration procedure:

The cup anemometer was calibrated against Standard air velocity transducer model: 8455-12 and pitot tube with precision differential pressure meter model: DPM2500 in an close 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 electricly 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-0052-21 and MW-0065-22

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"

Approved signatory:


 Mr. Parinya Booncharoen
 Calibration Department Manager

MEASUREMENT RESULTS⁵

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

V_{std} (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	V_{UUC} (m/s)	Error (m/s)	$U (k=2)$ (m/s)
1.025	24.90	24.95	0.9	-0.1	0.31
2.028	24.96	24.95	1.9	-0.1	0.31
2.997	25.00	24.95	2.9	-0.1	0.31
4.126	25.00	24.95	4.0	-0.1	0.31
5.02	24.90	24.95	4.9	-0.1	0.31
6.00	24.88	24.95	5.9	-0.1	0.31
7.05	24.90	24.95	7.0	-0.1	0.31
8.18	24.74	24.95	8.0	-0.1	0.31
9.09	24.84	24.95	9.0	0.0	0.31
10.07	24.70	24.95	10.0	-0.1	0.31
11.14	24.78	24.95	11.1	-0.1	0.31
12.12	24.70	24.95	12.0	-0.1	0.31
13.17	24.70	24.95	13.1	0.0	0.35
14.24	24.70	24.95	14.1	-0.2	0.31
15.20	24.70	24.95	15.2	0.0	0.44
16.28	24.70	24.95	16.2	-0.1	0.31

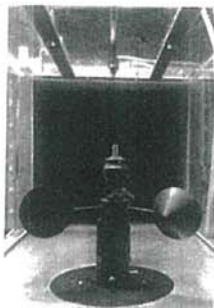
Remark:

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

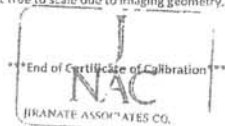
⁶ Velocity of standard

⁷ Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP



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



Certificate Number
CC-008-66



Jiranatee Associates Co., Ltd.
63/14-15, 62/15-16,
Petchkasem 1/1/1, Rd. Watthapra Bangkokya,
Bangkok 10600 (Thailand)
Tel: +6686680812
Mobile: +66863909453
E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

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

Air speed measurement laboratory
Calibration services department.

Certificate Number
CD-008-66

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM
MANUFACTURER
MODEL/TYPE

: Wind Direction Sensor
: Novalynx

SERIAL NUMBER

: Sensor: WS-02F
Data logger: 200-WS-25DL

ID NUMBER

: Sensor: WSD-A4985
Data logger: A4985

CONDITION AS-RECEIVED
CUSTOMER

: RYG_FS0085
: Used item
: 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

: 19 Jun 2023

ISSUE DATE

: 19 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 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, (55.4) %RH and (1008.5) hPa.

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:

☒ Mr. Sorawit Thachalad
☐ Miss Jitraporn Lertsomphol



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 $\frac{A_2}{A_1}$

Certificate Number

CD-008-66

Page 2 of 2 Pages

MEASUREMENT RESULTS⁵

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 ¹ _{std} Degree (°)	D ¹ _{rot} Degree (°)	Error Degree (°)	U (k=2) Degree (°)
5.01	45.000	44	-1	1.0
	90.001	87	-3	1.0
	135.000	132	-3	1.0
	180.000	179	-1	1.0
	225.000	228	3	1.0
	270.000	273	3	1.0
	315.000	319	4	1.0
	360.000	359	-1	1.0

Remark:

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

¹ Direction of standard

² Direction of Unit Under Calibration

End of Certificate of Calibration



SITHIPHORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY



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

Cert. No. : ACC23005

Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-75
Serial No.: 35002736
ID No.: RYG_FS0496

Condition As Found : GOOD

Customer : A.I.S 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 : 06 JANUARY 2023
Calibration Date : 17 JANUARY 2023
Date of Issue : 19 JANUARY 2023

Calibrated by :

Nathakorn Pisutpaisan

Approved by :

T. Petchumai
(Thanakul Petchumai)

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.

Continuation of Calibration Certificate

Cert. No. : ACC23005
Job No. : VC66AC0024
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-0008-22	04-Feb-23
Digital Multimeter	33461A	MY53220104	EEL.BP. 04/0265	09-Feb-23
Digital Multimeter	33461A	MY53220076	EEL.BP. 03/0265	09-Feb-23
Digital Multimeter	33461A	MY60024273	EEL.BP. 05/0265	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	EF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAI	34560495	AA-3005-22	22-Feb-23
Audio Analyzer	AVR-3360A	V744B6069	EF-0010-22	07-Feb-23

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

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

3.1 National Institute of Metrology (Thailand).

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

7. P.T.N.

Continuation of Calibration Certificate

Cert. No. : ACC23005
Job No. : VC66AC0024
Pages : 3 of 3

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit (dB)
94	93.98	-0.02	0.14	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Tolerance limit (%)
1000	1000.0	0.0	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
0.35	0.10	3.0

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

End of Calibration Certificate

7. P.T.N.

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

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



Cert. No. : ACL22226
Pages : 1 of 8

Calibration Certificate

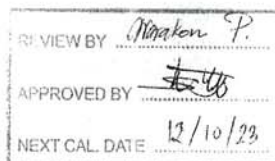
Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00623387 / 198634 / 26415
ID No.: -

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 : 28 SEPTEMBER 2022
Calibration Date : 12-17 OCTOBER 2022
Date of Issue : 18 OCTOBER 2022



Calibrated by : Nathakorn Pisutpaisan

Approved by :

(Thanakul Petchurai)

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

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22226
Job No. : VC65AC0086
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0007-22	04-Feb-23
Waveform Generator	33511B	MY52302742	EF-0008-22	04-Feb-23
Digital Multimeter	33461A	MY53220104	EEL.BP. 04/0265	09-Feb-23
Digital Multimeter	33461A	MY53220076	EEL.BP. 03/0265	09-Feb-23
Digital Multimeter	34461A	MY60024273	EEL.BP. 05/0265	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	EF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAI	34560495	AA-3005-22	22-Feb-23

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

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

- 3.1 National Institute of Metrology (Thailand).
- 3.2 Thailand Institute of Scientific and Technological Research (TISTR).

(Thanakul Petchurai)

Continuation of Calibration Certificate

Cert. No. : ACL22226
Job No. : VC65AC0086
Pages : 3 of 8

Summary of Measurement Result :

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

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL22226
Job No. : VC65AC0086
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.95)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.8

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

Frequency Weighting	Measured value (dB)
A - weight	11.6
C - weight	17.7
Flat	23.5

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.1	0.2	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	0.4	0.5	0.5	±5.0

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL22226
Job No. : VC65AC0086
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

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

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

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

T. Petch...

Continuation of Calibration Certificate

Cert. No. : ACL22226
Job No. : VC65AC0086
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	132.9	-0.1	± 1.1
132.0	131.9	-0.1	± 1.1
131.0	130.9	-0.1	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.1	0.1	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.1	0.1	± 1.1
25.0	25.1	0.1	± 1.1

T. Petch...

Continuation of Calibration Certificate

Cert. No. : ACL22226
Job No. : VC65AC0086
Pages : 7 of 8

8. Level linearity including the level range control

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

9. Tone burst response

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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.8	-0.6	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

T. Peth...

Continuation of Calibration Certificate

Cert. No. : ACL22226
Job No. : VC65AC0086
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 $k = 2$ or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate

T. Peth...

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

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



Cert. No. : ACC23009
Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-74
Serial No.: 34178121
ID No.: RYG_FS0213

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 : 24 JANUARY 2023
Calibration Date : 26 JANUARY 2023
Date of Issue : 27 JANUARY 2023

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchurai
(Thanakul Petchurai)

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SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACC23009
Job No. : VC66AC0031
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-0008-22	04-Feb-23
Digital Multimeter	33461A	MY53220104	EEL.BP. 04/0265	09-Feb-23
Digital Multimeter	33461A	MY53220076	EEL.BP. 03/0265	09-Feb-23
Digital Multimeter	33461A	MY60024273	EEL.BP. 05/0265	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	EF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAI	34560495	AA-3005-22	22-Feb-23
Audio Analyzer	AVR-3360A	V744B6069	EF-0010-22	07-Feb-23

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

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

3.1 National Institute of Metrology (Thailand).

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

T. Petchurai

Continuation of Calibration Certificate

Cert. No. : ACC23009
Job No. : VC66AC0031
Pages : 3 of 3

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit (dB)
94	94.16	0.16	0.14	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Tolerance limit (%)
1000	1003.2	0.3	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
1.97	0.10	3.0

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

End of Calibration Certificate

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



Cert. No. : ACL23320
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00597167 / 179118 / 87525
ID No.: RYG_FS0437

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 OCTOBER 2023
Calibration Date : 19-20 OCTOBER 2023
Date of Issue : 24 OCTOBER 2023

REVIEW BY	<i>Nathakorn P</i>
APPROVED BY	<i>T. Petchurai</i>
NEXT CAL. DATE	19/10/24

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchurai
(Thanakul Petchurai)

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T. Petchurai

Continuation of Calibration Certificate

Cert. No. : ACL23320
Job No. : VC67AC0011
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

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

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

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

Condition of this result of calibration :

1. Reference Standard Instruments :

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

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

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

3.1 National Institute of Metrology (Thailand).

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

T. Petch...

Continuation of Calibration Certificate

Cert. No. : ACL23320
Job No. : VC67AC0011
Pages : 3 of 8

Summary of Measurement Result :

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

Note : Pass/Fail evaluation for each parameter,

will be considered together from the acceptance limit and the Maximum-permitted uncertainty of measurement.

T. Petch...

Continuation of Calibration Certificate

Cert. No. : ACL23320

Job No. : VC67AC0011

Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.6

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

Frequency Weighting	Measured value (dB)
A - weight	11.2
C - weight	17.5
Flat	23.1

3. Acoustical signal tests of frequency weightings

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

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

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL23320

Job No. : VC67AC0011

Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

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

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

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

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL23320
Job No. : VC67AC0011
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.0	0.0	± 1.1
134.0	134.0	0.0	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	63.9	-0.1	± 1.1
59.0	59.0	0.0	± 1.1
54.0	53.9	-0.1	± 1.1
49.0	48.9	-0.1	± 1.1
44.0	43.9	-0.1	± 1.1
39.0	38.9	-0.1	± 1.1
34.0	34.0	0.0	± 1.1
30.0	29.9	-0.1	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.9	-0.1	± 1.1

T. Petin

Continuation of Calibration Certificate

Cert. No. : ACL23320
Job No. : VC67AC0011
Pages : 7 of 8

8. Level linearity including the level range control

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

9. Tone burst response

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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.1	0.1	±3.0
One	136.4	136.1	-0.3	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.1	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

T. Petin

Cert. No. : ACL23320

Job No. : VC67AC0011

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	89.6	0.1	±1.5

12. High level stability

Frequency	SLM Display at initial	SLM Display at final	Deviated Value	Acceptance Limits
Weighting	(dB)	(dB)	(dB)	(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

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



Cert. No. : ACL22194

Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00597168 / 179117 / 87524
ID No.: RYG_FS0438

Condition As Found : GOOD

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

Location :
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %
Received Date : 06 SEPTEMBER 2022
Calibration Date : 07-09 SEPTEMBER 2022
Date of Issue : 14 SEPTEMBER 2022

REVIEW BY:	<i>Nathakorn P</i>
APPROVED BY:	<i>T. Petchurai</i>
NEXT CAL. DATE	7/9/23

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.

T. Petchurai

Continuation of Calibration Certificate

Cert. No. : ACL22194
Job No. : VC65AC0081
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0007-22	04-Feb-23
Waveform Generator	33511B	MY52302742	EF-0008-22	04-Feb-23
Digital Multimeter	33461 A	MY53220104	EEL.BP. 04/0265	09-Feb-23
Digital Multimeter	33461 A	MY53220076	EEL.BP. 03/0265	09-Feb-23
Digital Multimeter	34461 A	MY60024273	EEL.BP. 05/0265	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	EF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAI	34560495	AA-3005-22	22-Feb-23

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).

Continuation of Calibration Certificate

Cert. No. : ACL22194
Job No. : VC65AC0081
Pages : 3 of 8

Summary of Measurement Result :

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

Continuation of Calibration Certificate

Cert. No. : ACL22194
Job No. : VC65AC0081
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.95)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.1

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

Frequency Weighting	Measured value (dB)
A - weight	11.6
C - weight	18.1
Flat	23.8

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.2	0.2	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	1.7	1.8	1.8	±5.0

T. Reth...

Continuation of Calibration Certificate

Cert. No. : ACL22194
Job No. : VC65AC0081
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±2.0
125	0.0	0.1	0.0	±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	0.1	±2.0
4000	0.1	0.1	0.1	±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	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	94.0	0.0	-
C - weight	94.0	0.0	± 0.2
Flat	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

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

6. Long - term stability

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

T. Reth...

Continuation of Calibration Certificate

Cert. No. : ACL22194
Job No. : VC65AC0081
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	± 1.1
136.0	136.0	0.0	± 1.1
135.0	135.1	0.1	± 1.1
134.0	134.1	0.1	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.1	0.1	± 1.1
114.0	114.1	0.1	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.1	0.1	± 1.1
99.0	99.1	0.1	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.9	-0.1	± 1.1

7. Retu

Continuation of Calibration Certificate

Cert. No. : ACL22194
Job No. : VC65AC0081
Pages : 7 of 8

8. Level linearity including the level range control

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

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	116.9	-0.1	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.8	-0.2	1.5 ; -5.0
	2	8	108.0	107.9	-0.1	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

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

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

7. Retu

Continuation of Calibration Certificate

Cert. No. : ACL22194
Job No. : VC65AC0081
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 $k = 2$
or any value following calculation, providing a level of confidence of approximately 95 %

End of Calibration Certificate



ROTA METER CALIBRATION RESULT JANUARY 2023

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R ²)
BKK_FS0577	03 Jan 23	Y = 1.0259x - 0.6354	0.9997
BKK_FS0579	05 Jan 23	Y = 1.0005x + 0.2803	1.0000
BKK_FS0583	05 Jan 23	Y = 0.9976x + 1.2146	1.0000
BKK_FS0584	03 Jan 23	Y = 1.0104x - 0.3929	1.0000
BKK_FS0586	05 Jan 23	Y = 1.001x - 1.3619	0.9999
BKK_FS0587	03 Jan 23	Y = 1.0038x + 0.881	1.0000
BKK_FS0588	05 Jan 23	Y = 1.0015x - 0.6876	0.9999
BKK_FS0590	05 Jan 23	Y = 0.9958x + 1.7452	1.0000
BKK_FS0591	03 Jan 23	Y = 0.9677x + 64.54	0.9951
BKK_FS0593	03 Jan 23	Y = 0.9792x + 21.393	0.9972
BKK_FS0594	03 Jan 23	Y = 1.0455x - 43.344	0.9976
BKK_FS0595	05 Jan 23	Y = 0.9993x + 1.18	1.0000
BKK_FS0597	05 Jan 23	Y = 0.9788x + 22.286	0.9971
BKK_FS1004	03 Jan 23	Y = 0.9943x + 7.1619	0.9996
BKK_FS1005	03 Jan 23	Y = 1.0045x + 2.1167	0.9998
BKK_FS1006	03 Jan 23	Y = 1.0288x - 0.3852	0.9999
BKK_FS1008	03 Jan 23	Y = 1.0181x + 0.1282	0.9998
BKK_FS1009	05 Jan 23	Y = 1.0018x + 1.1293	1.0000
BKK_FS1011	03 Jan 23	Y = 1.0463x - 1.9344	0.9985
BKK_FS1012	03 Jan 23	Y = 1.0082x - 53.425	0.9999
BKK_FS1013	03 Jan 23	Y = 1.0058x - 9.701	1.0000
BKK_FS1014	05 Jan 23	Y = 0.9869x + 1.2643	0.9995
BKK_FS1015	05 Jan 23	Y = 1.004x - 0.7571	0.9999
BKK_FS1016	05 Jan 23	Y = 0.978x + 24.623	0.9973
BKK_FS1017	17 Jan 23	Y = 1.0022x + 0.4211	1.0000
BKK_FS1018	17 Jan 23	Y = 0.9893x + 5.8317	1.0000
BKK_FS1019	17 Jan 23	Y = 0.9859x - 11.574	0.9986
BKK_FS1020	03 Jan 23	Y = 1.0208x - 0.6221	0.9998
BKK_FS1021	03 Jan 23	Y = 0.992x - 44.599	0.9997
BKK_FS1022	03 Jan 23	Y = 1.0067x - 12.483	0.9999
BKK_FS1023	03 Jan 23	Y = 1.0013x + 0.5823	0.9993
BKK_FS1024	03 Jan 23	Y = 1.0036x - 50.787	0.9999
BKK_FS1025	03 Jan 23	Y = 0.974x + 27.034	0.9969
BKK_FS1026	05 Jan 23	Y = 0.9783x + 1.7075	0.9991
BKK_FS1027	05 Jan 23	Y = 1.145x - 90.325	0.9797
BKK_FS1028	05 Jan 23	Y = 0.9815x + 13.626	0.9969
BKK_FS1029	03 Jan 23	Y = 0.9706x + 3.6283	0.9951
BKK_FS1030	03 Jan 23	Y = 1.0197x - 52.982	0.9999



ROTA METER CALIBRATION RESULT JANUARY 2023

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R ²)
BKK_FS1031	03 Jan 23	Y = 0.9995x - 0.1581	1.0000
BKK_FS1039	03 Jan 23	Y = 1.0242x - 4.3007	0.9986
BKK_FS1040	03 Jan 23	Y = 1.0035x + 1.0705	0.9998
BKK_FS1041	03 Jan 23	Y = 0.9791x + 0.252	1.0000
BKK_FS1042	03 Jan 23	Y = 1.0186x - 3.7429	0.9999
BKK_FS1043	03 Jan 23	Y = 1.0038x + 2.961	0.9999
BKK_FS1044	03 Jan 23	Y = 1.0189x + 0.2969	1.0000
BKK_FS1163	18 Jan 23	Y = 1.0127x + 0.8332	0.9996
BKK_FS1164	18 Jan 23	Y = 1.2176x + 4.7376	0.9952
BKK_FS1165	18 Jan 23	Y = 1.0005x - 47.94	1.0000
BKK_FS1166	18 Jan 23	Y = 1.0346x - 35.841	0.9996
BKK_FS1200	03 Jan 23	Y = 1.0168x + 0.4034	0.9997
BKK_FS1201	03 Jan 23	Y = 0.7655x + 60.985	0.9986
BKK_FS1202	03 Jan 23	Y = 0.9593x + 87.615	0.9958
RYG_FS0197	03 Jan 23	Y = 1.0305x - 94.849	0.9991
RYG_FS0198	03 Jan 23	Y = 1.0103x - 19.254	0.9999
RYG_FS0199	03 Jan 23	Y = 0.9897x + 0.998	0.9983

Review By :

Wichan Choonharat

(Mr. Wichan Choonharat)

Enviro Field Services Manager

Approved By :

Mr. Sarayuth Jittrantont

(Mr. Sarayuth Jittrantont)

Assistant General Manager



ROTA METER CALIBRATION RESULT OCTOBER 2023

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R ²)
BKK_FS0577	02 Oct 23	Y = 1.2862x - 1.2952	0.9963
BKK_FS0579	02 Oct 23	Y = 1.2546x + 0.0065	0.9946
BKK_FS0583	03 Oct 23	Y = 1.0773x - 2.4138	0.9989
BKK_FS0584	02 Oct 23	Y = 0.9787x + 12.569	0.9999
BKK_FS0585	18 Oct 23	Y = 1.0322x + 3.7767	0.9998
BKK_FS0586	02 Oct 23	Y = 0.9777x + 15.405	0.9997
BKK_FS0587	18 Oct 23	Y = 1.0175x + 14.717	0.9997
BKK_FS0589	03 Oct 23	Y = 1.0148x + 2.4143	1.0000
BKK_FS0590	03 Oct 23	Y = 1.0088x + 0.8429	1.0000
BKK_FS0591	02 Oct 23	Y = 1.0733x - 88.805	0.9989
BKK_FS0592	18 Oct 23	Y = 1.0037x + 10.388	1.0000
BKK_FS0593	02 Oct 23	Y = 1.0538x - 60.63	0.9996
BKK_FS0594	18 Oct 23	Y = 1.0052x + 5.3238	0.9999
BKK_FS0596	03 Oct 23	Y = 1.0449x - 48.241	0.9996
BKK_FS0597	03 Oct 23	Y = 1.0697x - 83.62	0.9994
BKK_FS1004	02 Oct 23	Y = 0.9855x + 14.75	0.9992
BKK_FS1005	02 Oct 23	Y = 1.02x + 1.7167	0.9996
BKK_FS1006	02 Oct 23	Y = 1.1762x - 3.5619	0.9999
BKK_FS1007	18 Oct 23	Y = 1.1405x + 2.6044	0.9993
BKK_FS1008	18 Oct 23	Y = 1.1267x + 4.8333	0.9991
BKK_FS1010	03 Oct 23	Y = 1.0027x + 2.5832	0.9986
BKK_FS1011	02 Oct 23	Y = 1.3811x - 6.2068	0.9998
BKK_FS1012	02 Oct 23	Y = 1.0017x + 0.9	1.0000
BKK_FS1013	02 Oct 23	Y = 1.0593x - 46.02	0.9994
BKK_FS1014	03 Oct 23	Y = 1.0961x - 1.6895	0.9983
BKK_FS1015	03 Oct 23	Y = 0.9979x + 6.2595	0.9993
BKK_FS1016	03 Oct 23	Y = 1.0683x - 82.491	0.9995
BKK_FS1017	06 Oct 23	Y = 0.9981x - 2.2235	0.9998
BKK_FS1018	06 Oct 23	Y = 0.9817x - 20.653	0.9999
BKK_FS1019	06 Oct 23	Y = 1.0152x - 64.485	0.9998
BKK_FS1020	02 Oct 23	Y = 1.2691x - 2.4721	0.9983
BKK_FS1021	02 Oct 23	Y = 1.0036x + 2.3286	0.9999
BKK_FS1022	02 Oct 23	Y = 1.0633x - 73.266	0.9990
BKK_FS1023	03 Oct 23	Y = 1.0879x - 1.0694	0.9984
BKK_FS1024	02 Oct 23	Y = 1.0035x + 1.4857	1.0000
BKK_FS1025	03 Oct 23	Y = 1.0556x - 58.597	0.9999
BKK_FS1026	02 Oct 23	Y = 1.2894x - 1.497	0.9970
BKK_FS1027	02 Oct 23	Y = 1.0032x + 1.5167	1.0000
BKK_FS1028	02 Oct 23	Y = 1.0433x - 30.012	0.9994



ROTA METER CALIBRATION RESULT OCTOBER 2023

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R ²)
BKK_FS1029	02 Oct 23	Y = 1.3494x - 3.5078	0.9981
BKK_FS1030	02 Oct 23	Y = 1.0015x + 1.2214	1.0000
BKK_FS1031	02 Oct 23	Y = 1.0516x - 56.996	0.9994
BKK_FS1039	02 Oct 23	Y = 0.9991x + 14.527	0.9994
BKK_FS1040	02 Oct 23	Y = 1.0049x - 2.4324	1.0000
BKK_FS1041	02 Oct 23	Y = 1.1682x - 2.1293	1.0000
BKK_FS1042	02 Oct 23	Y = 1.0051x + 6.2533	0.9989
BKK_FS1043	02 Oct 23	Y = 1.0022x + 3.96	1.0000
BKK_FS1044	02 Oct 23	Y = 1.0796x + 2.9806	0.9993
BKK_FS1164	02 Oct 23	Y = 1.2714x + 0.234	0.9945
BKK_FS1165	02 Oct 23	Y = 1.0029x + 3.3571	0.9994
BKK_FS1166	02 Oct 23	Y = 1.061x - 56.83	1.0000
BKK_FS1200	02 Oct 23	Y = 1.2803x - 1.4599	0.9962
BKK_FS1201	02 Oct 23	Y = 1.0374x - 6.1952	1.0000
BKK_FS1202	02 Oct 23	Y = 1.0486x - 44.05	0.9997
PHK_FS0027	09 Oct 23	Y = 1.1052x + 1.0293	1.0000
PHK_FS0028	09 Oct 23	Y = 1.0377x - 1.9833	1.0000
PHK_FS0029	09 Oct 23	Y = 1.0021x + 7.5248	1.0000
RYG_FS0197	02 Oct 23	Y = 1.0036x + 9.0133	1.0000
RYG_FS0198	02 Oct 23	Y = 0.9991x + 17.568	1.0000
RYG_FS0199	02 Oct 23	Y = 1.0814x - 1.2993	0.9997
RYG_FS0654	02 Oct 23	Y = 1.1168x - 2.1207	1.0000
RYG_FS0655	02 Oct 23	Y = 1.0086x + 6.2733	0.9991
RYG_FS0656	02 Oct 23	Y = 1.0009x + 8.48	1.0000
RYG_FS0657	02 Oct 23	Y = 1.0435x + 2.6459	0.9999
RYG_FS0658	02 Oct 23	Y = 0.9788x + 10.283	0.9992
RYG_FS0659	02 Oct 23	Y = 1.0074x - 6.621	1.0000
SGK_FS0135	18 Oct 23	Y = 0.9831x + 14.843	0.9994
SGK_FS0138	06 Oct 23	Y = 1.0831x - 0.8401	0.9998
SGK_FS0139	06 Oct 23	Y = 0.9826x + 8.6567	1.0000
SGK_FS0140	06 Oct 23	Y = 1.0011x + 7.8095	1.0000
SGK_FS0141	06 Oct 23	Y = 1.125x - 1.2259	0.9998
SGK_FS0142	06 Oct 23	Y = 0.9956x + 10.257	0.9997
SGK_FS0143	06 Oct 23	Y = 1.004x + 3.3105	1.0000

Review By :

(Mr. Wichan Choonharat)

Enviro Field Services Manager

Approved By :

(Mr. Sarayuth Jitranont)

Assistant General Manager

ALS Laboratory Group

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Agilent CrossLab Compliance Services

Certificate of System Qualification

GC-OQ

System ID: GC-6

Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.

Organization Location: 104 Phattanakan 40, Phattanakan Rd., Suan Luang, Bangkok 10250

Date: October 21, 2021 10:05:40 AM

EQP Name: Agilent Recommended

EQP Revision: GC.02.50

Overall Qualification Status: Pass

REVIEW BY	Suchada T.
APPROVED BY	Sarayuth M.
NEXT CAL. DATE	21 Apr 2023

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: 0.0 psi /5 minutes

Agilent Recommended: >= -2.0 and <= 0.5

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name: 7890

Front SSL

Date: October 21, 2021 10:05:40 AM

System ID: GC-6

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Setpoint Status: Pass

	Setpoint		Actual	
Inlet Pressure:	25.0	psi	24.9	psi
Accuracy:			0.1	psi
Agilent Recommended:			<= 1.2	

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Decay

Name:	7890
	Back
	SSL

Setpoint Status: Pass

Pressure:	25.0	psi
Pressure Change:	0.0	psi
Agilent Recommended:	>= -2.0	and <= 0.5

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name:	7890
	Back
	SSL

Setpoint Status: Pass

	Setpoint		Actual	
Inlet Pressure:	25.0	psi	24.9	psi
Accuracy:			0.1	psi
Agilent Recommended:			<= 1.2	

Overall Inlet Pressure Accuracy Test Status

Pass

Detector Flow Accuracy

Date: October 21, 2021 10:05:40 AM
System ID: GC-6

Name:	7890
	Front
	FID

Setpoint Status: Pass

Flow Type:	Fuel				
Setpoint:	30.0	mL/min	Measured Flow:	30.5	mL/min
Accuracy:			0.5	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:	394.0	mL/min
Accuracy:			6.0	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:	24.2	mL/min
Accuracy:			0.8	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

Detector Flow Accuracy

Name:	7890
	Back
	FID

Date: October 21, 2021 10:05:40 AM
System ID: GC-6

Setpoint Status: Pass

Flow Type: Fuel

Setpoint: 30.0 mL/min Measured Flow: 29.1 mL/min

Accuracy: 0.9 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: 397.3 mL/min

Accuracy: 2.7 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: 24.4 mL/min

Accuracy: 0.6 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: October 21, 2021 10:05:40 AM
System ID: GC-6

Setpoint Status: Pass

Zone: Oven

Setpoint/Actual

Temperature: 230.0 231.5 °C

Accuracy: 1.5 °C

Agilent Recommended: ≥ -1.0 % setpoint in K (-5.0 °C)
≤ 1.0 % setpoint in K (5.0 °C)

Setpoint Status: Pass

Zone: Oven

Setpoint/Actual

Temperature: 100.0 100.5 °C

Accuracy: 0.5 °C

Agilent Recommended: ≥ -1.0 % setpoint in K (-3.7 °C)
≤ 1.0 % setpoint in K (3.7 °C)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: 7890

Setpoint Status: Pass

Setpoint/Average

Temperature: 100.0 100.4667 °C

Stability: 0.1 °C

Agilent Recommended: ≤ 0.5

Overall GC Oven Temperature Stability Test Status

Pass

Scouting Run

Tested Combination1 Front SSL / Front FID

Injection Tower

Name: 7693A

Date: October 21, 2021 10:05:40 AM
System ID: GC-6

Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination1 Front SSL / Front FID

Name: 7890

Setpoint Status: Pass

Base Signal: 12.7 pA

ASTM Noise

pA

0.06

Agilent Recommended: <= 0.10

Status: Pass

Drift

pA/Hr

0.10

<= 2.50

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 uL

Area RSD: 0.42 % Retention Time RSD: 0.16 %

Agilent Recommended: <= 3.00 <= 1.00

Overall Injection Precision Test Status

Pass

Signal to Noise

Date: October 21, 2021 10:05:40 AM
System ID: GC-6

Tested Combination1 Front SSL / Front FID

Injection Tower

Name: 7890

Setpoint Status: Pass

Signal to Noise: 1174861

Agilent Recommended: >= 300000

Overall Signal to Noise Test Status

Pass

Scouting Run

Tested Combination2 Back SSL / Back FID

Injection Tower

Name: 7693A

Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination2 Back SSL / Back FID

Name: 7890

Setpoint Status: Pass

Base Signal: 10.4 pA

ASTM Noise

pA

0.05

Agilent Recommended: <= 0.10

Status: Pass

Drift

pA/Hr

0.00

<= 2.50

Pass

Date: October 21, 2021 10:05:40 AM
System ID: GC-6

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:	1.16	%	Retention Time RSD:	0.12 %
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:	805466			
Agilent Recommended:	>= 300000			

Overall Signal to Noise Test Status

Pass

Date: October 21, 2021 10:05:40 AM
System ID: GC-6

Instrument Details

Purpose

This section describes the as found system configuration.

Details

System

System ID	GC-6
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: October 21, 2021 10:05:40 AM
System ID: GC-6

Sampler 2

Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN10340103
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	CN16280128
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
Component ID/Asset No.	GC-6
Oven Type	Standard

Date: October 21, 2021 10:05:40 AM
System ID: GC-6

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: October 21, 2021 10:05:40 AM
System ID: GC-6

Electronic Signature

Purpose

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Date: October 21, 2021 10:05:40 AM
 System ID: GC-6

User Name: suriya.thongkaew
 Hostname: ASBKW7015

System Id: GC-6
 Print Date: October 21, 2021 10:05:46 AM

OQ GC-ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 12:18:50 PM	Audit	SessionCreated	Session	None
October 20, 2021 12:18:50 PM	Start	Configuration	Session	None
October 20, 2021 12:18:50 PM	Audit	Entitlement	Licensing	User is Nonpaying and does not require an unlock code
October 20, 2021 12:24:57 PM	Audit	EqpLoaded	Session	EOP details for primary technique [Gc] - File path [ProtocolPacks\Gc\Configuration\02.51\Gc_02.51.eqp] EQP File Name [Gc_02.51.eqp], EQP Name [AgilentRecommended]
October 20, 2021 12:25:02 PM	End	Configuration	Session	None
October 20, 2021 12:25:09 PM	Start	Qualification	Session	OQ
October 20, 2021 12:25:00 PM	Start	Execution	System Inspection and Basic Safety and Operation - 7890: - Qualitative Test - No setpoints associated	None
October 20, 2021 12:30:25 PM	End	Execution	System Inspection and Basic Safety and Operation - 7890: - Qualitative Test - No setpoints associated	Run Count: 1
October 20, 2021 12:56:29 PM	Start	Execution	Inlet Pressure Decay - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None

Date: October 21, 2021 10:05:40 AM
 System ID: GC-6

User Name: suriya.thongkiew
 Hostname: ASBHKW7015

System Id: GC-6
 Print Date: October 21, 2021 10:05:46 AM

OQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 1 02:16 PM	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
October 20, 2021 1 02:18 PM	Start	Execution	Inlet Pressure Accuracy - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
October 20, 2021 1 02:26 PM	End	Execution	Inlet Pressure Accuracy - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
October 20, 2021 1 02:29 PM	Start	Execution	Inlet Pressure Decay - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None
October 20, 2021 1 04:21 PM	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
October 20, 2021 1 07:53 PM	Start	Execution	Inlet Pressure Accuracy - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
October 20, 2021 1 08:11 PM	End	Execution	Inlet Pressure Accuracy - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
October 20, 2021 1 08:16 PM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None
October 20, 2021 1 20:23 PM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
October 20, 2021 1 20:26 PM	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: October 21, 2021 10:05:40 AM
 System ID: GC-6

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User Name: suriya.thongkiew
 Hostname: ASBHKW7015

System Id: GC-6
 Print Date: October 21, 2021 10:05:46 AM

OQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 1 20:29 PM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None
October 20, 2021 1 23:27 PM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
October 20, 2021 1 23:29 PM	End	Execution	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
October 20, 2021 1 23:31 PM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
October 20, 2021 1 27:40 PM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
October 20, 2021 1 27:42 PM	End	Execution	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
October 20, 2021 1 27:46 PM	Start	Execution	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None
October 20, 2021 1 32:10 PM	Audit	Data	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
October 20, 2021 1 32:12 PM	End	Execution	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
October 20, 2021 1 32:14 PM	Start	Execution	Detector Flow Accuracy - Back FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None
October 20, 2021 1 34:13 PM	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: October 21, 2021 10:05:40 AM
 System ID: GC-6

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User Name: suriya.thongkaew
 Hostname: ASBKW7015
 System Id: GC-6
 Print Date: October 21, 2021 10:05:46 AM

QQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 1:34:16 PM	End	Execution	Detector Flow Accuracy - Back FID - Type: Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count: 1
October 20, 2021 1:34:46 PM	Start	Execution	Detector Flow Accuracy - Back FID - Type: Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
October 20, 2021 1:36:33 PM	Audit	Data	Detector Flow Accuracy - Back FID - Type: Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
October 20, 2021 1:36:36 PM	End	Execution	Detector Flow Accuracy - Back FID - Type: Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count: 1
October 20, 2021 1:36:38 PM	Start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
October 20, 2021 2:04:31 PM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
October 20, 2021 2:04:32 PM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count: 1
October 20, 2021 2:04:34 PM	Start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
October 20, 2021 2:10:47 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

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Date: October 21, 2021 10:05:40 AM
 System ID: GC-6

User Name: suriya.thongkaew
 Hostname: ASBKW7015
 System Id: GC-6
 Print Date: October 21, 2021 10:05:46 AM

QQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 2:10:49 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
October 20, 2021 2:10:51 PM	Start	Execution	GC Oven Temperature Stability - 7890 - Temperature Oven - S: 100.0°C - L: <= 0.5°C	None
October 20, 2021 2:31:39 PM	Audit	Data	GC Oven Temperature Stability - 7890 - Temperature Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
October 20, 2021 2:31:41 PM	End	Execution	GC Oven Temperature Stability - 7890 - Temperature Oven - S: 100.0°C - L: <= 0.5°C	Run Count: 1
October 20, 2021 2:31:44 PM	Start	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	None
October 20, 2021 2:43:06 PM	Audit	AcqClosed	Session	None
October 21, 2021 9:18:59 AM	Audit	AcqRestarted	Session	None
October 21, 2021 9:19:02 AM	Audit	SessionReloaded	Session	None
October 21, 2021 9:19:09 AM	Start	Qualification	Session	QQ
October 21, 2021 9:19:09 AM	Start	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	None
October 21, 2021 9:19:41 AM	Audit	AcqClosed	Session	None

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Date: October 21, 2021 10:05:40 AM
 System ID: GC-6

User Name: nuriya.thongkaew
 Hostname: ASBKKW7015
 System ID: GC-6
 Print Date: October 21, 2021 10:05:46 AM

QQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:20:08 AM	Audit	AcqRestarted	Session	None
October 21, 2021 9:20:09 AM	Audit	SessionReloaded	Session	None
October 21, 2021 9:20:13 AM	Start	Qualification	Session	QQ
October 21, 2021 9:20:13 AM	Start	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	None
October 21, 2021 9:29:45 AM	Audit	Data	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	Data files Path : C:\Chem32\1\DATA\AQOPV20 21\OOPV2021_F 2021-10-20 15-49-01\SCOUT_F001.D\FID1A.ch
October 21, 2021 9:30:05 AM	End	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	Run Count : 1
October 21, 2021 9:30:08 AM	Start	Execution	Noise and Drift - Front FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/hour	None
October 21, 2021 9:30:41 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:\Chem32\1\DATA\AQOPV20 21\OOPV2021_F 2021-10-20 15-49-01\SIGNSDRF_F001.D\FID1A.ch
October 21, 2021 9:31:10 AM	End	Execution	Noise and Drift - Front FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/hour	Run Count : 1

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Date: October 21, 2021 10:05:40 AM
 System ID: GC-6

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User Name: suriya.thongkaew
 Hostname: ASBKKW7015
 System ID: GC-6
 Print Date: October 21, 2021 10:05:46 AM

QQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:31:42 AM	Start	Execution	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	None
October 21, 2021 9:32:55 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:\Chem32\1\DATA\AQOPV20 21\OOPV2021_F 2021-10-20 16-51-16\INJPREC_F002.D\FID1A.ch
October 21, 2021 9:32:55 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:\Chem32\1\DATA\AQOPV20 21\OOPV2021_F 2021-10-20 16-51-16\INJPREC_F003.D\FID1A.ch
October 21, 2021 9:32:56 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:\Chem32\1\DATA\AQOPV20 21\OOPV2021_F 2021-10-20 16-51-16\INJPREC_F004.D\FID1A.ch
October 21, 2021 9:32:56 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:\Chem32\1\DATA\AQOPV20 21\OOPV2021_F 2021-10-20 16-51-16\INJPREC_F005.D\FID1A.ch
October 21, 2021 9:32:56 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:\Chem32\1\DATA\AQOPV20 21\OOPV2021_F 2021-10-20 16-51-16\INJPREC_F006.D\FID1A.ch
October 21, 2021 9:32:56 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:\Chem32\1\DATA\AQOPV20 21\OOPV2021_F 2021-10-20 16-51-16\INJPREC_F007.D\FID1A.ch

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Date: October 21, 2021 10:05:40 AM
 System ID: GC-6

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User Name: suriya.thongkaew

Hostname: ASBKKW7015

System id: GC-6

Print Date: October 21, 2021 10:05:46 AM

OQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:33:07 AM	End	Execution	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Run Count: 1
October 21, 2021 9:33:23 AM	Start	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID - Detector FID - L >= 300000	None
October 21, 2021 9:34:01 AM	Audit	Data	Signal to Noise - Injection Tower, Front SSL, Front FID - Detector FID - L >= 300000	Data files Path : C:\Chem32\1\DATA\OQ\1\V20 21\OQPV2021_F 2021-10-20 16:51:16\SIGTONS_F001.D\FID1A.ch
October 21, 2021 9:34:15 AM	End	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID - Detector FID - L >= 300000	Run Count: 1
October 21, 2021 9:34:19 AM	Start	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID - Part of System Preparation - No limits associated	None
October 21, 2021 9:35:04 AM	Audit	Data	GC Scouting Run - Injection Tower, Back SSL, Back FID - Part of System Preparation - No limits associated	Data files Path : C:\Chem32\1\DATA\OQ\1\V20 21\OQPV2021_B 2021-10-20 17:13:45\SCOUT_B001.D\FID2B.ch
October 21, 2021 9:35:27 AM	End	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID - Part of System Preparation - No limits associated	Run Count: 1
October 21, 2021 9:35:32 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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User Name: suriya.thongkaew

Hostname: ASBKKW7015

System ID: GC-6

Print Date: October 21, 2021 10:05:46 AM

OQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:36:00 AM	Audit	Data	Noise and Drift - Back FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/hour	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17:13:45\SIGNSDRF_B001.D\FID2B.ch
October 21, 2021 9:36:16 AM	End	Execution	Noise and Drift - Back FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/hour	Run Count: 1
October 21, 2021 9:36:20 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	None
October 21, 2021 9:38:57 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:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17:13:45\INJPREC_B002.D\FID2B.ch
October 21, 2021 9:38:57 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:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17:13:45\INJPREC_B003.D\FID2B.ch
October 21, 2021 9:38:57 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:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17:13:45\INJPREC_B004.D\FID2B.ch
October 21, 2021 9:38:57 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:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17:13:45\INJPREC_B005.D\FID2B.ch

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User Name: suriya.thongkiew
Hostname: ASBKKW7015

System ID: GC-6
Print Date: October 21, 2021 10:05:44 AM

OQ GC ALS CN11461066 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:38:57 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:\Chem32\1\DATA\OOPV20 21\OOPV2021_B 2021-10-20 17-13-45\INJPREC_B006.D\FID2B.ch
October 21, 2021 9:38:57 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:\Chem32\1\DATA\OOPV20 21\OOPV2021_B 2021-10-20 17-13-45\INJPREC_B007.D\FID2B.ch
October 21, 2021 9:39:06 AM	End	Execution	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Ret. Time) <= 1.00%	Run Count: 1
October 21, 2021 9:39:11 AM	Start	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L: >= 300000	None
October 21, 2021 9:39:28 AM	Audit	Data	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L: >= 300000	Data files Path: C:\Chem32\1\DATA\OOPV20 21\OOPV2021_B 2021-10-20 17-13-45\SIGTONS_B001.D\FID2B.ch
October 21, 2021 9:39:39 AM	End	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L: >= 300000	Run Count: 1
October 21, 2021 9:39:43 AM	End	Qualification	Session	OQ
October 21, 2021 9:39:43 AM	Start	Reporting	Session	None
October 21, 2021 10:04:15 AM	Audit	Reporting	Session	Report Generated: Certificate

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Date: October 21, 2021 10:05:40 AM
System ID: GC-6

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Certificate of System Qualification

GC-OQ

REVIEW BY	<i>[Signature]</i>
APPROVED BY	<i>[Signature]</i>
NEXT CAL. DATE	21 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 3:26:38 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 3:26:38 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

Setpoint Actual
Inlet Pressure: 25.0 psi 25.2 psi
Accuracy: 0.2 psi
Agilent Recommended: ≤ 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Decay

Name: 7890
Back SSL

Setpoint Status:

Pass

Pressure: 25.0 psi
Pressure Change: 0.0 psi /5 minutes
Agilent Recommended: ≥ -2.0 and ≤ 0.5

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name: 7890
Back SSL

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

Setpoint Status:

Pass

Setpoint Actual
Inlet Pressure: 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:
System ID:April 21, 2023 3:26:38 PM
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 Combination1

Front

SSL

/ Front

FID

Injection Tower

Name:

7893A

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

Setpoint Status:

Completed

Injection Volume on Column:

1.0 uL

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 uL

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: CN11461066

Tested Combination1

Front SSL / Front FID

Injection Tower

Name:

7890

Setpoint Status:

Pass

Signal to Noise:

721755

Agilent Recommended:

>= 300000

Overall Signal to Noise Test Status

Pass

Scouting Run

Tested Combination2

Back SSL / Back FID

Injection Tower

Name:

7693A

Setpoint Status:

Completed

Injection Volume on Column:

1.0 uL

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: CN11461066

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 Tower
Injection Technique	Sampler 2
Sampler Identifier	Front
Inlet	Front
Detector	No
LTM Included?	No
Tested Combination2	Injection Tower
Injection Technique	Sampler 3
Sampler Identifier	Back
Inlet	Back
Detector	No
LTM Included?	No
Sampler 1	Agilent Technologies
Manufacturer	Tray
Type	7693A
Name	G4514A
Model Number	CN15380030
Serial Number	A.11.01
Firmware Revision	Not installed
Vial Heater	

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-CQ3SKOMV

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 11:21:36 AM	Audit	SessionCreated	Session	None
April 21, 2023 11:21:36 AM	Start	Configuration	Session	None
April 21, 2023 11:21:36 AM	Audit	Entitlement	Licensing	User is Nonpaying and does not require an unlock code
April 21, 2023 11:22:04 AM	Audit	EqpLoaded	Session	EQP details for primary technique [Gc] - File path: [ProtocolPacks\Gc\Configurations\02.52\Gc.02.52.eqp], EQP File Name: [Gc.02.52.eqp], EQP Name: [AgilentRecommended], Protocol Revision: [Gc.02.52]
April 21, 2023 11:22:06 AM	End	Configuration	Session	None
April 21, 2023 11:22:14 AM	Start	Qualification	Session	OQ
April 21, 2023 11:22:14 AM	Start	Execution	CDS Logon Verification - GC : - Qualitative test	None
April 21, 2023 11:23:14 AM	End	Execution	CDS 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	Inlet Pressure Decay - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None

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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 11:24:09 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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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 11:26:18 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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GC-6_BKK_EN0127_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: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 21, 2023 11:27:33 AM	Audit	Data	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
April 21, 2023 11:27:35 AM	End	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
April 21, 2023 11:27:37 AM	Start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 21, 2023 11:27:54 AM	Audit	Data	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry

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GC-6_BKK_EN0127_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 11:29:10 AM	End	Execution	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Run Count : 1
April 21, 2023 11:29:12 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 files Path : C:\Users\Public\Documents\IC hemStation\3\1Data\IQ_GC-6 _ALS_2023-04-20\IQ_GC-6 _2023 2023-04-20 14-36-08\F_SC01.D\FID1A.c 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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GC-6_BKK_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 hemStation3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023 2023-04-20 14-36-08\IND-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 11:33:55 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 hemStation3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023 2023-04-20 14-36-08\Pre01-013F.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 hemStation3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023 2023-04-20 14-36-08\Pre01-014F.D\FID 1A.ch

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GC-6_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\C hemStation3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023 2023-04-20 14-36-08\Pre01-015F.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 hemStation3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023 2023-04-20 14-36-08\Pre01-016F.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 hemStation3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023 2023-04-20 14-36-08\Pre01-017F.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 hemStation3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023 2023-04-20 14-36-08\Pre01-018F.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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GC-6_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:35:28 AM	Audit	Data	Signal to Noise - Injection Tower, Front SSL, Front FID: - Detector FID - L: >= 300000	Data files Path : C:\Users\Public\Documents\hemStation\3\Data\IQ_GC-6_ALS_2023-04-20\IQ_GC-6_2023-04-20 14-36-08\SN_Front.D\FID1A.ch
April 21, 2023 11:36:00 AM	End	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID: - Detector FID - L: >= 300000	Run Count : 1
April 21, 2023 11:36:03 AM	Start	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID: - Part of System Preparation - No limits associated	None
April 21, 2023 11:36:36 AM	Audit	Data	GC Scouting Run - Injection Tower, Back SSL, Back FID: - Part of System Preparation - No limits associated	Data files Path : C:\Users\Public\Documents\hemStation\3\Data\IQ_GC-6_ALS_2023-04-20\IQ_GC-6_2023-04-20 14-36-08\B_SC01.D\FID2B.ch
April 21, 2023 11:37:30 AM	End	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID: - Part of System Preparation - No limits associated	Run Count : 1
April 21, 2023 11:37:32 AM	Start	Execution	Noise and Drift - Back FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	None

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GC-6_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:38:06 AM	Audit	Data	Noise and Drift - Back FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Data files Path : C:\Users\Public\Documents\hemStation\3\Data\IQ_GC-6_ALS_2023-04-20\IQ_GC-6_2023-04-20 14-36-08\ND-01-005B.D\FID2B.ch
April 21, 2023 11:38:23 AM	End	Execution	Noise and Drift - Back FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Run Count : 1
April 21, 2023 11:38:32 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	None
April 21, 2023 11:38:51 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	None
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\hemStation\3\Data\IQ_GC-6_ALS_2023-04-20\IQ_GC-6_2023_Pre 2023-04-21 10-37-32\Pre11-004B.D\FID2B.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\hemStation\3\Data\IQ_GC-6_ALS_2023-04-20\IQ_GC-6_2023_Pre 2023-04-21 10-37-32\Pre11-005B.D\FID2B.ch

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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\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023_Pre 2023-04-21 10-37-32\Pre11-006B.D\FID 2B.ch
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\C hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023_Pre 2023-04-21 10-37-32\Pre11-007B.D\FID 2B.ch
April 21, 2023 11:40:21 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\C hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023_Pre 2023-04-21 10-37-32\Pre11-008B.D\FID 2B.ch
April 21, 2023 11:40:21 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\C hemStation\3\Data\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023_Pre 2023-04-21 10-37-32\Pre11-009B.D\FID 2B.ch
April 21, 2023 11:41:29 AM	End	Execution	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Run Count : 1
April 21, 2023 11:41:33 AM	Start	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID: - Detector FID - L: >= 300000	None

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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\OQ_GC-6 _ALS_2023-04-20\OQ_GC-6 _2023 2023-04-20 14-36-08\SN_Back.D\FID2B.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 3:16:07 PM	Audit	AccRestarted	Session	None
April 21, 2023 3:16:10 PM	Audit	SessionReloaded	Session	None
April 21, 2023 3:16:31 PM	Start	Qualification	Session	OQ
April 21, 2023 3:20:59 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 3:25:45 PM	Audit	Reporting	Session	Report Generated : Certificate

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Certificate of System Qualification

LC-OQ

System ID: DE62964837
Organization Name: ALS Laboratory Group (Thailand) Co.,Ltd.
Organization Location: 104 Phatthanakarn Rd.,Suan Luang,Bangkok 10250 Thailand.

Date: June 2, 2022 1:27:42 PM
EQP Name: AgilentRecommended
EQP Revision: LC.02.50
Overall Qualification Status: Pass

REVIEW BY	<i>Patt B.</i>
APPROVED BY	<i>SDH</i>
NEXT CAL. DATE	2 Dec 23

Pump Flow Accuracy

Model/Serial No.: G1311A DE62964837
Channel: A

Setpoint Status: Pass

Setpoint/Average		
Pump Flow Rate:	0.500	0.501 mL/min
Accuracy (as % error):		0.20 %
Agilent Recommended:	<=	5.00

Setpoint Status: Pass

Setpoint/Average		
Pump Flow Rate:	5.000	5.00417 mL/min
Accuracy (as % error):		0.08 %
Agilent Recommended:	<=	5.00

Overall Pump Flow Accuracy Test Status

Pass

Pump Flow Precision

Model/Serial No.: G1311A DE62964837
Channel: A

Date: June 2, 2022 1:27:42 PM
System ID: DE62964837

Setpoint Status: Pass

Setpoint/Average		
Pump Flow Rate:	0.500	0.501 mL/min
Precision RSD:		0.00 %
Agilent Recommended:	<=	0.50

Setpoint Status: Pass

Setpoint/Average		
Pump Flow Rate:	5.000	5.00417 mL/min
Precision RSD:		0.04 %
Agilent Recommended:	<=	0.50

Overall Pump Flow Precision Test Status

Pass

Column Temperature Accuracy

Model/Serial No.: G1316A DE63068461

Setpoint Status: Pass

Setpoint/Actual		
Column Compartment Temperature:	80.0	80.1 °C
Accuracy:		0.1 °C
Agilent Recommended:	<=	3.0

Setpoint Status: Pass

Setpoint/Actual		
Column Compartment Temperature:	40.0	40.0 °C
Accuracy:		0.0 °C
Agilent Recommended:	<=	2.0

Overall Column Temperature Accuracy Test Status

Pass

Column Temperature Stability

Date: June 2, 2022 1:27:42 PM
System ID: DE62964837

Model/Serial No.: G1316A DE63068461

Setpoint Status: Pass

Column Compartment Temperature: Setpoint/Average
40.0 / 40.0667 °C

Stability: 0.1 °C

Agilent Recommended: ≤ 1.0

Overall Column Temperature Stability Test Status

Pass

Wavelength Accuracy

Detector Type: FLD

Model/Serial No.: G1321A DE60556998

Setpoint Status: Pass

Setpoint: WL 1: 350 nm WL 2: 397 nm

Actual: 349 nm 399 nm

Acc.:* 1 nm 2 nm

Agilent Recommended: ≤ 3 ≤ 3

* Accuracy (error in nm)

Overall Wavelength Accuracy Test Status

Pass

Signal to Noise

Detector Type: FLD

Model/Serial No.: G1321A DE60556998

Setpoint Status: Pass

Signal to Noise: 568

Agilent Recommended: ≥ 400

Date: June 2, 2022 1:27:42 PM
System ID: DE62964837

Overall Signal to Noise Test Status

Pass

Scouting Run

Detector Type: FLD

Model/Serial No.: G1329A

DE64766191

Model/Serial No.: G1321A

DE60556998

Setpoint Status: Completed

Overall Scouting Run Status

Completed

Injection Precision

Detector Type: FLD

Model/Serial No.: G1329A

DE64766191

Model/Serial No.: G1321A

DE60556998

Setpoint Status: Pass

From EQP Actual

Injection Volume on Column: 5 / 5 µL

Area RSD: 0.29 % Height RSD: 0.43 %

Agilent Recommended: ≤ 1.00 ≤ 1.00

Overall Injection Precision Test Status

Pass

Injection Carry Over

Detector Type: FLD

Model/Serial No.: G1329A

DE64766191

Model/Serial No.: G1321A

DE60556998

Date: June 2, 2022 1:27:42 PM
System ID: DE62964837

Setpoint Status:

Pass

	From EQP	Actual	
Injection Volume on Column:	5	/ 5	µL
Area Carry Over:	0.00	%	Height Carry Over: 0.00 %
Agilent Recommended:	<= 0.20		<= 0.40

Overall Injection Carry Over Test Status

Pass

Date: June 2, 2022 1:27:42 PM
System ID: DE62964837

Instrument Details

Purpose

This section describes the as found system configuration.

Details

System

System ID	DE62964837
Manufacturer	Agilent Technologies
System Scale	Analytical
Typical System Pressure	HPLC (<= 400 bar)

Pumps 1

Manufacturer	Agilent Technologies
Name	1200
Model Number	G1311A
Scale	Analytical
Gradient Capability	Quaternary
Gradient Valve	Installed
Serial Number	DE62964837
Firmware Revision	A.06.55
Component ID/Asset No.	LC-2

Injectors 1

Manufacturer	Agilent Technologies
Name	1200
Model Number	G1329A
Maximum Injection Volume	100 ul
Serial Number	DE64766191
Firmware Revision	A.06.54
Component ID/Asset No.	LC-2

Date: June 2, 2022 1:27:42 PM
System ID: DE62964837

Column Compartments 1

Manufacturer	Agilent Technologies
Name	1260
Model Number	G1316A
Type	Heated and cooled
Serial Number	DE63068461
Firmware Revision	A.06.50
Component ID/Asset No.	LC-2

Detectors 1

Manufacturer	Agilent Technologies
Detector Type	FLD
Name	1200
Model Number	G1321A
Flow Cell	Standard
Serial Number	DE60556998
Firmware Revision	A.07.01
Component ID/Asset No.	LC-2

Electronic Signature

Purpose

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Details

Full Name of Signer:	Weerachai Singthong
Logged On User Name:	weerachai.singthong@non.agilent.com
Signature Creation Date:	June 2, 2022
Reason for Signature:	Executed protocol and published this original version of document

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User Name: weerachai.singthong
 Hostname: DESKTOP-JTND0HG

System Id: DE62964837
 Print Date: June 2, 2022 1:27:43 PM

LCOQ_6005117561_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 2, 2022 1:16:50 PM	Audit	SessionCreated	Session	None
June 2, 2022 1:16:50 PM	Start	Configuration	Session	None
June 2, 2022 1:16:50 PM	Audit	Entitlement	Licensing	User is Nonpaying and does not require an unlock code
June 2, 2022 1:16:57 PM	Audit	EqpLoaded	Session	EQP details for primary technique [LC] - File path: [ProtocolPacks\LC\Configurations\02.50\LC.02.50.eqp], EQP File Name: [LC.02.50.eqp], EQP Name: [AgilentRecommended]
June 2, 2022 1:17:00 PM	End	Configuration	Session	None
June 2, 2022 1:17:03 PM	Start	Qualification	Session	OQ
June 2, 2022 1:17:03 PM	Start	Execution	Pump Flow Accuracy : Pumps 1, G1311A, Channel 1: Flow 1	None
June 2, 2022 1:17:06 PM	Audit	AceClosed	Session	None
June 2, 2022 1:18:28 PM	Audit	AceRestarted	Session	None
June 2, 2022 1:18:30 PM	Audit	SessionReloaded	Session	None
June 2, 2022 1:18:33 PM	Start	Qualification	Session	OQ
June 2, 2022 1:18:44 PM	Start	Execution	Injection Carry Over : Injectors 1, G1320A - G1321A, FLD: Injection Volume 1	None
June 2, 2022 1:19:07 PM	Audit	Data	Injection Carry Over : Injectors 1, G1320A - G1321A, FLD: Injection Volume 1	Data files Path : C:\Users\weera\Desktop\IOQ Data_02Jun2022\OQPV_02J UN22 2022-06-02 12-33-35\FLDIP_01.D\fld1A.c h

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Date: June 2, 2022 1:27:42 PM
 System ID: DE62964837

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User Name: weerachai.singthong
 Hostname: DESKTOP-JTND0HG

System Id: DE62964837
 Print Date: June 2, 2022 1:27:43 PM

LCOQ_6005117561_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 2, 2022 1:19:07 PM	Audit	Data	Injection Carry Over : Injectors 1, G1320A - G1321A, FLD: Injection Volume 1	Data files Path : C:\Users\weera\Desktop\IOQ Data_02Jun2022\OQPV_02J UN22 2022-06-02 12-33-35\FLDIP_07.D\fld1A.c h
June 2, 2022 1:19:07 PM	Audit	Data	Injection Carry Over : Injectors 1, G1320A - G1321A, FLD: Injection Volume 1	Data files Path : C:\Users\weera\Desktop\IOQ Data_02Jun2022\OQPV_02J UN22 2022-06-02 12-33-35\FLDIP_08.D\fld1A.c h
June 2, 2022 1:20:11 PM	End	Execution	Injection Carry Over : Injectors 1, G1320A - G1321A, FLD: Injection Volume 1	Run Count : 1
June 2, 2022 1:20:15 PM	End	Qualification	Session	OQ
June 2, 2022 1:20:15 PM	Start	Reporting	Session	None
June 2, 2022 1:26:49 PM	Audit	Reporting	Session	Report Generated : Certificate
June 2, 2022 1:27:10 PM	Audit	Reporting	Session	Report Generated : Report

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Date: June 2, 2022 1:27:42 PM
 System ID: DE62964837

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Certificate of System Qualification

GC-OQ + GCMS-OQ

System ID: GM-2
Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.
Organization Location: 104 Phatthanakan 40, Phatthanakan Rd., Kheiwang Suan Luang, Khet Suan Luang, Bangkok 10250
Date: October 1, 2021 1:10:17 PM
EQP Name: AgilentRecommended, AgilentRecommended
EQP Revision: GC.02.51, GCMS.02.51
Overall Qualification Status: Pass

REVIEW BY: *Sararat M.*
APPROVED BY: *Ch*
CAL DATE: 1 April 23

System Inspection and Basic Safety and Operation

Name: 7890

Setpoint Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status

Pass

Inlet Pressure Accuracy

Name: 7890
Front MMI
Setpoint Status: Pass
Setpoint Actual
Inlet Pressure: 25.0 psi 24.9 psi
Accuracy: 0.1 psi
Agilent Recommended: <= 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 7890

Date: October 1, 2021 1:10:17 PM
System ID: GM-2

Setpoint Status: Pass
Zone: Oven
Setpoint/Actual
Temperature: 230.0 230.5 °C
Accuracy: 0.5 °C
Agilent Recommended: >= -1.0 % setpoint in K (-5.0 °C)
<= 1.0 % setpoint in K (5.0 °C)

Setpoint Status: Pass
Zone: Oven
Setpoint/Actual
Temperature: 100.0 101.5 °C
Accuracy: 1.5 °C
Agilent Recommended: >= -1.0 % setpoint in K (-3.7 °C)
<= 1.0 % setpoint in K (3.7 °C)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: 7890
Setpoint Status: Pass
Setpoint/Average
Temperature: 100.0 101.5 °C
Stability: 0.0 °C
Agilent Recommended: <= 0.5

Overall GC Oven Temperature Stability Test Status

Pass

Log Amp

Tested Combination1 Front MMI / External SQ

Name: 5975C Inert XL with TAD

Setpoint Status: Pass

Date: October 1, 2021 1:10:17 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:

6 mV

RFPA Voltage:

461 mV

Agilent Recommended:

>= -100 and <= 100

<= 1100

Overall RFPA Test Status

Pass

Tune EI

Tested Combination1

Front MMI / External SQ

Name:

5975C inert XL with TAD

Setpoint Status:

Pass

Filament:

1

Setpoint Status:

Pass

Filament:

2

Overall Tune EI Test Status

Pass

Scouting Run

Tested Combination1

Front MMI / External SQ

Injection Tower

Name:

7693A

Source:

EI - Inert

Setpoint Status:

Completed

Injection Volume on Column:

1.0 uL

Overall Scouting Run Status

Completed

Signal to Noise EI

Tested Combination1

Front MMI / External SQ

Name:

5975C inert XL with TAD

Source:

EI - Inert

Filament:

1

Setpoint Status:

Pass

Signal to Noise:

619

Agilent Recommended:

>= 320

Source:

EI - Inert

Filament:

2

Setpoint Status:

Pass

Signal to Noise:

647

Agilent Recommended:

>= 320

Overall Signal to Noise EI Test Status

Pass

Injection Precision

Tested Combination1

Front MMI / External SQ

Name:

7693A

Source:

EI - Inert

Setpoint Status:

Pass

Injection Volume on Column:

1.0 uL

Area RSD:

4.75 %

Retention Time RSD:

0.02 %

Agilent Recommended:

<= 5.00

<= 1.00

Overall Injection Precision Test Status

Pass

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

4.75 %

0.81 %

RSD:

Agilent Recommended:

<= 5.00

<= 5.00

Pass

Pass

Overall Mass Ratio Precision Test Status

Pass

Date: October 1, 2021 1:10:17 PM
System ID: 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 Combination1

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

Sampler 1

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

Date: October 1, 2021 1:10:17 PM
System ID: GM-2

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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: October 1, 2021 1:10:17 PM
System ID: GM-2

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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: October 1, 2021 1:10:17 PM
System ID: GM-2

Electronic Signature

Purpose

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

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Date: October 1, 2021 1:10:17 PM
System ID: GM-2

User Name: supasak.nimsongtham
Hostname: SCG1115HKC
System ID: GM-2
Print Date: October 1, 2021 1:10:19 PM

ALS_GM2 Transaction log :

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

Date: October 1, 2021 1:10:17 PM
System ID: GM-2

User Name: supasak.nimsongtham
 Hostname: SCG1115HKC

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

ALS_GM2 Transaction log :

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

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User Name: supasak.nimsongtham
 Hostname: SCG1115HKC

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

ALS_GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:48:38 PM	Start	Execution	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None
October 1, 2021 12:49:34 PM	Audit	Data	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
October 1, 2021 12:49:36 PM	End	Execution	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Run Count : 1
October 1, 2021 12:49:37 PM	Start	Execution	Log Amp - 5975C Inert XL with TAD SQ: - Source: EI - Inert	None
October 1, 2021 12:49:47 PM	End	Execution	Log Amp - 5975C Inert XL with TAD SQ: - Source: EI - Inert	Run Count : 1
October 1, 2021 12:49:48 PM	Start	Execution	RFPA - 5975C Inert XL with TAD SQ: - Source: EI - Inert	None
October 1, 2021 12:50:23 PM	End	Execution	RFPA - 5975C Inert XL with TAD SQ: - Source: EI - Inert	Run Count : 1
October 1, 2021 12:50:25 PM	Start	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: EI - Inert Filament 1 (Qualitative - No setpoints associated)	None
October 1, 2021 12:50:49 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: EI - Inert Filament 1 (Qualitative - No setpoints associated)	Run Count : 1
October 1, 2021 12:50:50 PM	Start	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: EI - Inert Filament 2 (Qualitative - No setpoints associated)	None
October 1, 2021 12:50:59 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: EI - Inert Filament 2 (Qualitative - No setpoints associated)	Run Count : 1

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User Name: supasak.nimsongtham

Hostname: 5CG1115HKC

System id: GM-2

Print Date: October 1, 2021 1:10:19 PM

ALS_GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:51:01 PM	Start	Execution	Scouting Run - Injection Tower, Front MMI, SQ: - Source: - EI - Inert-Part of GCMS System Preparation	None
October 1, 2021 12:51:16 PM	Audit	Data	Scouting Run - Injection Tower, Front MMI, SQ: - Source: - EI - Inert-Part of GCMS System Preparation	Data files Path : E:\GM20Q2021\SCOUTING RUN001.D\DATA.MS
October 1, 2021 12:51:42 PM	Audit	Data	Scouting Run - Injection Tower, Front MMI, SQ: - Source: - EI - Inert-Part of GCMS System Preparation	Data files Path : E:\GM20Q2021\SCOUTING RUN001.D\DATA.MS
October 1, 2021 12:52:42 PM	Audit	Data	Scouting Run - Injection Tower, Front MMI, SQ: - Source: - EI - Inert-Part of GCMS System Preparation	Data files Path : E:\GM20Q2021\SCOUTING RUN001.D\DATA.MS
October 1, 2021 12:53:25 PM	End	Execution	Scouting Run - Injection Tower, Front MMI, SQ: - Source: - EI - Inert-Part of GCMS System Preparation	Run Count : 1
October 1, 2021 12:53:27 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 1 - L: >= 320	None
October 1, 2021 12:53:40 PM	Audit	Data	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 1 - L: >= 320	Data files Path : E:\GM20Q2021\SNF1_001.D\DATA.MS
October 1, 2021 12:53:56 PM	End	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 1 - L: >= 320	Run Count : 1

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Date: October 1, 2021 1:10:17 PM
System ID: GM-2

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User Name: supasak.nimsongtham

Hostname: 5CG1115HKC

System id: GM-2

Print Date: October 1, 2021 1:10:19 PM

ALS_GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:53:59 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	None
October 1, 2021 12:54:04 PM	Audit	Data	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	Data files Path : E:\GM20Q2021\SNF2_001.D\DATA.MS
October 1, 2021 12:54:22 PM	End	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	Run Count : 1
October 1, 2021 12:54:26 PM	Start	Execution	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	None
October 1, 2021 12:54:37 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM20Q2021\IP_MRP003.D\DATA.MS
October 1, 2021 12:54:37 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM20Q2021\IP_MRP004.D\DATA.MS
October 1, 2021 12:54:37 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM20Q2021\IP_MRP005.D\DATA.MS
October 1, 2021 12:54:37 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM20Q2021\IP_MRP006.D\DATA.MS

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Date: October 1, 2021 1:10:17 PM
System ID: GM-2

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User Name: supasak.nimsongtham
 Hostname: SGG1115HKC

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

ALS_GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:54:37 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM2OQ2021\IP_MRP007.D\DATA.MS
October 1, 2021 12:54:37 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM2OQ2021\IP_MRP008.D\DATA.MS
October 1, 2021 12:54:52 PM	End	Execution	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Run Count : 1
October 1, 2021 12:54:55 PM	Start	Execution	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	None
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM2OQ2021\IP_MRP003.D\DATA.MS
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM2OQ2021\IP_MRP004.D\DATA.MS
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM2OQ2021\IP_MRP005.D\DATA.MS
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM2OQ2021\IP_MRP006.D\DATA.MS

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Date: October 1, 2021 1:10:17 PM
 System ID: GM-2

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User Name: supasak.nimsongtham
 Hostname: SGG1115HKC

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

ALS_GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM2OQ2021\IP_MRP007.D\DATA.MS
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM2OQ2021\IP_MRP008.D\DATA.MS
October 1, 2021 12:55:10 PM	End	Execution	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Run Count : 1
October 1, 2021 12:55:13 PM	End	Qualification	Session	OQ
October 1, 2021 12:55:13 PM	Start	Reporting	Session	None
October 1, 2021 1:09:11 PM	Audit	Reporting	Session	Report Generated : Certificate

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Date: October 1, 2021 1:10:17 PM
 System ID: GM-2

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Agilent CrossLab Compliance Services

Certificate of System Qualification

GC-OQ + GCMS-OQ

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

REVIEW BY: Suchada T.
APPROVED BY: [Signature]
NEXT CAL. DATE: 18 Oct 24

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

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Agilent CrossLab Compliance Services

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: RFP 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: April 18, 2023 3:15:25 PM
System ID: 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 %

0.39 %

Agilent Recommended:

<= 5.00

<= 5.00

Pass

Pass

Overall Mass Ratio Precision Test Status

Pass

Date: April 18, 2023 3:15:25 PM
System ID: 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 Combination1

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

Sampler 1

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

Mass Spectrometer 1

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

MS EI Source 1

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

Electronic Signature

Purpose

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

Details

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

Regulatory Disclaimer

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

User Name: supasak.nimsongtham
Hostname: 5CG1115HKC

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

ALS GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:14:23 PM	Audit	SessionCreated	Session	None
April 18, 2023 2:14:23 PM	Start	Configuration	Session	None
April 18, 2023 2:14:23 PM	Audit	Entitlement	Licensing	User is FieldEngineer 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 [GcMs] - File path: [ProtocolPacks/GcMs/Configurations/02.51/GcMs.02.51.eqp], EQP File Name: [GcMs.02.51.eqp], EQP Name: [AgilentRecommended]
April 18, 2023 2:15:07 PM	End	Configuration	Session	None
April 18, 2023 2:15:11 PM	Start	Qualification	Session	OQ
April 18, 2023 2:16:11 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

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

User Name: supasak.nimsongtham
Hostname: 5CG1115HKC

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 2:17:28 PM	Start	Execution	Inlet Pressure Accuracy - Front MMI: - 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 MMI: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
April 18, 2023 2:17:36 PM	Start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint In K	None
April 18, 2023 2:18:00 PM	Audit	Data	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint In K	Manual Data Entry
April 18, 2023 2:18:01 PM	End	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint In K	Run Count : 1
April 18, 2023 2:18:03 PM	Start	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint In K	None
April 18, 2023 2:18:20 PM	Audit	Data	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint In K	Manual Data Entry
April 18, 2023 2:18:22 PM	End	Execution	GC Oven Temperature Accuracy - 7890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint In K	Run Count : 1
April 18, 2023 2:18:44 PM	Start	Execution	GC Oven Temperature Stability - 7890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None

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

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User Name: supasak.nimsongtham
Hostname: 5CG1115HKC

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 2:19:36 PM	Start	Execution	Log Amp - 5975C Inert XL with TAD SQ: - Source: EI - Inert	None
April 18, 2023 2:19:46 PM	End	Execution	Log Amp - 5975C Inert XL with TAD SQ: - Source: EI - Inert	Run Count : 1
April 18, 2023 2:19:49 PM	Start	Execution	RFPA - 5975C Inert XL with TAD SQ: - Source: EI - Inert	None
April 18, 2023 2:32:54 PM	End	Execution	RFPA - 5975C Inert XL with TAD SQ: - Source: EI - Inert	Run Count : 1
April 18, 2023 2:32:57 PM	Start	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: - EI - Inert Filament 1 (Qualitative - No setpoints associated)	None
April 18, 2023 2:34:05 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: - EI - Inert Filament 1 (Qualitative - No setpoints associated)	Run Count : 1
April 18, 2023 2:34:07 PM	Start	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: - EI - Inert Filament 2 (Qualitative - No setpoints associated)	None
April 18, 2023 2:34:20 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ: - Source: - EI - Inert Filament 2 (Qualitative - No setpoints associated)	Run Count : 1

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

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User Name: supasak.nimsongtham
Hostname: SCG1115HKC

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

ALS GM2 Transaction log :

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

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

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User Name: supasak.nimsongtham
Hostname: SCG1115HKC

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

ALS GM2 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\IPMRP\IP_MRP002.D\DATA.MS
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\IPMRP\IP_MRP003.D\DATA.MS
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\IPMRP\IP_MRP004.D\DATA.MS
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\IPMRP\IP_MRP005.D\DATA.MS
April 18, 2023 2:36:20 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\IPMRP\IP_MRP006.D\DATA.MS
April 18, 2023 2:36:21 PM	Audit	Data	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data files Path : E:\GM-2 OQ2023\IPMRP\IP_MRP007.D\DATA.MS
April 18, 2023 2:36:42 PM	End	Execution	Injection Precision - Injection Tower, Front MMI, SQ: - Source: - EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Run Count : 1
April 18, 2023 2:36:45 PM	Start	Execution	Mass Ratio Precision - Injection Tower, Front MMI, 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: supasak.nimsongtham
Hostname: SCG111SHKC

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 MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM-2 OQ2023\IPMRP\IP_MRP002.D\DATA.MS
April 18, 2023 2:37:04 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM-2 OQ2023\IPMRP\IP_MRP003.D\DATA.MS
April 18, 2023 2:37:04 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM-2 OQ2023\IPMRP\IP_MRP004.D\DATA.MS
April 18, 2023 2:37:04 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM-2 OQ2023\IPMRP\IP_MRP005.D\DATA.MS
April 18, 2023 2:37:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM-2 OQ2023\IPMRP\IP_MRP006.D\DATA.MS
April 18, 2023 2:37:06 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MMI, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : E:\GM-2 OQ2023\IPMRP\IP_MRP007.D\DATA.MS
April 18, 2023 2:37:17 PM	End	Execution	Mass Ratio Precision - Injection Tower, Front MMI, 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 MMI, 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

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User Name: supasak.nimsongtham
Hostname: SCG111SHKC

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 2:56:38 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	None
April 18, 2023 2:57:00 PM	Audit	Data	DataManager	DataManager 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 MMI, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	Data files Path : E:\GM-2 OQ2023\ISNF2_003.D\DATA.MS
April 18, 2023 2:57:58 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - Source: EI - Inert using Filament 2 - L: >= 320	None
April 18, 2023 2:58:05 PM	End	Execution	Signal to Noise EI - Injection Tower, Front MMI, SQ: - 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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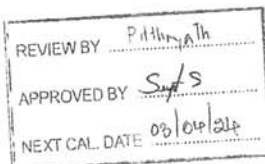
TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-9000-29 FAX. 0-2719-9484



Cert.No.: 23CH442
Page.: 1 of 2

Certificate of Calibration

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : Seven2Go TM pH/mV S2
Serial No. : C202355606
ID No. : RYG_FS0574
Condition As-Received: Used Item
Received Date : 31 March 2023
Calibration Date : 03 April 2023
Reference : 2303-1133DSC-3
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. Rayong Branch
616/10 Moo 5, T.Maenam Khu,
A.Pluakdaeng, Rayong 21140, Thailand
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In - house method :
- CP-CH5 by direct measurement with standard
voltage calibrator and direct measurement
with certified reference material (CRM)
Calibrated by : Warakorn Lernagatrakul
Approved by : 
(/) Malee Bulkruea
() Salthip Meangmai
() Warakorn Lernagatrakul
Issue Date : 5 April 2023



The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
Approval of the Head of Corporate Services 3 - Equipment Calibration and Testing Services



Cert. No.: 23CH442
Page.: 2 of 2

Condition of this calibration result

1. Reference Standard Instrument : -

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	22E2769	24 Aug 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 6.987	CPA chem	826589	09 July 2023
pH 10.010	CPA chem	863835	28 Dec 2023

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

Calibration Results

Function : mV Measurement

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

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter S/N.: C202355606	4.00	177.48	177	4.00	0.58	2.00
	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-178	10.00	0.58	2.00

Function : pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (±)	Coverage factor k
pH Electrode S/N.: 2015870	4.008	4.01	170	0.0071	2.00
	6.987	7.00	-5	0.011	2.00
	10.010	10.01	-181	0.0095	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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a 1156432



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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Cert. No.: 23LM86
Page.: 1 of 2

Certificate of Calibration

Equipment : pH Meter with Sensor
Manufacturer : Mettler Toledo
Model : Seven2GoTM pH/mV S2
Serial No. : C202355606
ID No. : RYG_FS0574
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 : 31 March 2023
Calibrated Date : 05 April 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Preecha Hlahib

Approved by : Malee
Approved Signatory

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

Issue Date : 21 April 2023

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : pH Meter with Sensor
Condition As-Received : Used Item
Reference : 2303-1133DSC-4
Procedure Used :-

Cert. No.: 23LM86
Page.: 2 of 2

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Digital Thermometer	1502A	A52847	2211325	31 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.

Result of Calibration :- (*) Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 2015870

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
25.0	100	25.002	25.1	0.098	0.16	2.00
40.0	100	40.001	40.2	0.199	0.16	2.00
60.0	100	60.005	60.5	0.495	0.16	2.00

UUC* : Unit Under Calibration

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

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RYG_EN0002

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-6, e-mail: service.thailand@sartorius.com



Certificate of Calibration

Model Number : MSE224S-100-DU
Description : Analytical Balance
Serial Number : 0026207038
ID No. : RYG_EN0002
Manufacturer : Sartorius

Certificate No. : 23BCI0112
Issued Date : Friday, March 03, 2023
Reference No. : 204833
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 Date : Wednesday, March 01, 2023

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

Metrological data :

Capacity : 220 g Readability : 0.0001 g

Ambients Conditions:

Temperature : 23.6 °C ± 5.0 °C
Humidity : 60.0 % RH ± 10.0 % RH
Pressure : — ± —

Reasons for calibration

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

Equipment Condition: ☒ Good Operate ☐ Fair

Measurement Method UKAS Publication Ref :Lab 14

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

Traceability:

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 5000g E2,YCS011-522-00	SPC-RT	C02212565	14-Sep-2023
MHB-382SD	Humidity/Barometer/Temp Lutron MHB-382SD	DKSH	C19220444	5-Sep-2023

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

Mr chonchai Inthana(Technical Manager)

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P



Sartorius (Thailand) Co., Ltd.

129 Rama 9 Road, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-6 Fax: +66 2643-8367, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

Model Number : MSE224S-100-DU
Description : Analytical Balance
Serial Number : 0026207038
ID No. : RYG_EN0002
Manufacturer : Sartorius

Certificate No. : 23BCI0112
Issued Date : Friday, March 03, 2023
Reference No. : 204833
Page No. : 2 of 2

Calibration Results : Without Adjustment

Repeatability			Eccentricity (Off-center loading error)		
<p>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.</p>			<p>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).</p>		
Nominal Value : (Low Load)	20.0000	199.9999	Nominal value :	100	g
20 g	20.0000	200.0000	Tolerance	0.0004	g
Tolerance	20.0000	199.9999			
0.0001 g	20.0000	200.0000			
Nominal Value : (High Load)	20.0000	199.9999	Difference		
200 g	19.9999	200.0000	1	—	
Tolerance	20.0000	200.0000	2	-0.0001	
0.0001 g	20.0000	199.9999	3	-0.0001	
	20.0000	200.0000	4	0.0001	
	20.0000	200.0000	5	0.0002	
	20.0000	200.0000	6	—	
Standard Deviation	0.00003	0.00005			

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	0.00014
0.05	0.0500	0.0500	0.0000	0.00014
0.1	0.1000	0.1000	0.0000	0.00014
0.5	0.5000	0.5000	0.0000	0.00014
1	1.0000	1.0000	0.0000	0.00014
5	5.0000	5.0000	0.0000	0.00014
10	10.0000	10.0001	0.0001	0.00014
20	20.0000	20.0000	0.0000	0.00024
50	50.0000	50.0000	0.0000	0.00015
100	100.0000	99.9999	-0.0001	0.00019
200	200.0000	200.0000	0.0000	0.00032

End of Report

SOP FM 33 03 February 2022

SOP FM 33 03 February 2022



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Cert. No.: 22TM1517
Page : 1 of 3

Certificate of Calibration

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 : 20 October 2022
Calibration Date : 20 October 2022
Ambient Temperature : $(26 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$

Calibrated by : Man Pattanapongpaiboon

Approved by : Manu.
Approved Signatory

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

Issue Date : 2 November 2022

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 : 2210-0376OC-2
Procedure Used :-

Cert. No.: 22TM1517
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	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY49023932	22LM97	29 Jul 2023

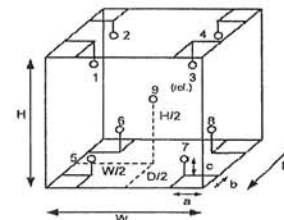
2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



Probe Installation Details :		Dimension of Chamber :	
a =	5.0 cm	D =	0.40 m
b =	5.0 cm	W =	0.56 m
c =	5.0 cm	H =	0.48 m
		Capacity =	0.11 m ³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	25	25
REL.Humid. (%)	54	59
AC Supply (Volt)	223	225

Ref. Std. ID No.: @ Calibration Point		
Position :	(180) °C	(104) °C
1	21-16TC-01	20-16RTD-01
2	21-16TC-02	20-16RTD-02
3	21-16TC-03	20-16RTD-03
4	21-16TC-04	20-16RTD-04
5	21-16TC-05	22-16RTD-05
6	21-16TC-06	20-16RTD-06
7	21-16TC-07	20-16RTD-07
8	21-16TC-08	22-16RTD-08
9 (ref.)	21-16TC-09	22-16RTD-09



Equipment : Hot Air Oven
 Condition As-Received : Used Item
 Reference : 2210-0376OC-2
 Result of Calibration :- (*) Without Adjustment
 Function of UUC* : Temperature Source
 Fresh air setting : Close

Cert. No.: 22TM1517
 Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
104.0	104.0	104.0	0.076	0.52	0.60	0.42	2
180.0	180.0	180.0	0.13	0.88	1.2	1.1	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
104.0	103.768	103.734	103.723	103.800	104.215	104.131	104.132	103.740	103.747
180.0	179.723	179.359	179.439	179.489	180.361	180.114	180.131	180.243	179.605

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.: 23CH275
 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 : 24 February 2023
 Calibration Date : 27 February 2023
 Reference : 2302-0886DSC-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 standard thermometer

REVIEW BY	N. Banait
APPROVED BY	[Signature]
NEXT CAL. DATE	27/2/24

Calibrated by : Walalak Sirithean

Approved by : [Signature]
 Approved Signatory

() Malee Bulkruea
 (✓) Saitthip Meangmai
 () Warakorn Lerngagtrakul

Issue Date : 28 February 2023
 The Uncertainties are for a confidence probability of approximately 95%

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Cert.No.: 23CH275
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	2211306	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	826588	09 July 2024
pH 6.987	CPA chem	826589	09 July 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.: C104059460	4.000	177.48	177.4	4.000	0.058	2.00
	7.000	0.00	-0.1	7.000	0.058	2.00
	10.000	-177.48	-177.5	10.000	0.058	2.00

Saithip

a 1149925



Cert.No.: 23CH275
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.: 1453404	4.008	4.008	179.1	0.0046	2.00
	6.987	6.988	4.7	0.0084	2.00
	10.010	10.013	-172.4	0.0069	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLabExpert Pro-ISM

- Serial No. : 1453404

Dimension of probe;

- Length : 120 mm.

- Diameter : 12 mm.

- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (\pm °C)	Coverage factor k
25.0	25.001	24.8	-0.201	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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Saithip

a 1149924



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Cert. No.: 23E753
Page.: 2 of 2

Certificate of Calibration

Certificate No.: 23E753
Page: 1 of 2

Equipment: pH Meter
Manufacturer: Mettler Toledo
Model: SevenCompact S220
Serial No.: C104059460
ID No.: RYG_EN0183
Condition As-Received: Used Item
Received Date: 24 February 2023
Calibration Date: 28 February 2023
Reference: 2302-0886DSC
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 10) %
Submitted by: ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng,
Rayong 21140, Thailand

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

Condition of this result of calibration

1.Reference standards instruments:

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Multi-Product Calibrator	5500A	6440007	22E1670	18 May 2023

2.This result of calibration was made on requested at the point specified by customer.

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

4.This Certification is traceable to the International System of Unit maintained at:-

-National Institute of Metrology Thailand (NIMT)

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

Function:	DC voltage measuremer	Range:	2000	mV	
	Standard Value	UUC* Reading	Error	Uncertainty	
	(mV)	(mV)	(mV)	(± μV)	
	-200.0000	-200.0	0.0	72	
	-150.0000	-150.0	0.0	69	
	-100.0000	-100.0	0.0	65	
	-50.0000	-50.0	0.0	62	
	0.0000	0.0	0.0	58	
	50.0000	50.0	0.0	62	
	100.0000	99.9	-0.1	65	
	150.0000	149.9	-0.1	69	
	200.0000	199.9	-0.1	72	

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95 %

UUC* = Unit Under Calibration.

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Calibrated by: Wutchareeporn Wongchutikrane
Issue Date: 02 March 2023
Approved Signatory:
[] Phalinee Prabpaipal
[x] Nuntawat Khamchai
[] Pornthippa Tameyakul

B 0309672

a 1150477



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TEL. 0-2717-8000-27 FAX. 0-2719-9454



Cert. No.: 22TM1492
Page: 1 of 3

Certificate of Calibration

Equipment : Hot Air Oven
Manufacturer : Memmert
Model : UM 400
Serial No. : b495.0899
ID No. : RYG_EN0006

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

Received Order : 20 October 2022
Calibration Date : 20 October 2022
Ambient Temperature : $(26 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$

Calibrated by : Preecha Hiahib

Approved by : Malu.
Approved Signatory

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

Issue Date : 2 November 2022

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 : 2210-0376OC-1
Procedure Used :-

Cert. No.: 22TM1492
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	34970A	MY44035217	21LM30	23 Dec 2022

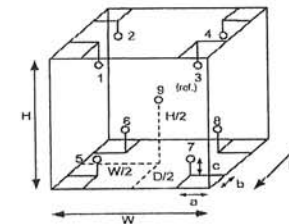
2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



Probe Installation Details :

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

Dimension of Chamber :

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

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	29
REL.Humid. (%)	43	47
AC Supply (Volt)	220	221

Position :	Ref. Std. ID No.:
1	18-10RTD-01
2	18-10RTD-02
3	18-10RTD-03
4	18-10RTD-04
5	18-10RTD-05
6	18-10RTD-06
7	18-10RTD-07
8	18-10RTD-08
9 (ref.)	18-10RTD-09



Equipment : Hot Air Oven
 Condition As-Received : Used Item
 Reference : 2210-0376OC-1
 Result of Calibration :- (*) Without Adjustment
 Function of UUC* : Temperature Source
 Fresh air setting : Close

Cert. No.: 22TM1492

Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
70.0	70.0	70.0	0.079	0.47	0.77	0.42	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
70.0	70.262	69.995	70.079	70.177	70.664	70.039	70.688	70.149	70.328

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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 TEL. 0 2717 3000-27 FAX. 0 2719 9181



Cert. No.: 22TM1491

Page : 1 of 3

Certificate of Calibration

Equipment : Water Bath
 Manufacturer : Memmert
 Model : WNB22
 Serial No. : L513.0648
 ID No. : RYG_EN0061
 Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
 616/10 Moo 5, T. Maenam Khu,
 A. Pluakdaeng,
 Rayong 21140, Thailand
 Location : Wet Chemistry Lab
 Received Order : 20 October 2022
 Calibration Date : 20 October 2022
 Ambient Temperature : (26 ± 10) °C
 Relative Humidity : (50 ± 30) %
 Calibrated by : Preecha Hlahib
 Approved by :
 Approved Signatory
 () Pornthippa Tameyakul
 (/) Malee Butkruea
 () Suwit Imjai

Issue Date : 2 November 2022

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
 Approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.

a 1132472

A 0046906



Equipment : Water Bath
 Condition As-Received : Used Item
 Reference : 2210-0376OC-4

Cert. No.: 22TM1491
 Page : 2 of 3

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT04 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY44035217	21LM30	23 Dec 2022

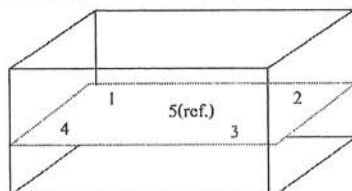
2. This certificate is valid only to the item calibrated on date and place of calibration.

3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

	Environmental		AC Voltage Supply
	(°C)	(%R.H.)	(Volt)
Beginning of Calibration	24	53	222
Finished of Calibration	24	50	221



Front

Position :	Ref. Std. S/N.:
1	N37P300726
2	N37P300727
3	N37P300728
4	N37P300729
5(ref.)	N37P300730



Equipment : Water Bath
 Condition As-Received : Used Item
 Reference : 2210-0376OC-4
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source

Cert. No.: 22TM1491
 Page : 3 of 3

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)				
			Position				
			1	2	3	4	5 (ref.)
85.0	85.0	85.0	84.527	84.563	84.628	84.516	84.580

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Uncertainty (± °C)	Coverage Factor k
85.0	0.12	0.081	0.18	2

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

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

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

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

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

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Malu

a 1132471


Malu



a 1132470



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 Sirithean
Approved by : 
Approved Signatory
() Malee Butkruea
(✓) Saitthip Meangmai
() Warakorn Lernagatrakul
Issue Date : 26 July 2023

REVIEW BY 
APPROVED BY 
NEXT CAL DATE 24/09/25

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.: 15E100464

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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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0 2717 3000-29 FAX. 0 2719 9181



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 & Equipment Calibration and Testing Services.



Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2307-0713DSC-2
Procedure Used :-

Cert. No.: 23LM125
Page.: 2 of 2

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	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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TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL: 0-2717-3000-29 FAX: 0-2719-9284



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. Pluakdaeng, 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 : Man Pattanapongpaiboon

Approved by :

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

Issue Date : 7 June 2023

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3: Equipment Calibration and Testing Services



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.

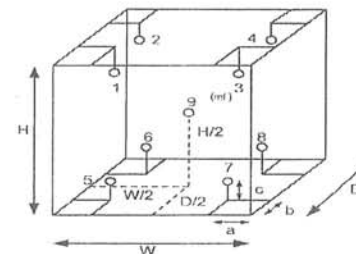
3. This certification is traceable to the International System of Unit.

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 0054967

a 1165130



Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2305-0898OC-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 23TM962
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	20.0	0.019	0.72	1.0	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	Position									
	1	2	3	4	5	6	7	8	9 (ref.)	
20.0	19.547	19.780	19.487	19.529	19.408	20.139	20.112	20.406	20.116	0.30

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

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

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

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

UUC* : Unit Under Calibration

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

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

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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	<i>N. Bann</i>
APPROVED BY	<i>D. Bann</i>
NEXT CAL. DATE	18/12/25

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 Stama Scientific Limited.

The standard for Wavelength Certificate No. 111583 and 111584
The standard for Photometric Certificate No. 9114984 and 111588
The standard for Stray light Certificate No. 111586 and 111585
The standard for Spectral resolution Certificate No. 111587

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

(Signature)
(Mr. Nitinun Srihawan)
Authorized signatory

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

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

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

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DKSH Technology Limited
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2533 Sukhumvit Road, Bangkok, Phrakhanong, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

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CAL-FM-C06-15: 12 Sep 2022

a 1165129

Calibration Results:

Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 2 nm and UUC at 2 nm				
Standard Wavelength	Unit Under Calibration	Correction	Uncertainty	
418.61	418.3	0.31	0.13	
536.66	536.6	0.06	0.13	
637.98	638.3	-0.32	0.13	
748.48	748.7	-0.22	0.13	
807.03	807.4	-0.37	0.13	
Photometric Accuracy (Absorbance)				
Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.2930	0.289	0.0040	0.0045
	0.5168	0.519	-0.0022	0.0045
	1.0298	1.029	0.0008	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.2867	0.283	0.0037	0.0045
	0.5073	0.509	-0.0017	0.0045
	1.0083	1.007	0.0013	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.2516	0.250	0.0016	0.0045
	0.4595	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

Calibration Results:

Without Adjustment

Photometric Accuracy (Absorbance)				
Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
235 nm	0.0000	0.000	0.0000	0.0080
	0.7355	0.737	-0.0015	0.0080
257 nm	0.0000	0.000	0.0000	0.0080
	0.8574	0.857	0.0004	0.0080
313 nm	0.0000	0.000	0.0000	0.0080
	0.2864	0.290	-0.0036	0.0080
350 nm	0.0000	0.000	0.0000	0.0080
	0.6374	0.637	0.0004	0.0080
Stray light *				
Standard: cut-off	UUC: Wavelength (nm)	UUC: Transmission (%T)	Absorbance (A)	
260.62 +/- 0.11 nm	260.6	1.3	1.886	
391.44 +/- 0.11 nm	391.4	1.3	1.886	
Spectral Resolution *				
Nominal Concentration 0.02 % v/v	Peak	Trough	Ratio	SEW
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



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"/>	

เพิ่มเติม/ข้อแนะนำ: *656.1nm=656.1nm

*486.0nm=485.5nm

Mr.Nattapat Rungreuang
Service Engineer

บริษัท ดีเคเอส อีเซีย จำกัด
DKSH Technology Limited
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CAL-FM-R31-03; 20 Jul 2022



Automation Service Co., Ltd.

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Rayong Branch : 1/15 Huaypong Rd., A. Muang, Rayong 21150 Tel. 038-692-152 Fax. 038-692-345
Lamphun Branch : 122/5 M.4, T.Ban Klang, A.Muang, Lamphun 51000 Tel/Fax. 053-581-876
website : www.automation.co.th

MTOC : L-0508/2023

Report No. : ALS-416/01

TOC-L Maintenance Report

Instrument : Total Organic Carbon Analyzer Measuring : TC 0 ~ 30000 mg/L
Model : TOC-LCSH Place of Installation : -
Serial No. : H54425300416 Department : LABORATORY
Manufacture : Shimadzu

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

Date of Maintenance : 11 / 05 / 2023

Ambient Condition : Temperature 25.5 ± 5 °C

: Humidifier 56 ± 15 %RH

REVIEW BY	Siriluk P.
APPROVED BY	KL AI
NEXT CAL. DATE	11/05/2024

Maintenance By : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

Approved By : N. Nipon
(Mr. Nipon Phungsomsak)
Technician Manager

User Name : Siriluk P.
(Siriluk P. Pengpan)

SHIMADZU ANALYZER

1/4



Automation Service Co.,Ltd.

929,929/1 Soi Pattanakarn 30, Pattanakarn Rd., Suanluang, Suanluang, Bangkok 10250
Head Office : Tel. 02-319-9994 ext.1 Fax.02-318-4961 E-mail : atsc@automation.co.th
Rayong Branch : 1/15 Huaypong Rd., A. Muang, Rayong 21150 Tel. 038-692-152 Fax. 038-692-345
Lamphun Branch : 122/5 M.4, T.Ban Klang, A.Muang, Lamphun 51000 Tel/Fax. 053-581-876
website : www.automation.co.th

MTOC : L-0508/2023

Report No. : ALS-416/01

Maintenance Sheet

Customer : ALS Laboratory Date : 11 / 05 / 2023

Model : TOC-LCSH Serial No. H54425300416

Item	Carry out maintenance work	Result	Exchange	Comment
1.	Check functionality of the device			
	Check furnace temperature (Standard cat. 680 °C / for TN cat. 720 °C)	O.K.		
	Check dehumidifier temperature (1 °C)	O.K.		
	Check the entire flow line related to leakage	O.K.		
	Check baseline status (OK)	O.K.		
	Check carrier gas pressure (200 ±10 kPa)	O.K.		
	Check carrier gas flow rate (150 mL/min)	O.K.		
2.	Tubes			
	Check all tubing for contamination, if necessary clean them	O.K.		
	Check all tubing for tight connection	O.K.		
3.	Container and Drainage			
	Fill up humidifier with pure water to max. level	O.K.		
	Check filling of dilution water and acid container	O.K.		
	Rinse Drain Pot, after wards refill again with pure water	O.K.		
	Check if outlet flow is in proper conditions	O.K.		
4.	TC and IC Injection			
	Clean Injector Block	O.K.		
	Check injector Block for wear	O.K.		
	Check injection tube adjustment	O.K.		
	Check injection for leakage	O.K.		
	Check injection for clogging	O.K.		
5.	IC Measurement (N-type)			
	Check acidification in syringe			
	Check sparging in syringe			
6.	Eye check of 8-Port valve, for sample residues or moist spots that indicate possible leakage	O.K.		
7.	Check and if necessary exchange consumable, Maintenance parts	O.K.		See list of consumable, maintenance parts

Inspection by : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

SHIMADZU ANALYZER
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Automation Service Co.,Ltd.

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website : www.automation.co.th

MTOC : L-0508/2023

Report No. : ALS-416/01

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	5.202 - 0.2705 = 4.9315 ppm	Pass

Inspection by : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

SHIMADZU ANALYZER
3/4



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website : www.automation.co.th

MTOC : L-0508/2023

Report No. : ALS-416/01

List of Consumable, Maintenance parts

Pos.	Part Number	Part Name	Result	Exchange	Recommended Interval
1.	036-11209-84	O-ring, 4D P10A (Viton , for TC,IC Slider)	O.K.	✓	1 time per year, Depending on condition
2.	036-11219-84	O-ring, 4D P20 (for sealing TC-Combustion tube)	O.K.		1 time per year, Depending on condition
3.	638-15025	O-ring, PIFE (for TC,IC-Slider)	O.K.		1 time per year, Depending on condition
4.	630-00105-01	Platinum net, (2pcs-set) (to support catalyst)	O.K.		6 month same time as catalyst exchange
5.	630-00557	Silica Wool (to support catalyst)	O.K.		6 month same time as catalyst exchange
6.	630-00992	Halogen Scrubber	O.K.		6 month
7.	630-00996	High Sensitivity TC Catalyst (When installed)	N/A		Depending on condition
8.	638-60116	Regular Catalyst (33g) (When installed)	O.K.		6 month
9.	638-56251-01	8-Port valve rotor	O.K.		1 time per year
10.	638-41323	TC-Combustion Tube	O.K.		6 month same time as catalyst exchange
11.	631-43404-01	Packing, gasket slider (for TC-Injection tube)	O.K.		1 time per year, Depending on condition
12.	638-59296	Syringe 5mL	O.K.		Depending on condition
13.	638-59296-01	Plunger Tip (for syringe 5mL)	O.K.	✓	6 month
14.	042-00405-11	IC reagent supply pump head	O.K.		1 time per year
15.	630-00999	CO2-Absorber (for cell space purge)	O.K.		1 time per year
16.	630-00964	Molecular Sieves 13x	O.K.		1 time per year

Note. Table indicates the guidelines replacement periods when NPOC measurement is performed on sample that are comparatively as clean as tap water ,use standard catalyst and at a rate of about 500 sample per month (operating five days a week)

Inspector By

Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

TOC-Control L Report

2023_05_11_001_PM_1_2.tif

Instr.Information

Instrument Options
Catalyst

TOC/ASM/IC Unit/
Regular Sensitivity

Cal. Curve

Sample Name:
Sample ID:
Cal. Curve:
Status

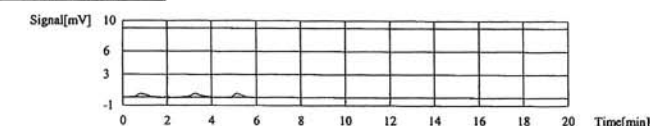
Untitled
Untitled
TC 0.1 - 20 ppm,2023_05_11_12_18_04.cal
Completed

Standard TC

Conc: 0.000mg/L

Time	Area	Height	Width	Area%	Time	Area	Height	Width	Area%
1	2.038	50uV	1.000	*****	E	5/11/2023 12:21:22 PM			
2	1.285	50uV	1.000	*****	E	5/11/2023 12:23:32 PM			
3	1.302	50uV	1.000	*****	E	5/11/2023 12:25:44 PM			

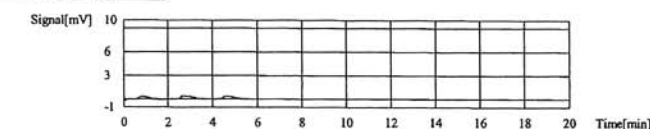
Acid Add. 0.000%
Mean Area 1.294
SD Area 0.01202
CV Area 0.93%



Conc: 0.1000mg/L

Time	Area	Height	Width	Area%	Time	Area	Height	Width	Area%
1	1.728	50uV	10.00	*****	E	5/11/2023 12:32:39 PM			
2	1.414	50uV	10.00	*****	E	5/11/2023 12:35:28 PM			
3	1.539	50uV	10.00	*****	E	5/11/2023 12:38:16 PM			

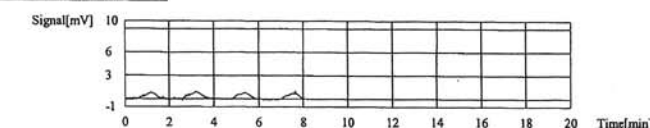
Acid Add. 0.000%
Mean Area 1.477
SD Area 0.08839
CV Area 5.99%



Conc: 0.5000mg/L

Time	Area	Height	Width	Area%	Time	Area	Height	Width	Area%
1	3.597	50uV	2.000	*****	E	5/11/2023 12:44:42 PM			
2	3.821	50uV	2.000	*****	E	5/11/2023 12:47:13 PM			
3	3.230	50uV	2.000	*****	E	5/11/2023 12:49:40 PM			
4	3.262	50uV	2.000	*****	E	5/11/2023 12:51:54 PM			

Acid Add. 0.000%
Mean Area 3.246
SD Area 0.02263
CV Area 0.70%



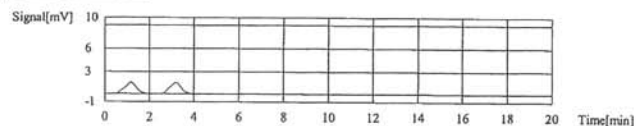
Conc: 1.000mg/L

TOC-Control L Report

2023_05_11_001_PM_1_2.txt

1	5.557	50ul	1.000	*****	5/11/2023 12:55:11 PM
2	5.433	50ul	1.000	*****	5/11/2023 12:57:34 PM

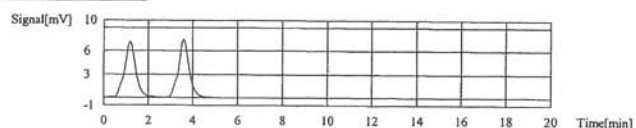
Acid Add. 0.000%
Mean Area 5.495
SD Area 0.08768
CV Area 1.60%



Conc: 5.000mg/L

1	24.52	50ul	4.000	*****	5/11/2023 1:04:59 PM
2	24.85	50ul	4.000	*****	5/11/2023 1:07:47 PM

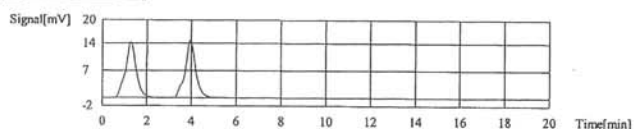
Acid Add. 0.000%
Mean Area 24.69
SD Area 0.2313
CV Area 0.95%



Conc: 10.00mg/L

1	48.44	50ul	2.000	*****	5/11/2023 1:14:25 PM
2	48.88	50ul	2.000	*****	5/11/2023 1:17:20 PM

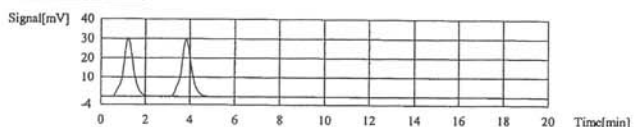
Acid Add. 0.000%
Mean Area 48.66
SD Area 0.3111
CV Area 0.64%



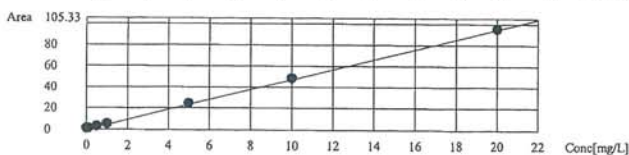
Conc: 20.00mg/L

1	95.93	50ul	1.000	*****	5/11/2023 1:31:11 PM
2	95.58	50ul	1.000	*****	5/11/2023 1:34:09 PM

Acid Add. 0.000%
Mean Area 95.75
SD Area 0.2475
CV Area 0.26%



Slope: 4.742
Intercept 0.000
r^2 1.0000
r 1.0000
RSE(%) N/A
Zero Shift Yes



TOC-Control L Report

2023_05_11_001_PM_1_2.txt

Instr. Information

Instrument Options
Catalyst

TOC/ASI/IC Unit/
Regular Sensitivity

Sample

Sample Name:
Sample ID:
Origin:
Status
Chk. Result

TC_5
Untitled
TC 0.1 - 20 ppm.cal
Completed

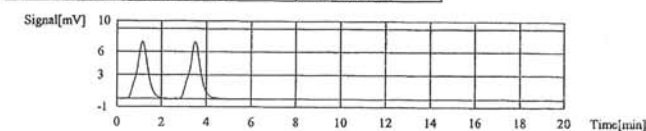
Unknown	TC	1.000	TC:5.202mg/L
---------	----	-------	--------------

1. Det

Anal.: TC

1	24.51	5.169mg/L	50ul	1.000	TC 0.1 - 20 ppm.2023_05_11_12_18_04.cal	5/11/2023 1:31:23 PM
2	24.80	5.236mg/L	50ul	1.000	TC 0.1 - 20 ppm.2023_05_11_12_18_04.cal	5/11/2023 1:34:09 PM

Mean Area 24.67
Mean Conc. 5.202mg/L



TOC-Control L Report

2023_05_11_001_PM_1_2.txt

Instr. Information

Instrument Options
Catalyst

TOC/AS/IC Unit/
Regular Sensitivity

Sample

Sample Name:
Sample ID:
Origin:
Status:
Chk. Result

Water
Untreated
TC 0.1 - 20 ppm.cal
Completed



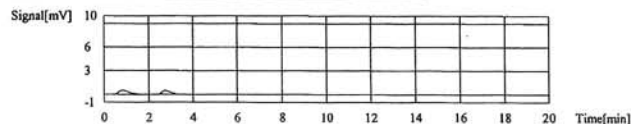
1. Det

Anal.: TC

Peak No.	Retention Time [min]	Area	Height	Width	Calibration	Time
1	1.311	0.2765mg/L	56ul	1.000	TC 0.1 - 20 ppm.2023_05_11_12_18_04.cal	5/11/2023 1:44:28 PM
2	1.254	0.2644mg/L	56ul	1.000	TC 0.1 - 20 ppm.2023_05_11_12_18_04.cal	5/11/2023 1:46:41 PM

Mean Area
Mean Conc.

1.283
0.2705mg/L



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website : www.automation.co.th

MTOC : L-0509/2023

Report No. : ALS-799/01

ASI Maintenance Report

Instrument : Automatic Sample Injector Measuring : Vial 40 mL
Model : ASI-L Place of Installation : -
Serial No. : H57415200799 Department : LABOLATORY
Manufacture : Shimadzu

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

Date of Maintenance : 11 / 05 / 2023

Ambient Condition : Temperature 25.5 ± 5 °C
: Humidifier 56 ± 15 %RH

REVIEW BY	<u>Sinluk P.</u>
APPROVED BY	<u>Mr. Nipon Phungsomsak</u>
NEXT CAL. DATE	<u>11/5/2024</u>

Maintenance By : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

Approved By : Mr. Nipon Phungsomsak
(Mr. Nipon Phungsomsak)
Technician Manager

User Name : Sinluk P.
(Mr. Sinluk Puengpang)

SHIMADZU ANALYZER

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Automation Service Co.,Ltd.

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 website : www.automation.co.th

MTOC : L-0509/2023

Report No. : ALS-799/01

Maintenance Sheet

Customer : ALS Laboratory Date : 11 / 05 / 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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 website : www.automation.co.th

MTOC : L-0509/2023

Report No. : ALS-799/01

List of Consumable, Maintenance parts

Pos.	Part Number	Part Name	Result	Exchange	Recommended Interval
1.	017-27021-01	Grease Paste, Lubricant 100g	O.K.	√	1 time per year
2.	032-22661-02	Belt, 60S2m596, Arm Drive	O.K.		1 time per year Depending on condition
3.	034-03067-02	Spring, F-642, Arm Drive	O.K.		Depending on condition
4.	042-00405-11	Pump Head, for ASI Rinse Pump (only ASI-V 24mL, 40mL)	O.K.		After 300 h of operating
5.	638-41448-01	Std. Needle Type1 24mL, 40mL* (for tube 2, 1x1, 6), [Sparge needle]	N/A		Depending on condition
6.	638-41448-02	Std. Needle Type1 125mL* (for tube 2, 1x1, 6)	N/A		Depending on condition
7.	631-41660-03	Flare Pipe 2x1,5x700mm* (for Standard Needle Type1 24mL,40mL, 125mL)	N/A		Depending on condition (may cut to origin length 600mm)
8.	638-41450-01	Needle for Suspended Particles,* 0,8mm (only ASI-V 24mL, 40mL)	N/A		Depending on condition
9.	638-41450-01	Std. Needle Type2 125mL* (for tube 1,4x0,9)	N/A		Depending on condition
10.	638-41472-01	Std. Needle Type2 24mL, 40mL* (for tube 1,4x0,9)	O.K.		Depending on condition
11.	631-41660-02	Flare Pipe 1,4x0,9x600mm* (for Suspended + Needle Type2)	O.K.		Depending on condition
12.	638-41449-01	Double Needle , only 24mL,40mL (simultaneous sparge type)*	N/A		Depending on condition
13.	631-41660-01	Flare Pipe 1,1x0,6x600mm* (for Double Needle 24mL,40mL)	N/A		Depending on condition

*Note: needed parts depending on installed needle types!

Inspection by :

Peerapong Sangpan
 (Mr. Peerapong Sangpan)
 Technician

ภาคผนวก จ

สำเนาหนังสือใบอนุญาตขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน



ที่ อก ๐๓๑๐(๓)/ ๑๐๖๙

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๕๐๐

๒๘ มกราคม ๒๕๖๕

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๓๐ กรกฎาคม ๒๕๖๓

- สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ แผ่น
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุ
หนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔-ค-๕๗๐๑
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 จำนวน ๑๖๒ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๕๙ รายการ น้ำใต้ดิน
จำนวน ๑๒๖ รายการ อากาศเสีย ๑๖ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๓๕ รายการ และดิน
จำนวน ๑๒๕ รายการ รวมทั้งสิ้นจำนวน ๓๖๑ รายการ ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กันยายน ๒๕๖๖ หากประสงค์จะต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอ
ต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์
เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายจิระ จันทรนิธิ)

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาการแทน
ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษโรงงาน
ปฏิบัติการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเฝ้าระวังมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๒๐๒ ๔๑๔๖ ๐ ๒๒๐๒ ๔๐๐๒

โทรสาร ๐ ๒๓๕๔ ๓๒๐๘ ๐ ๒๓๕๔ ๓๔๑๕

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ว-๒๐๔

ที่ อก ๐๓๑๐(๓)/

ลงวันที่ ๒๘ มกราคม ๒๕๖๕

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

- | | |
|--------------------------------|----------------------------|
| ๑) นางสาวยุพาพร จันทรเปล่ง | ทะเบียนเลขที่ ว-๒๐๔-ค-๕๗๐๐ |
| ๒) นางสาวชัชชัย โกมารกุล ณ นคร | ทะเบียนเลขที่ ว-๒๐๔-ค-๕๗๐๑ |
| ๓) นายศรายุทธ จิตรานนท์ | ทะเบียนเลขที่ ว-๒๐๔-ค-๕๗๐๒ |
| ๔) นางสาวกนกกร เอนก | ทะเบียนเลขที่ ว-๒๐๔-ค-๕๗๐๑ |
| ๕) นายสุริยา สอนแก้ว | ทะเบียนเลขที่ ว-๒๐๔-ค-๖๑๑๒ |
| ๖) นายวิชาญ ชุมพรี | ทะเบียนเลขที่ ว-๒๐๔-ค-๖๑๑๓ |

(นายจิระ จันทรนิธิ)

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาการแทน
ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษโรงงาน
ปฏิบัติการแทนอธิบดีกรมโรงงานอุตสาหกรรม

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แล็บอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ว-๒๐๔

ที่ อก ๐๓๑๐(๑) ๑๐๖๕

ลงวันที่ ๒๘ มกราคม ๒๕๖๕

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖๒ ราย

๑) นางสาวจินดา ไชจุลธรรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๐๘
๒) นางสาวสาวิตรี น้อยเสงี่ยม	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๐๙
๓) นางสาวชนัญญาญจน์ อัมมม	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๐
๔) นางสาวนรินทร์ สายแสง	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๕
๕) นางสาวนันทวดี สมบูรณ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๖
๖) นางสาวศรัณยา เฉลิมธำรงค์	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๗
๗) นางสาวสรารักษ์ มงคลจิรวดี	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๙
๘) นางสาวศิริลักษณ์ พึ่งแพง	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๒๐
๙) นายณพพงศ์ จันทร์พันธุ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๕๐๘
๑๐) นายบรรเศรษฐ์ โกมลาลัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๕๑๑
๑๑) นายธินา จริยา	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๕๑๔
๑๒) นางสาวเกศรินทร์ แก้วมัน	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๕๑๖
๑๓) นางสาวสุวิมล ชัยเรืองวุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๕๑๗
๑๔) นางสาวสุชาดา ธรรมถาวร	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๕๑๑
๑๕) นางสาวเปรมิกา ชัยเดชธนกุล	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๕๑๓
๑๖) นางสาวศศิธร หมูสวัสดิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๕๑๔
๑๗) นางสาวสาวลักษณ์ ภูณาทำพร	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๕๑๕
๑๘) นายอภิสิทธิ์ สิงหา	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๕๑๖
๑๙) นายศักดิ์สิทธิ์ ไพศาลพิสุทธิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๕๑๗
๒๐) ว่าที่ร้อยตรีหญิง พรรณิภา จำเจริญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๕๑๘
๒๑) นางจิตตา คำแก้ว	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๕๓๓
๒๒) นางสาวอรรณณ รักยง	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๕
๒๓) นางสาวพนรัตน์ แยมกรานต์	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๙
๒๔) นายจุลเดช วารินทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๐
๒๕) นางสาวดาญรัตน์ ร้องคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๑
๒๖) นายนคร สุขเจริญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๒
๒๗) นายบุญชา นามเขตต์	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๓
๒๘) นายพรมมี ศรีปิตเนตร	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๕
๒๙) นายอุทิศ อุณลิ้ม	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๖
๓๐) ว่าที่ร้อยตรี เฉลิมเกียรติ อมรศรีเสริม	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๘
๓๑) นางสาววริยา สร้างนา	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๙
๓๒) นายอนุพงศ์ รัตนศรีประเสริฐ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๓๐
๓๓) นางสาวจุฑารัตน์ โอนสันเทียะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๓๒
๓๔) นางสาวจารวรรณ พิมพ์อภัยกุล	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๗๖

(นายศิระ จันทร์เจิด)

๓๕) นางสาวปรารถนา...

นักวิทยาศาสตร์ชำนาญการพิเศษ วิชาการการแพทย์
ผู้อำนวยการกองวิจัยและเคมีย่อยเคมีภัณฑ์โรงงาน
ปตท.ปิโตรเคมีภัณฑ์และเคมีย่อยเคมีภัณฑ์โรงงาน

- ๒ -

๓๕) นางสาวปรารถนา...	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๗๘
๓๖) นางสาวเตือนใจ ทางกลาง	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๐
๓๗) นางสาวจิราพร ศิริเวช	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๒
๓๘) นายวรารักษ์ สุกรักษ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๓
๓๙) นายทวง วิริยะสทกิจ	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๔
๔๐) นายธนิต เจริญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๕
๔๑) นายคณิศร ข้าเพชร	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๖
๔๒) นายอรรคพล นิยมวิทยาพันธ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๗
๔๓) นายภูวิช พรหมสะอาด	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๘
๔๔) นายชนเดช โกศาพิพัฒน์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๙
๔๕) นายชวฤทธิ์ วงษ์จันทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๐
๔๖) นายอาทิตย์ ศรีเสน	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๑
๔๗) นายเจษฎินทร์ คงศักดิ์ไทย	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๒
๔๘) นายจรัส บุญยั้ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๕
๔๙) นายธนาณัติ เอนก	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๖
๕๐) นายอภิวัฒน์ ทุมหนู	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๗
๕๑) นางสาวสุภาวัญ มาก	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๘
๕๒) นางสาวทัศนพร ขวาลสมบูรณ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๐
๕๓) นางสาววิติมา บุญเพ็ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๑
๕๔) นางสาวกนกกร เข้มเพ็ชร	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๒
๕๕) นางสาวพัชรียา หงษ์สมิตี	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๓
๕๖) นางสาวภาวนิดา สุรวงศ์ตระกูล	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๔
๕๗) นางสาวภาณุมาศ นามวัฒน์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๕
๕๘) นางสาวอุไรรัตน์ หิรัญสร้างแป้น	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๖
๕๙) นายธีรวัฒน์ ปางสุข	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๗
๖๐) นายอิทธิพล ยะโส	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๘
๖๑) นายประพนธ์ วรรณสุขชัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๙
๖๒) นายชยธร พวงทิพย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๑๐
๖๓) นางสาวกนกวรรณ จันทบาล	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๑๑
๖๔) นางสาวเกษร หลักบุญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๑๒
๖๕) นายสิทธิโชค ธงเงิน	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๑๓
๖๖) นายศิวารณณ. ใจบุญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๐๕
๖๗) นางสาวพรรณธิดา ทุมคง	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๐๘
๖๘) นางสาวศรณีย์ ยิ่งดี	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๐๙
๖๙) นายณภัทร ศรีวิริยะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๐
๗๐) นายสุวิชา ทองอ่อน	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๑
๗๑) นายวิญญู บุญตะนัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๓

(นายศิระ จันทร์เจิด)

๗๒) นายสมบูรณ์...

นักวิทยาศาสตร์ชำนาญการพิเศษ วิชาการการแพทย์
ผู้อำนวยการกองวิจัยและเคมีย่อยเคมีภัณฑ์โรงงาน
ปตท.ปิโตรเคมีภัณฑ์และเคมีย่อยเคมีภัณฑ์โรงงาน

๗๒) นายสมบุรณ์ บุตรจันทร์
๗๓) นายวิรัตน์ ไชยชนะ
๗๔) นายอนุเบศร์ เพิ่มพูน
๗๕) นายจิรณัฐ ขาวละออ
๗๖) นายสมโภช วันสา
๗๗) นายอัสรี นามบุรี
๗๘) นายณัฐนันท์ ปานประเสริฐ
๗๙) นายอัครเวศ จ้อสาว
๘๐) นายประเสริฐ สุระขันธุ์
๘๑) นายบุญกุล จันทน์นิยม
๘๒) นายพิรพงษ์ ทองคุณปรีดา
๘๓) นายณพพล ทองนุช
๘๔) นายอนุวัฒน์ ม่วงแพ
๘๕) นายเจตศราวุฒิ ปัตตะมะ
๘๖) นายกฤษณะ สายวรรณ
๘๗) นายพิชัย บุญยงค์
๘๘) นายภาณุพงศ์ โคมวงศ์
๘๙) นายสามารถ คุ่มปลี
๙๐) นายสันชัย โกศรนาม
๙๑) นายณัฐวุฒิ ศรีประเสริฐ
๙๒) นายชวลิตชัย นาคพนม
๙๓) นายพงศธร ชัยทิพย์
๙๔) ว่าที่ร้อยตรี ภาณุพงศ์ แสนศรี
๙๕) นายสิทธิโชค ทาสีดา
๙๖) นายธนากร อินสุตา
๙๗) นางสาววรรณิษา ขาติวันชัย
๙๘) นางสาวพิมพ์ตะวัน มีนากุล
๙๙) นางสาวเพชรรัตน์ สิงห์สมบูรณ์
๑๐๐) นางสาวชญาณีน พรหมจันทร์
๑๐๑) นายกิตติ ทวีราช
๑๐๒) นายจักริน หมั่นวิชา
๑๐๓) นายอัครชัย สุขเปี้ย
๑๐๔) นายณรรณห์ ต๊ะทองคำ
๑๐๕) นายดุลยพล สมนอก
๑๐๖) นายทักษ์ดนัย อุบลศรี
๑๐๗) นายธนศร นามะกณณา
๑๐๘) นายธิติงค์ บัวแดง

ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๑๔
ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๑๕
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(นายศิระ จันทร์เจ็ด)

นักวิทยาศาสตร์ชำนาญการพิเศษ วิชาการงานพิเศษ
ผู้อำนวยการกองวิจัยและเตือนภัยกับภัยพิบัติ
ปฎิบัติราชการแบบถาวร

๑๐๙) นายณนทชัย...

๑๐๙) นายณนทชัย อุปถัมภ์
๑๑๐) นายณัฐพล คุณสุทธิ
๑๑๑) นายณัฏฐ์ ศาวิณ
๑๑๒) นายปิยะนัฐ พลมะศรี
๑๑๓) นายพงศ์สิริ โสมเขียว
๑๑๔) นายพิรพัฒน์ กำคำ
๑๑๕) นายภาณุพงศ์ มานิตย์
๑๑๖) นายมงคล ผลาทิพย์
๑๑๗) นายมนันท์ พูลศิริ
๑๑๘) นายสิรินันท์ ทองอิน
๑๑๙) นายอนเนชา ทนสมัย
๑๒๐) นายอดิศักดิ์ ฝมไผ
๑๒๑) นายอนันตชัย วิสม
๑๒๒) นายณัฐดนัย เจือละออง
๑๒๓) นายวรุต คีนัก
๑๒๔) นายแสงตะวัน นະตะสัท
๑๒๕) นายยุทธพงศ์ รัตนะ
๑๒๖) นายชัยณัฐ ไชยชนะนิจ
๑๒๗) นายวิศรุต ศรีธรรมมา
๑๒๘) นายณนทกร เมื่อก่อง
๑๒๙) นายกัษัย สุทธะ
๑๓๐) นางสาวณัฐภรณ์ รักทะเล
๑๓๑) นางสาวประภาภรณ์ บุตรพรม
๑๓๒) นางสาวนิลาวัลย์ นามพรม
๑๓๓) นางสาวพัชรินทร์ แสนสร้อย
๑๓๔) นายไพรัช ปรียะพินาย
๑๓๕) นางสาวศุภมาศ ทองมาก
๑๓๖) นางสาวลลิตา จิตรสว่าง
๑๓๗) นางสาวไมพร เลิกคู่เขียว
๑๓๘) นางสาวกฤติมาพร คำมีแก่น
๑๓๙) นางสาวสกุลรัตน์ ภาณุภูมิ
๑๔๐) นางสาวกาญจนา คงคุณ
๑๔๑) นางสาวไพรินทร์ ศรีรูป
๑๔๒) นางสาวทิพนตร ฝอยปัญญา
๑๔๓) นางสาวสาธิตา ปานทอง
๑๔๔) นางสาวอริสา ทองนวล
๑๔๕) นางสาวอรยา คำค้อย

ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๔๔
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(นายศิระ จันทร์เจ็ด)

นักวิทยาศาสตร์ชำนาญการพิเศษ วิชาการงานพิเศษ
ผู้อำนวยการกองวิจัยและเตือนภัยกับภัยพิบัติ
ปฎิบัติราชการแบบถาวร

๑๔๖) นางสาวชุตินันท์...

๑๔๖) นางสาวศุภมากรณ์ สุนทรสนาน	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๓๕
๑๔๗) นางสาวสุภารัตน์ นนทประสาธ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๓๖
๑๔๘) นางสาวรัชนิกร เนียมกลาง	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๓๗
๑๔๙) นางสาวกัญญารัตน์ ศรีนิลหา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๓๘
๑๕๐) นางสาวอัญชลี คำจันทร์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๓๙
๑๕๑) นายบุญฤทธิ์ เอี่ยมเทศ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๐
๑๕๒) นายศิริวัฒน์ พานิชย์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๑
๑๕๓) นางสาวศุภรดา ปันมยุรา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๒
๑๕๔) นางสาวพาฤดี คุณนาม	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๓
๑๕๕) นางสาวจิราเจต พงศา	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๔
๑๕๖) นางสาวกนกภรณ์ อูระ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๕
๑๕๗) นางสาวอารยา มีชัย	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๖
๑๕๘) นางสาวจิตสุภา ประเทืองสุข	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๗
๑๕๙) นางสาวอริสา วิริยขันติธรรม	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๘
๑๖๐) นางสาววิษุตา นาคผจญ	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๙
๑๖๑) นางสาวพนิดา ยอดอินทร์	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๕๐
๑๖๒) นางสาวนันทิยา จันทะลุน	ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๕๑



(นายจิระ จันทรเจ็ด)

นักวิทยาศาสตร์ชำนาญการพิเศษ วิชาการการแพทย์
ผู้อำนวยการกองวิจัยและเคอีนกับมลพิษโรงงาน
ปฏิบัติการการหนอับพิษกรรงานอุตสาหกรรม

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ๖-๒๐๔

ที่ อก ๐๓๑๐(๑) ๑๐ ๖ ๙

ลงวันที่ ๒๘ มกราคม ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๖๑ รายการ

น้ำเสีย จำนวน 59 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldicarb	High-Performance Liquid Chromatographic Method ⁽⁴⁾
2	Aldicarb Sulfone	High-Performance Liquid Chromatographic Method ⁽⁴⁾
3	Aldicarb Sulfoxide	High-Performance Liquid Chromatographic Method ⁽⁴⁾
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
5	Arsenic	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
6	Barium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
7	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
8	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
9	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
10	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
11	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method ⁽⁴⁾ 2) 5-Day BOD Test, Membrane Electrode Method ⁽⁴⁾
12	Carbaryl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
13	Carbofuran	High-Performance Liquid Chromatographic Method ⁽⁴⁾
14	Cadmium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
15	Chemical Oxygen Demand	1) Closed Reflux, Colorimetric Method ⁽⁴⁾ 2) Closed Reflux, Titrmetric Method ⁽⁴⁾
16	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
17	Chromium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁴⁾
18	Color	ADMI Weighted-Ordinate Spectrophotometric Method

(นางริภาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
19	Copper	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
20	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
21	2,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
22	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
23	2,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
24	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
25	2,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
26	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
27	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
28	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
29	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
30	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
31	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
32	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
33	Formaldehyde	Distillation, Colorimetric Method ⁽³⁾
34	Free Chlorine	1) DPD Ferrous Titrimetric Method ⁽⁴⁾ 2) Iodometric Method ⁽⁴⁾
35	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
36	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
37	Hexavalent Chromium	Filtration, Colorimetric Method ⁽⁴⁾
38	3-Hydroxycarbofuran	High-Performance Liquid Chromatographic Method ⁽⁴⁾
39	Lead	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
40	Manganese	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
41	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/Mass spectrometric Method ⁽⁴⁾
42	Methiocarb	High-Performance Liquid Chromatographic Method ⁽⁴⁾
43	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾

(นางริกาญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

44 Methomyl...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
44	Methomyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
45	Nickel	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ⁽⁴⁾ 2) Soxhlet Extraction Method ⁽⁴⁾
47	Oxamyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
48	Propoxur	High-Performance Liquid Chromatographic Method ⁽⁴⁾
49	pH	Electrometric Method ⁽⁴⁾
50	Phenols	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾
51	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
52	Sulfide	Iodometric Method ⁽⁴⁾
53	Temperature	Laboratory and Field Methods ⁽⁴⁾
54	Total Dissolved Solids	Dried at 180 °C ⁽⁴⁾
55	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ⁽⁴⁾
56	Total Suspended Solids	Dried at 103-105 °C ⁽⁴⁾
57	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
58	Trivalent Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ⁽⁴⁾
59	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁴⁾

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⁾

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3 Aldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
8	Barium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
9	Benzo(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⁾

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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⁾ Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
22	Butyl Benzyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾

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34 Chromium (III)...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ⁽⁴⁾
35	Chromium (VI)	Colorimetric Method ⁽⁴⁾
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
37	Cyanide	Distillation, Colorimetric Method ⁽⁴⁾
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
39	DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
40	DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
41	DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
43	Di-n-Butyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
47	3,3-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

วิมล

51 cis-1,2-Dichloroethylene...

(นางริกาญจน์ นัครสกุลวิไล)

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
57	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
58	Diethyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
63	Di-n-Octyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

วิมล

(นางริกาญจน์ นัครสกุลวิไล)

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68 Fluorene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
69	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
70	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
74	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
75	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
76	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
81	Lead	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
83	Mercury	1) Cold Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾

วิมล

84 Methanol...

(นางริกาญจน์ ฉัตรสกุลวิไล)
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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾ 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
94	N-Nitrosodiphenylamine	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⁾

วิมล

97 Pentachlorophenol...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
98	pH	Electrometric Method ^[4]
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
100	Phenol	1) Distillation, Direct Photometric Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
102	Selenium	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
103	Silver	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
109	TPH (C ₉ -C ₈)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,24]
110	TPH (C ₈ -C ₁₆)	Solvent Extraction, Gas Chromatographic Method ^[9,21]
111	TPH (C ₁₆ -C ₃₅)	Solvent Extraction, Gas Chromatographic Method ^[9,21]
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]

วิมล

114 1,1,2-Trichloroethane...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
120	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
121	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
122	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
123	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
124	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
126	Zinc	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]

อากาศเสีย (ปล่อยระบาย) จำนวน 16 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic, Digestion, Inductively Coupled Plasma Method ^[5]
2	Arsenic	Isokinetic, Digestion, Inductively Coupled Plasma Method ^[5]

วิมล

3 Carbon Monoxide...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
3	Carbon Monoxide	1) Sampling Bag Non-Dispersive Infrared Method ^[5] 2) Non-Dispersive Infrared Method ^[5] 3) Instrumental Analyzer Method ^[5]
4	Chlorine	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Isokinetic Sampling, Ion Chromatographic Method ^[5]
5	Copper	Isokinetic, Digestion, Inductively Coupled Plasma Method ^[5]
6	Dioxins	Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory or Analysis by Department of Industrial Works Registered Laboratory (Dioxins/Furans Analysis Approved) ^[5]
7	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Isokinetic Sampling, Ion Chromatographic Method ^[5]
8	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ^[5]
9	Lead	Isokinetic, Digestion, Inductively Coupled Plasma Method ^[5]
10	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[5] 2) Isokinetic, Digestion, Inductively Coupled Plasma Method ^[5]
11	Opacity	Ringelmann's Method ^[2]
12	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ^[5] 2) Chemiluminescence Method ^[5] 3) Instrumental Analyzer Method ^[5]
13	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 2) UV Fluorescence Method ^[5] 3) Instrumental Analyzer Method ^[5]
14	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5]
15	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ^[5]
16	Xylene	Adsorption Sampling, Gas Chromatographic Method ^[5]

วิมล
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กรมส่งเสริมการค้าระหว่างประเทศ

สิ่งปฏิกูล...

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[22,31]
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]

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6 Cadmium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,19,25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
9	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1,6,15,17) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1,6,16,17) 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,15,17) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,16,17)
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method ^(1,6,17) 2) Alkaline Digestion, Colorimetric Method ^(8,17)

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11 Cobalt...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction; Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,25)

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2) Soxhlet...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Dieldrin	2) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31) 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,25)
18	Endrin	2) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31) 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,25)
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(1,6,18)

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
2) Waste Extraction...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Methoxychlor	2) Waste Extraction, Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ^(1,6,19) 3) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^(1,6,20) 4) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁸⁾ 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ⁽¹⁹⁾ 6) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽²⁰⁾
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)

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
27 Polychlorinated...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5'-Trichlorobiphenyl - 2,4',5'-Trichlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5',6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1,9,23) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,23) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)


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28 Pentachlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
29	pH	Electrometric Method ^(29,30)
30	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,16)
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15)


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4) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
35	Zinc	4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16] 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]

ดิน จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
4	Anthracene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
8	Barium	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]

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9 Benz(a)anthracene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Benz(a)anthracene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
11	Benzo(b)fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
12	Benzo(k)fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
13	Benzoic acid	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
14	Benzo(a)pyrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
15	Benzo(g,h,i)perylene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]
17	Bis(2-chloroethyl)ether	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
18	Bis(2-ethylhexyl)phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
21	Butanol	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^[12,24]
22	Butyl Benzyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]
24	Carbazole	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]

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26 Carbon tetrachloride...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
28	p-Chloroaniline	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
32	2-Chlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^[7,8,15,17] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^[7,8,16,17]
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^[8,17]
36	Chrysene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
37	Cyanide	Extraction, Distillation, Colorimetric Method ^[26,27,28]
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
39	DDD	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]

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40 DDE...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
40	DDE	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
41	DDT	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
42	Dibenz(a,h)anthracene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
43	Di-n-Butyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
47	3,3-Dichlorobenzidine	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
53	2,4-Dichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]

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57 Dieldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
58	Diethyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
59	2,4-Dimethylphenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
60	2,4-Dinitrophenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
61	2,4-Dinitrotoluene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
62	2,6-Dinitrotoluene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
63	Di-n-Octyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
67	Fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
68	Fluorene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
70	Heptachlor Epoxide	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)

71 Hexachlorobenzene...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
73	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
74	α-HCH	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
75	β-HCH	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
76	γ-HCH	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
77	Hexachlorocyclopentadiene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
78	Hexachloroethane	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
79	Indeno(1,2,3-cd)pyrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
80	Isophorone	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
81	Lead	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁸⁾

2) Thermal...

(นางริกาญจน์ ฉัตรสุภาวิไล)
ผู้อำนวยการศูนย์มาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
กรมควบคุมมลพิษ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
84	Methanol	2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry ^[19] 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^[20] Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^[12,24]
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
88	2-methylphenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
89	2-Methylnaphthalene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
91	Naphthalene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]
93	Nitrobenzene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
94	N-Nitrosodiphenylamine	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
95	N-Nitrosodi-n-propylamine	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,23] 2) Automated Soxhlet Extraction, Gas Chromatographic Method ^[23,32]

อัทฉะ
(นางริกาญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์มลพิษ

- Aroclor 1242...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
	- Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	
97	Pentachlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
98	Phenanthrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
99	Phenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
100	Pyrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]

อัทฉะ
(นางริกาญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์มลพิษ
และทะเบียนปฏิบัติการ

101 Selenium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
101	Selenium	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,16)
102	Silver	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,16)
103	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
108	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
109	TPH (C ₈ -C ₁₆)	1) Solvent Extraction, Gas Chromatographic Method ^(11,21) 2) Automated Soxhlet Extraction, Gas Chromatographic Method ^(21,31)
110	TPH (C ₁₆ - C ₃₅)	1) Solvent Extraction, Gas Chromatographic Method ^(11,21) 2) Automated Soxhlet Extraction, Gas Chromatographic Method ^(21,31)
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
115	2,4,5-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)

วิมล
(นางริกาญจน์ อัครสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

116 2,4,6-Trichlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
116	2,4,6-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,16)
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
121	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
122	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
123	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
125	Zinc	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,16)


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วิมล
(นางริกาญจน์ อัครสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ


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(นางริกาญจน์ นัตถกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

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(นางริกาญจน์ นัตถกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ กองวิจัยและเตือนภัยมลพิษโรงงาน กรมโรงงานอุตสาหกรรม โทร. ๐ ๒๒๐๒ ๔๐๐๒, ๔๑๔๖



ที่ อก ๐๓๑๐(๑)/ ๕๓ ๗ ๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๐ ๕ มีนาคม ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๔ กุมภาพันธ์ ๒๕๖๖

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๙ ราย

- | | |
|---------------------------------|----------------------------|
| ๑) นายนคร สุขเจริญ | ทะเบียนเลขที่ ๖-๒๐๔-จ-๖๑๒๒ |
| ๒) นายปัญญา นามเขตต์ | ทะเบียนเลขที่ ๖-๒๐๔-จ-๖๑๒๓ |
| ๓) นายอรรถพล นิยมวิทยาพันธ์ | ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๐๘๗ |
| ๔) นางสาวพัชรียา หงษ์สมดี | ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๑๐๓ |
| ๕) นางสาวภาณิดา สุวงศ์ตระกูล | ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๑๐๔ |
| ๖) นางสาวศรวณีย์ ยิ่งดี | ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๐๔ |
| ๗) นายสมโภช วันสา | ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๑๔ |
| ๘) นายณัฐนันท์ ปานประเสริฐ | ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๑๔ |
| ๙) ว่าที่ร้อยตรีภาณุพงศ์ แสนศรี | ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๓๖ |
| ๑๐) นายมนันท์ พูลศิริ | ทะเบียนเลขที่ ๖-๒๐๔-จ-๘๖๐๒ |
| ๑๑) นายณัฐดนัย เจือละออง | ทะเบียนเลขที่ ๖-๒๐๔-จ-๘๖๐๗ |
| ๑๒) นางสาวกาญจนา คงคุณ | ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๒๔ |
| ๑๓) นางสาวรัชนิกร เนียมกลาง | ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๓๗ |
| ๑๔) นางสาวกัญญารัตน์ ศรีนิลทา | ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๓๘ |
| ๑๕) นายศิริวัฒน์ พานิชย์ | ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๑ |
| ๑๖) นางสาวกนกภรณ์ สุระ | ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๕ |
| ๑๗) นางสาวจิตสุภา ประเทืองสุข | ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๗ |
| ๑๘) นางสาวอริสา วิริยขันติธรรม | ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๔๘ |
| ๑๙) นางสาวพนิดา ยอดอินทร์ | ทะเบียนเลขที่ ๖-๒๐๔-จ-๙๒๕๐ |

๒. ให้เพิ่มเจ้าหน้าที่...

-๒-

๒. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ ราย

- | | |
|--------------------------------|----------------------------|
| ๑) นายกาจบัณฑิต กิตติศุภวณิชย์ | ทะเบียนเลขที่ ๖-๒๐๔-จ-๑๐๐๑ |
| ๒) นายภัทรพล สว่างใจธรรม | ทะเบียนเลขที่ ๖-๒๐๔-จ-๑๐๐๒ |
| ๓) นายณาริ๊ป เทือกชัยคำ | ทะเบียนเลขที่ ๖-๒๐๔-จ-๑๐๐๓ |
| ๔) นายศิริโชค พงษ์ประสม | ทะเบียนเลขที่ ๖-๒๐๔-จ-๑๐๐๔ |
| ๕) นายณัฐวุฒิ ดั่งแพง | ทะเบียนเลขที่ ๖-๒๐๔-จ-๑๐๐๕ |

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ที่ อก ๐๓๑๐(๑)/๑๐๖๔ ลงวันที่ ๒๘ มกราคม ๒๕๖๔ คือในวันที่ ๒ กันยายน ๒๕๖๖ ทั้งนี้ สามารถยื่นคำขอ
ผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code หายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นางริกาญจน์ อัครสกุลวิไล)

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาการแทน
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๔๔

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



อุตสาหกรรมก้าวหน้า ประสานใจก้าวไกล ร่วมกันพัฒนา อุตสาหกรรมสีเขียว





ที่อก ๐๓๑๐(๑)/ ๖ ๑ ๒ ๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒๓ มีนาคม ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๑๐ มีนาคม ๒๕๖๖

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด
ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๕ สถานที่ตั้งเลขที่ ๓๐๔ ซอยพัฒนาการ ๔๐
ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการ
วิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้เปลี่ยนแปลงชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการ
วิเคราะห์ จากเดิม นางสาวสรารัตน์ มงคลจิรฤติ ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๔ เป็น นางสาวอัญญธร มงคลจิรฤติ
ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๔

ทั้งนี้ หากท่านมีความประสงค์จะยื่นคำขอใดๆ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์
ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ห้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประสม คำทรงษ์)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติการแผนอภัยภิบาลโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๔๔

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์



กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน

แบบ ปอ.1

วันที่ 4 เดือน สิงหาคม พ.ศ. 2566

ข้าพเจ้า () ผู้รับใบอนุญาตประกอบกิจการโรงงาน

(✓) บริษัท/ห้างหุ้นส่วนจำกัด เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

ตั้งอยู่ที่เลขที่ 104 หมู่ที่ - ตระก/ซอย พัฒนาการ 40

ถนน พัฒนาการ ตำบล/แขวง พัฒนาการ

อำเภอ/เขต สวนหลวง จังหวัด กรุงเทพมหานคร รหัสไปรษณีย์ 10250

โทรศัพท์ 02 760-3040 โทรสาร 0 2 760-3197

ได้รับทราบระเบียบกรมโรงงานอุตสาหกรรมว่าด้วยการขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน พ.ศ. 2560 โดยตลอดแล้วและยินยอม

ปฏิบัติตามระเบียบฯทุกประการ และได้แนบเอกสารต่างๆ ตามรายการเอกสารประกอบการพิจารณา (แบบ ปอ.1-1) มาพร้อมนี้

รายการขอขึ้นทะเบียน

การดำเนินการ	รายละเอียด (รายการ)				
	น้ำเสีย/น้ำทิ้ง	น้ำใต้ดิน	อากาศเสีย	สิ่งปฏิกูลหรือ วัสดุที่ไม่ใช้แล้ว	ดิน
[] ขออนุญาตขึ้นทะเบียนห้องปฏิบัติการ วิเคราะห์เอกชน					
[✓] ต่ออายุห้องปฏิบัติการวิเคราะห์ เอกชน	59	126	16	35	125
[✓] เปลี่ยนแปลงสารมลพิษที่วิเคราะห์ (✓) เพิ่มสารมลพิษ () ยกเลิกสารมลพิษ	-	-	12	-	-
[✓] เปลี่ยนแปลงบุคลากร (✓) เพิ่มบุคลากร (✓) ยกเลิกบุคลากร	จำนวน จำนวน	38 ราย (รายละเอียดตาม แบบ ปว.1) 2 ราย (รายละเอียดตาม แบบ ปว.1)			
[] ยกเลิกห้องปฏิบัติการวิเคราะห์เอกชน					
[] อื่นๆ โปรดระบุ.....					

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ
วันที่ ๕ ๕ ๖๖
วันที่ ๗ ๕ ๖๖
วันที่ ๘ ๕ ๖๖

จึงเรียนมาเพื่อโปรดพิจารณา

เขียน 17/11

เพื่อโปรดพิจารณา

(นายประสม คำทรงษ์)

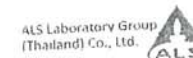
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน

ลงชื่อ

(นางทัศนีย์ เลขาภรณ์)

ผู้อำนวยการงานแผนนิติบุคคล

ประทับตรา (ถ้ามี)





ที่อก ๐๓๓๐(๓)/ ๖๔ ๗๐

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๔ มิถุนายน ๒๕๖๕

เรื่อง ขันทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๙ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำ
ห้องปฏิบัติการวิเคราะห์ และรายการสารมลพิษที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป
(ประเทศไทย) จำกัด ขันทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ๖-๓๒๓๓ สถานที่ตั้งเลขที่
๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้คู อำเภอบลุกแดง จังหวัดระยอง โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายเดช ช้างชน	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๔๒
๒) นางวิลาวัลย์ บริรักษ์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๔๓
๓) นายสุพจน์ สลามเต๊ะ	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๔๔

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นางสาวณมล บรรจงกิจ	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๔๕
๒) นางพจนา สีดา	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๔๖
๓) นางสาวธนิดา กุลสุริวงศ์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๔๗
๔) นายพิทยา ทองแดง	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๔๘
๕) นางชลธิชา สุนทร	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๔๙
๖) ว่าที่ ร.ต.รณชัย ม่วงมา	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๕๐
๗) นายวราวุฒิ พับพา	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๕๑
๘) นายศักดิ์นรินทร์ จรัสกาย	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๕๒
๙) นายสุรศักดิ์ สาชิน	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๕๓
๑๐) นางสาวเพชรคุณ ภวภูตานนท์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๕๔
๑๑) นายสราพร ภาแก้ว	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๕๕
๑๒) นายสุทธิดำรง โชคปิณันท์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๕๖

-๒-

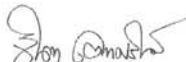
๑๓) นายวัลลภ หันไชยเนาว์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๕๗
๑๔) นางสาววนาลี เจริญตระกูล	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๕๘
๑๕) นางสาวนิตา ผดุงจิตต์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๕๙
๑๖) นายธนสิทธิ์ วงศ์ไชย	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๖๐
๑๗) นายชัยนุสรณ์ เลิศนันทกุลชัย	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๖๑
๑๘) นายสัจจา เพ็ชรแสวง	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๖๒
๑๙) นายกันตภณ มณีสัมพันธ์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๖๓
๒๐) นางสาวจันทิพย์ โกเมนชนะ	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๖๔
๒๑) นายจรินทร์ อ็อกจินดา	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๖๕
๒๒) นายศุภณัฐ พิสัยพันธ์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๖๖
๒๓) นายศุภชัย วงศ์สุริยฉาย	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๖๗
๒๔) นายปฐมพงศ์ กรสวัสดิ์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๖๘
๒๕) นายไสว ตันโพธิ์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๖๙
๒๖) นางสาวกิตติยา สัญญาริยาภรณ์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๗๐
๒๗) นางสาวเจษฎาพร ศรีบุญเรือง	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๗๑
๒๘) นางสาวมธุรินทร์ สิงห์เงา	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๗๒
๒๙) นางสาววิจิตรรัตน์ ศิริมงคลโร	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๗๓
๓๐) นายพิพัฒน์ นิภัทร์เศรษฐ์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๗๔
๓๑) นายศิริวิทย์ เรืองสม	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๗๕
๓๒) นายปารามศ สัตยาคุณ	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๗๖
๓๓) นายนฤนาท ธรรมสระโร	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๗๗
๓๔) นางสาวศุภรัตน์ ไสจันท์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๗๘
๓๕) นายพชรกร อินทรเสนา	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๗๙
๓๖) นายทิวากร เชื้อมวก	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๘๐
๓๗) นายอนุรักษ ทองขจรศักดิ์	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๘๑
๓๘) นายอภิชาติ วิลาศ	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๘๒
๓๙) นายจรัสระวี ศรีรักษา	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๘๓
๔๐) นายประสานมิตร เชื้อนเพชร	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๘๔
๔๑) นายภาณุวัฒน์ รังบง	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๘๕
๔๒) นายสันติ ชัยชนะ	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๘๖
๔๓) นายสิทธิชัย แก้วเกตุ	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๘๗
๔๔) นายทินกร กุลชาติ	ทะเบียนเลขที่	๖-๓๒๓๓-๖-๔๔๘๘

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๑๔ รายการ
อากาศเสีย (ปล่องระบาย) จำนวน ๗ รายการ และน้ำใต้ดิน จำนวน ๓ รายการ รวมทั้งสิ้นจำนวน ๒๔ รายการ
ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้มีอายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นางจินดา เทชะรินทร์)

ผู้อำนวยการกองวิจัยและเฝ้าระวังมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๒๘ มิ.ย. ๒๕๖๕

กองวิจัยและเฝ้าระวังมลพิษโรงงาน
ศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๘๐๕ ๗๒๖๑-๓
ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๓๒๓

ที่ อก ๐๓๑๐(๓)/ ๖๔๗๐

ลงวันที่ ๒๘ มิถุนายน ๒๕๖๕

ขอขยาสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ
น้ำเสีย จำนวน 14 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method ^[2] 2) 5-Day BOD Test, Azide Modification Method ^[2]
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method ^[2] 2) Closed Reflux, Colorimetric Method ^[2] 3) Closed Reflux, Titrimetric Method ^[2]
3	Color	ADMI Weighted – Ordinate Spectrophotometric Method ^[2]
4	Cyanide	Distillation, Colorimetric Method ^[2]
5	Formaldehyde	Distillation, Colorimetric Method ^[1]
6	Free Chlorine	DPD-Ferrous Titrimetric Method ^[2]
7	Oil and Grease	Liquid-Liquid Partition-Gravimetric Method ^[2]
8	pH	Electrometric Method ^[2]
9	Phenols	1) Distillation, Chloroform Extraction Method ^[2] 2) Distillation, Direct Photometric Method ^[2]
10	Sulfide	ZnS Precipitation, Iodometric Method ^[2]
11	Temperature	Laboratory and Field Method ^[2]
12	Total Dissolved Solids	Dried at 180 °C ^[2]
13	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ^[2]
14	Total Suspended Solids	Dried at 103-105 °C ^[2]

อากาศเสีย (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 ^[5]
3	Opacity	Ringelmann's Method ^[3,4]
4	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ^[6] 2) Instrumental Analyzer Method ^[9]
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Instrumental Analyzer Method ^[10]

วิภา สัมฤทธิ์ผล

(นางสาววิชุดา สัมฤทธิ์ผล)

ผู้อำนวยการ

ศูนย์วิจัยและเฝ้าระวังมลพิษโรงงานภาคตะวันออก

Sulfuric Acid...

สำเนา

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Sulfuric Acid	Isokinetic Sampling, Barium – Thorin Titrimetric Method ^[6]
7	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ^[7]

น้ำได้คืน 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 สัมฤทธิ์
(นางสาววิชุดา สัมฤทธิ์ผล)

ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก กองวิจัยและเตือนภัยมลพิษโรงงาน กรมโรงงานอุตสาหกรรม โทร ๐๒๕๐๕ ๙๖๖๓-๓

ที่ ออก ๐๓๒๐/ ๒๐๕๓

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๒ มิ.ค. ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนแปลงบุคลากร ของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๔ มีนาคม ๒๕๖๖

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอลพบุรี จังหวัดระยอง ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

ก. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ ราย

- | | | |
|------------------------------|---------------|--------------|
| ๑) นางสาวเจษฎาพร ศรีบุญเรือง | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๙๔๗๑ |
| ๒) นางสาวมธุรินทร์ สิงห์เงา | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๙๔๗๒ |
| ๓) นางสาวนิตา ผดุงจิตต์ | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๙๔๕๔ |
| ๔) นายศุภณัฐ พิสัยพันธ์ | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๙๔๖๖ |
| ๕) นายสิทธิชัย แก้วเกตุ | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๙๔๘๗ |

ข. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๒ ราย

- | | | |
|------------------------------|---------------|--------------|
| ๑) นายณัฐพงษ์ เฟื่องขาวนา | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๐๐๐๑ |
| ๒) นางสาวกัลยทรรศน์ รักดี | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๐๐๐๒ |
| ๓) นางสาวจุฑารัตน์ สีทองหลาง | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๐๐๐๓ |
| ๔) นางสาวจิตสุภา ประเทืองสุข | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๐๐๐๔ |
| ๕) นายสรเสรีณ คุ้มยศ | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๐๐๐๕ |
| ๖) นายณัฐวุฒิ ออมพรมราช | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๐๐๐๖ |
| ๗) นายจิตรกร สีวะสา | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๐๐๐๗ |
| ๘) นายสิทวิชญ์ สุวรรณรัตน์ | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๐๐๐๘ |
| ๙) นายสิทธิพันธ์ เสนาชีว | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๐๐๐๙ |
| ๑๐) นายอนุเวศน์ เตมา | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๐๐๑๐ |
| ๑๑) นายสุรวิทย์ นราพงษ์ | ทะเบียนเลขที่ | ๖-๓๒๓-จ-๐๐๑๑ |
| ๑๒) นายอดิศักดิ์ ตะริศนย์ | 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 eirw@diw.mail.go.th



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์



ที่ อก ๐๓๑๐(๓)/ ๖๔ ๗๐

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐
๒๘ มิถุนายน ๒๕๖๕

เรื่อง ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๙ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำ
ห้องปฏิบัติการวิเคราะห์ และรายการสารมลพิษที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบลอราทอรี กรุ๊ป
(ประเทศไทย) จำกัด ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่
๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู่ อำเภอบลวกแดง จังหวัดระยอง โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายเดช ช้างชน	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๔๒
๒) นางวิลาวัลย์ บริรักษ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๔๓
๓) นายสุพจน์ สลามเต๊ะ	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๔๔

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นางสาวณัฐมล บรรจงกิจ	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๔๕
๒) นางพจนา สีดา	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๔๖
๓) นางสาวอนิศา กุลสุริวงศ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๔๗
๔) นายพิทยา ทองแดง	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๔๘
๕) นางชลธิชา สุนัข	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๔๙
๖) ว่าที่ ร.ต.รณชัย ม่วงมา	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๕๐
๗) นายวราวุฒิ พับพา	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๕๑
๘) นายศักดิ์นรินทร์ จรัสภัย	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๕๒
๙) นายสุรศักดิ์ สาชิน	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๕๓
๑๐) นางสาวเพชรคุณ ภวภูตานนท์	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๕๔
๑๑) นายสถาพร ฉาแก้ว	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๕๕
๑๒) นายสุทธิดำรงค์ โชคปิตินันท์	ทะเบียนเลขที่	ว-๓๒๓-จ-๑๔๖๕๖

๑๓) นายวัลลภ หันไชยเนาว์
๑๔) นางสาวนาถิ์ เจริญตระกูล
๑๕) นางสาวนิตา ผดุงจิตต์
๑๖) นายธนะสิทธิ์ วงศ์ไชย
๑๗) นายชัยนุสรณ์ เลิศนันทกุลชัย
๑๘) นายสัจจา เพ็ชรแสง
๑๙) นายกันตภณ มณีสัมพันธ์
๒๐) นางสาวจันทิพย์ โกเมนชนะ
๒๑) นายธารินทร์ อ็อกจินดา
๒๒) นายศุภณัฐ พิสัยพันธ์
๒๓) นายศุภชัย วงศ์สุริยา
๒๔) นายปฐมพงศ์ กรสวัสด์
๒๕) นายไสว ดันโพธิ์
๒๖) นางสาวกิตติยา สัณญาอริยาภรณ์
๒๗) นางสาวเจษฎาพร ศรีบุญเรือง
๒๘) นางสาวมธุรินทร์ สิงห์เงา
๒๙) นางสาวธิดารัตน์ ศิริมงคลโร
๓๐) นายพิพัฒน์ นิกัทรเศรษฐ์
๓๑) นายศิริวิทย์ เรืองสม
๓๒) นายปารามศ สัตยาคุณ
๓๓) นายนฤนาท ธรรมสโร
๓๔) นางสาวศุภรัตน์ ไสจันทร์
๓๕) นายพชรกร อินทรเสนา
๓๖) นายทิวากร เชื้อมาก
๓๗) นายอนุรักษ ทองขจรศักดิ์
๓๘) นายอภิชาติ วัลลา
๓๙) นายจรัสระวี ศรีรักษา
๔๐) นายประสานมิตร เพ็ชรเพชร
๔๑) นายภาณุวัฒน์ วังบง
๔๒) นายสันติ ชัยชนะ
๔๓) นายสิทธิชัย แก้วเกตุ
๔๔) นายทินกร กุลชาติ

ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๕๗
ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๕๘
ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๕๙
ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๖๐
ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๖๑
ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๖๒
ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๖๓
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ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๘๗
ทะเบียนเลขที่ ๖-๓๒๓-จ-๔๔๘๘

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๑๔ รายการ
อากาศเสีย (ปล่องระบาย) จำนวน ๗ รายการ และน้ำใต้ดิน จำนวน ๓ รายการ รวมทั้งสิ้นจำนวน ๒๔ รายการ
ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้มีอายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์
จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบ
คำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นสุดอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการ
วิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นางจินดา เตชะศรีนทร์)

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๒๘ มิ.ย. ๒๕๖๕

กองวิจัยและเตือนภัยมลพิษโรงงาน
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๘๘๐๕ ๗๖๖๑-๓
ไปรษณีย์อิเล็กทรอนิกส์ airw@diw.mail.go.th

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุป (ประเทศไทย) จำกัด เลขทะเบียน ว-๓๒๓

ที่ ออ ๐๓๑๐(๓)/ ๖๔๗๐

ลงวันที่ ๒๘ มิถุนายน ๒๕๖๔

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม 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 ^[5]
3	Opacity	Ringelmann's Method ^[3,4]
4	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ^[6] 2) Instrumental Analyzer Method ^[9]
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Instrumental Analyzer Method ^[10]

วิภา สัมฤทธิ์
(นางสาววิชุดา สัมฤทธิ์ผล)

ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

Sulfuric Acid...

-2-

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Sulfuric Acid	Isokinetic Sampling, Barium – Thorin Titrimetric Method ^[4]
7	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ^[7]

น้ำใต้ดิน จำนวน 3 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method ^[2]
2	pH	Electrometric Method ^[2]
3	Phenols	Distillation, Direct Photometric Method ^[2]

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วิภา สัมฤทธิ์
(นางสาววิชุดา สัมฤทธิ์ผล)

ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก กองวิจัยและเตือนภัยมลพิษโรงงาน กรมโรงงานอุตสาหกรรม โทร ๐ ๓๘๐๔ ๙๖๖๓-๓

สำเนา

ที่ อก ๐๓๒๐/ ๒๐๕๓

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

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอปลวกแดง จังหวัดระยอง ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

ก. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ ราย

- | | | |
|------------------------------|---------------|--------------|
| ๑) นางสาวเจษฎาพร ศรีบุญเรือง | ทะเบียนเลขที่ | ว-๓๒๓-จ-๔๔๗๑ |
| ๒) นางสาวมธุรินทร์ สิงห์เงา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๔๔๗๒ |
| ๓) นางสาวนิตา ผดุงจิตต์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๔๔๕๔ |
| ๔) นายศุภณัฐ พิสัยพันธ์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๔๔๖๖ |
| ๕) นายสิทธิชัย แก้วเกตุ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๔๔๘๗ |

ข. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๒ ราย

- | | | |
|------------------------------|---------------|--------------|
| ๑) นายณัฐพงษ์ เพ็งขาวนา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๑ |
| ๒) นางสาวกัลยทรรศน์ รักดี | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๒ |
| ๓) นางสาวจุฑารัตน์ สีทองกลาง | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๓ |
| ๔) นางสาวจิตสุภา ประเทืองสุข | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๔ |
| ๕) นายสรเสรีณ ค่อยกสุย | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๕ |
| ๖) นายณัฐวุฒิ ออมพรมราช | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๖ |
| ๗) นายจิตรกร สีวะสา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๗ |
| ๘) นายสิทปวิชญ์ สุวรรณรัตน์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๘ |
| ๙) นายสิทธิพันธ์ เสนาชีว | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๐๙ |
| ๑๐) นายอนุวัฒน์ เตมา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๑๐ |
| ๑๑) นายสุรวิทย์ นราพงษ์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๑๑ |
| ๑๒) นายอดิศักดิ์ ตะริศุณย์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๐๐๑๒ |

-๒-

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ที่ อก ๐๓๑๐(๓)/๖๔๗๐ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๔ คือในวันที่ ๒๘ มิถุนายน ๒๕๖๗ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรมตาม QR Code ท้ายหนังสือนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายทวี อำพาพันธ์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๓๑๓ ๖๐๕๔ ต่อ ๕๐๐๑-๒
ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

อนึ่ง...



"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



ที่ อก ๐๓๒๐/๒๕๖๕.๓



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๐ พ.ย. ๒๕๖๕

เรื่อง เปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๕ ตุลาคม ๒๕๖๕

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์เอกชน เลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู่ อำเภอปลวกแดง
จังหวัดระยอง ขอเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย)
จำกัด เพิ่มขอขยายสารมลพิษที่วิเคราะห์ในน้ำเสีย จำนวน ๑๓ รายการ และน้ำได้ดิน ๓ รายการ ตามสิ่งที่ส่ง
มาด้วย

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์
เอกชนที่ อก ๐๓๒๐(๓)/๖๕๗๐ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๕ คือในวันที่ ๒๘ มิถุนายน ๒๕๖๗ ทั้งนี้ สามารถ
ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายทวี อำพาพันธ์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๓๑๓ ๖๐๕๙ ต่อ ๕๐๐๑-๒

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"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"



เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ว-๓๒๓

ที่ อก ๐๓๒๐/๒๕๖๕.๓

ลงวันที่

๑๐ พ.ย. ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๖ รายการ
น้ำเสีย จำนวน 13 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method 2) 5-Day BOD Test, Azide Modification Method
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method 2) Closed Reflux, Colorimetric Method 3) Closed Reflux, Titrimetric Method
3	Color	ADMI Weighted-Ordinate Spectrophotometric Method
4	Cyanide	Distillation, Colorimetric Method
5	Free Chlorine	DPD Ferrous Titrimetric Method
6	Oil and Grease	Liquid-Liquid, Partition-Gravimetric Method
7	pH	Electrometric Method
8	Phenols	1) Distillation, Chloroform Extraction Method 2) Distillation, Direct Photometric Method
9	Sulfide	ZnS Precipitation, Iodometric Method
10	Temperature	Field Method
11	Total Dissolved Solids	Dried at 180 °C
12	Total Kjeldahl Nitrogen	Semi-Macro Kjeldahl Method
13	Total Suspended Solids	Dried at 103-105 °C

น้ำได้ดิน จำนวน 3 รายการ

ลำดับ ที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method
2	pH	Electrometric Method
3	Phenols	Distillation, Direct Photometric Method

เอกสารอ้างอิง

APHA, AWWA, WEF. Standard Methods for the Examination of Water and
Wastewater. 24th ed. Washington, DC : APHA, 2023

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right solutions.
right partner.