

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 : 4512621611

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2227167

Date Received : Oct 28, 2022

Date Reported : Nov 02, 2022

Report Number : 2245944-2

Page 1 of 1

Sample Number 2227167-1
Sample Description Emission from Stationary Source
Location Boiler
Measurement Date Oct 28, 2022

Stack Description

Ambient Temperature	31 °C	Diameter	0.99 m	Oxygen	8.27 %
Ambient Pressure	757 mmHg	Shape	Circle	Carbon dioxide	7.87 %
Type of Process	Combustion	Stack Temperature	170 °C	Gas Velocity	5.01 m/s
Type of Fuel	Natural Gas	Moisture	11.34 %	Flow Rate	8253 Nm3/hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)		Carbon Monoxide (ppm)	
				at Actual O ₂	at 7% O ₂	at Actual O ₂	at 7% O ₂
1	11:10 AM - 11:30 AM	8.27	7.88	67.64	74.46	0.95	1.04
2	11:31 AM - 11:51 AM	8.26	7.88	67.92	74.70	1.49	1.64
3	11:52 AM - 12:12 PM	8.27	7.85	67.35	74.15	1.27	1.40
Average (ppm)		8.27	7.87	67.64	74.44	1.24	1.36
Guideline ^{1/} (ppm)				-	200	-	690
Guideline ^{2/} (ppm)				106.28	-	-	-
Result (mg/Nm ³)				127.25	140.04	1.42	1.56
Emission Rate at Actual O ₂ (g/s)				0.2917		0.0032	
Method				US EPA Method 7E		US EPA Method 10	

Sampled By : Sathapron Thakarw

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
Manager

ทะเบียนเลขที่ ว-204-ค-6113

Approved by

Sarayuth Jittranont
Assistant General Manager
ทะเบียนเลขที่ ว-204-ค-4702

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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 : 4512621611
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2227167
Date Received : Oct 28, 2022
Date Reported : Nov 02, 2022
Report Number : 2245944-2

Page 1 of 1

Sample Number : 2227167-1
Sample Description : Emission from Stationary Source
Location : Boiler
Measurement Date : Oct 28, 2022

		Stack Description			
Ambient Temperature	31 °C	Diameter	0.99 m	Oxygen	8.27 %
Ambient Pressure	757 mmHg	Shape	Circle	Carbon dioxide	7.87 %
Type of Process	Combustion	Stack Temperature	170 °C	Gas Velocity	5.01 m/s
Type of Fuel	Natural Gas	Moisture	11.34 %	Flow Rate	8253 Nm ³ /hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)	
				at Actual O ₂	At 7% O ₂
1	11:10 AM - 11:30 AM	8.27	7.88	67.64	74.46
2	11:31 AM - 11:51 AM	8.26	7.88	67.92	74.70
3	11:52 AM - 12:12 PM	8.27	7.85	67.35	74.15
Average (ppm)		8.27	7.87	67.64	74.44
Guideline ^{1/} (ppm)				-	200
Guideline ^{2/} (ppm)				106.28	-
Result (mg/Nm ³)				127.25	140.04
Emission Rate at Actual O ₂ (g/s)				0.2917	
Method				US EPA Method 7E	

Sampled By : Sathaporn Thakarw
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
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ทะเบียนเลขที่ ว-204-ค-6113

Approved by

Sarayuth Jitranont

Sarayuth Jitranont
Assistant General Manager
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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 : 4512621611
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2227186
Date Received : Oct 28, 2022
Date Reported : Nov 08, 2022
Report Number: 2245965-1

Page 1 of 2

Sample Number 2227186-1
Sampled Date Oct 28, 2022
Sample Description Emission from Stationary Source
Location Boiler
Date Analysis Commenced Oct 29, 2022
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle, one amber plastic bottle and one sorbent tuberefrigerated

Stack Description

Ambient Pressure	757	mmHg	Diameter	0.99	m	Oxygen	8.3	%
Ambient Temperature	31.0	°C	Shape	Circle		Carbon Dioxide	7.9	%
Type of Process	Combustion		Stack Temperature	170	°C	Gas Velocity	5.0	m/s
Type of Fuel	Natural Gas		Moisture	11.29	%	Flow Rate (Actual O2)	8248	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O ₂	Result at 8.3 % O ₂	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing										
Sulfur dioxide *	11:30 AM - 12:00 PM	ppm	-	2.0	<2.0	<2.0	60	-	US EPA, Method 6	Rayong
Total Suspended Particulate	11:10 AM - 11:52 AM	mg/m3	-	0.5	<0.5	<0.5	320	100	US EPA, Method 5	Rayong

Guideline :

Guideline

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ๖-323-๖-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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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 : 4512621611
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2227186
Date Received : Oct 28, 2022
Date Reported : Nov 08, 2022
Report Number: 2245965-1

Page 2 of 2

Sample Number 2227186-1
Sampled Date Oct 28, 2022
Sample Description Emission from Stationary Source
Location Boiler
Date Analysis Commenced Oct 29, 2022
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle, one amber plastic bottle and one sorbent tuberefrigerated

Stack Description

Ambient Pressure	757	mmHg	Diameter	0.99	m	Oxygen	8.3	%
Ambient Temperature	31.0	°C	Shape	Circle		Carbon Dioxide	7.9	%
Type of Process	Combustion		Stack Temperature	170	°C	Gas Velocity	5.0	m/s
Type of Fuel	Natural Gas		Moisture	11.29	%	Flow Rate (Actual O2)	8248	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Sulfur dioxide *	11:30 AM - 12:00 PM	g/s	-	-	<0.001	-	-	Calculated	Rayong
Total Suspended Particulate *	11:10 AM - 11:52 AM	g/s	-	-	<0.001	-	-	Calculated	Rayong

Sampled By : Thitipong Buadaeng , Sathaporn Thakaw

Remark :

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

Technical Management

Thanita K.

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

Approved by

D. Chamon.

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

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4512621611

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2227186

Date Received : Oct 28, 2022

Date Reported : Nov 09, 2022

Report Number: 2245965-2

Page 1 of 1

Sample Number 2227186-1
Sampled Date Oct 28, 2022
Sample Description Emission from Stationary Source
Location Boiler
Date Analysis Commenced Oct 29, 2022
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle, one amber plastic bottle and one sorbent tuberefrigerated

Stack Description

Ambient Pressure	757	mmHg	Diameter	0.99	m	Oxygen	8.3	%
Ambient Temperature	31.0	°C	Shape	Circle		Carbon Dioxide	7.9	%
Type of Process	Combustion		Stack Temperature	170	°C	Gas Velocity	5.0	m/s
Type of Fuel	Natural Gas		Moisture	11.29	%	Flow Rate (Actual O2)	8248	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result		Method	Testing Location
					at 7 %O ₂	at 8.3 % O ₂		
Air Testing								
1,3-Butadiene	11:30 AM - 11:45 AM	ppm	-	0.5	<0.5	<0.5	US 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.

Sampled By : Thitipong Buadaeng , Sathapron Thakarw

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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ภาคผนวก ค-2

คุณภาพอากาศในบรรยากาศ



Analysis / Test Report

TESTING
No.0042

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4503127820

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut

Lot ID: 22119541

Date Received : Nov 01, 2022

Date Reported : Nov 15, 2022

Report Number: 2447528-1C7

Page 1 of 1

Sample Description	Air Quality			
Location	บ้านอ่าวประดู่ (โรงพยาบาลส่งเสริมสุขภาพตำบลตากวน) (GPS 47P 0735531, 1402769)			
Date Analysis Commenced	Nov 02, 2022			
Condition of Sample	Drawn into one glass filter paper (8x10 inch) placed in plastic bag and one quartz filter paper (8x10 inch) placed in plastic bag			
Sample Number	Sampled Date	Particulate matter as PM 10 (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
22119541-3	Oct 27 - Oct 28, 2022	0.026	756	32
22119541-4	Oct 28 - Oct 29, 2022	0.027	756	32
22119541-5	Oct 29 - Oct 30, 2022	0.030	756	32
Guideline		0.12	-	-

Reference Method

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

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

Sampled By : 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: 22119527

Date Received : Nov 01, 2022

Date Reported : Nov 05, 2022

Report Number: 2447501-1C7

Page 1 of 1

Sample Description	Air Quality						
Location	บ้านอ่าวประจักษ์ (โรงพยาบาลส่งเสริมสุขภาพตำบลตากวน) (GPS 47P 0735531, 1402769)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Oct 25, 2022 - Nov 01, 2022						
Measurement by	Sitpawit Suwannarat						
Time	22119527-1 Oct 25, 2022	22119527-2 Oct 26, 2022	22119527-3 Oct 27, 2022	22119527-4 Oct 28, 2022	22119527-5 Oct 29, 2022	22119527-6 Oct 30, 2022	22119527-7 Oct 31, 2022
10:00 AM - 11:00 AM	<0.001	<0.001	0.002	<0.001	<0.001	0.001	<0.001
11:00 AM - 12:00 PM	0.002	<0.001	0.001	0.001	<0.001	0.001	<0.001
12:00 PM - 01:00 PM	0.001	0.002	<0.001	0.001	0.001	0.001	<0.001
01:00 PM - 02:00 PM	<0.001	<0.001	0.002	0.001	0.002	<0.001	<0.001
02:00 PM - 03:00 PM	0.001	<0.001	0.002	<0.001	0.002	<0.001	<0.001
03:00 PM - 04:00 PM	0.001	<0.001	0.004	0.003	0.001	0.001	<0.001
04:00 PM - 05:00 PM	0.003	0.002	0.004	0.010	0.001	<0.001	0.001
05:00 PM - 06:00 PM	0.003	0.011	0.002	0.029	0.001	0.001	0.004
06:00 PM - 07:00 PM	0.002	0.023	0.002	0.039	0.001	0.002	0.004
07:00 PM - 08:00 PM	0.003	0.023	0.003	0.040	0.002	0.002	0.021
08:00 PM - 09:00 PM	0.003	0.007	0.004	0.020	0.001	0.003	0.009
09:00 PM - 10:00 PM	0.003	0.003	0.003	0.007	<0.001	0.002	0.007
10:00 PM - 11:00 PM	0.003	0.003	0.006	0.003	0.001	0.002	0.003
11:00 PM - 12:00 AM	0.002	0.002	0.009	0.002	<0.001	0.002	0.002
12:00 AM - 01:00 AM	0.003	0.002	0.008	0.001	<0.001	0.002	0.002
01:00 AM - 02:00 AM	0.002	0.002	0.004	0.002	<0.001	0.001	0.002
02:00 AM - 03:00 AM	0.002	0.001	0.003	0.001	<0.001	<0.001	0.002
03:00 AM - 04:00 AM	0.002	0.001	0.002	0.001	<0.001	<0.001	0.002
04:00 AM - 05:00 AM	0.002	0.002	0.003	0.001	<0.001	0.001	0.002
05:00 AM - 06:00 AM	0.004	0.006	0.005	0.002	0.001	0.002	0.002
06:00 AM - 07:00 AM	0.003	0.005	0.004	0.002	0.001	0.002	0.002
07:00 AM - 08:00 AM	0.002	0.003	0.002	0.001	<0.001	<0.001	0.001
08:00 AM - 09:00 AM	0.001	0.003	0.002	<0.001	<0.001	<0.001	0.002
09:00 AM - 10:00 AM	0.001	0.002	0.001	<0.001	<0.001	<0.001	0.002
Average	0.002	0.004	0.003	0.007	0.001	0.001	0.003
1hr - Maximum	0.004	0.023	0.009	0.040	0.002	0.003	0.021
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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

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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 : 4512621611

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID : 22119534

Date Received : Nov 01, 2022

Date Reported : Nov 09, 2022

Report Number : 2447511-1 C7

Page 1 of 2

Sample Number 22119534-1 to 7
Parameter Wind Speed / Wind Direction
Location บ้านอ่าวประจักษ์ (โรงพยาบาลส่งเสริมสุขภาพตำบลตากวน) (GPS 47P 0735531, 1402769)
Sampling Date Oct 25 - Nov 01, 2022
Sampling by Sitpawit Suwannarat

Time	Oct 25 - Oct 26, 2022			Oct 26 - Oct 27, 2022			Oct 27 - Oct 28, 2022			Oct 28 - Oct 29, 2022			Oct 29 - Oct 30, 2022			Oct 30 - Oct 31, 2022			Oct 31 - Nov 01, 2022		
	WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)	
10:00 AM - 11:00 AM	1.1	190.0	S	0.8	34.0	NE	2.7	72.0	ENE	2.0	46.0	NE	0.7	35.0	NE	0.7	182.0	S	3.3	59.0	ENE
11:00 AM - 12:00 PM	2.1	247.0	WSW	0.0	-	-	1.6	66.0	ENE	0.3	23.0	NNE	1.1	186.0	S	1.2	194.0	SSW	0.9	344.0	NNW
12:00 PM - 01:00 PM	1.6	187.0	S	0.5	236.0	SW	0.7	143.0	SE	1.1	49.0	NE	0.4	139.0	SE	0.9	189.0	S	1.2	2.0	N
01:00 PM - 02:00 PM	2.8	250.0	WSW	2.4	212.0	SSW	0.0	-	-	0.7	69.0	ENE	1.8	248.0	WSW	1.8	252.0	WSW	1.0	62.0	ENE
02:00 PM - 03:00 PM	0.8	278.0	W	0.4	226.0	SW	0.0	-	-	1.1	183.0	S	1.2	253.0	WSW	0.4	220.0	SW	2.5	11.0	N
03:00 PM - 04:00 PM	0.3	280.0	W	2.6	86.0	E	0.3	224.0	SW	0.8	101.0	E	0.0	-	-	0.6	210.0	SSW	0.0	-	-
04:00 PM - 05:00 PM	0.3	39.0	NE	0.4	292.0	WNW	0.3	161.0	SSE	0.4	98.0	E	0.9	28.0	NNE	0.3	212.0	SSW	0.3	75.0	ENE
05:00 PM - 06:00 PM	0.4	40.0	NE	0.0	-	-	0.6	63.0	ENE	0.3	99.0	E	0.7	29.0	NNE	0.5	210.0	SSW	1.5	73.0	ENE
06:00 PM - 07:00 PM	0.0	-	-	0.0	-	-	0.5	63.0	ENE	0.3	101.0	E	0.5	16.0	NNE	1.2	210.0	SSW	0.6	75.0	ENE
07:00 PM - 08:00 PM	0.3	39.0	NE	0.0	-	-	1.1	38.0	NE	0.0	-	-	0.3	13.0	NNE	0.3	210.0	SSW	0.7	73.0	ENE
08:00 PM - 09:00 PM	0.3	2.0	N	0.5	39.0	NE	0.3	37.0	NE	0.7	46.0	NE	0.2	-	-	0.3	210.0	SSW	0.3	73.0	ENE
09:00 PM - 10:00 PM	0.3	28.0	NNE	0.0	-	-	0.3	38.0	NE	0.0	-	-	0.0	-	-	1.3	208.0	SSW	0.3	73.0	ENE
10:00 PM - 11:00 PM	0.5	49.0	NE	0.5	21.0	NNE	0.9	37.0	NE	0.5	35.0	NE	0.4	33.0	NNE	0.6	210.0	SSW	0.6	45.0	NE
11:00 PM - 12:00 AM	0.3	45.0	NE	0.5	100.0	E	1.3	38.0	NE	0.8	35.0	NE	0.2	-	-	0.5	210.0	SSW	0.4	32.0	NNE
12:00 AM - 01:00 AM	0.6	42.0	NE	1.1	37.0	NE	0.4	38.0	NE	1.5	18.0	NNE	0.0	-	-	0.0	-	-	0.3	34.0	NE
01:00 AM - 02:00 AM	1.0	18.0	NNE	0.0	-	-	0.3	38.0	NE	0.1	-	-	0.8	36.0	NE	0.4	1.0	N	0.3	36.0	NE
02:00 AM - 03:00 AM	0.4	11.0	N	0.0	-	-	0.0	-	-	0.8	27.0	NNE	0.5	36.0	NE	0.5	30.0	NNE	0.0	-	-
03:00 AM - 04:00 AM	0.8	30.0	NNE	0.1	-	-	0.0	-	-	1.6	71.0	ENE	0.7	43.0	NE	0.3	36.0	NE	0.6	40.0	NE
04:00 AM - 05:00 AM	0.3	20.0	NNE	0.0	-	-	1.1	24.0	NNE	0.4	29.0	NNE	0.6	16.0	NNE	0.8	15.0	NNE	0.3	21.0	NNE
05:00 AM - 06:00 AM	2.2	26.0	NNE	1.6	38.0	NE	3.6	27.0	NNE	0.2	-	-	0.7	11.0	N	0.6	30.0	NNE	1.1	27.0	NNE
06:00 AM - 07:00 AM	0.5	105.0	ESE	1.0	93.0	E	1.1	47.0	NE	0.9	79.0	E	1.4	93.0	E	0.9	68.0	ENE	0.8	34.0	NE
07:00 AM - 08:00 AM	0.4	50.0	NE	0.3	53.0	NE	0.5	39.0	NE	0.3	4.0	N	1.9	45.0	NE	1.4	359.0	N	0.4	36.0	NE
08:00 AM - 09:00 AM	1.3	43.0	NE	0.6	26.0	NNE	0.9	46.0	NE	2.1	42.0	NE	1.9	52.0	NE	2.3	23.0	NNE	0.3	37.0	NE
09:00 AM - 10:00 AM	0.0	-	-	0.7	29.0	NNE	2.6	11.0	N	0.5	74.0	ENE	1.9	226.0	SW	2.6	40.0	NE	0.6	40.0	NE

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 : 4512621611

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID : 22119534

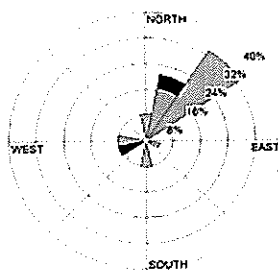
Date Received : Nov 01, 2022

Date Reported : Nov 09, 2022

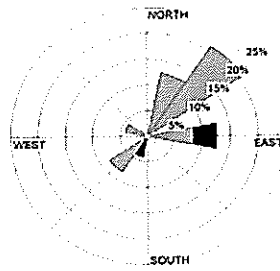
Report Number : 2447511-1 C7

Page 2 of 2

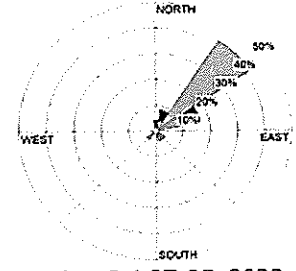
Wind Rose



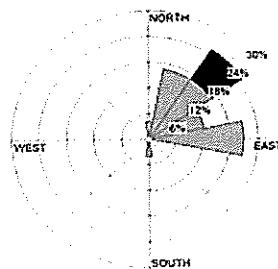
Date : Oct 25-26, 2022



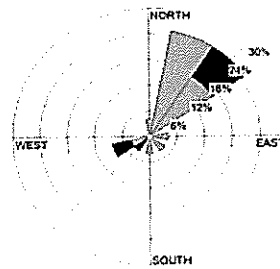
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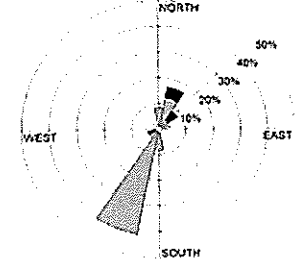
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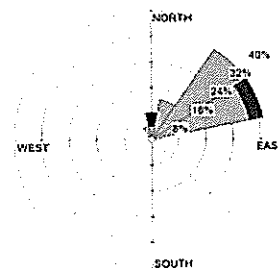
Date : Oct 28-29, 2022



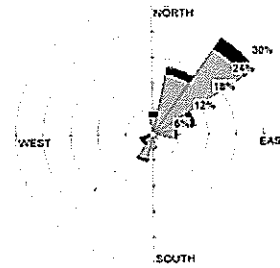
Date : Oct 29-30, 2022



Date : Oct 30-31, 2022



Date : Oct 31-Nov 01, 2022



Date : Oct 25-Nov 01, 2022

WS(m/s)	%
≥ 10.0	0.00
8.0-10.0	0.00
5.5-8.0	0.00
3.3-5.5	1.19
1.7-3.3	10.12
0.3-1.7	72.62
Calms	16.07

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Sarayuth Jitranont
Assistant General Manager



Analysis / Test Report

TESTING

No.0042

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4503127820

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut

Lot ID: 22119545

Date Received : Nov 01, 2022

Date Reported : Nov 15, 2022

Report Number: 2447541-1C7

Page 1 of 1

Sample Description	Air Quality			
Location	บ้านนาตาฟุต (GPS 47P 0735346, 1406705)			
Date Analysis Commenced	Nov 02, 2022			
Condition of Sample	Drawn into one glass filter paper (8x10 inch) placed in plastic bag and one quartz filter paper (8x10 inch) placed in plastic bag			
Sample Number	Sampled Date	Particulate matter as PM 10 (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
22119545-3	Oct 27 - Oct 28, 2022	0.019	756	32
22119545-4	Oct 28 - Oct 29, 2022	0.027	756	32
22119545-5	Oct 29 - Oct 30, 2022	0.033	756	32
Guideline		0.12	-	-

Reference Method

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

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

Sampled By : 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: 22119512

Date Received : Nov 01, 2022

Date Reported : Nov 05, 2022

Report Number: 2447505-1C7

Page 1 of 1

Sample Description	Air Quality						
Location	บ้านนาตาพูด (GPS 47P 0735346, 1406705)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Oct 25, 2022 - Nov 01, 2022						
Measurement by	Sitpawit Suwannarat						
	22119512-1	22119512-2	22119512-3	22119512-4	22119512-5	22119512-6	22119512-7
Time	Oct 25, 2022	Oct 26, 2022	Oct 27, 2022	Oct 28, 2022	Oct 29, 2022	Oct 30, 2022	Oct 31, 2022
09:00 AM - 10:00 AM	0.002	0.002	0.001	<0.001	0.002	0.001	0.013
10:00 AM - 11:00 AM	0.002	0.002	<0.001	0.001	0.001	0.001	0.015
11:00 AM - 12:00 PM	0.003	0.001	<0.001	0.003	0.001	0.001	0.016
12:00 PM - 01:00 PM	0.002	0.001	0.001	0.002	0.001	0.002	0.016
01:00 PM - 02:00 PM	0.002	<0.001	0.001	<0.001	0.001	0.003	0.021
02:00 PM - 03:00 PM	0.002	0.001	0.001	<0.001	0.002	0.004	0.012
03:00 PM - 04:00 PM	0.003	0.002	0.001	0.001	0.002	0.002	0.008
04:00 PM - 05:00 PM	0.003	0.002	0.002	0.002	0.002	0.001	0.007
05:00 PM - 06:00 PM	0.003	0.002	0.001	0.001	0.002	0.017	0.007
06:00 PM - 07:00 PM	0.002	0.002	0.001	0.001	0.002	0.009	0.006
07:00 PM - 08:00 PM	0.018	0.002	0.001	0.001	0.002	0.007	0.012
08:00 PM - 09:00 PM	0.001	0.001	<0.001	0.001	0.001	0.009	0.010
09:00 PM - 10:00 PM	0.001	<0.001	<0.001	<0.001	0.001	0.010	0.009
10:00 PM - 11:00 PM	0.001	<0.001	<0.001	<0.001	<0.001	0.012	0.015
11:00 PM - 12:00 AM	0.001	<0.001	<0.001	<0.001	<0.001	0.006	0.016
12:00 AM - 01:00 AM	0.001	<0.001	<0.001	<0.001	<0.001	0.010	0.022
01:00 AM - 02:00 AM	0.001	<0.001	0.001	<0.001	<0.001	0.009	0.017
02:00 AM - 03:00 AM	0.001	0.001	0.001	<0.001	<0.001	0.013	0.023
03:00 AM - 04:00 AM	0.001	0.002	0.002	0.001	<0.001	0.013	0.009
04:00 AM - 05:00 AM	0.002	0.002	0.001	0.002	<0.001	0.012	0.007
05:00 AM - 06:00 AM	0.002	0.002	0.001	0.002	0.001	0.017	0.005
06:00 AM - 07:00 AM	0.002	0.001	0.001	0.002	0.001	0.024	0.008
07:00 AM - 08:00 AM	0.002	0.001	<0.001	0.002	0.001	0.021	0.006
08:00 AM - 09:00 AM	0.002	0.001	<0.001	0.002	0.001	0.015	0.009
Average	0.003	0.001	0.001	0.001	0.001	0.009	0.012
1hr - Maximum	0.018	0.002	0.002	0.003	0.002	0.024	0.023
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)

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

Approved by

Saranya C.

Saranya Chalermtamrong
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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 : 4512621611

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID : 22119537

Date Received : Nov 01, 2022

Date Reported : Nov 09, 2022

Report Number : 2447520-1 C7

Page 1 of 2

Sample Number 22119537-1 to 7
Parameter Wind Speed / Wind Direction
Location บ้านนาตาพุด (GPS 47P 0735346, 1406705)
Sampling Date Oct 25 - Nov 01, 2022
Sampling by Sitpawit Suwannarat

Time	Oct 25 - Oct 26, 2022			Oct 26 - Oct 27, 2022			Oct 27 - Oct 28, 2022			Oct 28 - Oct 29, 2022			Oct 29 - Oct 30, 2022			Oct 30 - Oct 31, 2022			Oct 31 - Nov 01, 2022		
	WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)		WS (m/s)	WD (deg)	
09:00 AM - 10:00 AM	1.5	124.0	SE	1.3	45.0	NE	0.7	87.0	E	2.3	89.0	E	1.2	49.0	NE	0.7	195.0	SSW	0.9	63.0	ENE
10:00 AM - 11:00 AM	1.1	72.0	ENE	1.5	307.0	NW	0.8	66.0	ENE	0.5	187.0	S	2.1	106.0	ESE	0.4	222.0	SW	1.7	163.0	SSE
11:00 AM - 12:00 PM	0.0	-	-	1.2	68.0	ENE	2.2	148.0	SSE	0.2	-	-	1.6	84.0	E	0.3	298.0	WNW	2.4	64.0	ENE
12:00 PM - 01:00 PM	0.4	46.0	NE	0.2	-	-	0.7	78.0	ENE	0.5	90.0	E	2.4	183.0	S	0.3	89.0	E	2.2	74.0	ENE
01:00 PM - 02:00 PM	0.6	284.0	WNW	1.8	171.0	S	0.5	293.0	WNW	0.3	110.0	ESE	0.0	-	-	0.3	319.0	NW	0.9	101.0	E
02:00 PM - 03:00 PM	0.8	276.0	W	0.5	206.0	SSW	0.8	87.0	E	3.6	218.0	SW	0.5	223.0	SW	0.0	-	-	0.7	226.0	SW
03:00 PM - 04:00 PM	0.2	-	-	3.6	72.0	ENE	0.9	185.0	S	0.3	6.0	N	0.8	108.0	ESE	0.8	48.0	NE	1.0	197.0	SSW
04:00 PM - 05:00 PM	0.0	-	-	0.3	307.0	NW	0.4	157.0	SSE	0.3	304.0	NW	1.0	106.0	ESE	0.0	-	-	0.3	64.0	ENE
05:00 PM - 06:00 PM	0.3	299.0	WNW	0.3	301.0	WNW	0.4	73.0	ENE	0.6	52.0	NE	0.1	-	-	0.6	58.0	ENE	0.3	92.0	E
06:00 PM - 07:00 PM	0.4	298.0	WNW	0.5	278.0	W	0.0	-	-	1.6	75.0	ENE	0.0	-	-	0.8	274.0	W	0.4	306.0	NW
07:00 PM - 08:00 PM	0.0	-	-	0.3	109.0	ESE	0.3	119.0	ESE	2.1	112.0	ESE	0.3	40.0	NE	1.0	76.0	ENE	0.0	-	-
08:00 PM - 09:00 PM	0.3	290.0	WNW	1.4	278.0	W	0.3	90.0	E	0.3	272.0	W	0.2	-	-	0.9	75.0	ENE	0.0	-	-
09:00 PM - 10:00 PM	0.4	216.0	SW	0.5	284.0	WNW	0.4	65.0	ENE	0.3	58.0	ENE	0.9	27.0	NNE	1.6	67.0	ENE	0.0	-	-
10:00 PM - 11:00 PM	0.4	60.0	ENE	0.3	96.0	E	0.6	275.0	W	0.8	105.0	ESE	0.3	293.0	WNW	0.3	74.0	ENE	0.3	107.0	ESE
11:00 PM - 12:00 AM	0.6	271.0	W	0.0	-	-	0.3	294.0	WNW	0.0	-	-	0.0	-	-	0.4	284.0	WNW	0.4	76.0	ENE
12:00 AM - 01:00 AM	0.3	287.0	WNW	0.8	115.0	ESE	0.3	310.0	NW	0.3	156.0	SSE	0.4	131.0	SE	0.3	303.0	WNW	1.2	78.0	ENE
01:00 AM - 02:00 AM	1.2	65.0	ENE	0.4	121.0	ESE	0.0	-	-	0.2	-	-	0.4	228.0	SW	0.3	86.0	E	0.8	69.0	ENE
02:00 AM - 03:00 AM	0.3	39.0	NE	0.0	-	-	0.4	288.0	WNW	1.0	74.0	ENE	1.0	156.0	SSE	0.3	162.0	SSE	0.0	-	-
03:00 AM - 04:00 AM	0.4	294.0	WNW	0.3	236.0	SW	0.4	80.0	E	1.5	132.0	SE	0.6	250.0	WSW	0.4	253.0	WSW	0.6	95.0	E
04:00 AM - 05:00 AM	0.0	-	-	0.4	104.0	ESE	0.3	133.0	SE	0.0	-	-	0.6	151.0	SSE	0.4	258.0	WSW	0.5	275.0	W
05:00 AM - 06:00 AM	1.1	294.0	WNW	0.3	93.0	E	0.5	157.0	SSE	1.1	109.0	ESE	1.1	78.0	ENE	0.3	92.0	E	0.3	70.0	ENE
06:00 AM - 07:00 AM	0.7	284.0	WNW	1.6	66.0	ENE	1.5	124.0	SE	0.4	91.0	E	0.5	69.0	ENE	1.5	78.0	ENE	1.6	114.0	ESE
07:00 AM - 08:00 AM	0.9	36.0	NE	1.4	61.0	ENE	1.5	154.0	SSE	1.5	96.0	E	1.2	359.0	N	1.6	105.0	ESE	0.9	110.0	ESE
08:00 AM - 09:00 AM	0.2	-	-	0.9	0.0	N	1.9	267.0	W	1.0	92.0	E	0.3	61.0	ENE	1.2	179.0	S	0.4	95.0	E

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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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 : 4512621611

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID : 22119537

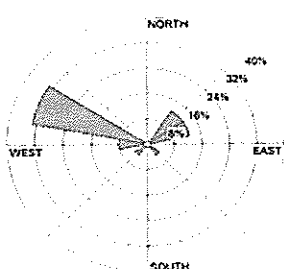
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Date Reported : Nov 09, 2022

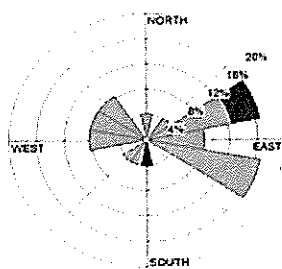
Report Number : 2447520-1 C7

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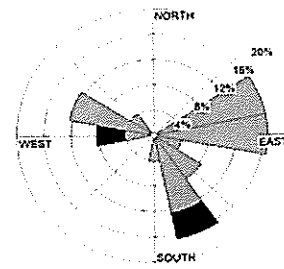
Wind Rose



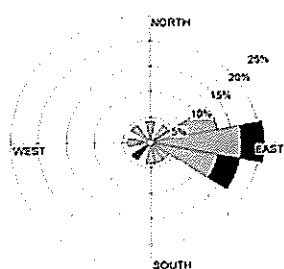
Date : Oct 25-26, 2022



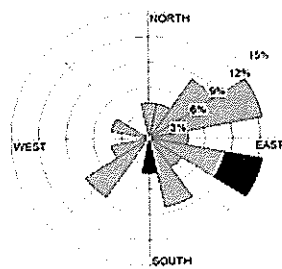
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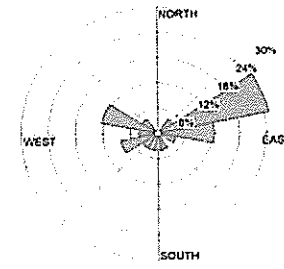
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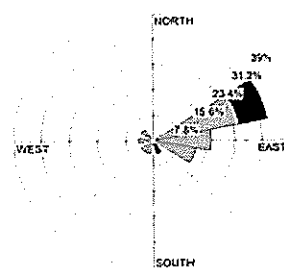
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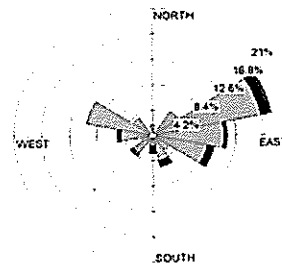
Date : Oct 29-30, 2022



Date : Oct 30-31, 2022



Date : Oct 31-Nov 01, 2022



Date : Oct 25-Nov 01, 2022

WS(m/s)	%
≥ 10.0	0.00
8.0-10.0	0.00
5.5-8.0	0.00
3.3-5.5	1.19
1.7-3.3	5.95
0.3-1.7	77.38
Calms	15.48

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Approved by

Sarayuth Jitranont
Assistant General Manager

ภาคผนวก ค-3

คุณภาพน้ำ



Analysis / Test Report

TESTING

No.0042

Lot ID: 2296715

Date Received : Sep 07, 2022

Date Reported : Sep 15, 2022

Report Number : 2435167-1

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4512621611

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Page 1 of 1

Sample Number	2296715-3						
Sampled Date	Sep 07, 2022 11:00 AM						
Sample Description	Wastewater						
Location	H-306						
Date Analysis Commenced	Sep 07, 2022						
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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	22	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	<5	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	<5	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	7.1	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	27.3	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	460	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	7	≤50	APHA (2017), 2540 D	Rayong

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

Sampled By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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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 : 4512621611

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 2296715

Date Received : Sep 07, 2022

Date Reported : Sep 15, 2022

Report Number : 2435167-2

Page 1 of 1

Sample Number 2296715-3
Sampled Date Sep 07, 2022 11:00 AM
Sample Description Wastewater
Location H-306
Date Analysis Commenced Sep 08, 2022
Condition of Sample Contained in two glass vials, two amber glass bottles and three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	6.47	No Standard	Based on APHA (2017), 5310 B	Bangkok

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

Sampled By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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Nanthawadee Somboon

Specialist 1

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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 : 4512621611
Project Name : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)

TESTING
No.0042
Lot ID: 2296715
Date Received : Sep 07, 2022
Date Reported : Sep 15, 2022
Report Number : 2435168-1

Page 1 of 1

Sample Number 2296715-4
Sampled Date Sep 07, 2022 11:50 AM
Sample Description Wastewater
Location H-307
Date Analysis Commenced Sep 07, 2022
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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	<5	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	<5	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	<5	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	7.3	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	26.3	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	29	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Sampled By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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Technical Management

N. Banchoangkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ 7-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ 7-323-ค-9442

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.
8, Map Ta Phut Industrial Estate, I-4 Road, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4512621611
Project Name : Water Testing
Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 2296715

Date Received : Sep 07, 2022

Date Reported : Sep 15, 2022

Report Number : 2435168-2

Page 1 of 1

Sample Number 2296715-4
Sampled Date Sep 07, 2022 11:50 AM
Sample Description Wastewater
Location H-307
Date Analysis Commenced Sep 08, 2022
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	0.94	No Standard	Based on APHA (2017), 5310 B	Bangkok

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

Sampled By : Wanlop Hunchainaow , Thanasoun Namakunna

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Nanthawadee Somboon

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Analysis / Test Report

TESTING

No.0042

Lot ID: 2278777

Date Received : Jul 06, 2022

Date Reported : Jul 15, 2022

Report Number : 2355956-1

Client : Dow Chemical Thailand Ltd.

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

P/O : 4512615548

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

Page 1 of 1

Sample Number	2278777-1
Sampled Date	Jul 06, 2022 9:30 AM
Sample Description	Wastewater
Location	H-304
Date Analysis Commenced	Jul 06, 2022
Condition of Sample	Contained in two amber glass bottles, two glass vials and three plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	26	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	12	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	10	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	7.7	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	29.9	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	360	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Sampled By : Pathompong Kornasaw, Thanasoun Namakunna

Remark :

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Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ๖-323-๖-9442

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.

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

P/O : 4512615548

Project Name : Water Testing

Project Location : Map Ta Phut_PU (PPTL)

Lot ID: 2278777

Date Received : Jul 06, 2022

Date Reported : Jul 15, 2022

Report Number : 2355956-2

Page 1 of 1

Sample Number 2278777-1
Sampled Date Jul 06, 2022 9:30 AM
Sample Description Wastewater
Location H-304
Date Analysis Commenced Jul 11, 2022
Condition of Sample Contained in two amber glass bottles, two glass vials and three plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	5.11	No Standard	Based on APHA (2017), 5310 B	Bangkok

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

Sampled By : Pathompong Kornawat , Thanasoun Namakunna

Remark :

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Siriluk P.

Siriluk Puengpang
Supervisor

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Analysis / Test Report

TESTING

No.0042

Lot ID: 2284554

Date Received : Aug 02, 2022

Date Reported : Aug 09, 2022

Report Number : 2369751-1

Client : Dow Chemical Thailand Ltd.

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

P/O : 4512615548

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

Page 1 of 1

Page 1 of 1

Sample Number	2284554-1						
Sampled Date	Aug 02, 2022 2:30 PM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Aug 02, 2022						
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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	10	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	15	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	13	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	7.0	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	28.3	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	62	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Sampled By : Pathompong Kornasawat , Thanasoun Namakunna

Remark :

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Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-จ-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 : 4512615548

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

Lot ID: 2284554

Date Received : Aug 02, 2022

Date Reported : Aug 09, 2022

Report Number : 2369751-2

Page 1 of 1

Sample Number 2284554-1
Sampled Date Aug 02, 2022 2:30 PM
Sample Description Wastewater
Location H-304
Date Analysis Commenced Aug 05, 2022
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	3.48	No Standard	Based on APHA (2017), 5310 B	Bangkok

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

Sampled By : Pathompong Kornawat , Thanasoun Namakunna

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Analysis / Test Report

TESTING

No.0042

Lot ID: 2296734

Date Received : Sep 07, 2022

Date Reported : Sep 15, 2022

Report Number : 2397667-1

Client : Dow Chemical Thailand Ltd.

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

P/O : 4512615548

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

Page 1 of 1

Sample Number	2296734-1						
Sampled Date	Sep 07, 2022 11:10 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Sep 07, 2022						
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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	<5	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	6	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	6	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	7.4	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	27.7	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	62	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Sampled By : Wanlop Hunchainaow , Thanasoun Namakunna

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Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-ก-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ก-9442

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4512615548
Project Name : Water Testing
Project Location: Map Ta Phut_PU (PPTL)

Lot ID: 2296734

Date Received : Sep 07, 2022

Date Reported : Sep 15, 2022

Report Number : 2397667-2

Page 1 of 1

Sample Number	2296734-1						
Sampled Date	Sep 07, 2022 11:10 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Sep 14, 2022						
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	2.32	No Standard	Based on APHA (2017), 5310 B	Bangkok

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

Sampled By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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Analysis / Test Report

TESTING

No.0042

Lot ID: 22110986

Date Received : Oct 04, 2022

Date Reported : Oct 11, 2022

Report Number : 2427407-1

Client : Dow Chemical Thailand Ltd.

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

P/O : 4512615548

Project Name : Water Testing

Project Location : Map Ta Phut_PU (PPTL)

Page 1 of 1

Sample Number	22110986-1
Sampled Date	Oct 04, 2022 9:00 AM
Sample Description	Wastewater
Location	H-304
Date Analysis Commenced	Oct 04, 2022
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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	16	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	12	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	10	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	7.6	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	28.7	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	116	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Sampled By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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

Technical Management

N. Banachit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4512615548
Project Name : Water Testing
Project Location: Map Ta Phut_PU (PPTL)

Lot ID: 22110986

Date Received : Oct 04, 2022

Date Reported : Oct 12, 2022

Report Number : 2427407-2

Page 1 of 1

Sample Number 22110986-1
Sampled Date Oct 04, 2022 9:00 AM
Sample Description Wastewater
Location H-304
Date Analysis Commenced Oct 08, 2022
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	4.53	No Standard	Based on APHA (2017), 5310 B	Bangkok

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

Sampled By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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Analysis / Test Report

TESTING

No.0042

Lot ID: 22122225

Date Received : Nov 01, 2022

Date Reported : Nov 09, 2022

Report Number : 2453571-1

Client : Dow Chemical Thailand Ltd.

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

P/O : 4512615548

Project Name : Water Testing

Project Location: Map Ta Phut_PU (PPTL)

Page 1 of 1

Sample Number	22122225-1						
Sampled Date	Nov 01, 2022 9:15 AM						
Sample Description	Wastewater						
Location	H-304						
Date Analysis Commenced	Nov 01, 2022						
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	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	25	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	18	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	16	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	8.1	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	27.4	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	214	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Sampled By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

Client : Dow Chemical Thailand Ltd.
8, I-4 Road, Map Ta Phut Industrial Estate, Map ta phut, Muang, Rayong Thailand 21150
P/O : 4512615548
Project Name : Water Testing
Project Location : Map Ta Phut_PU (PPTL)

Lot ID: 22122225

Date Received : Nov 01, 2022

Date Reported : Nov 09, 2022

Report Number : 2453571-2

Page 1 of 1

Sample Number 22122225-1
Sampled Date Nov 01, 2022 9:15 AM
Sample Description Wastewater
Location H-304
Date Analysis Commenced Nov 03, 2022
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	6.43	No Standard	Based on APHA (2017), 5310 B	Bangkok

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

Sampled By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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Siriluk P.

Siriluk Puengpang
Supervisor

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Analysis / Test Report

TESTING
No.0042

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

Lot ID: 2270897
Date Received : Jul 06, 2022
Date Reported : Dec 22, 2022
Report Number : 2338398-1 C2

Page 1 of 1

Sample Number	2270897-1						
Sampling Date	Jul 06, 2022 11:00 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Jul 06, 2022						
Condition of Sample	Contained in two amber glass bottles, six glass vials and seven plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	22	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	13	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	13	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	8.2	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	32.9	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	780	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Sampling By : Pathompong Kornawat , Thanasoun Namakunna

Remark :

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

N. Banachit

Narumon Banchongkit
Supervisor
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Approved by

D. Changchon

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: 2270897

Date Received : Jul 06, 2022
Date Reported : Dec 22, 2022
Report Number : 2338398-3 C2

Page 1 of 1

Sample Number 2270897-1
Sampling Date Jul 06, 2022 11:00 AM
Sample Description Wastewater
Location Outfall
Date Analysis Commenced Jul 07, 2022
Condition of Sample Contained in two amber glass bottles, six glass vials and seven plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	8.21	No Standard	Based on APHA (2017), 5310 B	Bangkok

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

Sampling By : Pathompong Kornawat, Thanasoun Namakunna

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Siriluk Puengpang
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Analysis / Test Report

TESTING

No.0042

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 2284532

Date Received : Aug 03, 2022

Date Reported : Aug 15, 2022

Report Number : 2369730-1 C2

Page 1 of 1

Sample Number	2284532-1						
Sampling Date	Aug 03, 2022 11:30 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Aug 03, 2022						
Condition of Sample	Contained in six glass vials, two amber glass bottles and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	18	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	7	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	6	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	7.4	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	29.9	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	282	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	7	≤50	APHA (2017), 2540 D	Rayong

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

Sampling By : Pathompong Kornawat , Thanasoun Namakunna

Remark :

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Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ๖-323-๖-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ๖-323-ค-9442

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Analysis / Test Report

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

Lot ID: 2284532

Date Received : Aug 03, 2022
Date Reported : Aug 15, 2022
Report Number : 2369730-3 C2

Page 1 of 1

Sample Number	2284532-1						
Sampling Date	Aug 03, 2022 11:30 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Aug 04, 2022						
Condition of Sample	Contained in six glass vials, two amber glass bottles and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	4.02	No Standard	Based on APHA (2017), 5310 B	Bangkok

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

Sampling By : Pathompong Kornawat, Thanasoun Namakunna

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Analysis / Test Report

TESTING

No.0042

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 2296689

Date Received : Sep 07, 2022

Date Reported : Sep 15, 2022

Report Number : 2397601-1 C2

Page 1 of 1

Sample Number	2296689-1						
Sampling Date	Sep 07, 2022 2:10 PM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Sep 07, 2022						
Condition of Sample	Contained in six glass vials, four amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	5	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	<5	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	<5	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	7.2	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	28.2	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	178	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Sampling By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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Technical Management

N. Banchongkit

Narumon Banchongkit
Supervisor

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Approved by

D. Changchon

Dej Changchon
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ทะเบียนเลขที่ ๖-323-๖-9442

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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: 2296689

Date Received : Sep 07, 2022

Date Reported : Sep 15, 2022

Report Number : 2397601-3 C2

Page 1 of 1

Sample Number 2296689-1
Sampling Date Sep 07, 2022 2:10 PM
Sample Description Wastewater
Location Outfall
Date Analysis Commenced Sep 08, 2022
Condition of Sample Contained in six glass vials, four amber glass bottles and eight plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	3.09	No Standard	Based on APHA (2017), 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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Analysis / Test Report

TESTING

No.0042

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 22110977

Date Received : Oct 04, 2022

Date Reported : Dec 22, 2022

Report Number : 2427394-1 C2

Page 1 of 1

Sample Number	22110977-1						
Sampling Date	Oct 04, 2022 10:10 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Oct 04, 2022						
Condition of Sample	Contained in six glass vials, two amber glass bottles and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	18	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	9	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	9	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	7.2	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	29.7	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	326	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Sampling By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

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

Lot ID: 22110977

Date Received : Oct 04, 2022
Date Reported : Dec 22, 2022
Report Number : 2427394-3 C2

Page 1 of 1

Sample Number 22110977-1
Sampling Date Oct 04, 2022 10:10 AM
Sample Description Wastewater
Location Outfall
Date Analysis Commenced Oct 05, 2022
Condition of Sample Contained in six glass vials, two amber glass bottles and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	7.63	No Standard	Based on APHA (2017), 5310 B	Bangkok

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

Sampling By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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

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Approved by

Siriluk P.

Siriluk Puengpang
Supervisor

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6506-102/ EMAIL



Analysis / Test Report

TESTING

No.0042

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 22121774

Date Received : Nov 01, 2022

Date Reported : Dec 22, 2022

Report Number : 2452487-1 Rev. No.1 C

Page 1 of 1

Sample Number	22121774-1						
Sampling Date	Nov 01, 2022 11:09 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Nov 01, 2022						
Condition of Sample	Contained in six glass vials, two amber glass bottles and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2	<2	≤20	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	31	≤120	APHA (2017), 5220 D	Rayong
Color (at Original pH)	ADMI	-	5	9	≤300	APHA (2017), 2120 F	Rayong
Color (at pH 7.0)	ADMI	-	5	8	≤300	APHA (2017), 2120 F	Rayong
Oil & Grease	mg/L	-	3	<3	≤5	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	8.2	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Temperature *	Degree C	-	-	30.5	≤40	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	404	≤3000	APHA (2017), 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	<5	≤50	APHA (2017), 2540 D	Rayong

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

Note : This Analysis test report is reissued to supersede report No.2452487-3, Date Reported : Nov 09, 2022 due to revise sample information.

Sampling By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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

Technical Management

N. Banachkit

Narumon Banachkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

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

Lot ID: 22121774

Date Received : Nov 01, 2022
Date Reported : Dec 22, 2022
Report Number : 2452487-3 Rev. No.1 C

Page 1 of 1

Sample Number	22121774-1						
Sampling Date	Nov 01, 2022 11:09 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Nov 02, 2022						
Condition of Sample	Contained in six glass vials, two amber glass bottles and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	8.00	No Standard	Based on APHA (2017), 5310 B	Bangkok

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

Note : This Analysis test report is reissued to supersede report No.2452487-3, Date Reported : Nov 09, 2022 due to revise sample information.

Sampling By : Wanlop Hunchainaow , Thanasoun Namakunna

Remark :

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Approved by

Sawitree N.

Sawitree Noisangiam
Manager

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6506-102/ EMAIL



Analysis / Test Report

TESTING

No.0042

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Lot ID: 22136120

Date Received : Dec 09, 2022

Date Reported : Dec 19, 2022

Report Number : 2486131-1 C2

Page 1 of 2

Sample Number	22136120-1						
Sampling Date	Dec 09, 2022 10:30 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Dec 09, 2022						
Condition of Sample	Contained in six glass vials, two amber glass bottles and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2	<2	≤20	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B	Rayong
COD	mg/L	1.5	5	27	≤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 *		-	-	7.6	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	30.8	≤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	820	≤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

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).

Technical Management

N. Banachit

Narumon Banchongkit
Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

TESTING
No.0042

Lot ID: 22136120

Date Received : Dec 09, 2022

Date Reported : Dec 19, 2022

Report Number : 2486131-1 C2

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4501177470

Project Name : Water Testing

Project Location: Map Ta Phut_Latex (SSLC)

Page 2 of 2

Sampling By : Tanasit Wongsachai , Thanasoun Namakunna

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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Analysis / Test Report

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

Lot ID: 22136120

Date Received : Dec 09, 2022

Date Reported : Dec 19, 2022

Report Number : 2486131-3 C2

Page 1 of 1

Sample Number	22136120-1						
Sampling Date	Dec 09, 2022 10:30 AM						
Sample Description	Wastewater						
Location	Outfall						
Date Analysis Commenced	Dec 10, 2022						
Condition of Sample	Contained in six glass vials, two amber glass bottles and seven plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Organic Carbon	mg/L	0.01	0.1	11.4	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5310 B	Bangkok

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

Sampling By : Tanasit Wongsachai , Thanasoun Namakunna

Remark :

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Approved by

Chanatt L.

Chanattagarn Imchom
Supervisor

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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 : 4512621611
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2291811
Date Received : Aug 19, 2022
Date Reported : Aug 24, 2022
Report Number: 2413251-1

Page 1 of 1

Sample Number 2291811-1
Parameter Noise (Leq 24 hrs.)
Location บริเวณริมรั้วโครงการฝั่งตะวันออก (GPS 47P 0733919, 1404606)
Measurement Date Aug 15 - Aug 16, 2022
Measurement by Sawai Tonpho
Sound Level meter Serial No. 1122607

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	65.2	78.2	64.4
11:00 AM - 12:00 PM	72.1	95.5	65.2
12:00 PM - 01:00 PM	66.0	79.5	65.4
01:00 PM - 02:00 PM	66.3	80.2	65.7
02:00 PM - 03:00 PM	66.3	74.1	65.8
03:00 PM - 04:00 PM	66.1	73.8	65.6
04:00 PM - 05:00 PM	65.7	69.5	65.1
05:00 PM - 06:00 PM	66.0	80.4	65.2
06:00 PM - 07:00 PM	66.1	72.8	65.2
07:00 PM - 08:00 PM	66.2	75.6	65.4
08:00 PM - 09:00 PM	66.2	76.9	65.4
09:00 PM - 10:00 PM	66.4	76.0	65.7
10:00 PM - 11:00 PM	66.3	75.6	65.7
11:00 PM - 12:00 AM	65.7	74.9	65.1
12:00 AM - 01:00 AM	65.6	78.8	65.0
01:00 AM - 02:00 AM	65.7	70.8	65.1
02:00 AM - 03:00 AM	66.0	71.3	65.4
03:00 AM - 04:00 AM	66.0	74.4	65.5
04:00 AM - 05:00 AM	65.3	75.3	64.7
05:00 AM - 06:00 AM	65.2	75.5	64.7
06:00 AM - 07:00 AM	62.4	77.7	61.3
07:00 AM - 08:00 AM	62.5	73.6	61.6
08:00 AM - 09:00 AM	62.4	86.6	61.4
09:00 AM - 10:00 AM	62.2	79.1	61.3

Leq Average 24 hrs. (dB(A)) 66.1
Lmax (dB(A)) 95.5
L90 (dB(A)) 65.2
Ldn (dB(A)) 72.0
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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 : 4512621611

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2291811

Date Received : Aug 19, 2022

Date Reported : Aug 24, 2022

Report Number: 2413252-1

Page 1 of 1

Sample Number 2291811-2
Parameter Noise (Leq 24 hrs.)
Location บริเวณริมรั้วโครงการฝั่งตะวันออก (GPS 47P 0733919, 1404606)
Measurement Date Aug 16 - Aug 17, 2022
Measurement by Sawai Tonpho
Sound Level meter Serial No. 1122607

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	62.1	77.7	61.2
11:00 AM - 12:00 PM	61.4	78.9	60.4
12:00 PM - 01:00 PM	61.4	75.7	60.3
01:00 PM - 02:00 PM	61.9	76.0	60.7
02:00 PM - 03:00 PM	61.5	77.1	60.4
03:00 PM - 04:00 PM	61.4	72.2	60.5
04:00 PM - 05:00 PM	61.4	70.7	60.6
05:00 PM - 06:00 PM	61.4	80.0	60.5
06:00 PM - 07:00 PM	61.8	77.8	61.0
07:00 PM - 08:00 PM	61.8	70.9	61.1
08:00 PM - 09:00 PM	62.6	78.3	61.6
09:00 PM - 10:00 PM	62.9	75.7	62.0
10:00 PM - 11:00 PM	62.7	75.4	61.9
11:00 PM - 12:00 AM	62.6	76.4	61.8
12:00 AM - 01:00 AM	62.9	77.9	62.0
01:00 AM - 02:00 AM	62.6	69.3	61.8
02:00 AM - 03:00 AM	62.8	81.3	61.9
03:00 AM - 04:00 AM	62.5	70.1	61.7
04:00 AM - 05:00 AM	62.5	73.3	61.7
05:00 AM - 06:00 AM	62.3	76.1	61.5
06:00 AM - 07:00 AM	62.1	69.2	61.3
07:00 AM - 08:00 AM	61.9	76.2	61.0
08:00 AM - 09:00 AM	61.9	77.2	60.8
09:00 AM - 10:00 AM	62.2	74.8	61.3

Leq Average 24 hrs. (dB(A)) 62.1
Lmax (dB(A)) 81.3
L90 (dB(A)) 61.2
Ldn (dB(A)) 68.9
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

Remark :

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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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 : 4512621611
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2291811
Date Received : Aug 19, 2022
Date Reported : Aug 24, 2022
Report Number: 2413253-1

Page 1 of 1

Sample Number 2291811-3
Parameter Noise (Leq 24 hrs.)
Location บริเวณริมรั้วโครงการฝั่งตะวันออก (GPS 47P 0733919, 1404606)
Measurement Date Aug 17 - Aug 18, 2022
Measurement by Sawai Tonpho
Sound Level meter Serial No. 1122607

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	62.5	73.2	61.6
11:00 AM - 12:00 PM	62.5	76.9	61.5
12:00 PM - 01:00 PM	61.9	71.6	61.0
01:00 PM - 02:00 PM	62.3	75.1	61.2
02:00 PM - 03:00 PM	62.3	76.6	61.3
03:00 PM - 04:00 PM	63.0	76.9	61.9
04:00 PM - 05:00 PM	63.8	72.1	62.9
05:00 PM - 06:00 PM	65.7	78.3	65.1
06:00 PM - 07:00 PM	65.8	79.3	65.2
07:00 PM - 08:00 PM	66.0	77.4	65.4
08:00 PM - 09:00 PM	66.1	80.2	65.5
09:00 PM - 10:00 PM	65.9	77.7	65.4
10:00 PM - 11:00 PM	65.6	84.7	65.0
11:00 PM - 12:00 AM	65.8	75.1	65.0
12:00 AM - 01:00 AM	66.3	80.7	65.3
01:00 AM - 02:00 AM	66.6	71.0	65.6
02:00 AM - 03:00 AM	66.7	75.6	65.6
03:00 AM - 04:00 AM	66.4	74.9	65.5
04:00 AM - 05:00 AM	66.3	73.2	65.7
05:00 AM - 06:00 AM	66.3	70.8	65.6
06:00 AM - 07:00 AM	66.2	72.5	65.5
07:00 AM - 08:00 AM	65.6	79.0	64.9
08:00 AM - 09:00 AM	63.4	81.1	62.7
09:00 AM - 10:00 AM	61.7	78.6	60.9

Leq Average 24 hrs. (dB(A)) 65.1
Lmax (dB(A)) 84.7
L90 (dB(A)) 65.0
Ldn (dB(A)) 72.4
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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 : 4512621611

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 2291809

Date Received : Aug 17, 2022

Date Reported : Aug 18, 2022

Report Number: 2385996-1

Page 1 of 1

Sample Number 2291809-1
Parameter Noise (Leq 8 hrs.)
Location บริเวณเครื่องทำความเย็น (MRU)
Measurement Date Aug 15, 2022
Measurement by Sawai Tonpho

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:19 AM - 10:19 AM	77.3	89.2	76.7
10:19 AM - 11:19 AM	79.8	98.5	76.4
11:19 AM - 12:19 PM	76.9	78.7	76.3
12:19 PM - 01:19 PM	79.0	80.1	78.6
01:19 PM - 02:19 PM	79.0	85.7	78.7
02:19 PM - 03:19 PM	82.4	104.7	78.0
03:19 PM - 04:19 PM	78.5	95.9	77.5
04:19 PM - 05:19 PM	77.6	78.6	77.4
Leq Average 8 hrs. (dB(A))	79.2		
Lmax (dB(A))		104.7	
Standard (dB(A))	90	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๕๖			

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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Analysis / Test Report

Client : Siam Synthetic Latex Co., Ltd.

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

P/O : 4512621611

Project Name : Environmental Quality Monitoring

Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 22145950

Date Received : Dec 07, 2022

Date Reported : Dec 13, 2022

Report Number: 2509704-1

Page 1 of 1

Sample Number : 22145950-1
Parameter : Noise (Leq 8 hrs.)
Location : บริเวณเครื่องทำความเย็น (MRU)
Measurement Date : Dec 06, 2022
Measurement by : Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:41 AM - 10:41 AM	83.0	90.4	66.4
10:41 AM - 11:41 AM	84.2	91.6	67.6
11:41 AM - 12:41 PM	84.5	91.9	67.9
12:41 PM - 01:41 PM	84.8	87.3	83.4
01:41 PM - 02:41 PM	82.6	84.9	81.8
02:41 PM - 03:41 PM	83.9	85.4	83.2
03:41 PM - 04:41 PM	84.4	85.9	83.9
04:41 PM - 05:41 PM	84.4	85.5	84.0
Leq Average 8 hrs. (dB(A))	84.0		
Lmax (dB(A))		91.9	
Standard (dB(A))	90	140	
Reference Method : ISO1996-1 and 1996-2			
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๕๖			

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 : 4512621611
Project Name : Environmental Quality Monitoring
Project Location : Map Ta Phut_Latex (SSLC)

Lot ID: 22119576

Date Received : Oct 28, 2022

Date Reported : Nov 05, 2022

Report Number : 2447633-1

Page 1 of 1

Sample Number 22119576-1
Sampled Date Oct 28, 2022
Sample Description Air Quality
Location Under Reactor
Date Analysis Commenced Oct 29, 2022
Condition of Sample Drawn into four sorbent tubes, refrigerated
Barometric Pressure 757 mmHg
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
1,3-Butadiene	11:00 AM - 01:00 PM	ppm	-	0.05	<0.05	1	NIOSH (1994), 1024	MOL	Bangkok
Acrylic Acid	11:00 AM - 01:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok
Acrylonitrile	11:00 AM - 01:00 PM	ppm	-	0.05	<0.05	2	NIOSH (1994), 1604	MOL	Bangkok
Styrene	11:00 AM - 01:00 PM	ppm	-	0.05	<0.05	100	Based on NIOSH (2003), 1501	MOL	Bangkok

Guideline :

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

Sampled By : Natthapon Jhengwareewong

Remark :

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

Approved by

Saranya C.

Saranya Chalermtamrong
Scientist (4)

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ใบรับรองการสอบเทียบเครื่องมือ



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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Stack	Butadiene	Console Control Unit	BKK_FS0518	12-Jul-22	12-Jan-23	6
Stack	Butadiene	Field Rotameter	BKK_FS1042	1-Oct-22	1-Jan-23	3
Stack	Butadiene	GC-MSD	BKK_EN0119	1-Oct-21	1-Apr-23	18
Stack	Total Suspended Particulate	Console Control Unit	BKK_FS0518	12-Jul-22	12-Jan-23	6
Stack	Total Suspended Particulate	Digital Balance	RYG_EN0003	23-Mar-22	23-Mar-23	12
Stack (CEMs)	Oxides of Nitrogen	Analyzer , System calibration, S	-	-	-	-
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0187	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	Digital Balance	RYG_EN0001	23-Mar-22	23-Mar-23	12
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0461	1-Jul-22	1-Jan-23	6
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	BKK_FS0141	7-Jun-21	6-Dec-22	18
Workplace	1,3-Butadiene	Field Rotameter	RYG_FS0199	1-Oct-22	1-Jan-23	3
Workplace	1,3-Butadiene	GC-MSD	BKK_EN0119	1-Oct-21	1-Apr-23	18
Workplace	Acrylonitrile	Field Rotameter	RYG_FS0199	1-Oct-22	1-Jan-23	3
Workplace	Acrylonitrile	GC-FID	BKK_EN0126	21-Oct-21	21-Apr-23	18
Workplace	Acrylic Acid	Field Rotameter	RYG_FS0199	1-Oct-22	1-Jan-23	3
Workplace	Acrylic Acid	HPLC	BKK_FL0083	2-Jun-22	2-Feb-24	20
Workplace	Styrene	Field Rotameter	RYG_FS0199	1-Oct-22	1-Jan-23	3
Workplace	Styrene	GC-MSD	BKK_EN0119	1-Oct-21	1-Apr-23	18
Noise	Leq 24 hrs	Sound Calibrator	RYG_FS0496	10-Jan-22	10-Jan-23	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0019	10-Jan-22	10-Jan-23	12
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0496	10-Jan-22	10-Jan-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0020	10-Jan-22	10-Jan-23	12
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0213	26-Apr-22	26-Apr-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0303	11-Jul-22	11-Jul-23	12
Rayong Lab	pH at 25 oC	pH meter	RYG_EN0183	17-Mar-22	17-Mar-23	12
Rayong Lab	Color (at Original pH)	Spectrophotometer	RYG_EN0037	27-Sep-22	27-Mar-24	18
Rayong Lab	Color (at pH 7.0)	Spectrophotometer	RYG_EN0037	27-Sep-22	27-Mar-24	18
Rayong Lab	BOD	DO meter with Sensor	RYG_EN0032	14-Feb-22	15-Aug-23	18
Rayong Lab	BOD	Incubator	RYG_EN0154	22-Apr-22	21-Oct-23	18
Rayong Lab	COD	Spectrophotometer	RYG_EN0037	27-Sep-22	27-Mar-24	18
Rayong Lab	Total Suspended Solids	Electronic Balance	RYG_EN0002	23-Mar-22	23-Mar-23	12
Rayong Lab	Total Suspended Solids	Chamber Oven	RYG_EN0010	20-Oct-22	20-Apr-24	18
Rayong Lab	Oil & Grease	Electronic Balance	RYG_EN0002	23-Mar-22	23-Mar-23	12
Rayong Lab	Oil & Grease	Chamber 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	Temperature	pH Meter	RYG_FS0420	14-Mar-22	14-Mar-23	12
Water Lab	Total Organic carbon	TOC Analyzer	BKK_EN0066	3-Oct-22	3-Oct-23	12



DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date : 12-Jul-22	Ambient Temperature (°C) : 30
Calibration Sheet No. : C-120722-BKK_FS0519	Relative Humidity (%) : 70
Digital Temperature ID : BKK_FS0519	Reference Temperature ID : BKK_FS1144
Console Serial No. : 1504025	Serial No. : 20109008013
Console Model : XC-572-V	Model : Digicon-CC-VT-MS
Next Calibrate : 31 Jan 23	

Location	Reference Temperature °C	Digital Temperature °C	Error °C	Remark
Stack	0	0	0	
	25	25	0	
	50	50	0	
	100	101	1	
	150	153	3	
	200	202	2	
	250	252	2	
	300	302	2	
	500	503	3	
	1000	1004	4	
Probe	1200	1205	5	
	100	101	1	
	125	127	2	
	150	153	3	
	100	101	1	
Oven	125	127	2	
	150	153	3	
	100	101	1	
	125	127	2	
	150	153	3	
Filler	100	101	1	
	125	127	2	
	150	153	3	
	0	0	0	
	10	9	-1	
Exhl	20	19	-1	
	0	0	0	
	25	24	-1	
	50	50	0	
	0	0	0	
Meter	25	25	0	
	50	50	0	
	0	0	0	
	25	25	0	
	50	50	0	
AUX	0	0	0	
	25	25	0	
	50	50	0	

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

Calibrated by : Mr.Minnakorn Kulchart
(Mr.Minnakorn Kulchart)
Field Scientist (1)



CONSOLE CONTROL UNIT CALIBRATION TEST REPORT

Calibration of Date : 12 Jul 22
Next Cal. Date : 12 Jan 23

Barometric Pressure (mm.Hg) : 755
Relative Humidity (%) : 70.0
Temperature (°C) : 30.0

Console Control Meter Data

Calibration No. : C-120722-BKK_FS0518
Dry Gas Meter No. : BKK_FS0518
Console Serial No. : 1504025
Console Model No. : XC-572-V

Reference Dry Gas Meter Data

Serial No. : A2003240
Model No. : DGM-SK25RM-QS8
Correction Factor (Yr) : 1.0160
Next Calibration Date : 27 May 23

ΔH (mm.H ₂ O)	Θ Minutes	Reference Dry Gas Meter Calibration				Console Control : Drygas Meter						Dry Gas Meter	Orifice
		Vr (Liters)			Tr (°C)	Vm (Liters)			Ti (°C)	To (°C)	Avg.Tm (°C)	Correction	Calibration
		Final	Initial	Total		Final	Initial	Total				Factor (Y)	Factor ΔH_{Θ}
15	12.41	150.00	0.00	150.00	31.0	153838.0	153687.0	151.00	29.0	29.0	29.0	1.0012	47.8984
25	9.38	150.00	0.00	150.00	31.0	154002.0	153851.0	151.00	29.0	29.0	29.0	1.0002	46.6070
50	6.61	150.00	0.00	150.00	31.0	154164.0	154013.0	151.00	29.0	29.0	29.0	0.9978	45.2959
100	4.65	150.00	0.00	150.00	32.0	154330.0	154177.0	153.00	30.0	30.0	30.0	0.9800	44.9789
120	4.17	150.00	0.00	150.00	32.0	154616.0	154463.0	153.00	30.0	30.0	30.0	0.9781	43.4066
Avg.											0.9915	45.4374	

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

ΔH_{Θ} : Orifice pressure differential that equates to 21.24 l/m of air @ 25 C and 760 mm of mercury , mmH₂O ; tolerance for individual values ± 5.08 from average .

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

Calibrated by : Mr.Minnakorn Kulchart
(Mr.Minnakorn Kulchart)
Field Scientist (1)

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



Pitot Tube Calibration Data

Pitot Tube Identification Number : BKK_FS0522 Calibration Date : 12 Jul 22
Lab test duct Number : 258-1-13-01 Standard Pitot ID : BKK_FS0441
Calibration Sheet No. : C-120722-BKK_FS0522 Cp Standard : 0.99


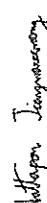
Type S Pitot Tube Coefficient Data					
	Type s pitot tube Leg A,B	Standard pitot tube (ΔP , mm.H ₂ O)	Type s pitot tube (ΔP , mm.H ₂ O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 2	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 3	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
$\overline{C_p}$				0.842	0.842

$$C_p(S) = C_p \cdot \sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

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

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

Nattapon Jengwarewong

Calibrated by :  Approved by : 
(Mr. Tinnakorn Kulchart) (Mr. Nattapol Jengwarewong)
Field Scientist (I) Field Specialist(I)

Form 281-016 (04/03/02)



Pitot Tube Calibration Data

Pitot Tube Identification Number : BKK_FS0523 Calibration Date : 12 Jul 22
Lab test duct Number : 258-1-13-01 Standard Pitot ID : BKK_FS0441
Calibration Sheet No. : C-120722-BKK_FS0523 Cp Standard : 0.99


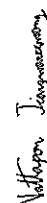
Type S Pitot Tube Coefficient Data					
	Type s pitot tube Leg A,B	Standard pitot tube (ΔP , mm.H ₂ O)	Type s pitot tube (ΔP , mm.H ₂ O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 2	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
Test 3	A	12.00	16.60	0.842	-
	B	12.00	16.60	-	0.842
$\overline{C_p}$				0.842	0.842

$$C_p(S) = C_p \cdot \sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

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

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

Nattapon Jengwarewong

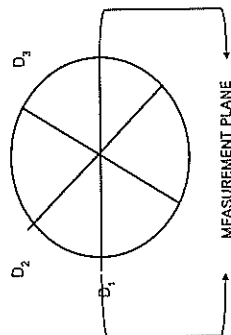
Calibrated by :  Approved by : 
(Mr. Jinnakorn Kulchar) (Mr. Nattapol Jengwarewong)
Field Scientist (I) Field Specialist(I)

Form 281-016 (04/03/02)



Nozzle ID #	Nozzle Diameter (cm.)			Hi - Lo ΔD	$(D_1 + D_2 + D_3) / 3$
	D ₁	D ₂	D ₃		
1	0.318	0.318	0.318	0.000	D _{avg} 0.318
2	0.475	0.475	0.475	0.000	0.475
3	0.635	0.635	0.635	0.000	0.635
4	0.792	0.792	0.792	0.000	0.792
5	0.952	0.952	0.952	0.000	0.952
6	1.110	1.110	1.110	0.000	1.110
7	1.270	1.270	1.270	0.000	1.270

(Mr.Natthapoi Jengwareewong)
Field Specialist(1)



Form No. Q5 281-075 (13/01/03)



ROTA METER CALIBRATION RESULT OCTOBER 2022

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R ²)
BKK_FS0577	01 Oct 22	Y = 1.0202x + 0.1976	1.0000
BKK_FS0579	01 Oct 22	Y = 1.0078x + 0.4789	0.9998
BKK_FS0583	01 Oct 22	Y = 1.016x + 0.3922	1.0000
BKK_FS0584	01 Oct 22	Y = 1.0036x + 2.2262	0.9997
BKK_FS0585	01 Oct 22	Y = 1.0189x - 5.6476	0.9997
BKK_FS0586	01 Oct 22	Y = 1.0095x - 1.1524	0.9995
BKK_FS0587	01 Oct 22	Y = 1.013x - 3.6619	0.9996
BKK_FS0588	01 Oct 22	Y = 1.0154x + 4.8357	0.9999
BKK_FS0589	01 Oct 22	Y = 0.9918x + 4.8069	0.9989
BKK_FS0590	01 Oct 22	Y = 1.0038x - 0.4857	0.9996
BKK_FS0591	01 Oct 22	Y = 0.9705x - 52.174	0.9986
BKK_FS0592	01 Oct 22	Y = 0.9646x - 37.642	0.9985
BKK_FS0593	01 Oct 22	Y = 0.9767x - 58.445	0.9988
BKK_FS0594	01 Oct 22	Y = 0.9902x - 62.87	0.9999
BKK_FS0595	01 Oct 22	Y = 1.0249x - 98.162	0.9999
BKK_FS0596	01 Oct 22	Y = 0.9843x - 26.806	0.9991
BKK_FS0597	01 Oct 22	Y = 0.9802x - 61.653	0.9978
BKK_FS1004	01 Oct 22	Y = 0.9762x + 11.724	0.9998
BKK_FS1005	01 Oct 22	Y = 1.0081x + 1.5143	1.0000
BKK_FS1006	01 Oct 22	Y = 1.098x - 2.9327	0.9999
BKK_FS1007	01 Oct 22	Y = 0.9917x + 1.6592	1.0000
BKK_FS1008	01 Oct 22	Y = 1.0132x + 0.7207	1.0000
BKK_FS1009	01 Oct 22	Y = 1.0132x + 1.1633	0.9960
BKK_FS1010	01 Oct 22	Y = 1.0033x + 0.5758	0.9999
BKK_FS1011	01 Oct 22	Y = 1.0234x + 0.1759	0.9996
BKK_FS1012	01 Oct 22	Y = 1.0106x - 2.0048	0.9997
BKK_FS1013	01 Oct 22	Y = 0.9677x - 35.851	0.9997
BKK_FS1014	01 Oct 22	Y = 1.0021x + 0.3148	0.9998
BKK_FS1015	01 Oct 22	Y = 0.9994x + 1.786	1.0000
BKK_FS1016	01 Oct 22	Y = 1.0105x - 80.256	0.9998
BKK_FS1017	01 Oct 22	Y = 0.9995x + 0.649	1.0000
BKK_FS1018	01 Oct 22	Y = 1.0011x + 1.1786	1.0000
BKK_FS1019	01 Oct 22	Y = 1.0023x - 88.424	0.9996
BKK_FS1020	01 Oct 22	Y = 1.0547x - 0.666	0.9998
BKK_FS1021	01 Oct 22	Y = 1.018x - 3.3286	0.9998
BKK_FS1022	01 Oct 22	Y = 0.9932x - 57.035	0.9986
BKK_FS1023	01 Oct 22	Y = 1.0094x + 0.0717	0.9999
BKK_FS1024	01 Oct 22	Y = 1.0042x + 0.4086	0.9997
BKK_FS1025	01 Oct 22	Y = 1.0132x - 88.507	0.9996



ROTA METER CALIBRATION RESULT OCTOBER 2022

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R ²)
BKK_FS1026	01 Oct 22	$Y = 1.0018x + 1.0776$	0.9997
BKK_FS1027	01 Oct 22	$Y = 1.0053x + 0.231$	0.9995
BKK_FS1028	01 Oct 22	$Y = 0.9792x - 60.312$	0.9982
BKK_FS1029	01 Oct 22	$Y = 0.9935x + 0.8234$	1.0000
BKK_FS1030	01 Oct 22	$Y = 1.0039x + 0.515$	0.9999
BKK_FS1031	01 Oct 22	$Y = 1.009x - 79.295$	0.9998
BKK_FS1039	01 Oct 22	$Y = 0.9967x + 4.5048$	0.9999
BKK_FS1040	01 Oct 22	$Y = 0.9936x + 32.694$	0.9998
BKK_FS1041	01 Oct 22	$Y = 1.067x - 1.999$	1.0000
BKK_FS1042	01 Oct 22	$Y = 1.0019x + 2.1571$	1.0000
BKK_FS1043	01 Oct 22	$Y = 1.1569x - 95.479$	0.8412
BKK_FS1044	01 Oct 22	$Y = 1.0318x - 0.9374$	0.9999
BKK_FS1161	01 Oct 22	$Y = 1.0126x + 0.7738$	0.9999
BKK_FS1162	01 Oct 22	$Y = 0.9994x + 2.6357$	0.9995
BKK_FS1163	01 Oct 22	$Y = 0.977x - 55.03$	0.9987
BKK_FS1164	01 Oct 22	$Y = 0.9914x + 0.8427$	0.9997
BKK_FS1165	01 Oct 22	$Y = 0.9893x + 6.5919$	0.9998
BKK_FS1166	01 Oct 22	$Y = 1.0031x - 77.881$	0.9996
BKK_FS1200	01 Oct 22	$Y = 1.0313x - 0.4602$	0.9995
BKK_FS1201	01 Oct 22	$Y = 1.0045x + 0.15$	0.9996
BKK_FS1202	01 Oct 22	$Y = 0.9702x - 44.156$	0.9994
RYG_FS0197	01 Oct 22	$Y = 1.0039x - 0.179$	0.9999
RYG_FS0198	01 Oct 22	$Y = 0.9964x + 21.757$	1.0000
RYG_FS0199	01 Oct 22	$Y = 1.0577x - 1.7486$	1.0000

Review By :

Wichan Choonharat

(Mr. Wichan Choonharat)

Enviro Field Services Manager

Approved By :

Sarayuth Jitranont

(Mr. Sarayuth Jitranont)

Assistant General Manager

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Certificate of System Qualification

GC-OQ + GCMS-OQ

Agilent CrossLab Compliance Services

REVIEW BY

Sarawat M

APPROVED BY

Ch

System ID:

GM-2

Organization Name:

ALS Laboratory Group (Thailand) Co., Ltd.

Organization Location:

104 Phalthunskan 40, Phatthanakan Rd., Khet Waeng Suan Luang, Khet Suan Luang, Bangkok 10250

Date:

October 1, 2021 11:10:17 PM

EQP Name:

Agilent Recommended, Agilent Recommended

EQP Revision:

GC.02.51, GCMS.02.51

Overall Qualification Status:

Pass

System Inspection and Basic Safety and Operation

Name:

7890

Setpoint Status:

Pass

Overall System Inspection and Basic Safety and Operation Test Status
Pass

Inlet Pressure Accuracy

Name:

7890

Front

MMI

Setpoint Status:

Pass

Setpoint

Actual

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 11:10:17 PM

System ID:

GM-2

Setpoint Status:

Zone:

Temperature:

Accuracy:

Agilent Recommended:

Setpoint Status:

Zone:

Temperature:

Accuracy:

Agilent Recommended:

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name:

Setpoint Status:

Temperature:

Stability:

Agilent Recommended:

Overall GC Oven Temperature Stability Test Status

Pass

Log Amp

Tested Combination1

Name:

Setpoint Status:

Date:

System ID:

October 1, 2021 1:10:17 PM

GM-2

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Pass

Oven

Setpoint/Actual

230.0 230.5 °C

0.5 °C

>= -1.0 °C

<= 1.0 °C

(-5.0 °C)

(5.0 °C)

Pass

Oven

Setpoint/Actual

100.0 101.5 °C

1.5 °C

>= -1.0 °C

<= 1.0 °C

(-3.7 °C)

(3.7 °C)

Overall Log Amp Test Status

Pass

RPFA

Tested Combination1

Name:

5975C Inert XL with TAD

Setpoint Status:

Pass

Amp:

1050 mV

Drift After Five Minutes:

6 mV

>= -100 mV

and <= 100 mV

<= 1100 mV

481

<= 1100

Agilent Recommended:

Overall RPFA Test Status

Pass

Tune EI

Tested Combination1

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

Name:

7693A

Source:

EI - Inert

Date:

System ID:

October 1, 2021 1:10:17 PM

GM-2

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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:

619

Agilent Recommended:

 \geq 320

Source:

EI - Inert

Filament:

2

Setpoint Status:

Pass

Signal to Noise:

647

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:

4.75 %

Agilent Recommended:

 \leq 5.00

Retention Time RSD:

0.02 %

 \leq 1.00

Overall Injection Precision Test Status

Pass

Date:

October 1, 2021 1:10:17 PM

System ID:

GM-2

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Mass Ratio Precision

Tested Combination1

Front MMI / External SQ

Injection Tower

Name:

7693A

Source:

EI - Inert

Setpoint Status:

Pass

Injection Volume on Column:

1.0 μ L

Area Mass 1

Abundance's

RSD:

4.75 %

Agilent Recommended:

 \leq 5.00

Mass Ratio

0.81 %

 \leq 5.00

Pass

Overall Mass Ratio Precision Test Status

Pass

Date:

October 1, 2021 1:10:17 PM

System ID:

GM-2

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Instrument Details

Purpose

This section describes the as found system configuration.

Details

System	GM-2
System ID	Agilent Technologies
Manufacturer	7690
Name	Manual Data
Flow Data Input	Manual Data or Other Data Logging
Temperature Data Input	
Tested Combination1	Injection Tower
Injection Technique	Front
Inlet	External
Detector	No
LTM Included?	

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	7690
Model Number	G3440A
Serial Number	CN10141049
Firmware Revision	A.01.16
Oven Type	Standard

Inlet 1

Manufacturer	Agilent Technologies
Name	7690
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

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:

October 1, 2021

Reason for Signature:

Executed protocol and published this original version of document

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User Name: supasa.khinseangham
Host Name: SC0116HMC
Print Date: October 1, 2021 1:10:17 PM
System ID: GM-2

ALS_GM2 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:42:27 PM	Audit	Session Created	Session	None
October 1, 2021 12:42:37 PM	Start	Configuration	Session	None
October 1, 2021 12:42:37 PM	Audit	Enrollment	Licensing	User is Field Engineer and does not require an unlock code
October 1, 2021 12:44:21 PM	Audit	Exp/Loaded	Session	EDP details for primary technique (GC) - File path: [ProtocolPack\Gd\Conf\Gral Ion\02.51HC\02.51.ecp] EDP File Name: [GC.02.51.ecp], EDP Name: [AgilentRecommended] EDP details for hyphenated technique (GC/MS) - File path: [ProtocolPack\Gd\Gd\Conf\Gral Ion\02.51HC\02.51.ecp] EDP File Name: [GC/MS.02.51.ecp], EDP Name: [AgilentRecommended]
October 1, 2021 12:44:24 PM	End	Configuration	Session	None
October 1, 2021 12:44:28 PM	Start	Qualification	Session	OQ
October 1, 2021 12:44:28 PM	Start	Execution	System Inspection and Basic Safety and Operation - 7890 - Qualitative Test - No setpoints associated	None

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

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User Name: supasa.khinseangham
Host Name: SC0116HMC
Print Date: October 1, 2021 1:10:19 PM
System ID: GM-2

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	Initial Pressure Accuracy - Front Multi - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
October 1, 2021 12:47:42 PM	End	Execution	Initial Pressure Accuracy - Front Multi - 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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Date:
System ID:October 1, 2021 1:10:17 PM
GM-2

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User Name: supasak.nimsongtham
Hostname: SCG1154KHC
ALS_GM2 Transaction log :
System ID: GM-2
Print Date: October 1, 2021 1:10:19 PM

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:46:39 PM	Start	Execution	GC Oven Temperature Stability	None - 7850 : Temperature : Oven - S: 100.0°C - L: <= 0.5°C
October 1, 2021 12:49:34 PM	Audit	Data	GC Oven Temperature Stability	Manual Data Entry - 7850 : Temperature : Oven - S: 100.0°C - L: <= 0.5°C
October 1, 2021 12:49:35 PM	End	Execution	GC Oven Temperature Stability	Run Count : 1 - 7850 : Temperature : Oven - S: 100.0°C - L: <= 0.5°C
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	None
October 1, 2021 12:50:49 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ - Source: EI - Inert	Run Count : 1
October 1, 2021 12:50:50 PM	Start	Execution	Tune EI - 5975C Inert XL with TAD SQ - Source: EI - Inert	None
October 1, 2021 12:50:59 PM	End	Execution	Tune EI - 5975C Inert XL with TAD SQ - Source: EI - Inert	Run Count : 1

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User Name: supasak.nimsongtham
Hostname: SCG1154KHC
ALS_GM2 Transaction log :
System ID: GM-2
Print Date: October 1, 2021 1:10:19 PM

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:51:01 PM	Start	Execution	Scouting Run - Injection Tower, Front MM, SQ - Source: EI - Inert-Part of GCMS System	None
October 1, 2021 12:51:18 PM	Audit	Data	Scouting Run - Injection Tower, Front MM, SQ - Source: EI - Inert-Part of GCMS System	Data files Path : E:\GM2002021\SCOUTING RUN001.D\DATA\MS
October 1, 2021 12:51:42 PM	Audit	Data	Scouting Run - Injection Tower, Front MM, SQ - Source: EI - Inert-Part of GCMS System	Data files Path : E:\GM2002021\SCOUTING RUN001.D\DATA\MS
October 1, 2021 12:52:42 PM	Audit	Data	Scouting Run - Injection Tower, Front MM, SQ - Source: EI - Inert-Part of GCMS System	Data files Path : E:\GM2002021\SCOUTING RUN001.D\DATA\MS
October 1, 2021 12:53:25 PM	End	Execution	Scouting Run - Injection Tower, Front MM, SQ - Source: EI - Inert-Part of GCMS System	Run Count : 1
October 1, 2021 12:53:27 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MM, 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 MM, SQ - Source: EI - Inert using Filament 1 - L: >= 320	Data files Path : E:\GM2002021\SNF1_001.D\DATA\MS
October 1, 2021 12:53:56 PM	End	Execution	Signal to Noise EI - Injection Tower, Front MM, SQ - Source: EI - Inert using Filament 1 - L: >= 320	Run Count : 1

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User Name: supasak.nimsongtham
Host Name: SCG115HKC
ALS_GM2 Transaction log :

System ID: GM-2
Print Date: October 1, 2021 11:01:19 PM

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:53:29 PM	Start	Execution	Signal to Noise EI - Injection Tower, Front MM, SQ: - Source: EI - Inert using Flament 2 - L >= 320	None
October 1, 2021 12:54:04 PM	Audit	Data	Signal to Noise EI - Injection Tower, Front MM, SQ: - Source: EI - Inert using Flament 2 - L >= 320	Data File Path : E:\GM2002021\NP_MRP001.D DATA\MS
October 1, 2021 12:54:22 PM	End	Execution	Signal to Noise EI - Injection Tower, Front MM, SQ: - Source: EI - Inert using Flament 2 - L >= 320	Run Count: 1
October 1, 2021 12:54:26 PM	Start	Execution	Injection Prediction - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	None
October 1, 2021 12:54:37 PM	Audit	Data	Injection Prediction - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data File Path : E:\GM2002021\NP_MRP003.D DATA\MS
October 1, 2021 12:54:37 PM	Audit	Data	Injection Prediction - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data File Path : E:\GM2002021\NP_MRP004.D DATA\MS
October 1, 2021 12:54:37 PM	Audit	Data	Injection Prediction - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data File Path : E:\GM2002021\NP_MRP005.D DATA\MS
October 1, 2021 12:54:37 PM	Audit	Data	Injection Prediction - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data File Path : E:\GM2002021\NP_MRP006.D DATA\MS

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Date: October 1, 2021 11:01:17 PM
System ID: GM-2

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User Name: supasak.nimsongtham
Host Name: SCG115HKC
ALS_GM2 Transaction log :

System ID: GM-2
Print Date: October 1, 2021 11:01:19 PM

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:54:37 PM	Audit	Data	Injection Prediction - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data File Path : E:\GM2002021\NP_MRP007.D DATA\MS
October 1, 2021 12:54:37 PM	Audit	Data	Injection Prediction - Injection Tower, Front MM, SQ: - Source: EI - Inert L (Area): <= 5.00% - L (Ret. Time): <= 1.00%	Data File Path : E:\GM2002021\NP_MRP008.D DATA\MS
October 1, 2021 12:54:37 PM	End	Execution	Injection Prediction - Injection Tower, Front MM, 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 Prediction - Injection Tower, Front MM, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	None
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Prediction - Injection Tower, Front MM, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data File Path : E:\GM2002021\NP_MRP009.D DATA\MS
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Prediction - Injection Tower, Front MM, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data File Path : E:\GM2002021\NP_MRP010.D DATA\MS
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Prediction - Injection Tower, Front MM, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data File Path : E:\GM2002021\NP_MRP011.D DATA\MS
October 1, 2021 12:55:06 PM	Audit	Data	Mass Ratio Prediction - Injection Tower, Front MM, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data File Path : E:\GM2002021\NP_MRP012.D DATA\MS

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Date: October 1, 2021 11:01:17 PM
System ID: GM-2

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Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 1, 2021 12:55:05 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, SD - Source: EI - Inet - L (RSD); <= 5.00%	Data Res Plan : E:\GMS000021WP_JMR007.D\DATA.MS
October 1, 2021 12:55:08 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front MM, SD - Source: EI - Inet - L (RSD); <= 5.00%	Data Res Plan : E:\GMS000021WP_JMR008.D\DATA.MS
October 1, 2021 12:55:10 PM	End	Execution	Mass Ratio Precision - Injection Tower, Front MM, SD - Source: EI - Inet - 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 1:02:11 PM	Audit	Reporting	Session	Report Generated : Certificate



PENTA

RYG EN0003

PENTA CALIBRATION CO., LTD.

66/124 The Connect 33 Village Kanchanaphisek Road
Doknai Prawet Bangkok 10250
Tel: +66 (0) 2069-5773
www.pentacat.com



Certificate of Calibration

Represent to Certificate of Calibration ,PTC/07/22099

Certificate No.: PTC/07/22099 Page: 1 of 2

Equipment: Digital Balance

Manufacturer: Sartorius Serial No: 31709552

Model: MSU224S-100-DU ID No: RYG-EN0003

Type of Balance: Single interval

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

Ravong 21140, Thailand

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

Calibration Place: AIS Laboratory Group (Thailand) Co., Ltd.

616/10 Moo 5 T.Maenamkoo, A.Pluakdaeng.

Ravong 21140, Thailand

The Method used:

In house method, PTC-WI-07, base on Euramet co. 13

Traceability: This certificate is traceable to the SI Units through Thai Calibration Service Co., Ltd.

NSC-ONSC Accreditation No.: Calibration 0189

Date Received: March 23, 2022

March 23, 2022

Calibration Date: March 23, 2022

March 23, 2022

Issued Date: March 25, 2022

March 25, 2022

Calibration By: _____
Mr. Rungroie Metakul


$$Q(\lambda) = \sum_{i=1}^n \lambda_i \log \lambda_i + \sum_{i=1}^n \lambda_i \log \lambda_i + \sum_{i=1}^n \lambda_i \log \lambda_i$$

(Mr. Kriangsak Kalasri)

Approved By :

This Committee has issued the units of measurement according to the International System of Units (SI). It provides frequently of measurement of national standard or other recognised national standard laboratories.

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

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



PENTA CALIBRATION

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

Represent to Certificate of Calibration : PTC07/22099

Certificate No.: PTC07/22099

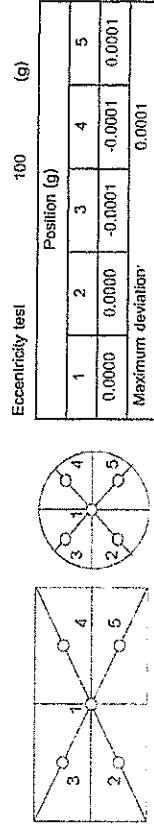
Page: 2 of 2

Measurement Results:

Without Adjustment :

Function Calibration: Non Adjustment

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



Repeatability Test : Weight to be $1/2 \leq L_1 \leq$ Maximum capacity

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

Nominal test value (g)	Standard Deviation
200	0.00007

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

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

Note: Weight of adjust (g)

The End of Certificate



ANALYZER CALIBRATION DATA

Client : Siam Synthetic Latex Co., Ltd. Location : Boilee
Date : 28 Oct 22 Test Operator : Sathaporn T.

O₂ ANALYZER : TELEDYNE API 200EH Serial No. : 735
Model : 25

	Cylinder Value (%)	Initial Analyzers Calibration Response (%)	Final Analyzers Calibration Response (%)	Difference (Percent of Span)
Zero Gas	0.00	0.00	0.18	0.72
Low-Level Gas	8.04	8.03	8.15	0.24
Span Gas	16.00	16.00	16.22	0.88

NO_x ANALYZER : TELEDYNE API 200EH Serial No. : 735
Model : 100

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.00	0.08	0.08
Low-Level Gas	54.95	54.93	54.90	0.03
Span Gas	79.42	79.42	79.35	0.07

CO ANALYZER : TELEDYNE API 300EM Serial No. : 425
Model : 100

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.00	0.04	0.04
Low-Level Gas	54.84	54.82	54.80	0.02
Span Gas	80.16	80.16	80.10	0.06

Calibrated by

Sathaporn Th.

(Mr. Sathaporn Thakawee)
Environmental Field Scientist (3)



Lot No. 2227187-1

SYSTEM CALIBRATION BIAS AND DRIFT DATA

Client : Siam Synthetic Latex Co., Ltd. Location : Boiler
Date : 28 Oct 22 Test Operator : Sathaporn T.O₂ ANALYZER : 18.00 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	0.00	0.16	0.64	0.21	0.84	0.20
Upscale Gas	16.00	15.14	0.56	16.22	0.88	0.32

NO_x ANALYZER : 79.42 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	0.00	0.04	0.04	0.08	0.08	0.04
Upscale Gas	79.42	79.38	0.04	79.35	0.07	0.03

CO ANALYZER : 80.16 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	0.00	0.03	0.03	0.04	0.04	0.01
Upscale Gas	80.16	80.14	0.02	80.10	0.06	0.04

Calibrated by

Sathaporn Th.

(Mr.Sathaporn Thakaeew)

Environmental Field Scientist (3)

FORM NO.: F 06-062 REVISION NO.: 2 ISSUE DATE: 306/19
ALS Laboratory Group

EMISSION TEST RESULT

Client : Siam Synthetic Latex Co., Ltd. Run # : 1
Date : 28 Oct 22 Location : Boiler
Start Time : 11:10 Test Operator : Sathaporn T.
Finish Time : 11:30
Serial No. : 735
Model : NO_x/O₂ Analyzer Model
TELEDYNE API 205EH
CO/CO₂ Analyzer Model
TELEDYNE API 300EM

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
11:10	8.33	7.86	67.42	-	1.10	
11:11	8.20	7.92	67.43	-	1.08	
11:12	8.26	7.85	67.50	-	1.05	
11:13	8.21	7.88	67.53	-	1.01	
11:14	8.36	7.82	67.22	-	1.03	
11:15	8.34	7.82	66.97	-	0.98	
11:16	8.18	7.92	67.30	-	0.99	
11:17	8.28	7.88	67.90	-	1.00	
11:18	8.29	7.90	67.70	-	0.99	
11:19	8.25	7.87	67.75	-	1.01	
11:20	8.29	7.93	67.75	-	0.95	
11:21	8.19	7.89	67.91	-	0.95	
11:22	8.31	7.81	67.79	-	0.89	
11:23	8.24	7.90	67.80	-	0.91	
11:24	8.31	7.83	67.78	-	0.85	
11:25	8.25	7.93	67.88	-	0.87	
11:26	8.30	7.85	67.86	-	0.95	
11:27	8.30	7.86	67.99	-	0.93	
11:28	8.13	8.00	67.74	-	0.80	
11:29	8.33	7.71	67.99	-	0.85	
11:30	8.38	7.88	67.61	-	0.85	
Average	8.27	7.88	67.64	-	0.95	

Sathaporn Th.

(Mr.Sathaporn Thakaeew)

Environmental Field Scientist (3)

FORM NO.: F 06-062 REVISION NO.: 1 ISSUE DATE: 306/19

ALS Laboratory Group



EMISSION TEST RESULT

Client	Slam Synthetics Lulux Co., Ltd.	Run #	2
Date	28 Oct 22	Location	Boiler
Start Time	11:31	Test Operator	Sathaporn Th.
NO _x /O ₂ Analyzer Model	TELEDYNE API 200EH	Finish Time	11:51
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
11:31	8.25	7.91	67.44	-	1.60	
11:32	8.15	8.00	68.34	-	1.61	
11:33	8.12	7.97	68.96	-	1.59	
11:34	8.28	7.78	68.99	-	1.60	
11:35	8.41	7.90	67.97	-	1.55	
11:36	8.27	7.87	67.25	-	1.53	
11:37	8.19	7.92	67.39	-	1.57	
11:38	8.24	7.86	68.51	-	1.51	
11:39	8.34	7.86	68.06	-	1.50	
11:40	8.27	7.98	67.73	-	1.52	
11:41	8.15	7.94	68.25	-	1.45	
11:42	8.29	7.86	68.69	-	1.50	
11:43	8.34	7.80	68.17	-	1.51	
11:44	8.19	7.97	67.69	-	1.42	
11:45	8.26	7.83	68.00	-	1.44	
11:46	8.32	7.81	67.82	-	1.44	
11:47	8.23	7.83	67.31	-	1.43	
11:48	8.31	7.85	67.47	-	1.40	
11:49	8.27	7.83	67.58	-	1.44	
11:50	8.36	7.75	67.14	-	1.41	
11:51	8.23	7.90	67.06	-	1.34	
Average	8.26	7.88	67.82	-	1.48	

Sathaporn Th.

(Mr. Sathaporn Thaksew)

Environmental Field Scientist (3)



EMISSION TEST RESULT

Client	Slam Synthetics Lulux Co., Ltd.	Run #	3
Date	28 Oct 22	Location	Boiler
Start Time	11:52	Test Operator	Sathaporn Th.
NO _x /O ₂ Analyzer Model	TELEDYNE API 200EH	Finish Time	12:12
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
11:52	8.22	7.83	67.43	-	1.36	
11:53	8.33	7.74	67.44	-	1.32	
11:54	8.30	7.88	66.87	-	1.36	
11:55	8.29	7.76	66.89	-	1.32	
11:56	8.29	7.78	66.71	-	1.34	
11:57	8.31	7.88	66.87	-	1.32	
11:58	8.30	7.80	66.75	-	1.28	
11:59	8.25	7.87	67.14	-	1.27	
12:00	8.30	7.75	67.33	-	1.32	
12:01	8.22	7.89	67.33	-	1.26	
12:02	8.25	7.92	67.41	-	1.25	
12:03	8.30	7.89	67.70	-	1.25	
12:04	8.27	7.83	67.76	-	1.22	
12:05	8.30	7.87	67.42	-	1.27	
12:06	8.25	7.87	67.26	-	1.27	
12:07	8.31	7.85	67.39	-	1.29	
12:08	8.24	7.84	67.55	-	1.26	
12:09	8.23	7.84	68.00	-	1.18	
12:10	8.33	7.86	67.80	-	1.13	
12:11	8.17	7.98	67.76	-	1.18	
12:12	8.31	7.84	67.97	-	1.21	
Average	8.27	7.85	67.35	-	1.27	

Sathaporn Th.

(Mr. Sathaporn Thaksew)

Environmental Field Scientist (3)



ANALYZER CALIBRATION DATA

Client : Siam Synthetic Latex Co., Ltd. Location : Boiler
Date : 28 Oct 22 Test Operator : Sathaporn T.

Lot No. 2227167-1

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	0.00	0.18	0.72
Low-Level Gas	8.04	8.03	8.15	0.24
Span Gas	16.00	16.00	16.22	0.88

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	0.00	0.08	0.08
Low-Level Gas	54.96	54.93	54.90	0.03
Span Gas	79.42	79.42	79.35	0.07

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	0.00	0.04	0.04
Low-Level Gas	54.84	54.82	54.80	0.02
Span Gas	80.16	80.16	80.10	0.06

Calibrated by

Sathaporn Th.

(Mr. Sathaporn Thaksaew)

Environmental Field Scientist (3)

FORM NO.: F 05-104 REVISION NO.: - ISSUE DATE: 306/19

ALS Laboratory Group



SYSTEM CALIBRATION BIAS AND DRIFT DATA

Client : Siam Synthetic Latex Co., Ltd. Location : Boiler
Date : 28 Oct 22 Test Operator : Sathaporn T.

Lot No. 2227167-1

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	0.00	0.16	0.64	0.21	0.84	0.20
Upscale Gas	16.00	16.14	0.56	16.22	0.88	0.32

NO_x ANALYZER

Cylinder Conc. (ppm) : 79.42 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	0.00	0.04	0.04	0.08	0.08	0.04
Upscale Gas	79.42	79.38	0.04	79.35	0.07	0.03

CO ANALYZER

Cylinder Conc. (ppm) : 80.16 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	0.00	0.03	0.03	0.04	0.04	0.01
Upscale Gas	80.16	80.14	0.02	80.10	0.06	0.04

Calibrated by

Sathaporn Th.

(Mr. Sathaporn Thaksaew)

Environmental Field Scientist (3)

FORM NO.: F 05-104 REVISION NO.: - ISSUE DATE: 306/19

ALS Laboratory Group

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04N199E15A0440
Cylinder Number: E80140237
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12020
Gas Code: CO,NO,NOX,SO₂,BALN
Reference Number: 160-401977167-1
Cylinder Volume: 144.4 CF
Cylinder Pressure: 2015 PSIG
Valve Outlet: 660
Certification Date: Dec 23, 2020
Expiration Date: Dec 23, 2028

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2013)" document EPA 600R-12/231, using the assay procedures listed. Analytical Methodology does not include any significant impurities which affect the use of this calibration mixture. All concentrations are on a uncertainty as stated below with a confidence level of 95%. This mixture is not for use in the calibration of instruments 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	Assay Dates
NOX	80.00 PPM	79.42 PPM	G1	12/14/2020, 12/23/2020
CARBON MONOXIDE	80.00 PPM	80.16 PPM	G1	12/14/2020, 12/23/2020
NITRIC OXIDE	80.00 PPM	79.41 PPM	G1	12/14/2020, 12/23/2020
SULFUR DIOXIDE	80.00 PPM	80.22 PPM	G1	12/14/2020, 12/23/2020
NITROGEN	Balance			
Total Relative Uncertainty				
				+/- 1.1% NIST Traceable
				+/- 0.5% NIST Traceable
				+/- 1.1% NIST Traceable
				+/- 1.1% NIST Traceable
				+/- 1.1% NIST Traceable
CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	11010130	KAL004535	97.31 PPM CARBON MONOXIDE/NITROGEN	Oct 04, 2022
PRM	12386	D85025	9.91 PPM ARNITROGEN DIOXIDE	Feb 20, 2020
NTRM	17060225	E80079109	100.3 PPM NITRIC OXIDE/NITROGEN	Jul 23, 2023
GMIS	124205889	CC323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN	Aug 15, 2021
NTRM	16010203	KAL003097	97.69 PPM SULFUR DIOXIDE/NITROGEN	Dec 23, 2021
The SRM, PRM or RGM noted above is only in reference to the GMS used in the assay and not part of the analysis.				
ANALYTICAL EQUIPMENT				
Instrument/Make/Model	Last Multipoint Calibration			
Nicolet IS50 FTIR AUP2010245 CO	FTIR	Dec 18, 2020		
Nicolet IS50 FTIR AUP2010245 NO	FTIR	Dec 16, 2020		
Nicolet IS50 FTIR AUP2010245 NO2	FTIR	Dec 02, 2020		
Nicolet IS50 FTIR AUP2010245 SO2	FTIR	Dec 02, 2020		

Triad Data Available Upon Request

NOTES:
Gross Weight: 27.8 Kg
Net Weight: 4.7 Kg



Michael A. Markley
Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04N199E15A021C
Cylinder Number: CT709609
Laboratory: 124 - Plumsteadville - PA
PGVP Number: A12021
Gas Code: CO,NO,NOX,SO₂,BALN
Reference Number: 160-402020199-1
Cylinder Volume: 144.4 CF
Cylinder Pressure: 2015 PSIG
Valve Outlet: 660
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 2013)" document EPA 600R-12/231, using the assay procedures listed. Analytical Methodology does not include any significant impurities which affect the use of this calibration mixture. All concentrations are on a uncertainty as stated below with a confidence level of 95%. This mixture is not for use in the calibration of instruments 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	Assay Dates
NOX	55.00 PPM	54.96 PPM	G1	02/15/2021, 02/22/2021
CARBON MONOXIDE	55.00 PPM	54.84 PPM	G1	02/15/2021, 02/22/2021
NITRIC OXIDE	55.00 PPM	54.69 PPM	G1	02/15/2021, 02/22/2021
SULFUR DIOXIDE	55.00 PPM	55.55 PPM	G1	02/15/2021, 02/22/2021
NITROGEN	Balance			
Total Relative Uncertainty				
				+/- 1.4% NIST Traceable
				+/- 0.7% NIST Traceable
				+/- 1.1% NIST Traceable
				+/- 1.0% NIST Traceable
				+/- 1.0% NIST Traceable
CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	14060753	CC434455	49.88 PPM CARBON MONOXIDE/NITROGEN	Feb 13, 2025
PRM	12386	D85025	9.91 PPM ARNITROGEN DIOXIDE	Feb 20, 2020
NTRM	200611-04	CC707968	49.82 PPM NITRIC OXIDE/NITROGEN	Feb 02, 2025
GMIS	124205889	CC323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN	Aug 15, 2021
NTRM	0141709	KAL003190	49.67 PPM SULFUR DIOXIDE/NITROGEN	Jun 20, 2022
The SRM, PRM or RGM noted above is only in reference to the GMS used in the assay and not part of the analysis.				
ANALYTICAL EQUIPMENT				
Instrument/Make/Model	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. Markley
Approved for Release

CERTIFICATE OF ANALYSIS

Customer Detail:		Production Order Number: 90145553	
ALS Laboratory Group (Thailand)		Material Number: 478100-J-44	
Cylinder Description:		Certification Date: 07-Dec-2017	
STEEL 47 L		Expiry Date: 07-Dec-2025	
<p>The measurement of this cylinder material is traceable to SI through NIST. The ASME of this standard has been approved and certified by the International Union of Pure and Applied Chemistry (IUPAC). The reported results have been certified by a standard and are in accordance with the ISO 9001:2015 standard.</p>			
Certificate Number:	Subject:		
398217	Anisotropy		
Cylinder Number:	Approve:		
14465	SUS 316 L (304/304L)		
Nominal Cylinder Content:	To Re-Order Please Quote:		
6.520 MPa	478100-J-44		
Nominal Pressure:	Comment:		
145.0 Bar	<ul style="list-style-type: none"> It is recommended that this product be not used below 50% of rated pressure or should not be used when the pressure is below 150mmHg. Other impurities that affect the analytical condition of this mixture shall be reported if it is more than 1% of minimum minor component. Keep and use in well-ventilated and secure area. 		
Valve Outlet:			
CGA 590 BRASS			

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

15 หมู่ 14 ถนนสุขุมวิท กม. 6.5 แขวง
คลองเตย เขต คลองเตย กรุงเทพฯ 10110
โทรศัพท์: 105 หมู่ 5 แขวง คลองเตย เขต คลองเตย กรุงเทพฯ 10110
โทรสาร: (66) 38 570-479-93 โทร (66) 38 570-323

Linde (Thailand) Public Company Limited

15 หมู่ 14 ถนนสุขุมวิท กม. 6.5 แขวง
คลองเตย เขต คลองเตย กรุงเทพฯ 10110
โทรศัพท์: 105 หมู่ 5 แขวง คลองเตย เขต คลองเตย กรุงเทพฯ 10110
โทรสาร: (66) 38 570-479-93 โทร (66) 38 570-323

Page 1 of 2

CERTIFICATE OF ANALYSIS

Analytical Result				
Component	Request Concentration	Certified Concentration	Certified Uncertainty	Method
Oxygen	8.00 %	8.04 %	± 1% relative	(3) I-PB-354
In Nitrogen				04-Dec-2017
Reference Standard used in Assay				
Reference Standard	Cylinder No.	Concentration	Expiry Date	
Oxygen	113553SG	9.9764 0.02 %	26-Mar-2018	
In Nitrogen				
Analytical Instruments used in Assay				
Instrument/Model/Code	Analytical Principle	Last Multipoint Calibration		
Servomex 4100 O2 Analyzer	Paramagnetic	04-Dec-2017		
<p>Method of Analysis</p> <ol style="list-style-type: none"> 1. Gas Chromatograph 2. Paramagnetic Oxygen Analyzer 3. Electrochemical Oxygen Analyzer 4. Electrochemical Nitrogen Analyzer 5. Total Hydrocarbon Analyzer 6. Other specified 				
Cylinder Number 14465	Production Order Number 90145553	Certification Date: 07-Dec-2017		
		Expiration Date: 07-Dec-2025		

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)


15 หมู่ 14 ถนนสุขุมวิท กม. 6.5 แขวง
คลองเตย เขต คลองเตย กรุงเทพฯ 10110
โทรศัพท์: 105 หมู่ 5 แขวง คลองเตย เขต คลองเตย กรุงเทพฯ 10110
โทรสาร: (66) 38 570-479-93 โทร (66) 38 570-323

Linde (Thailand) Public Company Limited

15 หมู่ 14 ถนนสุขุมวิท กม. 6.5 แขวง
คลองเตย เขต คลองเตย กรุงเทพฯ 10110
โทรศัพท์: 105 หมู่ 5 แขวง คลองเตย เขต คลองเตย กรุงเทพฯ 10110
โทรสาร: (66) 38 570-479-93 โทร (66) 38 570-323

Page 2 of 2

CERTIFICATE OF ANALYSIS

Customer Detail: ALS Laboratory Group (Thailand)		Production Order Number: 90145554 Material Number: 557200-J-44 Certification Date: 07-Dec-2017 Expiry Date: 07-Dec-2025	
Cylinder Description: STEEL 47L		<p>The measurement of this reference material is traceable to SI through the measurement of this standard has been performed in accordance with the ISO 9001:2015 standard. The analysis was performed using the following method: Gas chromatography-mass spectrometry (GC-MS). The reported uncertainty is based on a standard uncertainty of approximately 1%.</p>	
Certificate Number: 397717	Analyst: Anusara T. ANUSARA THONGNUNRI		
Cylinder Number: 94892	Approver:  SUKANYA KAMUTHARAI		
Nominal Cylinder Content: 6,560 M ³			
Nominal Pressure: 145.0 Bar			
Valve Outlet: CGA 590 BRASS	To Re-Order Please Quote: 557200-J-44		
Comment:	<ul style="list-style-type: none"> It is recommended that this product be not used below 3% of actual contents or should not be used when the gas pressure is below 150psi. 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. 		

CERTIFICATE OF ANALYSIS

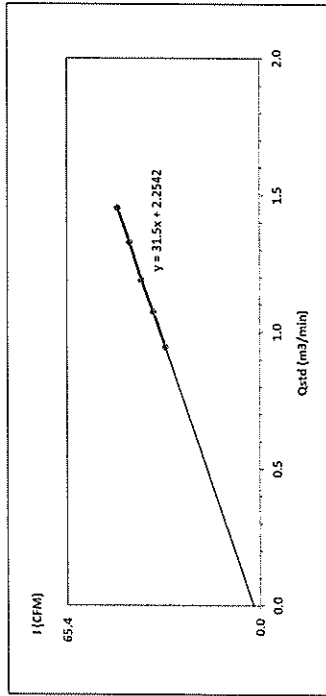
Analytical Result				
Component	Request Concentration	Certified Concentration	Certified Uncertainty	Method
Oxygen	16.0 %	16.0 %	± 1% relative	(2) I-PB-354
In Nitrogen				04-Dec-2017
Reference Standard used in Assay				
Reference Standard	Cylinder No.	Concentration	Expired Date	
Oxygen	113553SG	9.976± 0.02 %	26-Mar-2018	
In Nitrogen				
Analytical Instruments used in Assay				
Instrument/Make/Model	Analytical Principle	Last Multimount Calibration		
Servomex 4100 O2 Analyzer	Paramagnetic	04-Dec-2017		
Method of Analysis 1. Gas Chromatography 2. Paramagnetic Oxygen Analyzer 3. Electrochemical Oxygen Analyzer 4. Electrochemical Moisture Analyzer 5. Total Hydrocarbon Analyzer 6. Other specified				
Cylinder Number: 94892		Certification Date: 07-Dec-2017		
Production Order Number: 90145554		Expiration Date: 07-Dec-2025		



High Volume Air Sampler Calibration Worksheet

Project Site :	Siam Syrene Monomer Co., Ltd. โรงงานผลิตพลาสติก (ท่าเรือท่าเรือ)	Barometric Pressure (mm Hg) :	756
Calibrate Location :		Temperature (°C) :	32
Calibrate Date :	25-Oct-22	High Volume ID :	RYG-FS0187
Calibration Sheet No.:	C-251022-RYG-FS0187	High Volume Model :	TE-5009X
Calibrator ID:	RYG-FS0205	High Volume S/N :	4795
Calibrator Model:	TE-5028A	Calibrator Slope:	1.50765
Calibrator S/N:	1166	Calibrator Intercept:	-0.02043

Test No.	Delta H ₂ O (inch)	Q _{ad} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.0	0.9452	32	Slope: 31.4999
2	2.6	1.0748	36	Intercept: 2.2542
3	3.2	1.1902	40	Correlation Coefficient: 0.9997
4	4.0	1.3282	44	
5	4.8	1.4530	48	



Calibrated by: Silpa Wits

Approved by: [Signature]

(Mr. Silpa Witsuwannarat)
Field Scientist(1)

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

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



PENTA
CALIBRATION

RYG_EN0001

PENTA CALIBRATION CO., LTD.
66/124 The Connect 33 Village Kanchanaphisek Road
Dokmai Prawet Bangkok 10250
Tel: +66 (0) 2069-0773
www.pentalcal.com

Certificate of Calibration

Represent to Certificate of Calibration, PTC07/22102

Certificate No.: PTC07/22102 Page: 1 of 2
Equipment: Digital Balance Condition: Normal
Manufacturer: Sartorius Serial No: 25409664
Model: LA1305-F ID No: RYG_EN0001
Type of Balance: Single interval

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

Environment Condition: Temperature 23.9 °C ± 0.3 °C
Humidity 58.1 %RH ± 4.4 %RH
Air density 1.17 kg/m³

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

The Method used: In house method, PTC-WI-07, base on Euramet cg. 18
Traceability: This certificate is traceable to the SI Units through Thai Calibration Service Co., Ltd.
NSC-ONSC Accreditation No.: Calibration 0189

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

Reviewed by: [Signature]
(Mr. Kriangsak Kalasri)

Approved By: [Signature]
(Mr. Keattisak Kerdto)
Laboratory Manager

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other 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). This effect that the results relate only to the items calibrated.

This calibration certificate shall not be reproduced except in full only, without written approval from Penta Calibration Co., Ltd.



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PENTA CALIBRATION CO., LTD.
86/124 The Connect 33 Village Kanchanaphisek Road
Dokmat Pravek Bangkok 10250
Tel: +66 (0) 2068-9773
www.pentalcal.com

Represent to Certificate of Calibration, PTC/07/22/102

Certificate No.: PTC/07/22/102

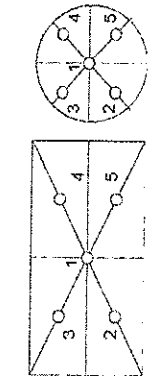
Page: 2 of 2

Measurement Results:

Without Adjustment :

Function Calibration: Non Adjustment

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



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

Repeatability Test : Weight to be $1/2 \leq L_1 \leq$ Maximum capacity

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

Nominal test value (g)	Standard Deviation
100	0.00009

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

Nominal Value (g)	Conventional Mass (g)	Indication (g)	Correction of Balance (g)	Uncertainty (g)	k
0	0.00000	0.0000	0.0000	0.00026	2.87
0.01	0.01000	0.0100	0.0000	0.00026	2.65
0.05	0.05000	0.0500	0.0000	0.00026	2.65
0.1	0.10000	0.1000	0.0000	0.00026	2.65
0.5	0.50000	0.4999	0.0001	0.00026	2.65
1	1.00000	0.9999	0.0001	0.00026	2.65
2	2.00000	1.9999	0.0001	0.00026	2.65
5	5.00001	5.0000	0.0000	0.00026	2.65
10	10.00000	10.0001	-0.0001	0.00026	2.65
20	20.00003	20.0001	-0.0001	0.00026	2.62
100	100.00004	100.0001	-0.0001	0.00027	2.18

Note: Weight of adjust

(g)

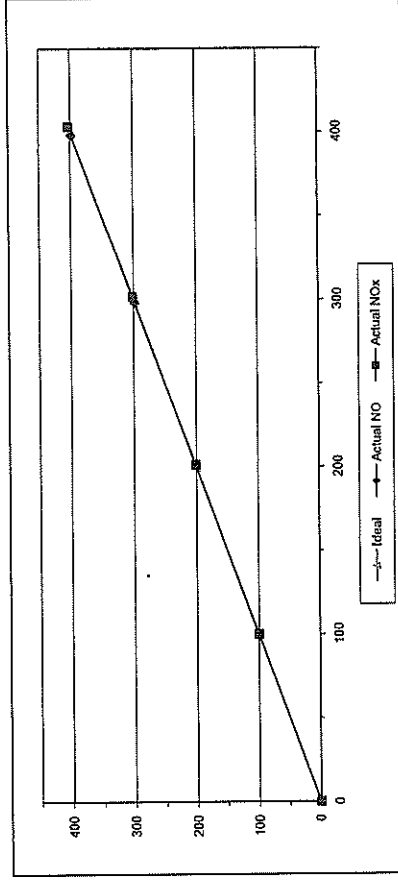
The End of Certificate



MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-22	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	T95HWM41	Equipment ID	RYG_FS0461
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947	Cylinder No.	GN0027222
Std. Gas Concentration (PPM)	55.88	Certified By	Airgas Inc.
Cylinder Pressure (psi)	1800	Expired Date	9-Feb-30
Certified Date	9-Feb-22		

CALIBRATION RESULTS						
Point	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	100.10	0.10 0.10
2	200.00	201.00	1.00	0.50	201.40	1.40 0.70
3	300.00	298.30	-1.70	-0.57	302.10	2.10 0.70
4	400.00	398.40	-1.60	-0.40	403.50	3.50 0.88
AVERAGE (%)				-0.33		0.50



Calibrated By

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

Approved By

(Mr. Sarayuth Jitrantont)
Assistant General Manager



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

Page 1 of 2 Pages

CERTIFICATE OF CALIBRATION

Certificate No: WS-01062021

Page 1 of 2 Pages

Measurement Item

Manufacturer

Model/Type

Serial Number

Id No

Customer

Test Conditions

Test Conditions

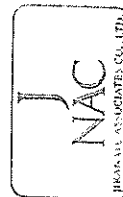
Calibration Procedure

Traceability

Measurement Date
Issued Date

Calibrated by

☒ Mr. Sorach Ruchakul
☐ Mrs. Oranai Wathavithay



Approved Signature:

Mr. Patsara Ratanaporn
Technical Support
etc Calibration Manager

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

Cap anemometer with data logger

Data logger: Kasya, etc.

Cap anemometer: Novalys

Data logger: WS-24DL

Cap anemometer: WS-02F

Data logger: A44B1

Cap anemometer:

Lab logger: BGR FSD141

Cap anemometer:

ALS laboratory group (thailand) co., ltd.

104 Phrahitankon 4D, Phrahitankon Rd, Kanchanaburi, Bangkok 10200
Thailand

Wind tunnel cross test section area

Anemometer holder area

Transfer of measuring type

Percentage ratio of test object

Air temperature

Air pressure

Relative air humidity

Calibration was carried out under the

ISO 61400-12-1:2011:2005-Power Performance Measurements of Electric Producing Wind

Turbines

MEASNET Anemometer Calibration Procedure Version 2: 2009

This calibration documents the traceable to national standards, when made the unit of

measurements according to the international system of units (SI) through NIST via Institute of

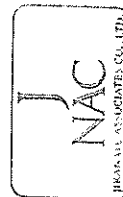
Micrology, Thailand (NIST)

: Jun 07, 2021

: Jun 07, 2021

Calibrated by

☒ Mr. Sorach Ruchakul
☐ Mrs. Oranai Wathavithay



Approved Signature:

Mr. Patsara Ratanaporn
Technical Support
etc Calibration Manager

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Wathapra, Bangkokyai,Bangkok 10600 Thailand.
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Page 2 of 2 Pages

Continuation of Certificate of Calibration Number

Certificate No: WS-01062021

Page 2 of 2 Pages

Result of calibration: ☒ Without adjustment ☐ With adjustment

Calibration in the range of 1 - 16 m/s at a calibration interval of 1 m/s.

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

Van Reading m/s	V _{cor} Reading m/s	Correct (m/s)	Uncertainty (m/s)
2.065	2.0	-0.1	2.6
4.124	4.0	-0.1	1.2
6.99	6.0	0.0	1.01
8.00	8.0	0.0	0.74
9.99	10.1	0.1	0.60
11.06	12.2	0.2	0.67
14.02	14.4	0.4	0.45
16.03	16.6	0.6	0.36
16.01	16.3	0.3	2.8
12.99	13.3	0.3	0.41
10.99	11.2	0.2	0.53
9.01	9.3	0.3	1.2
7.36	7.0	0.0	0.77
5.123	5.0	-0.1	0.68
3.048	3.0	0.0	1.8
1.089	1.0	-0.1	5.3

UNI: Uni User Calibration

The reported expanded uncertainty is based on standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%.

Appendix 1: Instrumentations

NO	Sensor	Manufacturer	Model/Type	Calibration Date	Certificate Report Number	Range
1	Flow rate	TECOT NC	03327145	July 16, 2020	MY-0036-20	5 - 30 m³/s
2	Pressure Differential Pressure Meter	Zojab	DPH2500	July 16, 2020	MY-0036-20	5 - 30 m/s
3	Air velocity transducer (flat vane)	ISI INC.	8455-12	July 20, 2020	MY-0036-20	0 - 9 m/s
4	Temperature	Zojab	DSH-1UP	March 30, 2021	CL-0271-21	-30 - 70 °C
5	Relative humidity	Zojab	DSH-1UP	March 30, 2021	PH-0303-2021	0 - 100 %RH
6	Atmospheric pressure	Zojab	DSH-1UP	March 30, 2021	PH-0303-2021	500 - 1100 hPa
7	Wind tunnel	CSCEM	MP3350			0 - 50 m/s

End of certificate of calibration





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Wathapra, Bangkokkai, Bangkok 10600 Thailand.
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CERTIFICATE OF CALIBRATION

Certificate No: WD-01062021
Page 1 of 2 pages

Measurement Item : Wind direction sensor with data logger.

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

Model/Type : Data logger: WS-26DL.
Wind direction sensor: WS-02F.

Serial Number : Data logger: A4481.
Wind direction sensor: -

ID No : Data logger: BKK_F50141.
Cue anemometer: -

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

Environmental Condition:

The measurement was carried out in an ambient temperature of $(23 \pm 3)^\circ\text{C}$, and relative humidity, of $(40 \pm 10)\%$.

Measurement Method:

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

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

Traceability:

The measurement results are traceable to the International system of units (SI) through Certificate No: QC623-07-0045.
Certificate No: WWS63/0044.

Measurement Date : Jun 07, 2021.
Issued Date : Jun 07, 2021.

Performed by

☒ Mr. Soravit Thachand
☐ Miss Oranai Wivakvillaya

Approved Signatory:

Mr. Puriya Booncharoen,
Technical Support
and Calibration Manager



[Signature]

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Continuation of Certificate of Calibration Number

Certificate No: WD-01062021
Pages: 2 of 2 pages

Result of calibration: ☐ Without adjustment ☒ With adjustment.

Calibration in the range of $0 - 360^\circ$ at a calibration interval of 45° .

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

NO	Turning Direction	Nominal Angle ($^\circ$)	Standard Heading ($^\circ$)	UUC* Heading ($^\circ$)	Error ($^\circ$)	Uncertainty \pm ($^\circ$)
1	Clockwise	0/360	0	0	0	3.0
2		45	45	42	-3	3.0
3		90	90	90	0	3.0
4		135	135	136	1	3.0
5		180	180	182	2	3.0
6		225	225	227	2	3.0
7		270	270	273	3	3.0
8		315	315	314	-1	3.0
9	Counter Clockwise	0/360	0	0	0	3.0
10		45	45	42	-3	3.0
11		90	90	90	0	3.0
12		135	135	136	1	3.0
13		180	180	182	2	3.0
14		225	225	227	2	3.0
15		270	270	273	3	3.0
16		315	315	314	-1	3.0

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

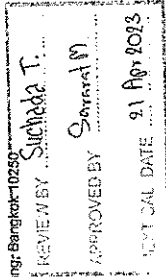
End of Certificate of Calibration



Certificate of System Qualification

GC-OQ

System ID: GC-6
Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.
Organization Location: 104 Phallanakan 40, Phallanakan Rd., Suan Luang, Bangkok-10250
Date: October 21, 2021 10:05:40 AM
EQP Name: AgilentRecommended
EQP Revision: GC.02.50
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 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

Setpoint Status: Pass

Inlet Pressure: 25.0 psi Actual 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 /5 minutes
Agilent Recommended: >= -2.0 and <= 0.5

Overall Inlet Pressure Decay Test Status
Pass

Inlet Pressure Accuracy

Name: 7890 Back SSL

Setpoint Status: Pass
Inlet Pressure: 25.0 psi Actual 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

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

Setpoint Status: Pass
Zone: Oven

Temperature: 230.0 Setpoint/Actual 231.5 °C

Accuracy: 1.5 °C

Agilent Recommended: >= -1.0 °C (-5.0 °C)
<= 1.0 °C (5.0 °C)

Setpoint Status: Pass
Zone: Oven

Temperature: 100.0 Setpoint/Actual 100.5 °C

Accuracy: 0.5 °C

Agilent Recommended: >= -1.0 °C (-3.7 °C)
<= 1.0 °C (3.7 °C)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: 7890

Setpoint Status: Pass

Temperature: 100.0 Setpoint/Average 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
Name: Injection Tower 7693A

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

Setpoint Status: Completed

Injection Volume on Column: 1.0 µL

Overall Scouting Run Status
Completed

Noise and Drift

Tested Combination1 Front SSL / Front FID
Name: 7890

Setpoint Status: Pass

Base Signal: 12.7 pA

Agilent Recommended: <= 0.10 pA
Status: Pass

ASTM Noise
pA 0.06
Drift
pVHr 0.10
<= 12.50

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 µL

Area RSD: 0.42 %

Agilent Recommended: <= 3.00 %

Retention Time RSD: 0.16 %

Overall Injection Precision Test Status
Pass

Signal to Noise

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

Tested Combination1 Front 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 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 Injection Tower
Name: 7890

Setpoint Status: Pass

Base Signal: 10.4 pA
ASTM Noise pA 0.05
Drift pA/Hr 0.00

Agilent Recommended: <= 0.10
Status: Pass

Overall Noise and Drift Test Status
Pass

Injection Precision

Tested Combination2 Back Injection Tower
Name: 7693A

Setpoint Status: Pass

Injection Volume on Column: 1.0 uL

Area RSD: 1.16 %

Agilent Recommended: <= 3.00 %

Overall Injection Precision Test Status
Pass

Signal to Noise

Tested Combination2 Back Injection Tower
Name: 7690

Setpoint Status: Pass

Signal to Noise: 805466

Agilent Recommended: >= 300000

Overall Signal to Noise Test Status
Pass

Instrument Details

Purpose

This section describes the as found system configuration.

Details

System	System ID	GC-6
Manufacturer	Manufacturer	Agilent Technologies
Name	Name	7690
Flow Data Input	Manual Data	Manual Data
Temperature Data Input	Manual Data or Other Data Logging	Manual Data or Other Data Logging
Tested Combination1	Injection Tower	Injection Tower
Injection Technique	Sampler 2	Sampler 2
Sampler Identifier	Front	Front
Inlet	Front	Front
Detector	No	No
LTM Included?	Injection Tower	Injection Tower
Tested Combination2	Sampler 3	Sampler 3
Injection Technique	Back	Back
Sampler Identifier	Back	Back
Inlet	No	No
Detector	Agilent Technologies	Agilent Technologies
LTM Included?	Tray	Tray
Sampler 1	7693A	7693A
Manufacturer	Model Number	G4514A
Type	Serial Number	CN15380030
Name	Firmware Revision	A.11.01
Model Number	Vial Heater	Not Installed
Serial Number		
Firmware Revision		
Vial Heater		

Sampler 2	Manufacturer	Agilent Technologies
Type	Injection Tower	Injection Tower
Name	7693A	7693A
Model Number	G4513A	G4513A
Serial Number	CN10340103	CN10340103
Firmware Revision	A.10.09	A.10.09
Usage	Sample Injection	Sample Injection
Location	Front	Front
Syringe Volume (µL)	10	10
Sampler 3	Manufacturer	Agilent Technologies
Type	Injection Tower	Injection Tower
Name	7693A	7693A
Model Number	G4513A	G4513A
Serial Number	CN16280128	CN16280128
Firmware Revision	A.10.09	A.10.09
Usage	Sample Injection	Sample Injection
Location	Back	Back
Syringe Volume (µL)	10	10
Mainframe 1	Manufacturer	Agilent Technologies
Manufacturer	7890	7890
Name	G3440A	G3440A
Model Number	CN11461066	CN11461066
Serial Number	Version 4.27	Version 4.27
Firmware Revision	GC-6	GC-6
Component ID/Asset No.	Standard	Standard
Oven Type		

Inlet 1		Agilent Technologies
Manufacturer		
Name	7890	
Type	SSL	
Location	Front	
Carrier Gas	Helium	
Control Type	Electronic Pressure Control (EPC)	
Purged Inlet	Yes	
Inlet 2		Agilent Technologies
Manufacturer		
Name	7890	
Type	SSL	
Location	Back	
Carrier Gas	Helium	
Control Type	Electronic Pressure Control (EPC)	
Purged Inlet	Yes	
Detector 1		Agilent Technologies
Manufacturer		
Name	7890	
Type	FID	
Adapter	Capillary	
Control Type	Electronic Pressure Control (EPC)	
Location	Front	
Makeup Gas	Nitrogen	
Detector 2		Agilent Technologies
Manufacturer		
Name	7890	
Type	FID	
Adapter	Capillary	
Control Type	Electronic Pressure Control (EPC)	
Location	Back	
Makeup Gas	Nitrogen	

Electronic Signature

Purpose

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Details

Full Name of Signer: Suriya Thongkaew
Logged On User Name: suriya.thongkaew@non.agilent.com
Signature Creation Date: October 21, 2021
Reason for Signature: Executed protocol and published this original version of document

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Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 12:16:50 AM	Start	Session Created	Session	None
October 20, 2021 12:16:50 PM	Start	Configuration	Session	None
October 20, 2021 12:16:50 PM	Start	Enrollment	Licensing	User is Nonpaying and does not require an unlock code
October 20, 2021 12:24:57 PM	Start	Enrollment	Session	EOP checks for primary technique (Gd) - File path: (Protocol)Pds-GdConfigurat and G.51G (G.51 exp). EOP File Name: (Gd.02.51 exp). EOP Name: (ApplmtRecommended)
October 20, 2021 12:25:02 PM	End	Configuration	Session	None
October 20, 2021 12:25:09 PM	Start	Qualification	Session	OO
October 20, 2021 12:25:09 PM	Start	Execution	System Inspection and Basic Safety and Operation - 7899 - Qualitative Test - No serpins associated	None
October 20, 2021 12:30:25 PM	End	Execution	System Inspection and Basic Safety and Operation - 7899 - Qualitative Test - No serpins associated	Run Count: 1
October 20, 2021 12:55:26 PM	Start	Execution	Initial Pressure Decay - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= 2.0 psi and <= 0.5 psi	None

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User Name: surya.jhaukawa
Username: ASBKW0705

System Id: GC-6
Print Date: October 21, 2021 10:06:16 AM

DQ GC ALS CNI1451065 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 1:02:16 PM	End	Execution	Initial 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 1:02:16 PM	Start	Execution	Initial 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	Initial 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	Initial 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	Initial 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	Initial 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	Initial 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	Awful	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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User Name: suriya.hongleew
Hostname: ASBKW7D15
System ID: GC-6
Print Date: October 21, 2021 10:05:46 AM

DQ GC ALS CN1461666 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: Outlier - 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: Outlier - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
October 20, 2021 1:23:28 PM	End	Execution	Detector Flow Accuracy - Front FID - Type: Outlier - 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 1:30:10 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: Outlier - 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: Outlier - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry

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User Name: suriya.hongleew
Hostname: ASBKW7D15
System ID: GC-6
Print Date: October 21, 2021 10:05:46 AM

DQ GC ALS CN1461666 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: Outlier - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count: 1
October 20, 2021 1:34:45 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 1:35:36 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 1:35:38 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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User Name: surya.thangiahaw
Hostname: ASBKNW7015
Print Date: October 21, 2021 10:05:46 AM
System ID: GC-6

OQ GC ALS CH11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 12:19:49 PM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % segment 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 2:43:08 PM	Audit	AcqClosed	Session	None
October 21, 2021 9:18:50 AM	Audit	AcqRestarted	Session	None
October 21, 2021 9:19:02 AM	Audit	SessionReheated	Session	None
October 21, 2021 9:19:09 AM	Start	Qualification	Session	OQ
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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User Name: surya.thangiahaw
Hostname: ASBKNW7015
Print Date: October 21, 2021 10:05:46 AM
System ID: GC-6

OQ GC ALS CH11461066 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	SessionReheated	Session	None
October 21, 2021 9:20:13 AM	Start	Qualification	Session	OQ
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 9:20:45 AM	Audit	Data	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	Data file Path : C:\ChemData\AQCPV20
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 file Path : C:\ChemData\AQCPV20
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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User Name: suriya.hongkiew
Hostname: ASBKW7015
System ID: GC-6
Print Date: October 21, 2021 10:05:40 AM

OO GC ALS CH1451066 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:\Chem321\DATA\AOOPV20 21\OOPV2021_F_2021-10-20 16-51-16\INUPREC_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:\Chem321\DATA\AOOPV20 21\OOPV2021_F_2021-10-20 16-51-16\INUPREC_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:\Chem321\DATA\AOOPV20 21\OOPV2021_F_2021-10-20 16-51-16\INUPREC_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:\Chem321\DATA\AOOPV20 21\OOPV2021_F_2021-10-20 16-51-16\INUPREC_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:\Chem321\DATA\AOOPV20 21\OOPV2021_F_2021-10-20 16-51-16\INUPREC_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:\Chem321\DATA\AOOPV20 21\OOPV2021_F_2021-10-20 16-51-16\INUPREC_F007.D\FID1A.ch

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User Name: suriya.hongkiew
Hostname: ASBKW7015
System ID: GC-6
Print Date: October 21, 2021 10:05:40 AM

OO GC ALS CH1451066 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:\Chem321\DATA\AOOPV20 21\OOPV2021_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:\Chem321\DATA\AOOPV20 21\OOPV2021_B_2021-10-20 17-13-46\SCOUT_R001.D\FID1A.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.thongkiew
Host Name: ASDKNV7015
System ID: GC-6
Print Date: October 21, 2021 10:05:46 AM

QQ GC ALS CH1461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:38:56 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00% pA/hour	Data files Path: C:\Chem321\DATA\AQCPV20 2100PV2021_9 2021-10-20 17-13-45\INUPREC_0001.D\FID28.ch
October 21, 2021 9:38:57 AM	End	Execution	Neat and Dilut - Back FID - Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00% pA/hour	Run Count: 1
October 21, 2021 9:38:57 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. 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 (Rel. Time) <= 1.00%	Data files Path: C:\Chem321\DATA\AQCPV20 2100PV2021_9 2021-10-20 17-13-45\INUPREC_0002.D\FID28.ch
October 21, 2021 9:38:57 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	Data files Path: C:\Chem321\DATA\AQCPV20 2100PV2021_9 2021-10-20 17-13-45\INUPREC_0003.D\FID28.ch
October 21, 2021 9:38:57 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	Data files Path: C:\Chem321\DATA\AQCPV20 2100PV2021_9 2021-10-20 17-13-45\INUPREC_0004.D\FID28.ch
October 21, 2021 9:38:57 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	Data files Path: C:\Chem321\DATA\AQCPV20 2100PV2021_9 2021-10-20 17-13-45\INUPREC_0005.D\FID28.ch

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User Name: suriya.thongkiew
Host Name: ASDKNV7015
System ID: GC-6
Print Date: October 21, 2021 10:05:46 AM

QQ GC ALS CH1461066 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 (Rel. Time) <= 1.00%	Data files Path: C:\Chem321\DATA\AQCPV20 2100PV2021_9 2021-10-20 17-13-45\INUPREC_0001.D\FID28.ch
October 21, 2021 9:38:57 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	Data files Path: C:\Chem321\DATA\AQCPV20 2100PV2021_9 2021-10-20 17-13-45\INUPREC_0002.D\FID28.ch
October 21, 2021 9:38:57 AM	End	Execution	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	Run Count: 1
October 21, 2021 9:38:57 AM	Start	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L: >= 300000	None
October 21, 2021 9:38:57 AM	Audit	Data	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L: >= 300000	Data files Path: C:\Chem321\DATA\AQCPV20 2100PV2021_9 2021-10-20 17-13-45\INUPREC_0001.D\FID28.ch
October 21, 2021 9:38:57 AM	End	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L: >= 300000	Run Count: 1
October 21, 2021 9:38:57 AM	End	Qualification	Session	OO
October 21, 2021 9:38:57 AM	Start	Repeating	Session	None
October 21, 2021 10:04:15 AM	Audit	Repeating	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: Agilent Recommended
EQP Revision: LC 02.50
Overall Qualification Status: Pass

REVIEW BY *Det. B.*
APPROVED BY *SM*
NEXT CAL. DATE 2 Feb 24

Pump Flow Accuracy

Model/Serial No.: G1311A DE62964837

Channel: A

Setpoint Status: Pass

Pump Flow Rate: 5.000 mL/min
Accuracy (as % error): 0.20 %
Agilent Recommended: <= 5.00

Setpoint Status: Pass

Pump Flow Rate: 5.000 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

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

Setpoint Status: Pass

Pump Flow Rate: 5.000 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

Column Compartment Temperature: 80.0 °C
Accuracy: 10.1 °C
Agilent Recommended: <= 3.0

Setpoint Status: Pass

Column Compartment Temperature: 40.0 °C
Accuracy: 10.0 °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 / 40.06667 °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:

350

nm

WL 2:

397

nm

Actual:

349

nm

WL 1:

369

nm

Acc.*

1

nm

WL 2:

2

nm

Agilent Recommended:

<= 3

* Accuracy (error in nm)

<= 3

Overall Wavelength Accuracy Test Status

Pass

Signal to Noise

Detector Type:

FLD

Model/Serial No.:

G1321A

DE60556998

Setpoint Status:

Pass

Signal to Noise:

568

>= 400

Agilent Recommended:

>= 400

Date:
System ID:June 2, 2022 1:27:42 PM
DE62964637

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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

Injection Volume on Column:

From EQP

Actual

5 / 15 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:
System ID:June 2, 2022 1:27:42 PM
DE62964637

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Setpoint Status:

Pass

Injection Volume on Column:

From EQP

15

Actual

15

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:
System ID:

June 2, 2022 1:27:42 PM
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 µl

Serial Number

DE64766191

Firmware Revision

A.06.54

Component ID/Asset No.

LC-2

Date:
System ID:

June 2, 2022 1:27:42 PM
DE62964837

Column Compartments 1

Manufacturer	Agilent Technologies
Name	1260
Model Number	G1316A
Type	Heated and cooled
Serial Number	DE63068461
Firmware Revision	A.05.50
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

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:	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.singhong
Hostname: DESKTOP-JTNDQHG
System ID: DE62964837
Print Date: June 2, 2022 1:27:43 PM

LCOQ_6085117561_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 2, 2022 1:16:50 PM	Audit	Session Created	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 1:16:51 PM	Audit	Exp. loaded	Session	EOP details for primary technique [L] - File path: [Protocol\Packaged\Configurat on\07.50\Lc_02.50.sap] EOP File Name: [Lc_02.50.sap], EOP 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	AccClosed	Session	None
June 2, 2022 1:18:28 PM	Audit	AccRestarted	Session	None
June 2, 2022 1:18:30 PM	Audit	SessionReleased	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, G1329A - G1331A, FLD: Injection Volume 1	None
June 2, 2022 1:19:07 PM	Audit	Data	Injection Carry Over : Injectors 1, G1329A - G1331A, FLD: Injection Volume 1	Data files Path : C:\Users\weera\Desktop\OQ Data_02Jun2022OCPV_02J UN22 2022-06-02 12:33:35\FLDIP_01.D\data.c h

Page 1 / 2

Date:
System ID:

June 2, 2022 1:27:42 PM
DE62964837

Page 9 / 10

User Name: weerachai.singhong
Hostname: DESKTOP-JTNDQHG
System ID: DE62964837
Print Date: June 2, 2022 1:27:43 PM

LCOQ_6085117561_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, G1329A - G1331A, FLD: Injection Volume 1	Data files Path : C:\Users\weera\Desktop\OQ Data_02Jun2022OCPV_02J UN22 2022-06-02 12:33:35\FLDIP_07.D\data.c h
June 2, 2022 1:19:07 PM	Audit	Data	Injection Carry Over : Injectors 1, G1329A - G1331A, FLD: Injection Volume 1	Data files Path : C:\Users\weera\Desktop\OQ Data_02Jun2022OCPV_02J UN22 2022-06-02 12:33:35\FLDIP_08.D\data.c h
June 2, 2022 1:20:11 PM	End	Execution	Injection Carry Over : Injectors 1, G1329A - G1331A, 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

Page 2 / 2

Date:
System ID:

June 2, 2022 1:27:42 PM
DE62964837

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SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

451-451/1 Sirinphom Rd., Bangbunru, Bangplud Bangkok 10700 THAILAND.

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



NEC-TS12-TS 17025
CALIBRATION 0394

Cert. No. : ACC22001

Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR

Manufacturer : RION

Model : NC-75

Serial No.: 35002736

ID No.: 35002736

Condition As Found : GOOD

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

Location :

Ambient Temperature : (23.0 ± 3) °C

Pressure : (101.3 ± 3) kPa

Relative Humidity : (50.0 ± 20) %

Received Date : 05 JANUARY 2022

Calibration Date : 10 JANUARY 2022

Date of Issue : 13 JANUARY 2022

Calibrated by :

Nathakorn Pisutpaisan

Approved by :

T. Petchurai
(Thanakul Petchurai)

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QF-TS12-04-01-020664

SITHIPORN / SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACC22001

Job No. : VC65AC0040

Pages : 2 of 3

Calibration Procedure : CIP-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	MY53202742	EF-0011-21	10-Feb-22
Digital Multimeter	33461A	MY53220104	EEL-BP. 03/0264	10-Feb-22
Digital Multimeter	33461A	MY53220076	EEL-BP. 03/0264	08-Feb-22
Digital Multimeter	33461A	MY60024273	I-15180725251-1	15-Sep-22
Programmable Attenuator	MAT-1070	62100114	1500-07774E	08-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KAJ	34560495	AA-3003-21	16-Feb-22
Audio Analyzer	AVR-3360A	V744B6069	EF-0010-21	10-Feb-22

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

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

3.1 National Institute of Metrology (Thailand).

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

QF-TS12-04-01-020664

T. Petchurai

Continuation of Calibration Certificate

Cert. No. : ACC22001
Job No. : VC65AC0040
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	93.99	-0.01	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 (%)
0.28	0.10	3.0

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

End of Calibration Certificate

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

Cert. No. : ACL22030
Pages : 1 of 8

Calibration Certificate

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

Condition As Found : GOOD

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

Location :
Ambient Temperature : (23.0 \pm 3) °C
Pressure : (101.3 \pm 3) kPa
Relative Humidity : (50.0 \pm 20) %
Received Date : 05 JANUARY 2022
Calibration Date : 10-12 JANUARY 2022
Date of Issue : 13 JANUARY 2022

Calibrated by : Nathakorn Pisupaisan

Approved by : *T. Peteh.*
(Thanakul Petehurai)

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Continuation of Calibration Certificate

Cert. No. : ACL22030
Job No. : VC65AC0040
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-0012-21	10-Feb-22
Waveform Generator	33511B	MY32302742	EF-0011-21	10-Feb-22
Digital Multimeter	33461A	MY53220104	EEL.BP. 05/0264	10-Feb-22
Digital Multimeter	33461A	MY53220076	EEL.BP. 03/0264	08-Feb-22
Digital Multimeter	34461A	MY60024273	1-15180725251-1	15-Sep-22
Programmable Attenuator	MAT-1070	62100114	1500-07774E	08-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KA1	34500495	AA-3003-21	16-Feb-22

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

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

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

Continuation of Calibration Certificate

Cert. No. : ACL22030
Job No. : VC65AC0040
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. : ACL22030
Job No. : VC65AC0040
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
16.5

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

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

3. Acoustical signal tests of frequency weightings

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

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

Continuation of Calibration Certificate

Cert. No. : ACL22030
Job No. : VC65AC0040
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
63	-0.1	-0.1	-0.1
125	-0.1	0.0	0.0
250	0.0	0.0	0.0
500	0.0	0.0	-0.1
1000	0.0	0.0	0.0
2000	0.0	0.0	0.0
4000	0.0	0.0	0.0
8000	0.0	0.1	0.1
			Acceptance Limits
			±2.0
			±1.5
			±1.5
			±1.0
			±2.0
			±3.0
			±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

Continuation of Calibration Certificate

Cert. No. : ACL22030
Job No. : VC65AC0040
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	0.1	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.1	±1.1
69.0	69.0	0.1	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.1	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
30.0	30.0	0.0	±1.1
29.0	29.0	0.0	±1.1
28.0	28.0	0.0	±1.1
27.0	26.9	-0.1	±1.1
26.0	25.9	-0.1	±1.1
25.0	24.9	-0.1	±1.1

Continuation of Calibration Certificate

Cert. No. : ACL22030
Job No. : VC65AC0040
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, Lepeak (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

Continuation of Calibration Certificate

Cert. No. : ACL22030
Job No. : VC65AC00040
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 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

50 04 11

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



NSC-TS1-TS 17025
CALIBRATION 0394

Cert. No. : ACL22031
Pages : 1 of 8

Calibration Certificate

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

Condition As Found : GOOD

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

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

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

Calibrated by : Nuthakorn Pisutpaisan

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

REVIEW BY	<i>Nuthakorn P.</i>
APPROVED BY	<i>T. Petchuraj</i>
NEXT CAL DATE	10/1/25

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Continuation of Calibration Certificate

Cert. No. : ACL22031
Job No. : VC65AC0040
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-0012-21	10-Feb-22
Waveform Generator	33511B	MY52302742	EF-0011-21	10-Feb-22
Digital Multimeter	33461A	MY53220104	EEL.BP. 05/0264	10-Feb-22
Digital Multimeter	33461A	MY53220076	EEL.BP. 03/0264	08-Feb-22
Digital Multimeter	34461A	MY60024273	I-1518072521-1	15-Sep-22
Programmable Attenuator	MAT-1070	62100114	I500-07774E	08-Mar-22
Condenser Microphone	4180	2977906	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KAI	34560495	AA-3003-21	16-Feb-22

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

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

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

Continuation of Calibration Certificate

Cert. No. : ACL22031
Job No. : VC65AC0040
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. : ACL22031
Job No. : VC65AC0040
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.6

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

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

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)		
	Flat	C-weight	A-weight
125	0.7	0.7	0.7
1000	0.0	0.0	0.0
8000	-2.1	-2.0	-2.0

Continuation of Calibration Certificate

Cert. No. : ACL22031
Job No. : VC65AC0040
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
63	0.0	0.0	-0.1
125	0.0	0.0	0.0
250	0.0	0.0	0.0
500	0.0	0.1	0.0
1000	0.0	0.0	0.0
2000	0.0	0.1	0.0
4000	0.0	0.0	0.0
8000	0.0	0.1	0.1

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

Continuation of Calibration Certificate

Cert. No. : ACL22031
Job No. : VC6SAC0040
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	38.9	-0.1	±1.1
34.0	34.0	0.0	±1.1
30.0	29.9	-0.1	±1.1
29.0	28.9	-0.1	±1.1
28.0	27.9	-0.1	±1.1
27.0	26.9	-0.1	±1.1
26.0	25.9	-0.1	±1.1
25.0	24.8	-0.2	±1.1

Continuation of Calibration Certificate

Cert. No. : ACL22031
Job No. : VC6SAC0040
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, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; -5.0
	2	8	117.0	117.0	0.0	1.0; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5; -5.0
	2	8	108.0	108.0	0.0	1.0; -2.5
	200	800	128.0	128.1	0.1	±1.0

10. Peak C sound level

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

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

Continuation of Calibration Certificate

Cert No. : ACL22031
Job No. : VC65AC0040
Pages : 8 of 8

11. Overload indication

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

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

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. : ACC22013
Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-7A
Serial No. : 34178121
TD No. : RYQ_JS0213

Condition As Found : GOOD

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

Location :
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %
Received Date : 22 APRIL 2022
Calibration Date : 26 APRIL 2022
Date of Issue : 29 APRIL 2022

Calibrated by :

Naihakom Pisupaisan

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.

REVIEW BY	APPROVED BY	NEXT CAL DATE
Naihakom P	T. Petchurai	26/4/23

Continuation of Calibration Certificate

Cert. No. : ACC22013
Job No. : VC65AC0054
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).

Continuation of Calibration Certificate

Cert. No. : ACC22013
Job No. : VC65AC0054
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	94.11	0.11	0.14	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Tolerance limit (%)
1000	1003.1	0.3	0.1	1.0

3. Total distortion

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
2.02	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

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

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



Cert. No. : ACL22159
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00472130 / 157774 / 72464
ID No.: RYG_FS0303

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 :	06 JULY 2022
Calibration Date :	11-18 JULY 2022
Date of Issue :	19 JULY 2022

Calibrated by : Nathakorn Pisupaisan

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. : ACL22159
Job No. : VC65AC0069
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).

Continuation of Calibration Certificate

Cert. No. : ACL22159

Job No. : VC65AC0069

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. : ACL22159

Job No. : VC65AC0069

Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
23.4

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

Frequency Weighting	Measured value (dB)
A - weight	15.4
C - weight	21.0
Flat	26.9

3. Acoustical signal tests of frequency weightings

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

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

Continuation of Calibration Certificate

Cert. No. : ACL22159
Job No. : YC65AC0069
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
63	-0.1	-0.2	-0.1
125	-0.1	0.0	-0.1
250	0.0	0.0	-0.1
500	0.0	0.0	-0.1
1000	0.0	0.0	0.0
2000	0.0	0.0	0.0
4000	0.0	0.0	0.0
8000	0.0	0.0	0.0

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	93.9	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	93.9	0.0	± 0.1
Lec	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	93.9	94.0	0.1	± 0.3

Continuation of Calibration Certificate

Cert. No. : ACL22159
Job No. : YC65AC0069
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.1	0.1	± 1.1
136.0	136.1	0.1	± 1.1
135.0	135.1	0.1	± 1.1
134.0	134.1	0.1	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.1	0.1	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.1	0.1	± 1.1
114.0	114.1	0.1	± 1.1
109.0	109.1	0.1	± 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	28.0	0.0	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	26.0	0.0	± 1.1
25.0	25.0	0.0	± 1.1

Continuation of Calibration Certificate

Cert. No. : ACL22159
Job No. : VC65AC0069
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, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	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
	0.25	1	99.0	98.8	-0.2	1.5 ; -5.0
SEL	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.6	-0.8	±3.0

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

Continuation of Calibration Certificate

Cert. No. : ACL22159
Job No. : VC65AC0069
Pages : 8 of 8

11. Overload indication

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

12. High level stability

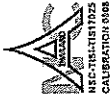
Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A - weight	137.0	137.0	0.0	±0.3

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



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
53/44 PATTANAKARN ROAD SOI 18, SUANLIANG, SHANLIANG BANGKOK 10250
TEL. 0-2317-3000-27 FAX. 0-2719-0484



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

Certificate of Calibration

Equipment : pH Meter

Manufacturer : Mettler Toledo

Model : Seven Compact S220

Serial No. : C104059460

ID No. : RYG_EN0183

Condition As-Received:

Used Item

Received Date : 16 March 2022

Calibration Date : 17 March 2022

Reference : 2203-0611DSC-4

Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd.

Rayong Branch

618/10 Moo 5 T.Maenam Khu,

A.Pluakdaeng, Rayong 21140, Thailand

(25 ± 2.5) °C

(50 ± 15) %

In - house method :

- CP-CH5 by direct measurement with standard

voltage calibrator and direct measurement with

certified reference material (CRM)

- CP-CH8 by comparison with standard thermometer

Calibrated by :

Warakorn Lerngagrakul

Approved by :

Approved Signatory

() Malee Bulkruea

() Sathip Meangmai

() Warakorn Lerngagrakul

Issue Date :

22 March 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.

A 0037307



Cert.No.: 22CH405
Page.: 2 of 3

Condition of this calibration result

1. Reference Standard Instrument : -

1) Document Process Calibrator Serial No. 54030049 ID No. 130RC116 Cert. No. 21E2682 Due Date 25 Aug 2022

2) Ref. Standard Thermometer 4982054 110RC044 21H201 26 Oct 2022

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

2. Certified Reference Materials : The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	788995	01 Jan 2024
pH 6.982	CPA chem	761017	02 Aug 2022
pH 10.015	CPA chem	766924	04 Sep 2022

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

Calibration Results

Function : mV Measurement

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

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
			mV	pH		
pH Meter S/N: C104059460	pH 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

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Cert.No.: 22CH405
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 (±)	Coverage factor k
pH Electrode S/N.: 1453404	4.008	4.010	177.7	0.0046	2.00
	6.982	6.988	3.6	0.0084	2.00
	10.015	10.010	-172.9	0.0073	2.05

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLab Expert Pro-ISM

- Serial No. : 1453404

Dimension of probe:

- Length : 120 mm.

- Diameter : 12 mm.

- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.002	24.9	-0.102	0.13	2.00

Remark : - UUC* = Unit Under Calibration

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

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MSC-TS-013 1/2023
CALIBRATION 0028

Certificate of Calibration

Certificate No. : 22E986

Page : 1 of 2

Equipment :

pH Meter

Manufacturer :

Mettler Toledo

Model :

SevenCompact S220

Serial No. :

C104059480

ID No. :

RYG_END183

Condition As-Received: Used Item

Received Date:

16 March 2022

Calibration Date:

21 March 2022

Reference:

2203-0611DSC

Ambient Temperature: (23 ± 2) °C

Relative Humidity: (50 ± 10) %

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 CPE17 According to direct measurement method with Multi-Product Calibrator.

Condition of this result of calibration

1.Reference standards instruments :

Instrument

1) Multi-Product Calibrator

Model

5500A

Serial No.

6440007

Certificate No.

21E1444

Due Date

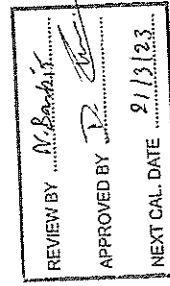
07 May 2022

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

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

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

-National Institute of Metrology Thailand (NIMT)



Calibrated by : Pongsorn Boonyaporn
Issue Date : 22 March 2022

Approved Signatory :
[Signature]
{ } Phalinee Prabpai
{ } Nuntawat Khamchai
{ } Ponthippa Tameyakul

B 0284414



Cert. No.: 22E986
Page.: 2 of 2

Result of calibration:- (*) Without adjustment () After adjustment
Function: DC voltage measurement Range:

Standard Value (mV)	UUC* Reading (mV)	Error (mV)	Uncertainty ($\pm \mu V$)
-200.0000	-200.0	0.0	72
-150.0000	-150.0	0.0	69
-100.0000	-100.0	0.0	65
-50.0000	-50.0	0.0	62
0.0000	0.0	0.0	58
50.0000	50.0	0.0	62
100.0000	100.0	0.0	65
150.0000	150.0	0.0	69
200.0000	200.0	0.0	72

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

*UUC= Unit Under Calibration.

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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.: C06220464
Issued Date: 27 September 2022
Job No.: KSPR2212224
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.

REVIEW BY: *[Signature]*
APPROVED BY: *[Signature]*
NEXT CAL. DATE: 27/12/24
3.2 %RH

Environment Condition: Temperature 23.1 °C \pm
Humidity 65.4 %RH \pm

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. Chattuphon Follthong
Calibration Date: 27 September 2022

The Method used:
Traceability:

In house method, CAL-WI-24, base on ASTM E 275-08 and ASTM E 387-04
This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Sigma Scientific Limited.

The standard for Wavelength Certificate No. 91418 and 91435
The standard for Photometric Certificate No. 91441 and 101088
The standard for Stray light Certificate No. 101041 and 101040
The standard for Spectral resolution Certificate No. 101037

[Signature]
(Mr. Chattuphon Follthong)

Person in charge

[Signature]
(Mr. Thalengkeat Pongngam)
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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Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

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Certificate No.: C06220464

Page 2 of 3

Calibration Results:
Without Adjustment

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

Standard Wavelength	Unit Under Calibration	Correction	Uncertainty
---------------------	------------------------	------------	-------------

418.61	418.4	0.21	0.14
--------	-------	------	------

535.66	536.7	-0.04	0.14
--------	-------	-------	------

637.99	638.3	-0.32	0.14
--------	-------	-------	------

748.48	748.8	-0.32	0.14
--------	-------	-------	------

807.03	807.4	-0.37	0.13
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Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
------------	---------------------	------------------------	------------	-------------

420 nm	0.0000	0.000	0.0000	0.0045
--------	--------	-------	--------	--------

	0.5605	0.563	-0.0025	0.0045
--	--------	-------	---------	--------

	0.7334	0.737	-0.0036	0.0045
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	1.0534	1.057	-0.0036	0.0045
--	--------	-------	---------	--------

	0.0000	0.000	0.0000	0.0045
--	--------	-------	--------	--------

	0.5503	0.553	-0.0027	0.0045
--	--------	-------	---------	--------

440 nm	0.7179	0.720	-0.0021	0.0045
--------	--------	-------	---------	--------

	1.0312	1.034	-0.0028	0.0045
--	--------	-------	---------	--------

	0.0000	0.000	0.0000	0.0045
--	--------	-------	--------	--------

	0.5024	0.506	-0.0038	0.0045
--	--------	-------	---------	--------

465 nm	0.6893	0.672	-0.0027	0.0045
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	0.9604	0.964	-0.0036	0.0045
--	--------	-------	---------	--------

	0.0000	0.000	0.0000	0.0045
--	--------	-------	--------	--------

	0.5168	0.519	-0.0022	0.0045
--	--------	-------	---------	--------

546.1 nm	0.6903	0.691	-0.0007	0.0045
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	0.9904	0.992	-0.0016	0.0045
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	0.0000	0.000	0.0000	0.0045
--	--------	-------	--------	--------

	0.5525	0.554	-0.0015	0.0045
--	--------	-------	---------	--------

590 nm	0.7175	0.718	-0.0005	0.0045
--------	--------	-------	---------	--------

	1.0301	1.031	-0.0009	0.0045
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	0.0000	0.000	0.0000	0.0045
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	0.5367	0.538	-0.0013	0.0045
--	--------	-------	---------	--------

635 nm	0.6847	0.685	-0.0003	0.0045
--------	--------	-------	---------	--------

	0.9823	0.983	-0.0007	0.0045
--	--------	-------	---------	--------

Unit: Absorbance unit, 1.000
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2333 Sukhumvit Road, Bangkok 10260
Phone: +66 2638 7000 Email: info.calibration@dksh.com Website: www.dksh.com/calibration-thailand

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Certificate No.: C06220464

Page 3 of 3

Calibration Results:
Without Adjustment

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
------------	---------------------	------------------------	------------	-------------

235 nm	0.0000	0.000	0.0000	0.0080
--------	--------	-------	--------	--------

	0.7423	0.744	-0.0017	0.0083
--	--------	-------	---------	--------

257 nm	0.0000	0.000	0.0000	0.0080
--------	--------	-------	--------	--------

	0.8609	0.861	-0.0001	0.0084
--	--------	-------	---------	--------

313 nm	0.0000	0.000	0.0000	0.0080
--------	--------	-------	--------	--------

	0.2895	0.292	-0.0025	0.0080
--	--------	-------	---------	--------

350 nm	0.0000	0.000	0.0000	0.0080
--------	--------	-------	--------	--------

	0.6381	0.638	0.0001	0.0080
--	--------	-------	--------	--------

Stray light *

Standard: cut-off	UUC: Wavelength (nm)	UUC: Transmission (%)	Absorbance (A)
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260.67 +/- 0.11 nm	260.7	2.1	1.678
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391.94 +/- 0.11 nm	391.9	1.7	1.770
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Spectral Resolution *

Nominal Concentration 0.02 % w/v	Peak	Trough	Ratio	SBW
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Standard Wavelength (nm)	268.80	266.63	1.39	2.00
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UUC: Wavelength (nm)	268.2	266.1		
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Sid Absorbance (A)	0.4810	0.3176		
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Absorbance (A)	0.373	0.268		
----------------	-------	-------	--	--

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

The End of Certificate

Unit: Absorbance unit, 1.000
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ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: KSPR2212224

หมายเลขเครื่อง: 1827845

รุ่น: DR6000

ชนิดเครื่องมือ: SPECTROPHOTOMETER

ตรวจสอบ (วัน)		รายการตรวจสอบ	ตรวจสอบ (ส่ง)	หมายเหตุ
27 Sep 2022				
ปกติ	ไม่ปกติ			
		General		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิตช์ ปิด - เปิด เครื่อง (On-Off Switch)	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" 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"/>	7. ตัวหน่วงเลือกความยาวคลื่น (Wavelength Control)	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. ความยาวคลื่น (Wavelength Check)	<input checked="" type="checkbox"/>	656.1 nm
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. แหล่งกำเนิดแสง (UV $< 3,000$ hour)	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. แหล่งกำเนิดแสง (Visible $< 5,000$ hour)	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	11. ช่องวัดความยาวคลื่น (Carousel Module)	<input checked="" 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"/>	13. ระดับสารละลายใน Electrode (Level KCl)	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	15. ฐานยึดอิเล็กโทรด (Stand)	<input type="checkbox"/>	
		Turbidimeter		
<input type="checkbox"/>	<input type="checkbox"/>	16. ค่าความขุ่นที่สุ่ม (No Sample)	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	17. ระดับการส่องสว่างของแสง (≥ 2.5 ไม่นาที 3.0)	<input type="checkbox"/>	
		Automatic titrator		
<input type="checkbox"/>	<input type="checkbox"/>	18. ถังพัก Piston Burettes	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	19. Function Rinsing and Dosing	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	20. ระบบท่อสายงานและอุปกรณ์ประกอบ	<input type="checkbox"/>	

เซ็นเซอร์/ข้อบกพร่อง:

Mr. Chaituphon Follthong
Service Engineer

บริษัท ดิเคส เอเซีย จำกัด
2533 ซอยสุขุมวิท 101/1 ถนนสุขุมวิท 101/1
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CAL-FM-R31-03: 20 Jul 2022



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Cert.No.: 22TW34
Page.: 1 of 2

Certificate of Testing

Equipment: DO Meter
Manufacturer: YSI
Model: 5000-11SV
Serial No.: 15E102796
ID No.: RYG_EN0032

Received Date: 11 February 2022
Test Date: 14 February 2022
Reference: 2202-0404DSC-4
Submitted by: ALS Laboratory Group (Thailand) Co., Ltd.

(Rayong Branch)
616/10 Moo 5 T.Maenam Khu, A.Pluakaeng,
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 : Walailak Sirithean

Approved by : Sailhip
Approved Signatory

() Malee Bulkruea
() Sailhip Meangmai
() Warakorn Lemgagrakul

Issue Date : 18 February 2022

B 0281285

REVIEW BY	N. Benjai
APPROVED BY	D. Sir
NEXT CAL. DATE	15/8/23



Cert.No.: 22TW34
Page.: 2 of 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)
8.02	8.02	0.0084

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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TEL. 0-2717-3900-27 FAX. 0-2719-9484



Cert. No.: 22LM12
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 : 11 February 2022
Calibrated Date : 21 February 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V
Calibrated by : Kunchit Promprat

Approved by : Wala
Approved Signatory
() Pornhippa Tameyakul
(✓) Malee Bulkruea
() Suwit Imjai
Issue Date : 21 February 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.

A 0038008



Cert. No.: 22LM12
Page.: 2 of 2

Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2202-0404DSC-5

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Digital Thermometer	1523	2188080	211273	22 Nov 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 : Temperature measurement.

This instrument was connected with temperature sensor, S/NL: 15E100464

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
20.00	45	20.001	19.88	-0.121	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)
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TEL. 0-2717-3990-37 FAX. 0-2719-9454



Cert. No.: 22TM317
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)
818/10 Moo 5 T.Maenam Khu,
A.Pluakdaeng, Rayong 21140, Thailand
Location : BOD Room
Received Order : 22 April 2022
Calibration Date : 22 April 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Man Pattanapongpalboon

REVIEW BY	<i>N. S. S. S.</i>
APPROVED BY	<i>D. S. S.</i>
NEXT CAL. DATE	21/10/23

Approved by : *Wdu*
Approved Signatory

() Pornthippa Taneyakul
(/) Malee Bulkruea
() Suwil Imjai

Issue Date : 3 May 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.

A 0040735



Cert. No.: 22TM317
Page.: 2 of 3

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement. The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

<u>Instrument</u>	<u>Model</u>	<u>Serial No.</u>
1) Data Acquisition	34970A	MY44031769

02 Sep 2022

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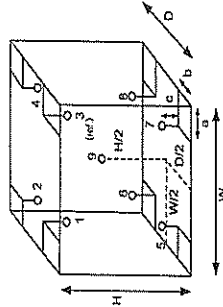
System of Unit

Result of Calibration :-

Function of IHC* : Temperature Source

Frage zur Selbstprüfung: Close

Close



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

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

Probe Installation Details : Dimension of Chamber :

a =	10	cm	D =	0.60	m
b =	10	cm	W =	1.0	m
c =	10	cm	H =	1.2	m
			Capacity =	0.75	m ³

Capacity = 0.75 m³

Male.

a 1106485

Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2204-0146OC-1
Result of Calibration :- (*) Without Adjustment
Result of UUC* : Temperature Source
Fresh air setting : Close

Result of Calibration :-

Function of UUC* : Temperature Source

Fresh air setting. Close

Figure 1

Calibration Point (°C)	UUC ^a Setting (°C)	UUC ^b Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (±°C)	Coverage Factor <i>k</i>
20.0	20.0	20.0	0.022	0.20	0.22	0.30	2
Measured Temperature (°C)							
Calibration Point (°C)	Position						
	1	2	3	4	5	6	7
20.0	20.209	20.174	20.199	20.110	20.075	20.082	20.027
							20.069
							20.030
							9 (ref.)

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

UUC* : Unit Under Calibration

Note : The reported uncertainty of measurement was included stability and excluded uniformity .
The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k , providing a level of confidence of approximately 95 % .

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Malu

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RYG_EN0002

Certificate of Calibration

Represent to Certificate of Calibration, PTC/07/22-103

Certificate No.: PTC/07/22-103 Page: 1 of 2

Equipment: Digital Balance Condition: Normal

Manufacturer: Sartorius Serial No: 26207038

Model: MSE224S-100-DU ID No: RYG_EN0002

Type of Balance: Single interval

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

Environment Condition: Temperature 23.9 °C ± 0.3 °C
Humidity 58.1 %RH ± 4.4 %RH
Air density 1.17 kg/m³

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

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

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

Date Received: March 23, 2022

Calibration Date: March 23, 2022

Issued Date: March 25, 2022

Calibration By: Mr. Rungroje Melekul

Reviewed by:
(Mr. Kiangsak Kalasri)

Approved By:

(Mr. Keattisak Kerdto)
Laboratory Manager

This certificate is issued in the unit 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 in 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 the Expression of Uncertainty in Measurement (GUM).

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PTC/07/22-103 2 Feb 2020



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Represent to Certificate of Calibration, PTC/07/22-103

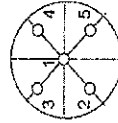
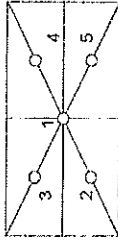
Certificate No.: PTC/07/22-103 Page: 2 of 2

Measurement Results:

Without Adjustment:

Function Calibration: Non Adjustment

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



Eccentricity test 100 (g)

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

Repeatability Test: Weight to be 1/2 ≤ L₁ ≤ Maximum capacity

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

Noninal test value (g)	Standard Deviation
200	0.00003

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

Nominal Value (g)	Conventional Mass (g)	Indication (g)	Correction of Balance (g)	Uncertainty (g)	k
0	0.00000	0.0000	0.0000	0.0000086	2.16
0.01	0.01000	0.0100	0.0000	0.00010	2.06
0.1	0.10000	0.1000	0.0000	0.00010	2.06
1	1.00000	1.0000	0.0000	0.00010	2.06
2	2.00000	1.9999	0.0001	0.00010	2.06
5	5.00001	5.0000	0.0000	0.00010	2.06
10	10.00000	10.0000	0.0000	0.00010	2.06
20	20.00003	19.9999	0.0001	0.00011	2.05
50	50.00004	49.9999	0.0001	0.00012	2.00
100	100.00004	100.0001	-0.0001	0.00017	2.00
200	200.00011	200.0000	0.0001	0.00027	2.00

Note: Weight of adjust (g)

The End of Certificate

PTC/07/22-103 2 Feb 2020



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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5364 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL 0-2712-3000-27 FAX 0-2710-9424



HBC-THAI
HSC-T01-0151925
CALIBRATION 0003

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

REVIEW BY	Thantail
APPROVED BY	Man Pattenapongpaiboon
NEXT CAL DATE	30/04/2023

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 Pattenapongpaiboon

Approved by :

() Pornthippa Tameyakul
(x) Malee Bulkruea
() Suwit Imjai

Issue Date : 2 November 2022

The Uncertainties are for a confidence probability of approximately 95%

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Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2210-0376OC-2
Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

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

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

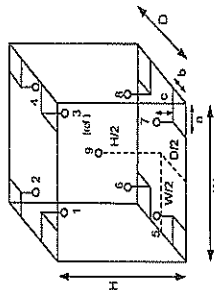
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration			
	Beginning	Finished	
Temp. ($^\circ\text{C}$)	26	25	
REL Humid. (%)	54	59	
AC Supply (Volt)	223	225	



Probe Installation Details :

Probe	a =	b =	c =	D =	W =	H =	Capacity =
1	5.0 cm	5.0 cm	5.0 cm	0.40 m	0.56 m	0.48 m	0.11 m ³

Ref. Std. ID No.: @ Calibration Point		
Position :	(180) $^\circ\text{C}$	(104) $^\circ\text{C}$
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

Man Pattenapongpaiboon



Equipment : Hot Air Oven
Condition As-Received : 2210-0376OC-2
Reference :
Result of Calibration :-
Function of UUC* : Temperature Source
Fresh air setting : Close

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (± °C)	Coverage Factor k
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	180.351	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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Walu .

a 1132465

RYG_EN0006



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53/42 PATTANAKARN ROAD 501 IS. SUANLUNG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-37 FAX. 0-2719-4354



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

REVIEW BY	Thawakul
APPROVED BY	D. K.
NEXT CAL. DATE	30/04/24

Submitted by : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)

618/10 Moo 5, T. Maenam Khu,

A. Phuakdaeng,

Rayong 21140, Thailand

Location : Oven Room

Received Order : 20 October 2022

Calibration Date : 20 October 2022

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Preecha Hlaibh

Approved by : Walu .
Approved Signatory

() Pornthippa Tamayakul

() Malee Buikrua

() Suwit Injai

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.

A 0046905



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2210-03760C-1
Procedure Used :-
Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).
The temperature scale used was based on ITS-90.

Cert. No.: 22TM1492
Page : 2 of 3

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 :-

Function of UUC* : Temperature Source

Fresh air setting : Close

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 :-

Function of UUC* : Temperature Source

Fresh air setting : Close

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 :-

Function of UUC* : Temperature Source

Fresh air setting : Close

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 :-

Function of UUC* : Temperature Source

Fresh air setting : Close

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 :-

Function of UUC* : Temperature Source

Fresh air setting : Close

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.



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2210-03760C-1
Result of Calibration :-
Function of UUC* : Temperature Source

Fresh air setting : Close

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (±°C)	Coverage Factor k
70.0	70.0	70.0	0.079	0.47	0.77	0.42	2

Calibration Point (°C)	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 .

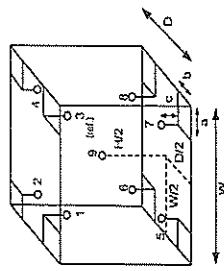
The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %.

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Math.

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



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

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

Math.

a 1132472



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TEL. 0-2717-3800-27 FAX 0-2710-9483



NSC-TS-115-17522
CALIBRATION 0061

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. Pluekdaeng,
Rayong 21140, Thailand
Location: Wet Chemistry Lab

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: Preescha Hlahib

Approved by:  Approved Signatory

() Pomihippa Tameyakul
() Malee Buikrua
() 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 Y. Equipment Calibration and Testing Services



Equipment: Water Bath
Condition As-Received: Used Item
Reference: 2210-03760C-4

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: 34970A Serial No.: MY44035217 Cert. No.: 21LM30 Due Date: 23 Dec 2022

1) Data Acquisition

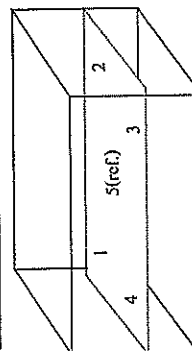
2. This certificate is valid only to the item calibrated on date and place of calibration.

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 (Volt)
	(°C)	(%R.H.)	
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



Cert. No.: 22TM1491
Page : 3 of 3

Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2210-0376OC-4
Result of Calibration : () Without Adjustment
Function of UUC* : Temperature Source

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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Walu.

a 1132470



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TEL. 0 2717 8000-27 FAX. 0 2719 9184



Cert.No.: 22CH377
Page: 1 of 2

Certificate of Calibration

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : Seven2Go
Serial No. : B531256371
ID No. : RYG_FS0420
Condition As-Received : Used Item
Received Date : 11 March 2022
Calibration Date : 14 March 2022
Reference : 2203-0495DSC-1
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd. Rayong Branch
616/10 Moo 5 T.Maenam Khu,
A.Pluakdaeng, Rayong 21140, Thailand

REVIEW BY	<i>P. Jha</i>
APPROVED BY	<i>S. S.</i>
NEXT CAL DATE	14/03/23

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 Lengagrakul

Approved by : *Walu.*
Approved Signatory

() Malee Bulkrua
() Sallhip Meangmai
() Warakorn Lengagrakul

Issue Date : 17 March 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

A 0039308



Cert. No.: 22CH377
Page.: 2 of 2

Condition of this calibration result

- Reference Standard Instrument :
Instrument :
Serial No. : 54030049 130RC116
ID No. : 21E2682
Cert. No. :
Due Date : 25 Aug 2022
1) Document Process Calibrator
This certification is traceable to the International System of Unit maintained at:-
- Traceable to National Institute of Metrology (Thailand), NIMT

- 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	766820	23 Sep 2023
pH 6.983	CPA chem	766822	04 Sep 2022
pH 10.015	CPA chem	766824	04 Sep 2022

- 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		Actual Reading		Uncertainty of Measurement (\pm mV)	Coverage factor k
		pH	mV	mV	pH		
pH Meter	4.00	177.48	177	4.00	4.00	0.58	2.00
S/N.: B531256371	7.00	0.00	0	7.00	7.00	0.58	2.00
	10.00	-177.48	-178	10.00	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 Buffer Solution	Standard pH	Actual pH Reading		Uncertainty of pH measurement (\pm)	Coverage factor k
			Actual pH Reading (mV)	Actual mV Reading (mV)		
pH Electrode	4.008	4.01	181	0.0079	0.0079	2.00
S/N.: 1311407	6.983	6.98	7	0.0093	0.0093	2.00
	10.015	10.01	-171	0.0092	0.0092	2.00

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

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TEL. 0 2717-3093, 27 FAX. 0 2710-6181



Cert. No.: 22LM41
Page.: 1 of 2

Certificate of Calibration

Equipment : pH Meter with Sensor
Manufacturer : Mettler Toledo
Model : Seven2Go
Serial No. : B531256371
ID No. : RYG_FS0420
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.
(Rayong Branch)
616/10 Moo 5 T. Maenam Khu, A. Phakdaeng,
Rayong 21140 Thailand
Location : TPA On Site Calibration Laboratory
Received Order : 11 March 2022
Calibrated Date : 15 March 2022
Ambient Temperature : (26 \pm 10) °C
Relative Humidity : (50 \pm 30) %
AC Line Voltage : (220 \pm 22) V

Calibrated by : Malee Bulkruea

Approved by :
() Ponthippa Tameyakul
(✓) Suwit Imjai

Issue Date : 17 March 2022

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

a 1100595

A 0039307



Equipment : pH Meter with Sensor
Condition As-Received : Used Item
Reference : 2203-0495DSC-2
Page: 2 of 2

Procedure Used :

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument Model Serial No. Cert. No. Due Date
1) Digital Thermometer 1523 2188080 2111273 22 Nov 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 : Temperature measurement.

This instrument was connected with temperature sensor, S/N : 1311407

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
25.0	100	25.009	25.4	0.391	0.16	2.00
30.0	100	30.008	30.5	0.492	0.16	2.00
40.0	100	39.997	40.6	0.603	0.16	2.00
50.0	100	49.997	50.6	0.603	0.16	2.00

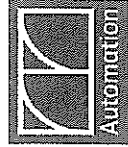
UUC* : Unit Under Calibration

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 %.

-000-

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a 1100597



บริษัท ออโตเมชัน เซอร์วิส จำกัด
Automation Service Co., Ltd.

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MTOC : L-1002/2022

Report No. : ALS-799/02

ASI Maintenance Report

Instrument : Automatic Sample Injector Measuring : Vial 40 ml
Model : ASI-L Place of Installation :
Serial No. : H57445200799 Department : LABORATORY
Manufacture : Shimadzu

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

Date of Maintenance : 03 / 10 / 2022

Ambient Condition : Temperature $25.4 \pm 5^\circ\text{C}$
: Humidifier $60 \pm 15\% \text{RH}$

Maintenance By : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

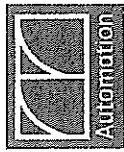
Approved By : N. Nipon
(Mr. Nipon Phongsomsak)
Technician Manager

User Name : Sirilok
(Mrs. Sirilok Pueyphong)

SHIMADZU ANALYZER
I/3

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โทรศัพท์ (Tel.) 0-2318-9934 โทรสาร (Fax) 0-2318-9559 website : www.automation.co.th

MTOC: L-1002/2022

Report No.: ALS-799/02

Maintenance Sheet

Customer: ALS Laboratory Date: 03 / 10 / 2022
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.		
3.	Check if outlet flow is in proper condition	O.K.		
	Check and if necessary exchange consumable, Maintenance parts	O.K.		See appropriate list of maintenance parts
4.	Check Stirrer [When installed]	O.K.		
5.	Verify ASI function via mechanical check	O.K.		

Inspection by : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

SHIMADZU ANALYZER

2/3

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1715 หมู่ 4 ถนนพหลโยธิน แขวงจตุจักร กรุงเทพฯ 10250
Tel. 038-692-152 Fax 038-692-345



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MTOC: L-1002/2022

Report No.: ALS-799/02

List of Consumable, Maintenance parts

Pos.	Part Number	Part Name	Result	Exchange	Recommended Interval
1.	017-27021-01	Grease Paste, Lubricant 100g	O.K.		1 time per year
2.	032-22661-02	Belt, 60S2m596, Arm Drive	O.K.		1 time per year
3.	034-03067-02	Spring, F-642, Arm Drive	O.K.		Depending on condition
4.	042-00405-11	Pump Head, for ASI Rinse Pump	O.K.		Depending on condition
5.	638-41448-01	Std. Needle Type1 24mL, 40mL* (for tube 2, 1x1.6), (Sparg needle)	N/A		After 300 h of operating
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 1.4x0.6x600mm* (for Double Needle 24mL, 40mL)	N/A		Depending on condition

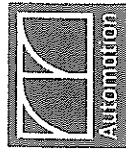
*Note: needed parts depending on installed needle types!

Inspection by : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

SHIMADZU ANALYZER

3/3

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MTOC : L-1001/2022

Report No. : ALS-416/02

TOC-L Maintenance Report

Instrument : Total Organic Carbon Analyzer Measuring : TOC ~ 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.,
Khaew Suan Luang, Khet Suan Luang,
Bangkok 10250 Thailand

Date of Maintenance : 03 / 10 / 2022

Ambient Condition : Temperature 25.4 ± 5 °C

: Humidifier 60 ± 15 %RH

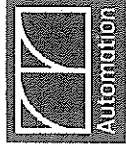
Maintenance By : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

Approved By : P. Pong
(Mr. Nipon Phongsomsak)
Technician Manager

User Name : Sinluk P.
(Supervisor)

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MTOC : L-1001/2022

Report No. : ALS-416/02

Maintenance Sheet

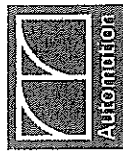
Customer : ALS Laboratory Date : 03 / 10 / 2022
Model : TOC-LCSH Serial No. H54425300416

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

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Inshun (Tel.) 0-2319-9994 Inshun (Fax) 0-2319-9958 website : www.automation.co.th

MTOC : L-1001/2022

Report No. : ALS-416/02

Item	Carry out maintenance work	Result	Exchange	Comment
8.	Due to instrument condition, clean the instrument inside and outside.	O.K.		
9.	After checking the system and exchanging of consumable and maintenance parts a new 1-3 point calibration have to be done.	O.K.		Addition test 1.
10.	After wards the calibration perform check sample measurement.	O.K.		Addition test 2.

Addition test

Test no.	Test conditions	Meas. value	Result
1.	Calibration TC standard solution at 0, 0.1, 0.5, 1, 5, 10, 20 injection volume 50 µL No. of measurement 2 times (Max.3) Criteria : $R^2 = 0.995$ or more	1.0000	Attachment : ALS-416/02 Page 1/4 - 2/4 Pass
2.	Measurement of reagent water and TC standard solution at 5.0 mg/L injection volume 50 µL No. of measurement 2 times (Max.3) and calculate accuracy by Meas. of TC standard - Meas. of Reagent water Criteria : Accuracy % Recovery 10% or less	5.477 - 0.4414 = 5.0356 ppm	Attachment : ALS-416/02 Page 3/4 - 4/4 Pass

Inspection by : Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

SHIMADZU ANALYZER

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1225 หมู่ 4 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพฯ 10110
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MTOC : L-1001/2022

Report No. : ALS-416/02

List of Consumable, Maintenance parts

Pos.	Part Number	Part Name	Result	Exchange	Recommended Interval
1.	036-11209-84	O-ring, 4D P10A (Viton, for TC, IC Slider)	O.K.	✓	1 time per year, Depending on condition
2.	036-11219-84	O-ring, 4D P20 (for sealing TC-Combustion tube)	O.K.	✓	1 time per year, Depending on condition
3.	638-15025	O-ring, PIPE (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.	✓	6 month
13.	638-59296-01	Plunger Tip (for syringe 5mL)	O.K.		1 time per year
14.	042-00405-11	IC reagent supply pump head	O.K.		1 time per year
15.	630-00999	CO2-Absorber (for cell space purge)	O.K.	✓	1 time per year
16.	630-00964	Molecular Sieves 13x	O.K.		1 time per year

Note. Table indicates the guidelines replacement periods when NPOC measurement is performed on sample that are comparatively as clean as tap water, use standard catalyst and at a rate of about 500 sample per month (operating five days a week)

Inspector By Peerapong Sangpan
(Mr. Peerapong Sangpan)
Technician

SHIMADZU ANALYZER

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TOC-Control L Report

2022_10_03_10_14_02_24.m

Inst: Information
Instrument Options
Catalyst

TOC/AST/C Unit
Regina Sewerfly

Cal Curve

Sample Name:
Sample ID:
Cal Curve:
Status

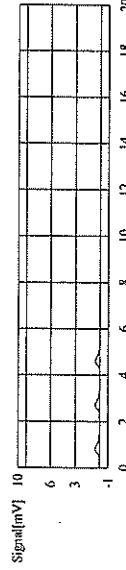
Unit:
TC 0.1-20 ppm, 2022_10_03_14_02_24.m
Completed

Conc	Area	Mean	SD	CV
0.000mg/L	1.63	1.00	0.00	0.00%
0.000mg/L	1.35	1.00	0.00	0.00%
0.000mg/L	1.31	1.00	0.00	0.00%

Conc: 0.000mg/L

No	Area	Mean	SD	CV
1	1.63	1.00	0.00	0.00%
2	1.35	1.00	0.00	0.00%
3	1.31	1.00	0.00	0.00%

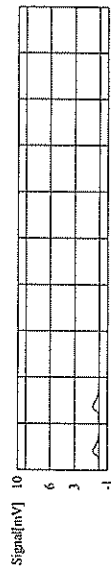
Acid Add:
Mean Area
SD Area
CV Area



Conc: 0.1000mg/L

No	Area	Mean	SD	CV
1	2.10	1.00	0.00	0.00%
2	2.13	1.00	0.00	0.00%

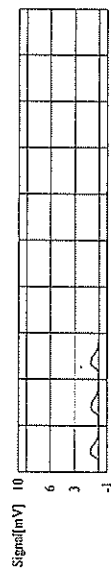
Acid Add:
Mean Area
SD Area
CV Area



Conc: 0.5000mg/L

No	Area	Mean	SD	CV
1	4.159	2.00	0.00	0.00%
2	3.808	2.00	0.00	0.00%
3	3.922	2.00	0.00	0.00%

Acid Add:
Mean Area
SD Area
CV Area



Conc: 1.000mg/L

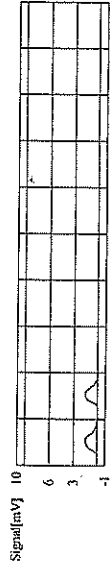
No	Area	Mean	SD	CV
1	6.174	2.00	0.00	0.00%
2	6.210	2.00	0.00	0.00%



TOC-Control L Report

2022_10_03_10_14_02_24.m

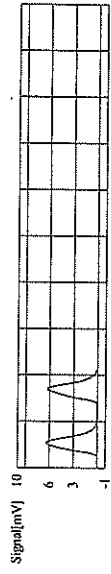
Acid Add:
Mean Area
SD Area
CV Area



Conc: 5.000mg/L

No	Area	Mean	SD	CV
1	23.31	2.00	0.00	0.00%
2	23.34	2.00	0.00	0.00%

Acid Add:
Mean Area
SD Area
CV Area



Conc: 10.00mg/L

No	Area	Mean	SD	CV
1	45.10	2.00	0.00	0.00%
2	45.15	2.00	0.00	0.00%

Acid Add:
Mean Area
SD Area
CV Area



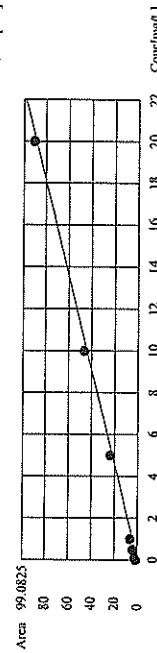
Conc: 20.00mg/L

No	Area	Mean	SD	CV
1	90.44	2.00	0.00	0.00%
2	89.71	2.00	0.00	0.00%

Acid Add:
Mean Area
SD Area
CV Area



Slope:
Intercept:
R²:
RSE (%):
Zero Shift



TOC-Control L Report

2022_10_03_001_PNA02.LIS

Inst. Information

Instrument Options
Catalyst

TOC/AS/IC Unit/
Regular Sensitivity

Sample

Sample Name:
Sample ID:
Origin:
Status:
Chk. Result:

TC 5
Unfilled
TC 0.1 - 20 ppm
Completed

Type	Area	Mean Area	Mean Conc	Signal [mV]	Time [min]
TC	1.000	1.000	1.000	1.000	1.000

1 Del

Anal: TC

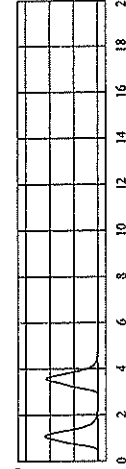
No.	Area	Mean Area	Mean Conc	Signal [mV]	Time [min]
1	24.48	5.530mg/L	5.530mg/L	1.000	1.000
2	24.01	5.425mg/L	5.425mg/L	1.000	1.000

Mean Area

Mean Conc

24.25

5.477mg/L



TOC-Control L Report

2022_10_03_001_PNA02.LIS

Inst. Information

Instrument Options
Catalyst

TOC/AS/IC Unit/
Regular Sensitivity

Sample

Sample Name:
Sample ID:
Origin:
Status:
Chk. Result:

Water
Unfilled
TC 0.1 - 20 ppm
Completed

Type	Area	Mean Area	Mean Conc	Signal [mV]	Time [min]
TC	1.000	1.000	1.000	1.000	1.000

1 Del

Anal: TC

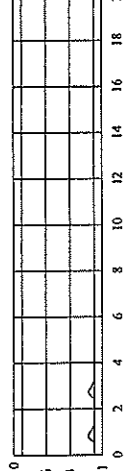
No.	Area	Mean Area	Mean Conc	Signal [mV]	Time [min]
1	2.000	0.431mg/L	0.431mg/L	1.000	1.000
2	1.984	0.430mg/L	0.430mg/L	1.000	1.000

Mean Area

Mean Conc

1.954

0.441mg/L



ภาคผนวก จ

สำเนาหนังสือใบอนุญาตขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน



ที่ อก ๐๓๐๐(๑)/ ๑๐๖ ๙

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๔๐๐

๒๘ มกราคม ๒๕๖๕

เรื่อง ด่วนขอหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แล็บราทอรี่ จำกัด (ประเทศไทย) จำกัด
อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๓๐ กรกฎาคม ๒๕๖๓

สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ แผ่น
๓. ขอบข่ายสารเคมีที่รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๑ แผ่น
ตามที่หนังสือที่อ้างถึง บริษัท เอแอลเอส แล็บราทอรี่ จำกัด (ประเทศไทย) จำกัด ขอต่ออายุ
หนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๑๔ สถานที่ตั้งเลขที่ ๑๐๔
ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร
ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ความเห็น เอแอลเอส แล็บราทอรี่ จำกัด (ประเทศไทย)
จำกัด ต่ออายุหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้
ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖๒ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารเคมีที่รับขึ้นทะเบียนไว้วิเคราะห์ในน้ำเสีย จำนวน ๕๔ รายการ น้ำได้ดิน
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 ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบการคำขอ
ต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นสุดอายุของหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์
เอกชน ซึ่งคำขออยู่ดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

๐๒๒๓
(นายธีระ จันทะโรจกิจ)

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาการแทน
ผู้อำนวยการสำนักงานสิ่งแวดล้อมและเฝ้าระวังมลพิษ
ศูนย์ปฏิบัติการและเฝ้าระวังมลพิษในโรงงานอุตสาหกรรม

กองวิจัยและเฝ้าระวังมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๒๐๒ ๔๔๖๖ ๐ ๒๒๐๒ ๔๐๐๖
โทรสาร ๐ ๒๒๕๔ ๓๒๐๘ ๐ ๒๒๕๔ ๓๔๑๕

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แล็บราทอรี่ จำกัด (ประเทศไทย) จำกัด
ที่ อก ๐๓๐๐(๑)/ ลงวันที่ ๒๘ มกราคม ๒๕๖๕ เลขทะเบียน ๖-๒๐๑๔

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

- ๑) นางสาวยุพพร จันทะโรจกิจ
- ๒) นางสาวจันทะโรจกิจ โสมกุล ฌ นคร
- ๓) นายศรยุทธ จิตรานนท์
- ๔) นางสาวกนกกร เอนก
- ๕) นายสุริยา สอนแก้ว
- ๖) นายวิชาญ ชุมหวัด

๐๒๒๓

(นายธีระ จันทะโรจกิจ)

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาการแทน
ผู้อำนวยการสำนักงานสิ่งแวดล้อมและเฝ้าระวังมลพิษ
ศูนย์ปฏิบัติการและเฝ้าระวังมลพิษในโรงงานอุตสาหกรรม

๗๒) นายสมบุรณ์ บุตรจันทร์ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๑๔
๗๓) นายวิวัฒน์ ไชยนรธา ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๑๕
๗๔) นายอนุเบบน์ เพิ่มพูน ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๑๖
๗๕) นายจิรชัย ขวาละออ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๑๗
๗๖) นายสมโภช วิสาทะ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๑๘
๗๗) นายอัสรี นามบุรี ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๑๙
๗๘) นายณัฐนันท์ ป่าประเสริฐ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๒๐
๗๙) นายศุภราช จอสาทะ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๒๑
๘๐) นายประเสริฐ สุระพันธ์ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๒๒
๘๑) นายณัฐ อิ่มทรัพย์ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๒๓
๘๒) นายพัชรพงษ์ ทองคุณโรธาทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๒๔
๘๓) นายณัฐพล ทองบุษ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๒๕
๘๔) นายอนุวัฒน์ ม่วงแพร่ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๒๖
๘๕) นายเจตตราวุฒิ ปัตตะมะ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๒๗
๘๖) นายณัฐพล สายวรารณ์ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๒๘
๘๗) นายพิชัย บุญจักษ์ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๒๙
๘๘) นายภาณุพงศ์ โสมวงศ์ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๓๐
๘๙) นายสวนกรรณ คุ่มปลี ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๓๑
๙๐) นายสัณฐิธ โคศรีนาม ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๓๒
๙๑) นายณัฐวุฒิ ศรีประเสริฐ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๓๓
๙๒) นายชวลิตชัย นาคหอม ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๓๔
๙๓) นายพงษ์ธร ชัยทิพย์ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๓๕
๙๔) ว่าที่ร้อยตรี ภาณุพงศ์ แสนศรี ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๓๖
๙๕) นายสิทธิโชค หาดสีดา ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๓๗
๙๖) นายอนากา อินสุตา ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๓๘
๙๗) นางสาววรรณิษา ขาติวันชัย ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๓๙
๙๘) นางสาวพิมพ์ตะวัน มีมากุล ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๔๐
๙๙) นางสาวเพชรรัตน์ สิงห์สมบัติ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๔๑
๑๐๐) นางสาวณัฐนันท์ พรหมจันทร์ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๔๒
๑๐๑) นายภักดี ทวีราช ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๔๓
๑๐๒) นายจักริน นันทวิสา ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๔๔
๑๐๓) นายฉัตรชัย สุขเปีย ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๔๕
๑๐๔) นายณรรณนทร์ ต๊ะทองคำ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๔๖
๑๐๕) นายศุภพล สมนอก ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๔๗
๑๐๖) นายทักษ์ดนัย อุบลศรี ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๔๘
๑๐๗) นายธนากร นานะบุญมา ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๔๙
๑๐๘) นายอิทธิพงศ์ บัวแดง ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๕๐

(นายศิระ จันทร์เลิศ) ๑๐๙) นายณนพชัย...
ผู้มีอำนาจลงนามและติดต่อกับผู้เกี่ยวข้อง
เป็นหลักฐาน

๑๐๙) นายณนพชัย อุบลรัตน์ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๕๑
๑๑๐) นายณัฐพล คุณสุทธิ์ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๕๒
๑๑๑) นายณัฐนันท์ สรริน ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๕๓
๑๑๒) นายปิยะนัฐ พลชนะศรี ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๕๔
๑๑๓) นายพงษ์สิริ โสมชัยวาทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๕๕
๑๑๔) นายพัชรพัฒน์ กำคำ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๕๖
๑๑๕) นายภาณุพงศ์ มานิตย์ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๕๗
๑๑๖) นายมงคล ผลาทิพย์ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๕๘
๑๑๗) นายณัฐนันท์ พุทธิศรี ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๕๙
๑๑๘) นายสิริเมธ ทองอัม ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๖๐
๑๑๙) นายอนนชา ทับสมัย ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๖๑
๑๒๐) นายอติศักดิ์ ฌมไผ่ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๖๒
๑๒๑) นายอนันต์ชัย วิสุม ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๖๓
๑๒๒) นายณัฐดนัย เจือละของ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๖๔
๑๒๓) นายวรวิฑูร์ ตีนัก ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๖๕
๑๒๔) นายแสงตะวัน มะตะขิด ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๖๖
๑๒๕) นายยุทธิพงษ์ รัตนะ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๖๗
๑๒๖) นายชัยวุฒิ ไชยชนะกิจ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๖๘
๑๒๗) นายวิศรุต ศรีธรรมมา ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๖๙
๑๒๘) นายณนทกร เกื้อทอง ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๗๐
๑๒๙) นายกำชัย สุทธะ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๗๑
๑๓๐) นางสาวณัฐภรณ์ รักทะเล ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๗๒
๑๓๑) นางสาวประภาภรณ์ บุตรพรหม ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๗๓
๑๓๒) นางสาวนิลาวัลย์ นามพรม ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๗๔
๑๓๓) นางสาวพัชรินทร์ แนนสร้อย ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๗๕
๑๓๔) นายไพรัชย์ เจริญพิมาย ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๗๖
๑๓๕) นางสาวสุภาภค ทองมาก ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๗๗
๑๓๖) นางสาวลลิตา จิตรสว่าง ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๗๘
๑๓๗) นางสาวไพบร เลิกอุทัยวาทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๗๙
๑๓๘) นางสาวกฤติมาพร คำแม่เกน ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๘๐
๑๓๙) นางสาวสุกฤติณ ภาณุภูมิ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๘๑
๑๔๐) นางสาวภาณุจินา คงคุณ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๘๒
๑๔๑) นางสาวไพโรจน์ ศรีภูมิ ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๘๓
๑๔๒) นางสาวทิพนพร ผุสปัญญา ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๘๔
๑๔๓) นางสาวสาธิตา ปานทอง ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๘๕
๑๔๔) นางสาวอริสา ทองวาล ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๘๖
๑๔๕) นางสาวธรรยา คำล้อย ทะเบียนเลขที่ ๖-๒๐๔-จ-๗๕๘๗

(นายศิระ จันทร์เลิศ) ๑๔๖) นางสาวสุดาภรณ์...
ผู้มีอำนาจลงนามและติดต่อกับผู้เกี่ยวข้อง
เป็นหลักฐาน

- ๑๕๖) นางสาวสุภาภรณ์ สมุทรสนาม
๑๕๗) นางสาวสุภาภรณ์ นนทบุรี
๑๕๘) นางสาววันกร เมียมกลาง
๑๕๙) นางสาวกัญญารัตน์ ศรีนิลา
๑๖๐) นางสาวอัญชลี คำจันทร์
๑๖๑) นายอนุชิต ธีรมาศ
๑๖๒) นายศิริวัฒน์ พานิชย์
๑๖๓) นางสาวสุภาภรณ์ ปันมูรา
๑๖๔) นางสาวพาณี คุณมาน
๑๖๕) นางสาวจิราเจต พ้องดา
๑๖๖) นางสาวกนกภรณ์ ฤๅ
๑๖๗) นางสาวอารยา มีชัย
๑๖๘) นางสาวจิตสุภา ประเทืองสุข
๑๖๙) นางสาวอริสา วัชรินทร์ธรรม
๑๗๐) นางสาววิชุดา นาคเจริญ
๑๗๑) นางสาวพนิดา ยอดอินทร์
๑๗๒) นางสาวนันทิยา จันทะสุน




(นายจิระ จันทะสุน)
ผู้อำนวยการกองบริหารงาน
ผู้ชำนาญการพิเศษและผู้อำนวยการ
ปฏิบัติการแผนงานและโครงการพิเศษ

เอกสารแนบท้ายหนังสือรับข้อบัญญัติการวิเคราะห์
บริษัท เอนเทล แลปทอริ กรุ๊ป (ประเทศไทย) จำกัด
ที่ กก ๐๓๑๐(๑)/ ๑๐๖๕ ลงวันที่ ๒๘ มกราคม ๒๕๖๕
เลขทะเบียน ๖-๒๐๔

ขอข่ายสารเคมีที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๖๑ รายการ

แนบท้าย จำนวน 59 รายการ

ลำดับที่	สารเคมี	วิธีการ
1	Aldicarb	High-Performance Liquid Chromatographic Method ^(a)
2	Aldicarb Sulfone	High-Performance Liquid Chromatographic Method ^(a)
3	Aldicarb Sulfoxide	High-Performance Liquid Chromatographic Method ^(a)
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
5	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
6	Barium	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
7	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
8	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
9	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
10	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
11	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method ^(a) 2) 5-Day BOD Test, Membrane Electrode Method ^(a)
12	Carbaryl	High-Performance Liquid Chromatographic Method ^(a)
13	Carbofuran	High-Performance Liquid Chromatographic Method ^(a)
14	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
15	Chemical Oxygen Demand	1) Closed Reflux, Colorimetric Method ^(a) 2) Closed Reflux, Titrimetric Method ^(a)
16	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
17	Chromium	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(a)
18	Color	ADMI Weighted-Ordinate Spectrophotometric Method


(นางจิระ จันทะสุน)
ผู้อำนวยการแผนงานและโครงการพิเศษ
และระเบียบข้อบังคับ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
19	Copper	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
20	Cyanide	Distillation, Colorimetric Method ^(a)
21	2,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
22	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
23	2,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
24	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
25	2,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
26	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
27	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
28	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
29	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
30	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
31	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
32	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
33	Formaldehyde	Distillation, Colorimetric Method ^(a)
34	Free Chlorine	1) DPD Ferrous Titrimetric Method ^(a) 2) Iodometric Method ^(a)
35	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
36	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
37	Hexavalent Chromium	Filtration, Colorimetric Method ^(a)
38	3-Hydroxycarbofuran	High-Performance Liquid Chromatographic Method ^(a)
39	Lead	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
40	Manganese	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
41	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
42	Methiocarb	2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
43	Methoxychlor	High-Performance Liquid Chromatographic Method ^(a) Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)

3 Aldrin...

วิธีวิเคราะห์

(นางวิภาดา บุญเลิศ) ผู้ดำเนินการทดสอบ
ผู้ดำเนินการทดสอบ (นางวิภาดา บุญเลิศ)
ผู้ดำเนินการทดสอบ (นางวิภาดา บุญเลิศ)

ลำดับที่	สารเคมี	วิธีวิเคราะห์
44	Methomyl	High-Performance Liquid Chromatographic Method ^(a)
45	Nickel	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ^(a) 2) Soxhlet Extraction Method ^(a)
47	Oxamyl	High-Performance Liquid Chromatographic Method ^(a)
48	Propoxur	High-Performance Liquid Chromatographic Method ^(a)
49	pH	Electrometric Method ^(a)
50	Phenols	1) Distillation, Chloroform Extraction Method ^(a) 2) Distillation, Direct Photometric Method ^(a)
51	Selenium	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
52	Sulfide	Iodometric Method ^(a)
53	Temperature	Laboratory and Field Methods ^(a)
54	Total Dissolved Solids	Dried at 180 °C ^(a)
55	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ^(a)
56	Total Suspended Solids	Dried at 103-105 °C ^(a)
57	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic Method ^(a)
58	Trivalent Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ^(a)
59	Zinc	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)

หน้าใช้ซ้ำ จำนวน 126 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)

วิธีวิเคราะห์

(นางวิภาดา บุญเลิศ) ผู้ดำเนินการทดสอบ
ผู้ดำเนินการทดสอบ (นางวิภาดา บุญเลิศ)
ผู้ดำเนินการทดสอบ (นางวิภาดา บุญเลิศ)

ลำดับที่	สารเคมี	วิธีวิเคราะห์
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
8	Barium	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
13	Benzoic Acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)

วิธีวิเคราะห์

18 Bis(2-ethylhexyl)phthalate...

(เบซิลิกายูเรนัล ดีคัลกิวลิได)
ผู้ดำเนินการศูนย์มาตรฐานวิธีวิเคราะห์การทดสอบเคมี
กรมวิทยาศาสตร์สิ่งแวดล้อม

ลำดับที่	สารเคมี	วิธีวิเคราะห์
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
22	Butyl Benzyl Phthalate	Mass Spectrometric Method ^(a)
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)

วิธีวิเคราะห์

34 Chromium (III)...

(เบซิลิกายูเรนัล ดีคัลกิวลิได)
ผู้ดำเนินการศูนย์มาตรฐานวิธีวิเคราะห์การทดสอบเคมี
กรมวิทยาศาสตร์สิ่งแวดล้อม

- บ -

ลำดับที่	สารเคมี	วิธีวิเคราะห์
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^(a) 2) Digestion, inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ^(a)
35	Chromium (VI)	Colorimetric Method ^(a)
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
37	Cyanide	Distillation, Colorimetric Method ^(a)
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
39	DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
40	DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
41	DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
43	Di-n-Butyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
47	3,3-Dichlorobenzidine	Mass Spectrometric Method ^(a)
48	1,1-Dichloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)

51 cis-1,2-Dichloroethylene...

สำนักงานคณะกรรมการอาหารและยา
(นางวิภาดา จิตตฤทธิกุล)

- ค -

ลำดับที่	สารเคมี	วิธีวิเคราะห์
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
57	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
58	Diethyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
63	Di-n-Octyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)

68 Fluorene...

สำนักงานคณะกรรมการอาหารและยา
(นางวิภาดา จิตตฤทธิกุล)

ลำดับที่	สารเคมี	วิธีวิเคราะห์
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
69	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
70	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
74	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
75	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
76	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
81	Lead	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
83	Mercury	1) Cold Vapor Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾

84 Methanol...

Signature
(นางธิษฏาญ์ อัครกุลวิไล)
ผู้อำนวยการศูนย์บริการวิเคราะห์ทดสอบกลาง
กรมส่งเสริมการค้าระหว่างประเทศ

ลำดับที่	สารเคมี	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⁾

Signature
97 Pentachlorophenol...

(นางธิษฏาญ์ อัครกุลวิไล)
ผู้อำนวยการศูนย์บริการวิเคราะห์ทดสอบกลาง
กรมส่งเสริมการค้าระหว่างประเทศ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
98	pH	Electrometric Method ^(a)
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
100	Phenol	1) Distillation, Direct Photometric Method ^(a) 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
102	Selenium	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
103	Silver	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
109	TPH (C ₅ -C ₆)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
110	TPH (C ₈ -C ₁₀)	Solvent Extraction, Gas Chromatographic Method ^(a)
111	TPH (C ₁₀ -C ₃₀)	Solvent Extraction, Gas Chromatographic Method ^(a)
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)

114 1,1,2-Trichloroethane...

Signature
(นางวิภาดาญจน์ อัครกุลวุฒิไค)
ผู้อำนวยการศูนย์ปฏิบัติการระดับเขตและจังหวัด
และระดับท้องถิ่น

ลำดับที่	สารเคมี	วิธีวิเคราะห์
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(a)
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)
120	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
121	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
122	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
123	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
124	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(a)
126	Zinc	1) Digestion, Inductively Coupled Plasma Method ^(a) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(a)

หมายเหตุ: (เปลี่ยนรายชื่อ) จำนวน 16 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Antimony	Isokinetic, Digestion, Inductively Coupled Plasma Method ^(a)
2	Arsenic	Isokinetic, Digestion, Inductively Coupled Plasma Method ^(a)

Signature
3 Carbon Monoxide...

(นางวิภาดาญจน์ อัครกุลวุฒิไค)
ผู้อำนวยการศูนย์ปฏิบัติการระดับเขตและจังหวัด
และระดับท้องถิ่น

ลำดับที่	สารเคมี	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]
5	Copper	2) Isokinetic Sampling, Ion Chromatographic Method ^[5] 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]
8	Hydrogen Sulfide	2) Isokinetic Sampling, Ion Chromatographic Method ^[5]
9	Lead	Absorption Sampling, Iodometric Method ^[5] Isokinetic, Digestion, Inductively Coupled Plasma Method ^[5]
10	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[5]
11	Opacity	2) Isokinetic, Digestion, Inductively Coupled Plasma Method ^[5]
12	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ^[5]
13	Sulfur Dioxide	2) Chemiluminescence Method ^[5] 3) Instrumental Analyzer Method ^[5]
14	Sulfuric Acid	1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 2) UV Fluorescence Method ^[5] 3) Instrumental Analyzer Method ^[5]
15	Total Suspended Particulate	Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5]
16	Xylene	Isokinetic Sampling, Gravimetric Method ^[5] Adsorption Sampling, Gas Chromatographic Method ^[5]

สัญญา

สัญญา

(นางธิษฐาน ธีรสุภาวดี)

ผู้อำนวยการศูนย์การศึกษานานาชาติเพื่อการพัฒนา

๒๕๖๓-๒๕๖๔

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,2,3] 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 ^[1,6,13] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,13] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,13] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,13] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,13] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,13] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,13] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,13] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]

6 Cadmium...

สัญญา

(นางธิษฐาน ธีรสุภาวดี)

ผู้อำนวยการศูนย์การศึกษานานาชาติเพื่อการพัฒนา

๒๕๖๓-๒๕๖๔

ลำดับที่	สารเคมี	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 ^(7.13) 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 ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(2.23.1)
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 ^(7.13) 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)

Signature

11 Cobalt...

(นางริกาญจน์ ถักรกุลวิไล)

ผู้อำนวยการศูนย์ปฏิบัติการวิเคราะห์ของกลาง
กรมวิทยาศาสตร์บริการ

ลำดับที่	สารเคมี	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 ^(7.13) 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 ^(7.13) 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 ^(2.23.1)
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 ^(2.23.1)
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 ^(2.23.1)
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25)

Signature

2) Soxhlet...

(นางริกาญจน์ ถักรกุลวิไล)

ผู้อำนวยการศูนย์ปฏิบัติการวิเคราะห์ของกลาง
กรมวิทยาศาสตร์บริการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Dieldrin	2) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁰²²⁾ 3) Automated Soxhlet Extraction, Gas Chromatographic Method ⁽²²³¹⁾ 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁹²⁵⁾ 2) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁰²²⁾ 3) Automated Soxhlet Extraction, Gas Chromatographic Method ⁽²²³¹⁾
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁹²⁵⁾ 2) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁰²²⁾ 3) Automated Soxhlet Extraction, Gas Chromatographic Method ⁽²²³¹⁾
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁹²⁵⁾ 2) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁰²²⁾ 3) Automated Soxhlet Extraction, Gas Chromatographic Method ⁽²²³¹⁾
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ⁽¹⁶¹⁵⁾ 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽¹⁶¹⁶⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁷¹⁵⁾ 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁷¹⁶⁾
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁹²⁵⁾ 2) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁰²²⁾ 3) Automated Soxhlet Extraction, Gas Chromatographic Method ⁽²²³¹⁾
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁶¹⁸⁾

2) Waste Extraction...

วิธีวิเคราะห์

(นางธิยาญจน์ อัครฤทธิไค)

ผู้ควบคุมการปฏิบัติงานวิเคราะห์ในห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Methoxychlor	2) Waste Extraction, Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ⁽¹⁶¹⁹⁾ 3) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽¹⁴²⁰⁾ 4) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁶⁾ 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ⁽¹⁹⁾ 6) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽²⁰⁾ 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁹²⁵⁾ 2) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁰²²⁾ 3) Automated Soxhlet Extraction, Gas Chromatographic Method ⁽²²³¹⁾
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁹²⁵⁾ 2) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁰²²⁾ 3) Automated Soxhlet Extraction, Gas Chromatographic Method ⁽²²³¹⁾
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ⁽¹⁶¹⁵⁾ 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽¹⁶¹⁶⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁷¹⁵⁾ 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁷¹⁶⁾
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ⁽¹⁶¹⁵⁾ 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽¹⁶¹⁶⁾ 3) Digestion, Inductively Coupled Plasma Method ⁽⁷¹⁵⁾ 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁷¹⁶⁾

วิธีวิเคราะห์

(นางธิยาญจน์ อัครฤทธิไค)

ผู้ควบคุมการปฏิบัติงานวิเคราะห์ในห้องปฏิบัติการ

27 Polychlorinated...

ลำดับที่	สารเคมี	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',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',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 ^(23,31)

วิธีแปล
(นางวิภาดาญ์ อัครฤทธิไกร)
ผู้อำนวยการศูนย์มาตรฐานวิธีวิเคราะห์ทางพิษวิทยา

28 Pentachlorophenol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
28	Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,23) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,23) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(23,31)
29	pH	Electrometric Method ^(23,30)
30	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,13) 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 ^(1,9,23) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,23) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(23,31)
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)

วิธีแปล
(นางวิภาดาญ์ อัครฤทธิไกร)
ผู้อำนวยการศูนย์มาตรฐานวิธีวิเคราะห์ทางพิษวิทยา

4) Digestion...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
35	Zinc	4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.16) 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.13) 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	สารเคมี	วิธีวิเคราะห์
1	Acenaphthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14.24)
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
4	Anthracene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ^(7.15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.16)
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^(7.15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.16)
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
8	Barium	1) Digestion, Inductively Coupled Plasma Method ^(7.15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.16)

9 Benz(a)anthracene...

วิธีวิเคราะห์

(นางวิภาดา บุญ อัครฤทธิกุล)

ผู้อำนวยการศูนย์ปฏิบัติการวิเคราะห์ทดสอบดิน

ลำดับที่	สารเคมี	วิธีวิเคราะห์
9	Benz(a)anthracene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
10	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14.24)
11	Benzo(b)fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
12	Benzo(k)fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
13	Benzoic acid	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
14	Benzo(a)pyrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
15	Benzo(g,h,i)perylene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^(7.15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.16)
17	Bis(2-chloroethyl)ether	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
18	Bis(2-ethylhexyl)phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14.24)
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14.24)
21	Butanol	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^(12.24)
22	Butyl Benzyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^(7.15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7.16)
24	Carbazole	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14.24)

26 Carbon tetrachloride...

วิธีวิเคราะห์

(นางวิภาดา บุญ อัครฤทธิกุล)

ผู้อำนวยการศูนย์ปฏิบัติการวิเคราะห์ทดสอบดิน

ลำดับที่	สารเคมี	วิธีวิเคราะห์
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,20)
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 ^(14,20)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,20)
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,20)
32	2-Chlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,16)
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,15,17) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,16,17)
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^(8,17)
36	Chrysene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
37	Cyanide	Extraction, Distillation, Colorimetric Method ^(26,27,28)
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
39	DDD	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)

40 DDE...

Signature
(นางวิภาดา ชัยพรกุล)

ผู้อำนวยการศูนย์ฯ/หัวหน้าสำนักงานสิ่งแวดล้อม

ลำดับที่	สารเคมี	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)

57 Dieldrin...

Signature
(นางวิภาดา ชัยพรกุล)

ผู้อำนวยการศูนย์ฯ/หัวหน้าสำนักงานสิ่งแวดล้อม

ลำดับที่	สารเคมี	วิธีการวิเคราะห์
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...

พินิติ

๒. คณะกรรมการส่งเสริมวิสาหกิจขนาดเล็ก

ลำดับที่	สารเคมี	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/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⁾

Leads

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ผู้ดำเนินการกลุ่มมาตรฐานวิชาชีพสหกรณ์แห่งชาติ

2) Thermal...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
84	Methanol	2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry ^(1,19) 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 ^(14,20)
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,20)
88	2-methylphenol	Mass Spectrometric Method ^(14,20) 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 ^(14,20)
91	Naphthalene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ^(7,19) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
93	Nitrobenzene	Mass Spectrometric Method ^(7,16) 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)

วิธีใหม่
(นางริกาญจน์ ฉัตรสุตวิไล)

ผู้ดำเนินการกลุ่มงานวิชาการด้านวิทยาศาสตร์สุขภาพ

- Aroclor 1242...

ลำดับที่	สารเคมี	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 Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5'-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5',6'-Heptachlorobiphenyl - 2,2',3,4',5,5',6'-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6'-Nonachlorobiphenyl Pentachlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
97	Phenanthrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
98	Phenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
100	Pyrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)

วิธีใหม่
(นางริกาญจน์ ฉัตรสุตวิไล)

ผู้ดำเนินการกลุ่มงานวิชาการด้านวิทยาศาสตร์สุขภาพ

101 Selenium...

ลำดับที่	สารเคมี	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 ^(10.21) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25.31)
108	TPH (C ₅ -C ₆)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14.24)
109	TPH (C ₅ -C ₁₆)	1) Solvent Extraction, Gas Chromatographic Method ^(11.21) 2) Automated Soxhlet Extraction, Gas Chromatographic Method ^(21.31)
110	TPH (C ₅ -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)

116 2,4,6-Trichlorophenol...

(นางจิรกัญจน์ ฉัตรสุตวิไล)
ผู้อำนวยการศูนย์มาตรฐานวิธีวิเคราะห์ทางเคมี

ลำดับที่	สารเคมี	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)

เอกสารอ้างอิง

- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2548. เรื่อง การกำจัดสิ่งปฏิกูลหรือ
วัสดุที่ไม่ใช้แล้ว.ราชกิจจานุเบกษา. 25 มกราคม 2549. เล่มที่ 123 ตอนพิเศษ 114.
- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเมฆา
ควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใกล้เคียงให้เป็นเชื้อเพลิง.
ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125จ.
- สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ:
เรียนแก้วการพิมพ์, 2547.
- APHA, AWWA, WEF. Standard Methods for the Examination of Water and
Wastewater. 23rd ed. Washington, DC: APHA, 2017.
- United States Environmental Protection Agency. Standards of Performance for
New Stationary Sources. 40 CFR 60. Appendix A, 2019.
- United States Environmental Protection Agency. Test Methods for Evaluation
Solid Waste Physical/Chemical Methods. SW-846, 1997.

(นางจิรกัญจน์ ฉัตรสุตวิไล)
ผู้อำนวยการศูนย์มาตรฐานวิธีวิเคราะห์ทางเคมี

7. United States...

7. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Acid Digestion of Sludges and Sediments and Soils. SW-846 Method 3050B, 1996.
8. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Alkaline Digestion for Hexavalent Chromium. SW-846 Method 3060A, 1996.
9. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Separatory Funnel Liquid-Liquid Extraction. SW-846 Method 3510C, 1996.
10. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Soxhlet Extraction. SW-846 Method 3540C, 1996.
11. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Microscale Solvent Extraction (MSE). SW-846 Method 3570, 2002.
12. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Volatile Organic Compounds (VOCs) in Various Sample Matrices Using Equilibrium Headspace Analysis. SW-846 Method 5021A, 2014.
13. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Purge-and-Trap for Aqueous Samples. SW-846 Method 5030B, 1996.
14. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. SW-846 Method 5035, 1996.
15. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Inductively Coupled Plasma- Atomic Emission Spectrometry. SW-846 Method 6010B, 1996.
16. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Inductively Coupled Plasma-Mass Spectrometry. SW-846 Method 6020A, 2007.
17. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Chromium, Hexavalent (Colorimetric). SW-846 Method 7196A, 1992.
18. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique). SW-846 Method 7471B, 2007.
19. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Mercury in Solids and Solutions by Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry. SW-846 Method 7473, 2007
20. United States...

วิมล
(นางวิมล วัชรกุลวิไล)

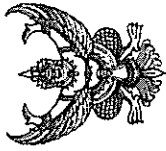
ผู้อำนวยการศูนย์มาตรฐานวิธีการตรวจวัดคุณภาพสิ่งแวดล้อม
กรมควบคุมมลพิษ

20. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Mercury in Sediment and Tissue Sample by Atomic Fluorescence Spectrometry. SW-846 Method 7474, 2007.
21. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Nonhalogenated Organics Using GC/FID. SW-846 Method 8015B, 1996.
22. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Organochlorine Pesticides by Gas Chromatography. SW-846 Method 8081B, 2007.
23. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Polychlorinated Biphenyls (PCBs) by Gas Chromatography. SW-846 Method 8082, 1996.
24. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). SW-846 Method 8260D, 2018.
25. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). SW-846 Method 8270E, 2018.
26. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Total and Amenable Cyanide: Distillation SW-846 Method 9010B, 1996.
27. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Cyanide Extraction Procedure for Solids and Oil. SW-846 Method 9013A, 1996.
28. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Cyanide in Waters and Extracts Using Titrimetric and Manual Spectrophotometric Procedures. SW-846 Method 9014, 2014.
29. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. pH Electrometric Measurement. SW-846 Method 9040C, 2004.
30. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Soil and Waste pH. SW-846 Method 9045D, 2004.
31. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Automated Soxhlet Extraction. SW-846 Method 3541, 1994.

วิมล
(นางวิมล วัชรกุลวิไล)

ผู้อำนวยการศูนย์มาตรฐานวิธีการตรวจวัดคุณภาพสิ่งแวดล้อม
กรมควบคุมมลพิษ

กลุ่มมาตรฐานวิธีการตรวจวัดคุณภาพสิ่งแวดล้อมและระบบห้องปฏิบัติการ กองวิจัยและพัฒนาสิ่งแวดล้อมทางน้ำ กรมโรงงานอุตสาหกรรม โทร. ๐ ๒๖๒๖ ๔๐๐๖, ๔๑๔๖



ที่อก ๐๓๐๑(๗)/ ๒๔ ๗๐

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
กรุงเทพมหานคร ๑๐๕๐๐

๒๔ มิถุนายน ๒๕๖๕

เรื่อง ขันทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอลแอล แลอบราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๔ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอลแอล แลอบราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอลแอล แลอบราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำ
ห้องปฏิบัติการวิเคราะห์ และรายการสารเคมีที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอลแอล แลอบราทอรี กรุ๊ป
(ประเทศไทย) จำกัด ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ๖-๒๒๓ สถานที่ตั้งเลขที่
๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่ไม้ อำเภอลำปาง จังหวัดพะเยา โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายเดช จ้างชน ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๒

๒) นางวิลาวัลย์ บริรักษ์ ทะเบียนเลขที่ ๖-๒๒๓-ค-๙๔๕๓

๓) นายสุพจน์ สลามเต๊ะ ทะเบียนเลขที่ ๖-๒๒๓-ค-๙๔๕๔

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นางสาวณมิต บรจรงกิจ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๕

๒) นางพจนา สีตา ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๖

๓) นางสาวนิตา กุลสุวัจน ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๗

๔) นายพิทยา ทองแดง ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๘

๕) นางธณิชา สุนงาช ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๙

๖) ว่าที่ ร.ต.รมย์ ม่วงมา ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๐

๗) นายวรารุณ ทัพพา ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๑

๘) นายศักดิ์รินทร์ จรัสกาย ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๒

๙) นายสุวัจน์ สาจีน ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๓

๑๐) นางสาวเพชรคุณ กาวตานนท์ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๔

๑๑) นายสถาพร อาแก้ว ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๕

๑๒) นายสุพจน์ดำรง ไชยรัตน์ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๖

๑๓) นายวัลลภ...

๑๓) นายวัลลภ หันไชยเนาว์ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๗
๑๔) นางสาววราลี เจริญตระกูล ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๘
๑๕) นางสาวนิตา ผดุงจิตต์ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๕๙
๑๖) นายธนสิทธิ์ วงศ์ไชย ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๖๐
๑๗) นายชัยสุรินทร์ เลิศนันทกุลชัย ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๖๑
๑๘) นายสังจา เพ็ชรแสง ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๖๒
๑๙) นายกณณมณี มณีสัมพันธ์ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๖๓
๒๐) นางสาวจันทิพย์ โทณะนยะ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๖๔
๒๑) นายกรนิษฐ์ อธิกจินดา ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๖๕
๒๒) นายศุภณัฐ พิสัยพันธ์ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๖๖
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๒๕) นายไสว คันโพธิ์ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๖๙
๒๖) นางสาวกิตติยา สัตยาอริยาภรณ์ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๗๐
๒๗) นางสาวณงษ์พร ศรีบุญเรือง ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๗๑
๒๘) นางสาวณัฐรินทร์ สิงห์งาม ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๗๒
๒๙) นางสาวธิดารัตน์ ศรีมงคลโร ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๗๓
๓๐) นายพิพัฒน์ นิภัทร์ศรีธรรม ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๗๔
๓๑) นายศิริวิทย์ เรืองลม ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๗๕
๓๒) นายปารามศ สัตยาคุณ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๗๖
๓๓) นายณนุภา ธรรมสโร ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๗๗
๓๔) นางสาวกฤตน์ ไสจันทร์ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๗๘
๓๕) นายพชรกร อินทเลนา ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๗๙
๓๖) นายทิวากร เชื้อมก ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๘๐
๓๗) นายอนุรักษ์ ทองจงศักดิ์ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๘๑
๓๘) นายอภิชาติ วิชา ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๘๒
๓๙) นายจรัสวี ศรีรักษา ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๘๓
๔๐) นายประสานมิตร เทียนเพชร ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๘๔
๔๑) นายภาณุวัฒน์ วัจิง ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๘๕
๔๒) นายสันติ ชัยชนะ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๘๖
๔๓) นายสิทธิชัย นวีกฤฑ์ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๘๗
๔๔) นายทินกร กุลาชาติ ทะเบียนเลขที่ ๖-๒๒๓-จ-๙๔๘๘

ค. ขอขำสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๑๔ รายการ
อากาศเสีย (ปล่องระบาย) จำนวน ๗ รายการ และน้ำใต้ดิน จำนวน ๓ รายการ รวมทั้งสิ้นจำนวน ๒๔ รายการ
ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้อายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์
จะต่ออายุหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบ
คำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือขึ้นทะเบียนห้องปฏิบัติการ
วิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นางสิริน จิตกานต์)
ผู้อำนวยการกองวิจัยและพัฒนาเครื่องมือวัดโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๒๘ มิ.ย. ๒๕๖๕

กองวิจัยและพัฒนาเครื่องมือวัดพิษโรงงาน
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๘๐๕ ๗๒๖๑-๓
ไปรษณีย์อิเล็กทรอนิกส์: einfo@divn.mae.go.th

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แล็บอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๓๒๓
ที่ อก ๐๓๐(๓)/ ๖๔ ๗๐ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๕

ขอจ่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ

นับเสียจำนวน 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]

ขอจ่ายเสีย (ไม่ลงระยะขาย) 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-Thiorin Titrimetric Method ^[9] 2) Instrumental Analyzer Method ^[10]

วิไล สันสุภะ
(นางสาววิชุดา สัมฤทธิ์ผล)

ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

Sulfuric Acid...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
6	Sulfuric Acid	Isokinetic Sampling, Barium – Thorin Titrimetric Method ^[6]
7	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ^[7]

น้ำใต้ดิน จำนวน 3 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method ^[21]
2	pH	Electrometric Method ^[21]
3	Phenols	Distillation, Direct Photometric Method ^[21]

เอกสารอ้างอิง

1. องค์การอนามัยโลก และยูเอสนีส์. วิสัชนา. (2547) คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย.
2. APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 23rd ed. Washington, DC : APHA, 2017
3. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเคมีภัณฑ์ที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อไอน้ำที่ใช้ถ่านหินเป็นเชื้อเพลิง. ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.
4. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเคมีภัณฑ์ที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อไอน้ำของโรงงาน. ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.
5. United States Environmental Protection. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A. 2017.
6. United States Environmental Protection. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2019.
7. United States Environmental Protection. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2020.
8. United States Environmental Protection Agency. Determination of Carbon Monoxide Emissions from Stationary Sources; Instrumental Analyzer Procedure. 40 CFR 60. Appendix A Method 10, 2017.
9. United States Environmental Protection Agency. Determination of Oxide of Nitrogen Emissions from Stationary Sources; Instrumental Analyzer Procedure. 40 CFR 60. Appendix A Method 7E, 2019.
10. United States Environmental Protection Agency. Determination of Sulfur Dioxide Emissions from Stationary Sources; Instrumental Analyzer Procedure. 40 CFR 60. Appendix A Method 6C, 2017.

วิรัตน์ สันกุล
(นางสาววิจิตา สันกุลเชิด)

ผู้อำนวยการ

ศูนย์วิจัยและพัฒนาศักยภาพโรงงานภาคตะวันออก

ศูนย์วิจัยและพัฒนาศักยภาพโรงงานภาคตะวันออก กองวิจัยและพัฒนาศักยภาพโรงงาน กรมโรงงานอุตสาหกรรม โทร ๐ ๒๕๐๕ ๗๖๖๓