

ภาคผนวก ค

ใบรับรองผลการตรวจวิเคราะห์
ผลกระทบสิ่งแวดล้อม



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107054
Date Received : Oct 21, 2022
Date Reported : Oct 25, 2022
Report Number : 2418781-1

Page 1 of 1

Sample Number	22107054-1	Stack Description	
Sample Description	Emission from Stationary Source		
Location	HRSGs 1		
Measurement Date	Oct 21, 2022		
Ambient Temperature	30 °C	Diameter	3.30 m
Ambient Pressure	758 mmHg	Shape	Circle
Type of Process	Combustion	Stack Temperature	132 °C
Type of Fuel	Natural Gas	Moisture	8.84 %
		Oxygen	13.62 %
		Carbon dioxide	4.26 %
		Gas Velocity	19.69 m/s
		Flow Rate	405238 Nm ³ /hr
Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)
1	11:40 AM - 12:00 PM	13.62	4.26
2	12:01 PM - 12:31 PM	13.62	4.26
3	12:32 PM - 12:42 PM	13.62	4.26
Average (ppm)		13.62	4.26
Guideline (ppm)		-	26.58
Guideline (ppm)		-	120
Guideline (ppm)		-	120
Result (mg/m ³)		17.06	32.58
Emission Rate at Actual O ₂ (g/s)		1.9199	0.6054
Emission Rate (g/s)		3.000	0.255
Method		US EPA Method 7E	US EPA Method 6C

Sampled By : Sakot Phaisanphut

Guideline :
1) Environmental Impact Assessment Report of Global Power Synergy Public Company Limited (CUP 4)
2) Notification of the Ministry of Industry on determining pollutant contents in air emitted from electric power generation, transmission and distribution plant, 2004 (B.E. 2547), dated September, 2004 (B.E. 2547).
3) Notification of the Ministry of Natural Resources and Environment, 2010 (B.E. 2553) on Emission Standard from New Power Plants.

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Analysis / Test Report



TESTING
No.0042

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107063
Date Received : Oct 21, 2022
Date Reported : Oct 28, 2022
Report Number : 2418790-1

Page 1 of 2

Sample Number	22107063-1	Stack Description	
Sample Date	Oct 21, 2022		
Sample Description	Emission from Stationary Source		
Location	HRSGs 1		
Date Analysis Commenced	Oct 22, 2022		
Condition of Sample	Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one amber plastic bottle, refrigerated		
Ambient Pressure	758 mmHg	Diameter	3.30 m
Ambient Temperature	30.0 °C	Shape	Circle
Type of Process	Combustion	Stack Temperature	132 °C
Type of Fuel	Natural Gas	Moisture	8.83 %
		Oxygen	13.6 %
		Carbon Dioxide	4.3 %
		Gas Velocity	19.7 m/s
		Flow Rate (Actual O ₂)	404805 Nm ³ /hr
Analyte	Sampled Time	Unit	LOD
Air Testing			
Total Suspended Particulate	11:45 AM - 12:33 PM	mg/m ³	0.5
Guideline (1)			60
Guideline (2)			7.108
Method			US EPA Method 5
Testing Location			Rayong

Guideline (1) : Notification of the Ministry of Industry on determining pollutant contents in air emitted from electric power generation, transmission and distribution plant, 2004 (B.E. 2547), dated September, 2004 (B.E. 2547).
Notification of the Ministry of Natural Resources and Environment, 2010 (B.E. 2553) on Emission Standard from New Power Plants.

Guideline (2) : Environmental Impact Assessment Report of Global Power Synergy Public Company Limited. (CUP 4)

Technical Management

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S:\Reports_Air Stack_CD_2GL.rpt (11/3746)



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107063
Date Received : Oct 21, 2022
Date Reported : Oct 28, 2022
Report Number : 2418790-1

Page 2 of 2

Sample Number	22107063-1	Stack Description	
Sample Date	Oct 21, 2022		
Sample Description	Emission from Stationary Source		
Location	HRSGs 1		
Date Analysis Commenced	Oct 22, 2022		
Condition of Sample	Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one amber plastic bottle, refrigerated		
Ambient Pressure	758 mmHg	Diameter	3.30 m
Ambient Temperature	30.0 °C	Shape	Circle
Type of Process	Combustion	Stack Temperature	132 °C
Type of Fuel	Natural Gas	Moisture	8.83 %
		Oxygen	13.6 %
		Carbon Dioxide	4.3 %
		Gas Velocity	19.7 m/s
		Flow Rate (Actual O ₂)	404805 Nm ³ /hr
Analyte	Sampled Time	Unit	LOD
Air Testing			
Total Suspended Particulate *	11:45 AM - 12:33 PM	g/s	0.056
Guideline (1)			0.416
Guideline (2)			0.416
Method			Calculated
Testing Location			Rayong

Guideline (1) : Notification of the Ministry of Industry on determining pollutant contents in air emitted from electric power generation, transmission and distribution plant, 2004 (B.E. 2547), dated September, 2004 (B.E. 2547).
Notification of the Ministry of Natural Resources and Environment, 2010 (B.E. 2553) on Emission Standard from New Power Plants.

Guideline (2) : Environmental Impact Assessment Report of Global Power Synergy Public Company Limited. (CUP 4)

Sampled By : Kantaphon Manesampan

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

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Analysis / Test Report

Lot ID: 22107069
Date Received : Oct 24, 2022
Date Reported : Oct 29, 2022
Report Number : 2477534-1

Page 1 of 1

Sample Description	Air Quality
Location	สถานีสุราษฎร์ธานี (GPS 47P 0726292, 1402782)
Parameter	Nitrogen dioxide (ppm)
Measurement Date	Oct 16, 2022 - Oct 23, 2022
Measurement by	Puvannart Pimpan
Time	22107069-1 Oct 16, 2022
22107069-2 Oct 17, 2022	22107069-3 Oct 18, 2022
22107069-4 Oct 19, 2022	22107069-5 Oct 20, 2022
22107069-6 Oct 21, 2022	22107069-7 Oct 22, 2022
12:00 PM - 01:00 PM	<0.001
01:00 PM - 02:00 PM	0.001
02:00 PM - 03:00 PM	0.001
03:00 PM - 04:00 PM	0.001
04:00 PM - 05:00 PM	0.001
05:00 PM - 06:00 PM	0.001
06:00 PM - 07:00 PM	0.001
07:00 PM - 08:00 PM	0.001
08:00 PM - 09:00 PM	0.001
09:00 PM - 10:00 PM	0.001
10:00 PM - 11:00 PM	0.001
11:00 PM - 12:00 AM	0.001
12:00 AM - 01:00 AM	0.001
01:00 AM - 02:00 AM	0.001
02:00 AM - 03:00 AM	0.001
03:00 AM - 04:00 AM	0.001
04:00 AM - 05:00 AM	0.001
05:00 AM - 06:00 AM	0.001
06:00 AM - 07:00 AM	0.001
07:00 AM - 08:00 AM	0.001
08:00 AM - 09:00 AM	0.001
09:00 AM - 10:00 AM	0.001
10:00 AM - 11:00 AM	0.001
11:00 AM - 12:00 PM	0.001
Average	0.001
1hr - Maximum	0.002
Standard 1hr - Average	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 : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107069
Date Received : Oct 24, 2022
Date Reported : Oct 29, 2022
Report Number: 2477535-1

Page 1 of 1

Sample Description	Air Quality							
Location	สถานีวัดอากาศ (GPS 47P 0728261, 1403387)							
Parameter	Nitrogen dioxide (ppm)							
Measurement Date	Oct 16, 2022 - Oct 23, 2022							
Measurement by	Puwannat Pimpan							
Time	22107069-8 Oct 16, 2022	22107069-9 Oct 17, 2022	22107069-10 Oct 18, 2022	22107069-11 Oct 19, 2022	22107069-12 Oct 20, 2022	22107069-13 Oct 21, 2022	22107069-14 Oct 22, 2022	22107069-15 Oct 23, 2022
11:00 AM - 12:00 PM	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.004
12:00 PM - 01:00 PM	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003
01:00 PM - 02:00 PM	0.002	0.002	0.003	0.004	0.002	0.002	0.002	0.003
02:00 PM - 03:00 PM	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
03:00 PM - 04:00 PM	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
04:00 PM - 05:00 PM	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
05:00 PM - 06:00 PM	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
06:00 PM - 07:00 PM	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
07:00 PM - 08:00 PM	0.002	0.004	0.002	0.002	0.002	0.002	0.002	0.002
08:00 PM - 09:00 PM	0.001	0.010	0.002	0.002	0.002	0.002	0.002	0.002
09:00 PM - 10:00 PM	0.001	0.003	0.002	0.003	0.003	0.003	0.003	0.003
10:00 PM - 11:00 PM	0.004	0.003	0.002	0.003	0.003	0.003	0.003	0.004
11:00 PM - 12:00 AM	0.001	0.001	0.002	0.003	0.003	0.003	0.003	0.004
12:00 AM - 01:00 AM	0.001	0.003	0.003	0.003	0.003	0.003	0.003	0.004
01:00 AM - 02:00 AM	0.001	0.003	0.003	0.003	0.003	0.003	0.003	0.003
02:00 AM - 03:00 AM	0.001	0.002	0.003	0.003	0.002	0.004	0.003	0.003
03:00 AM - 04:00 AM	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003
04:00 AM - 05:00 AM	0.002	0.003	0.002	0.002	0.002	0.003	0.003	0.003
05:00 AM - 06:00 AM	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.003
06:00 AM - 07:00 AM	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003
07:00 AM - 08:00 AM	0.002	0.003	0.002	0.002	0.002	0.002	0.004	0.003
08:00 AM - 09:00 AM	0.002	0.003	0.002	0.002	0.002	0.003	0.004	0.003
09:00 AM - 10:00 AM	0.002	0.003	0.003	0.002	0.002	0.005	0.007	0.004
10:00 AM - 11:00 AM	0.002	0.003	0.003	0.002	0.002	0.004	0.006	0.004
Average	0.002	0.003	0.002	0.002	0.002	0.003	0.003	0.003
1hr - Maximum	0.004	0.010	0.003	0.004	0.003	0.005	0.008	0.004
Standard 1hr - Average	0.170	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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S/Report_Air SONIX rpt (10.51AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107069
Date Received : Oct 24, 2022
Date Reported : Oct 29, 2022
Report Number: 2477536-1

Page 1 of 1

Sample Description	Air Quality							
Location	สถานีวัดอากาศ (GPS 47P 0730056, 1409679)							
Parameter	Nitrogen dioxide (ppm)							
Measurement Date	Oct 16, 2022 - Oct 23, 2022							
Measurement by	Puwannat Pimpan							
Time	22107069-15 Oct 16, 2022	22107069-16 Oct 17, 2022	22107069-17 Oct 18, 2022	22107069-18 Oct 19, 2022	22107069-19 Oct 20, 2022	22107069-20 Oct 21, 2022	22107069-21 Oct 22, 2022	22107069-22 Oct 23, 2022
12:00 PM - 01:00 PM	0.002	0.003	0.002	0.002	0.002	0.005	0.005	0.005
01:00 PM - 02:00 PM	0.002	0.002	0.002	0.002	0.002	0.004	0.004	0.004
02:00 PM - 03:00 PM	0.002	0.003	0.002	0.002	0.002	0.005	0.004	0.004
03:00 PM - 04:00 PM	0.002	0.003	0.002	0.003	0.002	0.003	0.003	0.004
04:00 PM - 05:00 PM	0.002	0.003	0.002	0.002	0.002	0.003	0.003	0.004
05:00 PM - 06:00 PM	0.003	0.003	0.002	0.002	0.002	0.003	0.003	0.004
06:00 PM - 07:00 PM	0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.004
07:00 PM - 08:00 PM	0.004	0.004	0.003	0.002	0.002	0.003	0.003	0.004
08:00 PM - 09:00 PM	0.004	0.003	0.003	0.002	0.002	0.003	0.003	0.004
09:00 PM - 10:00 PM	0.004	0.003	0.003	0.002	0.002	0.004	0.004	0.004
10:00 PM - 11:00 PM	0.003	0.003	0.002	0.001	0.002	0.005	0.004	0.004
11:00 PM - 12:00 AM	0.003	0.003	0.002	0.001	0.003	0.006	0.004	0.004
12:00 AM - 01:00 AM	0.003	0.003	0.003	0.001	0.005	0.007	0.004	0.004
01:00 AM - 02:00 AM	0.003	0.003	0.004	0.001	0.005	0.007	0.004	0.004
02:00 AM - 03:00 AM	0.003	0.003	0.004	0.001	0.006	0.003	0.003	0.003
03:00 AM - 04:00 AM	0.003	0.003	0.004	0.001	0.006	0.003	0.003	0.003
04:00 AM - 05:00 AM	0.003	0.003	0.004	0.002	0.003	0.003	0.003	0.003
05:00 AM - 06:00 AM	0.004	0.003	0.004	0.002	0.003	0.004	0.003	0.003
06:00 AM - 07:00 AM	0.006	0.003	0.004	0.002	0.002	0.003	0.003	0.003
07:00 AM - 08:00 AM	0.007	0.003	0.004	0.002	0.002	0.004	0.003	0.003
08:00 AM - 09:00 AM	0.007	0.003	0.003	0.002	0.002	0.003	0.004	0.003
09:00 AM - 10:00 AM	0.004	0.002	0.002	0.002	0.003	0.004	0.003	0.003
10:00 AM - 11:00 AM	0.003	0.002	0.002	0.002	0.003	0.004	0.003	0.003
11:00 AM - 12:00 PM	0.002	0.002	0.003	0.002	0.003	0.004	0.004	0.004
Average	0.003	0.003	0.003	0.002	0.003	0.004	0.003	0.003
1hr - Maximum	0.007	0.004	0.004	0.003	0.006	0.007	0.005	0.005
Standard 1hr - Average	0.170	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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S/Report_Air SONIX rpt (10.51AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107069
Date Received : Oct 24, 2022
Date Reported : Oct 29, 2022
Report Number: 2418813-1

Page 1 of 1

Sample Description	Air Quality							
Location	สถานีวัดอากาศ (GPS 47P 0730826, 1407360)							
Parameter	Nitrogen dioxide (ppm)							
Measurement Date	Oct 16, 2022 - Oct 23, 2022							
Measurement by	Puwannat Pimpan							
Time	22107069-22 Oct 16, 2022	22107069-23 Oct 17, 2022	22107069-24 Oct 18, 2022	22107069-25 Oct 19, 2022	22107069-26 Oct 20, 2022	22107069-27 Oct 21, 2022	22107069-28 Oct 22, 2022	22107069-29 Oct 23, 2022
11:00 AM - 12:00 PM	0.008	0.005	0.009	0.008	0.001	0.007	0.004	0.004
12:00 PM - 01:00 PM	0.006	0.004	0.009	0.006	0.004	0.006	0.004	0.004
01:00 PM - 02:00 PM	0.004	0.004	0.010	0.007	0.011	0.006	0.007	0.007
02:00 PM - 03:00 PM	0.005	0.004	0.011	0.006	0.011	0.004	0.009	0.009
03:00 PM - 04:00 PM	0.006	0.006	0.005	0.010	0.012	0.005	0.008	0.008
04:00 PM - 05:00 PM	0.006	0.010	0.020	0.012	0.011	0.005	0.009	0.009
05:00 PM - 06:00 PM	0.014	0.011	0.017	0.014	0.010	0.007	0.012	0.012
06:00 PM - 07:00 PM	0.013	0.008	0.013	0.009	0.008	0.006	0.010	0.010
07:00 PM - 08:00 PM	0.011	0.006	0.012	0.006	0.006	0.005	0.008	0.008
08:00 PM - 09:00 PM	0.009	0.007	0.005	0.005	0.006	0.004	0.007	0.007
09:00 PM - 10:00 PM	0.009	0.006	0.004	0.005	0.005	0.004	0.004	0.004
10:00 PM - 11:00 PM	0.008	0.005	0.003	0.003	0.004	0.004	0.004	0.004
11:00 PM - 12:00 AM	0.006	0.004	0.005	0.003	0.004	0.004	0.004	0.004
12:00 AM - 01:00 AM	0.005	0.003	0.005	0.003	0.003	0.003	0.002	0.002
01:00 AM - 02:00 AM	0.005	0.003	0.005	0.002	0.002	0.002	0.002	0.002
02:00 AM - 03:00 AM	0.004	0.003	0.005	0.004	0.002	0.002	0.001	0.001
03:00 AM - 04:00 AM	0.006	0.003	0.006	0.003	0.003	0.003	<0.001	<0.001
04:00 AM - 05:00 AM	0.006	0.006	0.007	0.003	0.003	0.005	0.003	0.003
05:00 AM - 06:00 AM	0.006	0.002	0.006	0.002	0.002	0.002	0.007	0.007
06:00 AM - 07:00 AM	0.009	0.006	0.010	0.001	0.024	0.011	0.001	0.001
07:00 AM - 08:00 AM	0.006	0.007	0.009	0.001	0.023	0.011	0.009	0.009
08:00 AM - 09:00 AM	0.008	0.006	0.008	0.001	0.011	0.018	0.003	0.003
09:00 AM - 10:00 AM	0.005	0.002	0.009	0.002	0.010	0.004	0.006	0.006
10:00 AM - 11:00 AM	0.004	0.008	0.010	0.002	0.004	0.004	0.006	0.006
Average	0.007	0.005	0.008	0.005	0.007	0.005	0.005	0.005
1hr - Maximum	0.014	0.011	0.020	0.014	0.024	0.016	0.012	0.012
Standard 1hr - Average	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107074
Date Received : Oct 24, 2022
Date Reported : Oct 29, 2022
Report Number: 2477538-1

Page 1 of 1

Sample Description	Air Quality						
Location	สารพิษในอากาศ (GPS 47P 0728261, 1403387)						
Parameter	Sulfur Dioxide (ppm)						
Measurement Date	Oct 16, 2022 - Oct 23, 2022						
Measurement by	Puvannart Pimpin						
Time	22107074-8 Oct 16, 2022	22107074-9 Oct 17, 2022	22107074-10 Oct 18, 2022	22107074-11 Oct 19, 2022	22107074-12 Oct 20, 2022	22107074-13 Oct 21, 2022	22107074-14 Oct 22, 2022
11:00 AM - 12:00 PM	0.002	0.002	<0.001	0.001	0.001	0.001	0.002
12:00 PM - 01:00 PM	0.002	0.002	0.002	0.001	0.001	0.001	0.002
01:00 PM - 02:00 PM	0.002	0.002	0.001	0.002	0.001	0.001	0.002
02:00 PM - 03:00 PM	0.002	0.002	0.001	0.002	0.001	0.001	0.002
03:00 PM - 04:00 PM	0.002	0.002	0.001	0.001	0.002	0.001	0.002
04:00 PM - 05:00 PM	0.002	0.002	0.001	0.002	0.001	0.001	0.002
05:00 PM - 06:00 PM	0.002	0.002	0.001	0.002	0.001	0.001	0.002
06:00 PM - 07:00 PM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
07:00 PM - 08:00 PM	0.002	0.002	0.001	0.001	0.001	0.001	0.001
08:00 PM - 09:00 PM	0.002	0.001	0.001	0.001	0.001	0.001	0.001
09:00 PM - 10:00 PM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
10:00 PM - 11:00 PM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
11:00 PM - 12:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.001
12:00 AM - 01:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
01:00 AM - 02:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
02:00 AM - 03:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
03:00 AM - 04:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
04:00 AM - 05:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
05:00 AM - 06:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
06:00 AM - 07:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
07:00 AM - 08:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
08:00 AM - 09:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
09:00 AM - 10:00 AM	0.002	0.002	0.001	0.001	0.001	0.002	0.002
10:00 AM - 11:00 AM	0.002	0.002	0.001	0.001	0.001	0.002	0.002
Average	0.002	0.002	0.001	0.001	0.001	0.001	0.001
1hr - Maximum	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Standard 1hr - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Standard 24 hrs - Average	0.12	0.12	0.12	0.12	0.12	0.12	0.12

Standard : Notification of the National Environment Board No.10, 1995 (B.E.2538), No. 21, 2001 (B.E.2544) and No.24, 2004 (B.E.2547).
Reference Method : US EPA Method Part 53 and 58

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S/Report_Air SOINON rpt (10.54AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107074
Date Received : Oct 24, 2022
Date Reported : Oct 29, 2022
Report Number: 2418819-1

Page 1 of 1

Sample Description	Air Quality						
Location	สารพิษในอากาศ (GPS 47P 0730826, 1407360)						
Parameter	Sulfur Dioxide (ppm)						
Measurement Date	Oct 16, 2022 - Oct 23, 2022						
Measurement by	Puvannart Pimpin						
Time	22107074-22 Oct 16, 2022	22107074-23 Oct 17, 2022	22107074-24 Oct 18, 2022	22107074-25 Oct 19, 2022	22107074-26 Oct 20, 2022	22107074-27 Oct 21, 2022	22107074-28 Oct 22, 2022
11:00 AM - 12:00 PM	0.002	0.002	0.002	0.003	0.002	0.002	0.002
12:00 PM - 01:00 PM	0.002	0.002	0.002	0.003	0.002	0.002	0.002
01:00 PM - 02:00 PM	0.002	0.002	0.002	0.003	0.002	0.002	0.002
02:00 PM - 03:00 PM	0.003	0.003	0.003	0.002	0.002	0.002	0.002
03:00 PM - 04:00 PM	0.002	0.003	0.003	0.002	0.002	0.002	0.002
04:00 PM - 05:00 PM	0.003	0.003	0.002	0.002	0.002	0.002	0.002
05:00 PM - 06:00 PM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
06:00 PM - 07:00 PM	0.003	0.002	0.002	0.002	0.002	0.002	0.002
07:00 PM - 08:00 PM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
08:00 PM - 09:00 PM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
09:00 PM - 10:00 PM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
10:00 PM - 11:00 PM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
11:00 PM - 12:00 AM	0.002	0.002	0.002	0.002	0.002	0.002	0.001
12:00 AM - 01:00 AM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
01:00 AM - 02:00 AM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
02:00 AM - 03:00 AM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
03:00 AM - 04:00 AM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
04:00 AM - 05:00 AM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
05:00 AM - 06:00 AM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
06:00 AM - 07:00 AM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
07:00 AM - 08:00 AM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
08:00 AM - 09:00 AM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
09:00 AM - 10:00 AM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
10:00 AM - 11:00 AM	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Average	0.002	0.002	0.002	0.002	0.002	0.002	0.002
1hr - Maximum	0.003	0.003	0.003	0.003	0.002	0.002	0.002
Standard 1hr - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Standard 24 hrs - Average	0.12	0.12	0.12	0.12	0.12	0.12	0.12

Standard : Notification of the National Environment Board No.10, 1995 (B.E.2538), No. 21, 2001 (B.E.2544) and No.24, 2004 (B.E.2547).
Reference Method : US EPA Method Part 53 and 58

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S/Report_Air SOINON rpt (10.54AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107074
Date Received : Oct 24, 2022
Date Reported : Oct 29, 2022
Report Number: 2477540-1

Page 1 of 1

Sample Description	Air Quality						
Location	สารพิษในอากาศ (GPS 47P 0730056, 1409679)						
Parameter	Sulfur Dioxide (ppm)						
Measurement Date	Oct 16, 2022 - Oct 23, 2022						
Measurement by	Puvannart Pimpin						
Time	22107074-15 Oct 16, 2022	22107074-16 Oct 17, 2022	22107074-17 Oct 18, 2022	22107074-18 Oct 19, 2022	22107074-19 Oct 20, 2022	22107074-20 Oct 21, 2022	22107074-21 Oct 22, 2022
12:00 PM - 01:00 PM	0.002	0.002	0.002	0.001	0.001	0.001	0.002
01:00 PM - 02:00 PM	0.002	0.002	0.002	0.001	0.001	0.001	0.002
02:00 PM - 03:00 PM	0.002	0.002	0.002	0.001	0.001	0.001	0.002
03:00 PM - 04:00 PM	0.002	0.002	0.002	0.001	0.001	0.001	0.002
04:00 PM - 05:00 PM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
05:00 PM - 06:00 PM	0.002	0.002	0.001	0.002	0.001	0.001	0.002
06:00 PM - 07:00 PM	0.002	0.002	0.002	0.001	0.001	0.001	0.002
07:00 PM - 08:00 PM	0.002	0.002	0.002	0.001	0.001	0.001	0.002
08:00 PM - 09:00 PM	0.002	0.002	0.002	0.002	0.001	0.001	0.002
09:00 PM - 10:00 PM	0.002	0.002	0.002	0.001	0.001	0.001	0.002
10:00 PM - 11:00 PM	0.002	0.002	0.002	0.002	0.001	0.001	0.002
11:00 PM - 12:00 AM	0.002	0.002	0.002	0.002	0.001	0.001	0.002
12:00 AM - 01:00 AM	0.002	0.002	0.001	0.002	0.001	0.001	0.002
01:00 AM - 02:00 AM	0.002	0.002	0.002	0.002	0.001	0.001	0.002
02:00 AM - 03:00 AM	0.002	0.002	0.001	0.002	0.001	0.001	0.002
03:00 AM - 04:00 AM	0.002	0.001	0.001	0.002	0.001	0.001	0.002
04:00 AM - 05:00 AM	0.002	0.001	0.002	0.002	0.001	0.001	0.002
05:00 AM - 06:00 AM	0.002	0.002	0.002	0.001	0.001	0.001	0.002
06:00 AM - 07:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
07:00 AM - 08:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
08:00 AM - 09:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
09:00 AM - 10:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
10:00 AM - 11:00 AM	0.002	0.002	0.001	0.001	0.001	0.001	0.002
11:00 AM - 12:00 PM	0.002	0.001	0.001	0.001	0.001	0.001	0.002
Average	0.002	0.002	0.001	0.001	0.001	0.001	0.002
1hr - Maximum	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Standard 1hr - Average	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Standard 24 hrs - Average	0.12	0.12	0.12	0.12	0.12	0.12	0.12

Standard : Notification of the National Environment Board No.10, 1995 (B.E.2538), No. 21, 2001 (B.E.2544) and No.24, 2004 (B.E.2547).
Reference Method : US EPA Method Part 53 and 58

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Saranya Chalerthamrong
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S/Report_Air SOINON rpt (10.54AM)





Analysis / Test Report



TESTING
No.0042

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107076
Date Received : Oct 24, 2022
Date Reported : Oct 28, 2022
Report Number: 2418829-2

Page 1 of 1

Sample Description : Air Quality
Location : สานักงาน (GPS 47P 0728261, 1403387)
Date Analysis Commenced : Oct 25, 2022
Condition of Sample : Drawn into one quartz filter paper (8x10 inch) placed in plastic bag and one glass filter paper (8x10 inch) placed in plastic bag

Sample Number	Sampled Date	Total Suspended Particulate (mg/m ³)	Particulate Matter (PM-10) (mg/m ³)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
22107076-8	Oct 16 - Oct 17, 2022	0.057	0.038	757	28
22107076-9	Oct 17 - Oct 18, 2022	0.088	0.062	757	30
22107076-10	Oct 18 - Oct 19, 2022	0.086	0.066	757	30
22107076-11	Oct 19 - Oct 20, 2022	0.085	0.064	757	29
22107076-12	Oct 20 - Oct 21, 2022	0.077	0.047	757	29
22107076-13	Oct 21 - Oct 22, 2022	0.048	0.031	757	29
22107076-14	Oct 22 - Oct 23, 2022	0.031	0.021	757	30
Guideline		0.33	0.12	-	-

Reference Method

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

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

Remark :

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

Approved by

Thanita Kulswong
Scientist (4)

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Analysis / Test Report



TESTING
No.0042

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107076
Date Received : Oct 24, 2022
Date Reported : Oct 28, 2022
Report Number: 2418829-3

Page 1 of 1

Sample Description : Air Quality
Location : สานักงาน (GPS 47P 0730056, 1409679)
Date Analysis Commenced : Oct 25, 2022
Condition of Sample : Drawn into one quartz filter paper (8x10 inch) placed in plastic bag and one glass filter paper (8x10 inch) placed in plastic bag

Sample Number	Sampled Date	Total Suspended Particulate (mg/m ³)	Particulate Matter (PM-10) (mg/m ³)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
22107076-15	Oct 16 - Oct 17, 2022	0.041	0.023	757	28
22107076-16	Oct 17 - Oct 18, 2022	0.081	0.045	757	30
22107076-17	Oct 18 - Oct 19, 2022	0.098	0.059	757	30
22107076-18	Oct 19 - Oct 20, 2022	0.078	0.049	757	29
22107076-19	Oct 20 - Oct 21, 2022	0.080	0.039	757	29
22107076-20	Oct 21 - Oct 22, 2022	0.036	0.019	757	29
22107076-21	Oct 22 - Oct 23, 2022	0.042	0.020	757	30
Guideline		0.33	0.12	-	-

Reference Method

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

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

Remark :

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

Approved by

Thanita Kulswong
Scientist (4)

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Analysis / Test Report



TESTING
No.0042

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107076
Date Received : Oct 24, 2022
Date Reported : Oct 28, 2022
Report Number: 2418829-4

Page 1 of 1

Sample Description : Air Quality
Location : สานักงาน (GPS 47P 0730826, 1407360)
Date Analysis Commenced : Oct 25, 2022
Condition of Sample : Drawn into one quartz filter paper (8x10 inch) placed in plastic bag and one glass filter paper (8x10 inch) placed in plastic bag

Sample Number	Sampled Date	Total Suspended Particulate (mg/m ³)	Particulate Matter (PM-10) (mg/m ³)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
22107076-22	Oct 16 - Oct 17, 2022	0.042	0.026	757	28
22107076-23	Oct 17 - Oct 18, 2022	0.084	0.062	757	30
22107076-24	Oct 18 - Oct 19, 2022	0.093	0.057	757	30
22107076-25	Oct 19 - Oct 20, 2022	0.085	0.057	757	29
22107076-26	Oct 20 - Oct 21, 2022	0.101	0.056	757	29
22107076-27	Oct 21 - Oct 22, 2022	0.043	0.025	757	29
22107076-28	Oct 22 - Oct 23, 2022	0.045	0.025	757	30
Guideline		0.33	0.12	-	-

Reference Method

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

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

Remark :

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

Approved by

Thanita Kulswong
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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107075
Date Received : Oct 24, 2022
Date Reported : Oct 28, 2022
Report Number: 2418827-1

Page 1 of 2

Sample Number : 22107075-1 to 7
Parameter : Wind Speed / Wind Direction
Location : สานักงาน (GPS 47P 0726292, 1407282)
Sampling Date : Oct 16 - Oct 23, 2022
Sampling by : Puvant Pimpan

Time	Oct 16 - Oct 17, 2022			Oct 17 - Oct 18, 2022			Oct 18 - Oct 19, 2022			Oct 19 - Oct 20, 2022			Oct 20 - Oct 21, 2022			Oct 21 - Oct 22, 2022			Oct 22 - Oct 23, 2022		
	WS (m/s)	WDU (deg)		WS (m/s)	WDU (deg)		WS (m/s)	WDU (deg)		WS (m/s)	WDU (deg)		WS (m/s)	WDU (deg)		WS (m/s)	WDU (deg)		WS (m/s)	WDU (deg)	
12:00 PM - 01:00 PM	1.3	50.0	NE	1.3	56.0	NE	1.9	60.0	ENE	2.9	66.0	ENE	0.7	60.0	ENE	1.3	4.0	N	1.3	169.0	S
01:00 PM - 02:00 PM	2.3	359.0	N	0.9	65.0	ENE	0.6	150.0	SSE	1.2	63.0	ENE	0.0	-	-	1.0	46.0	NE	0.8	168.0	SSE
02:00 PM - 03:00 PM	1.9	32.0	NNE	1.1	82.0	E	3.8	244.0	WSW	1.7	60.0	ENE	0.0	-	-	0.0	-	-	2.7	162.0	SSE
03:00 PM - 04:00 PM	0.9	78.0	NNE	1.2	146.0	SE	1.1	228.0	SW	1.3	217.0	SW	0.9	264.0	W	2.5	315.0	NW	2.5	291.0	WNW
04:00 PM - 05:00 PM	0.7	39.0	NE	1.6	242.0	WSW	2.1	216.0	SW	0.4	230.0	SW	0.0	-	-	0.2	-	-	1.3	41.0	NE
05:00 PM - 06:00 PM	1.3	39.0	NE	1.2	236.0	WSW	1.4	274.0	W	0.3	215.0	SW	0.6	257.0	WSW	1.3	10.0	N	0.0	-	-
06:00 PM - 07:00 PM	0.4	16.0	NNE	2.3	296.0	WNW	0.5	335.0	NW	0.2	-	-	-	-	-	0.0	-	-	0.1	-	-
07:00 PM - 08:00 PM	0.3	28.0	NNE	0.0	-	-	0.0	-	-	0.0	-	-	0.1	-	-	0.4	40.0	ENE	0.0	-	-
08:00 PM - 09:00 PM	0.4	10.0	N	0.3	349.0	N	0.2	-	-	1.2	295.0	WSW	0.5	372.0	N	0.2	-	-	0.0	-	-
09:00 PM - 10:00 PM	0.6	-	-	0.0	-	-	0.6	398.0	N	0.0	-	-	0.3	34.0	NE	0.4	58.0	ENE	0.0	-	-
10:00 PM - 11:00 PM	0.5	188.0	S	1.0	0.0	N	0.0	-	-	0.0	-	-	0.2	-	-	0.0	-	-	0.3	188.0	S
11:00 PM - 12:00 AM	1.2	27.0	NNE	0.1	-	-	0.0	-	-	0.3	55.0	NE	0.8	45.0	NE	0.0	-	-	0.0	-	-
12:00 AM - 01:00 AM	1.0	36.0	NE	1.3	43.0	NE	0.4	5.0	N	0.7	39.0	ENE	0.0	-	-	0.3	59.0	ENE	0.0	-	-
01:00 AM - 02:00 AM	2.7	4.0	N	1.1	59.0	ENE	0.7	60.0	ENE	1.2	59.0	ENE	0.5	339.0	N	0.0	-	-	0.0	-	-
02:00 AM - 03:00 AM	1.0	31.0	NNE	1.3	52.0	NE	0.7	60.0	ENE	1.3	59.0	ENE	0.5	3.0	N	0.3	60.0	ENE	0.6	279.0	W
03:00 AM - 04:00 AM	0.9	7.0	N	0.7	46.0	NE	0.9	46.0	NE	1.3	36.0	NE	0.3	346.0	N	0.0	-	-	0.8	312.0	NW
04:00 AM - 05:00 AM	0.1	-	-	0.0	-	-	0.9	61.0	ENE	1.7	59.0	ENE	0.0	-	-	0.2	-	-	0.0	-	-
05:00 AM - 06:00 AM	0.2	-	-	0.4	62.0	ENE	1.3	60.0	ENE	1.0	54.0	NE	1.0	108.0	ESE	0.0	-	-	0.2	-	-
06:00 AM - 07:00 AM	0.5	18.0	NNE	1.2	47.0	NE	1.4	55.0	NE	1.6	54.0	NE	0.1	-	-	1.0	344.0	NW	0.8	342.0	NW
07:00 AM - 08:00 AM	0.6	-	-	0.9	50.0	NE	0.7	39.0	ENE	1.0	65.0	ENE	0.5	59.0	ENE	0.2	-	-	0.0	-	-
08:00 AM - 09:00 AM	1.0	357.0	N	2.6	50.0	NE	1.5	51.0	NE	0.5	76.0	ENE	0.1	-	-	1.4	47.0	NE	0.7	27.0	NE
09:00 AM - 10:00 AM	1.4	46.0	NE	2.0	45.0	NE	0.8	69.0	ENE	0.9	44.0	NE	0.2	-	-	0.8	7.0	N	0.8	68.0	ENE
10:00 AM - 11:00 AM	3.6	22.0	NNE	1.3	35.0	NE	2.1	56.0	NE	0.6	63.0	ENE	0.2	-	-	0.7	69.0	ENE	0.4	92.0	E
11:00 AM - 12:00 PM	2.0	48.0	NE	1.0	76.0	ENE	2.3	40.0	NE	0.5	88.0	E	0.2	-	-	0.8	69.0	ENE	1.0	256.0	WSW

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Saranyut Jitranont
Assistant General Manager

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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 1

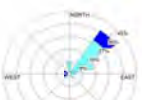
Lot ID : 22107075
Date Received : Oct 24, 2022
Date Reported : Oct 28, 2022
Report Number : 2418827-1

Page 2 of 2

Wind Rose



Date : Oct 16-17, 2022



Date : Oct 17-18, 2022



Date : Oct 18-19, 2022



Date : Oct 19-20, 2022



Date : Oct 20-21, 2022



Date : Oct 21-22, 2022



Date : Oct 22-23, 2022



Date : Oct 23-24, 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	11.31
0.3-1.7	57.14
Calms	30.36

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Approved by

Serayuth Jitranont
Assistant General Manager

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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID : 22107063
Date Received : Oct 21, 2022
Date Reported : Oct 28, 2022
Report Number : 2418790-2

Page 1 of 2

Sample Number : 22107063-1
Sample Date : Oct 21, 2022
Sample Description : Emission from Stationary Source
Location : HRS01
Date Analysis Commenced : Oct 22, 2022
Condition of Sample : Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one amber plastic bottle, refrigerated

Stack Description								
Ambient Pressure	758	mmHg	Diameter	3.30	m	Oxygen	13.6	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	4.3	%
Type of Process	Combustion		Stack Temperature	132	°C	Gas Velocity	19.7	m/s
Type of Fuel	Natural Gas		Moisture	8.83	%	Flow Rate (Actual O2)	404805	Nm³/hr
Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O₂	Method	Testing Location	
Air Testing								
Ammonia	11:45 AM - 12:45 PM	ppm		0.02	0.25	Based on Method of Air Sampling and Analysis, 401	Rayong	

Approved by

Thanitak.
Thanita Kulruiwong
Scientist (4)

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S:\Reports\Air Stack_NGL\sp (11-37AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID : 22107063
Date Received : Oct 21, 2022
Date Reported : Oct 28, 2022
Report Number : 2418790-2

Page 2 of 2

Sample Number : 22107063-1
Sample Date : Oct 21, 2022
Sample Description : Emission from Stationary Source
Location : HRS01
Date Analysis Commenced : Oct 22, 2022
Condition of Sample : Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one amber plastic bottle, refrigerated

Stack Description								
Ambient Pressure	758	mmHg	Diameter	3.30	m	Oxygen	13.6	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	4.3	%
Type of Process	Combustion		Stack Temperature	132	°C	Gas Velocity	19.7	m/s
Type of Fuel	Natural Gas		Moisture	8.83	%	Flow Rate (Actual O2)	404805	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Method	Testing Location
Air Testing							
Ammonia	11:45 AM - 12:45 PM	g/s	-	-	0.01	Calculated	Rayong

Sampled By : Kantaphon Manesampan

Remark :

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

Approved by

Thanitak.
Thanita Kulruiwong
Scientist (4)

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S:\Reports\Air Stack_NGL\sp (11-37AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID : 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number : 2478430-1

Page 1 of 1

Sample Number : 22107117-1
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณพื้นที่รอบสนามหญ้าโรงงาน (GPS 47P 0727956, 1405409)
Measurement Date : Oct 16 - Oct 17, 2022
Measurement by : Puvannart Pimpan
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	53.0	86.4	47.0
12:00 PM - 01:00 PM	52.1	71.9	46.8
01:00 PM - 02:00 PM	51.8	77.7	47.3
02:00 PM - 03:00 PM	51.0	75.3	47.5
03:00 PM - 04:00 PM	53.7	74.2	47.3
04:00 PM - 05:00 PM	50.4	73.0	46.1
05:00 PM - 06:00 PM	50.3	77.2	46.3
06:00 PM - 07:00 PM	55.7	80.0	47.0
07:00 PM - 08:00 PM	52.9	75.3	47.7
08:00 PM - 09:00 PM	50.6	71.5	48.2
09:00 PM - 10:00 PM	50.2	70.0	46.4
10:00 PM - 11:00 PM	50.6	70.4	46.6
11:00 PM - 12:00 AM	51.3	71.9	49.2
12:00 AM - 01:00 AM	50.9	69.0	49.5
01:00 AM - 02:00 AM	53.0	71.1	49.8
02:00 AM - 03:00 AM	51.2	66.6	49.6
03:00 AM - 04:00 AM	50.9	65.5	49.7
04:00 AM - 05:00 AM	50.4	62.8	49.4
05:00 AM - 06:00 AM	51.3	74.1	48.8
06:00 AM - 07:00 AM	55.6	81.5	49.3
07:00 AM - 08:00 AM	55.3	72.7	48.5
08:00 AM - 09:00 AM	55.4	80.0	48.6
09:00 AM - 10:00 AM	54.4	76.8	46.6
10:00 AM - 11:00 AM	53.7	78.4	46.1
Leq Average 24 Hrs. (dB(A))	52.8		
Lmax (dB(A))		86.4	
L90 (dB(A))			48.2
Ldn (dB(A))	58.6		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540
2. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540

Technical Management

Saranyu C.
Saranya Chalermthamrong
Scientist (4)

Approved by

Supot S.
Supot Salantheth
Section Head

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S:\Reports\Air Stack_NGL\sp (4-48PM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number: 2478440-1

Page 1 of 1

Sample Number : 22107117-2
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณพื้นที่รวมของอาคารโรงงาน (GPS 47P 0727956, 1405409)
Measurement Date : Oct 17 - Oct 18, 2022
Measurement by : Puwanart Pimpan
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	53.2	76.4	46.3
12:00 PM - 01:00 PM	53.0	75.2	45.8
01:00 PM - 02:00 PM	56.1	81.8	46.0
02:00 PM - 03:00 PM	52.3	75.0	47.2
03:00 PM - 04:00 PM	50.8	72.2	47.1
04:00 PM - 05:00 PM	54.6	77.2	47.1
05:00 PM - 06:00 PM	55.3	74.9	50.2
06:00 PM - 07:00 PM	56.1	77.0	48.6
07:00 PM - 08:00 PM	58.1	80.4	47.8
08:00 PM - 09:00 PM	49.3	70.9	47.7
09:00 PM - 10:00 PM	50.4	70.9	48.2
10:00 PM - 11:00 PM	51.0	65.6	49.7
11:00 PM - 12:00 AM	52.0	72.1	50.3
12:00 AM - 01:00 AM	51.9	71.0	49.6
01:00 AM - 02:00 AM	51.0	66.9	49.7
02:00 AM - 03:00 AM	50.8	61.4	49.3
03:00 AM - 04:00 AM	50.3	68.0	49.1
04:00 AM - 05:00 AM	50.2	57.5	49.0
05:00 AM - 06:00 AM	51.5	72.5	49.2
06:00 AM - 07:00 AM	55.2	73.3	49.8
07:00 AM - 08:00 AM	57.3	84.1	49.9
08:00 AM - 09:00 AM	56.4	76.8	48.2
09:00 AM - 10:00 AM	54.9	75.0	49.0
10:00 AM - 11:00 AM	54.8	74.9	48.9

Leq Average 24 hrs. (dB(A)) : 53.9
Lmax (dB(A)) : 90.4
L90 (dB(A)) : 48.9
Ltn (dB(A)) : 58.8
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2

Standard : 1. มาตรการควบคุมการปล่อยเสียงจากอาคาร 15 (ม.ร. 2540) ควบคุมค่าการรบกวนเสียงในเวลากลางวัน
2. มาตรการควบคุมการปล่อยเสียงจากอาคาร 15 (ม.ร. 2540) ควบคุมค่าการรบกวนเสียงในเวลากลางคืน
โดย ม.ร. 2548

Technical Management

Saranya C.
Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.
Supot Salameth
Section Head

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S:\Reports_Air Noise opt (4-49P6)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number: 2478441-1

Page 1 of 1

Sample Number : 22107117-3
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณพื้นที่รวมของอาคารโรงงาน (GPS 47P 0727956, 1405409)
Measurement Date : Oct 18 - Oct 19, 2022
Measurement by : Puwanart Pimpan
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	51.7	71.6	46.1
12:00 PM - 01:00 PM	53.6	76.0	45.5
01:00 PM - 02:00 PM	53.4	80.2	47.2
02:00 PM - 03:00 PM	58.1	74.8	47.5
03:00 PM - 04:00 PM	54.3	73.3	48.3
04:00 PM - 05:00 PM	56.9	84.5	49.1
05:00 PM - 06:00 PM	53.7	74.8	48.5
06:00 PM - 07:00 PM	55.7	89.0	47.9
07:00 PM - 08:00 PM	50.7	76.2	47.0
08:00 PM - 09:00 PM	48.8	67.2	47.8
09:00 PM - 10:00 PM	49.3	68.4	47.2
10:00 PM - 11:00 PM	50.3	68.9	48.4
11:00 PM - 12:00 AM	51.5	72.1	49.3
12:00 AM - 01:00 AM	52.0	71.9	49.7
01:00 AM - 02:00 AM	50.9	69.7	49.4
02:00 AM - 03:00 AM	50.7	62.8	49.5
03:00 AM - 04:00 AM	50.8	63.9	48.9
04:00 AM - 05:00 AM	50.9	67.5	49.2
05:00 AM - 06:00 AM	52.1	74.0	49.7
06:00 AM - 07:00 AM	56.2	80.9	49.6
07:00 AM - 08:00 AM	56.2	82.6	48.8
08:00 AM - 09:00 AM	55.4	77.9	48.4
09:00 AM - 10:00 AM	55.0	74.8	48.3
10:00 AM - 11:00 AM	53.8	74.0	48.9

Leq Average 24 hrs. (dB(A)) : 53.4
Lmax (dB(A)) : 89.0
L90 (dB(A)) : 48.4
Ltn (dB(A)) : 58.9
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2

Standard : 1. มาตรการควบคุมการปล่อยเสียงจากอาคาร 15 (ม.ร. 2540) ควบคุมค่าการรบกวนเสียงในเวลากลางวัน
2. มาตรการควบคุมการปล่อยเสียงจากอาคาร 15 (ม.ร. 2540) ควบคุมค่าการรบกวนเสียงในเวลากลางคืน
โดย ม.ร. 2548

Technical Management

Saranya C.
Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.
Supot Salameth
Section Head

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S:\Reports_Air Noise opt (4-49P6)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number: 2478441-1

Page 1 of 1

Sample Number : 22107117-4
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณพื้นที่รวมของอาคารโรงงาน (GPS 47P 0727956, 1405409)
Measurement Date : Oct 19 - Oct 20, 2022
Measurement by : Puwanart Pimpan
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	55.2	82.2	46.5
12:00 PM - 01:00 PM	52.8	77.9	45.3
01:00 PM - 02:00 PM	54.5	78.5	45.6
02:00 PM - 03:00 PM	53.3	76.7	45.9
03:00 PM - 04:00 PM	52.5	79.6	46.5
04:00 PM - 05:00 PM	58.1	83.5	46.9
05:00 PM - 06:00 PM	56.9	85.0	47.4
06:00 PM - 07:00 PM	54.3	73.5	47.1
07:00 PM - 08:00 PM	51.4	77.3	46.4
08:00 PM - 09:00 PM	51.6	75.2	47.5
09:00 PM - 10:00 PM	48.7	64.7	47.1
10:00 PM - 11:00 PM	50.2	64.5	47.4
11:00 PM - 12:00 AM	50.7	69.3	48.8
12:00 AM - 01:00 AM	51.0	68.6	49.0
01:00 AM - 02:00 AM	50.6	73.3	48.9
02:00 AM - 03:00 AM	50.0	60.2	48.6
03:00 AM - 04:00 AM	51.6	80.0	49.3
04:00 AM - 05:00 AM	50.4	58.9	48.9
05:00 AM - 06:00 AM	53.0	80.1	49.7
06:00 AM - 07:00 AM	55.9	76.7	49.6
07:00 AM - 08:00 AM	57.3	83.9	49.3
08:00 AM - 09:00 AM	55.2	76.6	47.3
09:00 AM - 10:00 AM	54.8	87.5	47.3
10:00 AM - 11:00 AM	53.2	73.0	46.8

Leq Average 24 hrs. (dB(A)) : 53.8
Lmax (dB(A)) : 87.5
L90 (dB(A)) : 47.4
Ltn (dB(A)) : 58.8
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2

Standard : 1. มาตรการควบคุมการปล่อยเสียงจากอาคาร 15 (ม.ร. 2540) ควบคุมค่าการรบกวนเสียงในเวลากลางวัน
2. มาตรการควบคุมการปล่อยเสียงจากอาคาร 15 (ม.ร. 2540) ควบคุมค่าการรบกวนเสียงในเวลากลางคืน
โดย ม.ร. 2548

Technical Management

Saranya C.
Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.
Supot Salameth
Section Head

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S:\Reports_Air Noise opt (4-49P6)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number: 2478441-1

Page 1 of 1

Sample Number : 22107117-5
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณพื้นที่รวมของอาคารโรงงาน (GPS 47P 0727956, 1405409)
Measurement Date : Oct 20 - Oct 21, 2022
Measurement by : Puwanart Pimpan
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	52.9	73.4	46.1
12:00 PM - 01:00 PM	55.1	82.4	45.4
01:00 PM - 02:00 PM	55.4	81.5	45.3
02:00 PM - 03:00 PM	54.8	80.5	47.2
03:00 PM - 04:00 PM	56.3	84.4	48.3
04:00 PM - 05:00 PM	53.7	77.0	47.1
05:00 PM - 06:00 PM	55.1	78.4	47.6
06:00 PM - 07:00 PM	54.6	73.4	48.2
07:00 PM - 08:00 PM	52.2	72.7	47.9
08:00 PM - 09:00 PM	49.5	73.3	48.2
09:00 PM - 10:00 PM	49.2	68.4	46.2
10:00 PM - 11:00 PM	51.2	68.9	46.5
11:00 PM - 12:00 AM	51.2	69.4	49.1
12:00 AM - 01:00 AM	50.7	71.5	48.3
01:00 AM - 02:00 AM	49.9	60.1	48.7
02:00 AM - 03:00 AM	51.4	72.3	48.0
03:00 AM - 04:00 AM	50.2	59.6	49.1
04:00 AM - 05:00 AM	49.2	57.8	48.1
05:00 AM - 06:00 AM	50.8	73.5	48.0
06:00 AM - 07:00 AM	55.3	79.4	49.1
07:00 AM - 08:00 AM	59.1	88.8	49.8
08:00 AM - 09:00 AM	55.3	75.9	45.9
09:00 AM - 10:00 AM	55.6	78.9	47.8
10:00 AM - 11:00 AM	55.0	77.1	47.1

Leq Average 24 hrs. (dB(A)) : 53.9
Lmax (dB(A)) : 88.8
L90 (dB(A)) : 48.1
Ltn (dB(A)) : 58.6
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2

Standard : 1. มาตรการควบคุมการปล่อยเสียงจากอาคาร 15 (ม.ร. 2540) ควบคุมค่าการรบกวนเสียงในเวลากลางวัน
2. มาตรการควบคุมการปล่อยเสียงจากอาคาร 15 (ม.ร. 2540) ควบคุมค่าการรบกวนเสียงในเวลากลางคืน
โดย ม.ร. 2548

Technical Management

Saranya C.
Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.
Supot Salameth
Section Head

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S:\Reports_Air Noise opt (4-49P6)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number: 2478444-1

Page 1 of 1

Sample Number : 22107117-6
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณโรงโม่หิน (GPS 479 0727956, 1405409)
Measurement Date : Oct 21 - Oct 22, 2022
Measurement by : Puwanart Pimpan
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	54.2	76.2	46.3
12:00 PM - 01:00 PM	53.8	80.9	45.0
01:00 PM - 02:00 PM	54.3	78.2	45.6
02:00 PM - 03:00 PM	52.9	74.7	48.6
03:00 PM - 04:00 PM	59.7	83.5	49.9
04:00 PM - 05:00 PM	56.6	79.2	47.9
05:00 PM - 06:00 PM	61.1	76.4	48.4
06:00 PM - 07:00 PM	54.7	75.7	47.9
07:00 PM - 08:00 PM	54.6	79.5	47.0
08:00 PM - 09:00 PM	53.8	82.3	49.3
09:00 PM - 10:00 PM	51.8	70.0	50.2
10:00 PM - 11:00 PM	51.9	69.4	49.9
11:00 PM - 12:00 AM	52.5	66.0	50.5
12:00 AM - 01:00 AM	53.2	72.6	50.7
01:00 AM - 02:00 AM	52.0	63.9	51.0
02:00 AM - 03:00 AM	52.4	64.8	51.1
03:00 AM - 04:00 AM	50.6	60.6	49.5
04:00 AM - 05:00 AM	49.2	63.2	48.3
05:00 AM - 06:00 AM	50.8	71.6	49.6
06:00 AM - 07:00 AM	54.0	75.7	49.6
07:00 AM - 08:00 AM	57.2	80.2	48.8
08:00 AM - 09:00 AM	54.3	73.9	46.8
09:00 AM - 10:00 AM	52.2	75.6	47.3
10:00 AM - 11:00 AM	54.0	74.5	48.1

Leq Average 24 hrs. (dB(A)) : 54.8
Lmax (dB(A)) : 83.5
L90 (dB(A)) : 48.9
Ltn (dB(A)) : 59.3
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย
2. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย
3. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย
4. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย

Technical Management

Saranya C.

Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.

Supot Salameth
Section Head

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S:\Reports_Air Noise\pt (4 5096)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number: 2478445-1

Page 1 of 1

Sample Number : 22107117-7
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณโรงโม่หิน (GPS 479 0727956, 1405409)
Measurement Date : Oct 22 - Oct 23, 2022
Measurement by : Puwanart Pimpan
Sound Level meter : Serial No. 1222716

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	52.9	73.7	47.9
12:00 PM - 01:00 PM	53.5	71.6	46.9
01:00 PM - 02:00 PM	52.7	74.4	48.4
02:00 PM - 03:00 PM	51.7	74.4	45.7
03:00 PM - 04:00 PM	52.4	72.5	48.1
04:00 PM - 05:00 PM	69.6	79.5	50.2
05:00 PM - 06:00 PM	57.6	78.3	51.9
06:00 PM - 07:00 PM	55.5	78.3	49.9
07:00 PM - 08:00 PM	55.5	77.3	49.4
08:00 PM - 09:00 PM	52.9	75.5	49.7
09:00 PM - 10:00 PM	51.2	80.2	48.9
10:00 PM - 11:00 PM	51.2	65.9	49.6
11:00 PM - 12:00 AM	50.4	64.4	48.6
12:00 AM - 01:00 AM	51.9	73.0	50.5
01:00 AM - 02:00 AM	53.4	73.9	48.2
02:00 AM - 03:00 AM	69.9	75.0	63.0
03:00 AM - 04:00 AM	69.7	79.2	54.4
04:00 AM - 05:00 AM	69.3	76.1	55.2
05:00 AM - 06:00 AM	65.2	76.1	53.5
06:00 AM - 07:00 AM	55.4	75.0	50.3
07:00 AM - 08:00 AM	55.7	77.7	50.7
08:00 AM - 09:00 AM	54.7	70.5	48.6
09:00 AM - 10:00 AM	52.6	79.9	47.9
10:00 AM - 11:00 AM	54.4	78.2	48.3

Leq Average 24 hrs. (dB(A)) : 62.7
Lmax (dB(A)) : 80.2
L90 (dB(A)) : 48.1
Ltn (dB(A)) : 71.4
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย
2. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย
3. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย
4. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย

Technical Management

Saranya C.

Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.

Supot Salameth
Section Head

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S:\Reports_Air Noise\pt (4 5096)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number: 2478446-1

Page 1 of 1

Sample Number : 22107117-8
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณโรงโม่หิน (GPS 479 0728246, 1403366)
Measurement Date : Oct 16 - Oct 17, 2022
Measurement by : Puwanart Pimpan
Sound Level meter : Serial No. 1122607

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	56.0	84.7	45.3
12:00 PM - 01:00 PM	55.2	84.0	47.6
01:00 PM - 02:00 PM	49.9	69.7	46.1
02:00 PM - 03:00 PM	56.6	83.6	46.2
03:00 PM - 04:00 PM	56.4	84.0	45.6
04:00 PM - 05:00 PM	57.9	84.5	47.2
05:00 PM - 06:00 PM	52.9	85.1	48.9
06:00 PM - 07:00 PM	51.9	73.5	49.3
07:00 PM - 08:00 PM	54.8	84.8	48.3
08:00 PM - 09:00 PM	56.0	74.1	55.1
09:00 PM - 10:00 PM	53.0	62.5	50.4
10:00 PM - 11:00 PM	54.7	59.3	53.7
11:00 PM - 12:00 AM	53.7	59.1	51.9
12:00 AM - 01:00 AM	50.9	59.8	49.8
01:00 AM - 02:00 AM	51.4	81.3	46.1
02:00 AM - 03:00 AM	55.2	61.7	54.1
03:00 AM - 04:00 AM	53.6	62.5	51.7
04:00 AM - 05:00 AM	52.0	58.8	50.7
05:00 AM - 06:00 AM	51.3	61.6	50.5
06:00 AM - 07:00 AM	60.2	71.0	50.6
07:00 AM - 08:00 AM	56.3	67.3	52.8
08:00 AM - 09:00 AM	57.3	70.4	53.2
09:00 AM - 10:00 AM	56.4	65.2	54.7
10:00 AM - 11:00 AM	56.8	62.8	53.7

Leq Average 24 hrs. (dB(A)) : 55.3
Lmax (dB(A)) : 85.1
L90 (dB(A)) : 50.4
Ltn (dB(A)) : 61.3
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย
2. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย
3. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย
4. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย

Technical Management

Saranya C.

Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.

Supot Salameth
Section Head

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S:\Reports_Air Noise\pt (4 5096)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number: 2478447-1

Page 1 of 1

Sample Number : 22107117-9
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณโรงโม่หิน (GPS 479 0728246, 1403366)
Measurement Date : Oct 17 - Oct 18, 2022
Measurement by : Puwanart Pimpan
Sound Level meter : Serial No. 1122607

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	58.2	86.9	47.5
12:00 PM - 01:00 PM	54.9	83.7	47.3
01:00 PM - 02:00 PM	48.3	66.6	47.0
02:00 PM - 03:00 PM	57.9	84.9	46.5
03:00 PM - 04:00 PM	57.7	86.1	46.9
04:00 PM - 05:00 PM	58.2	84.8	47.5
05:00 PM - 06:00 PM	52.3	84.5	48.5
06:00 PM - 07:00 PM	51.3	72.9	48.7
07:00 PM - 08:00 PM	54.5	84.5	48.0
08:00 PM - 09:00 PM	57.2	75.3	56.3
09:00 PM - 10:00 PM	55.0	72.8	53.4
10:00 PM - 11:00 PM	53.8	67.0	51.2
11:00 PM - 12:00 AM	52.9	62.7	51.8
12:00 AM - 01:00 AM	53.0	62.9	52.0
01:00 AM - 02:00 AM	52.6	67.8	51.5
02:00 AM - 03:00 AM	51.9	71.3	51.0
03:00 AM - 04:00 AM	51.6	61.4	50.4
04:00 AM - 05:00 AM	51.3	57.9	50.5
05:00 AM - 06:00 AM	50.4	58.8	49.6
06:00 AM - 07:00 AM	51.1	71.8	49.7
07:00 AM - 08:00 AM	58.4	80.0	50.9
08:00 AM - 09:00 AM	55.3	81.5	50.0
09:00 AM - 10:00 AM	54.7	79.9	48.7
10:00 AM - 11:00 AM	53.0	81.1	48.8

Leq Average 24 hrs. (dB(A)) : 55.0
Lmax (dB(A)) : 86.0
L90 (dB(A)) : 49.6
Ltn (dB(A)) : 59.4
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย
2. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย
3. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย
4. ประกาศกระทรวงมหาดไทยว่าด้วยค่ามาตรฐานเสียง 15 (พ.ศ. 2540) ประกาศกระทรวงมหาดไทยว่าด้วย

Technical Management

Saranya C.

Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.

Supot Salameth
Section Head

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S:\Reports_Air Noise\pt (4 5096)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number: 2478449-1

Page 1 of 1

Sample Number : 22107117-10
Parameter : Noise (Leq 24 hrs.)
Location : บ้านท่าหินโงน (GPS 47P 0728246, 1403366)
Measurement Date : Oct 18 - Oct 19, 2022
Measurement by : Puvant Pimpan
Sound Level meter : Serial No. 1122607

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	50.4	67.3	46.0
12:00 PM - 01:00 PM	49.0	62.1	47.5
01:00 PM - 02:00 PM	48.7	63.4	46.8
02:00 PM - 03:00 PM	49.1	60.1	46.5
03:00 PM - 04:00 PM	48.8	63.1	46.5
04:00 PM - 05:00 PM	58.8	91.2	46.5
05:00 PM - 06:00 PM	57.4	89.9	47.5
06:00 PM - 07:00 PM	50.5	72.4	47.9
07:00 PM - 08:00 PM	51.7	71.1	49.6
08:00 PM - 09:00 PM	56.1	73.6	55.2
09:00 PM - 10:00 PM	53.6	70.5	51.8
10:00 PM - 11:00 PM	51.9	63.0	51.3
11:00 PM - 12:00 AM	51.7	58.5	50.9
12:00 AM - 01:00 AM	52.4	59.0	51.8
01:00 AM - 02:00 AM	51.7	56.3	51.0
02:00 AM - 03:00 AM	51.7	55.8	50.9
03:00 AM - 04:00 AM	52.0	58.8	51.3
04:00 AM - 05:00 AM	51.1	57.0	50.2
05:00 AM - 06:00 AM	50.3	66.2	49.5
06:00 AM - 07:00 AM	50.8	64.0	49.5
07:00 AM - 08:00 AM	50.6	67.9	50.1
08:00 AM - 09:00 AM	54.3	80.3	49.5
09:00 AM - 10:00 AM	51.4	77.7	48.8
10:00 AM - 11:00 AM	51.4	74.9	48.6

Leq Average 24 hrs. (dB(A))

33.4

Lmax (dB(A))

91.2

L90 (dB(A))

49.5

Ltn (dB(A))

58.5

Standard (dB(A))

70

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540 (ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540) 2. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540 (ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540)

Technical Management

Saranya C.
Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.
Supot Salameth
Section Head

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S:\Reports_Air Noise opt (4 SPK)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number: 2478449-1

Page 1 of 1

Sample Number : 22107117-11
Parameter : Noise (Leq 24 hrs.)
Location : บ้านท่าหินโงน (GPS 47P 0728246, 1403366)
Measurement Date : Oct 19 - Oct 20, 2022
Measurement by : Puvant Pimpan
Sound Level meter : Serial No. 1122607

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	49.8	74.7	47.2
12:00 PM - 01:00 PM	49.2	66.1	46.7
01:00 PM - 02:00 PM	49.1	66.3	45.7
02:00 PM - 03:00 PM	49.4	70.5	45.9
03:00 PM - 04:00 PM	49.8	67.0	46.2
04:00 PM - 05:00 PM	50.4	63.2	46.3
05:00 PM - 06:00 PM	50.6	72.8	46.6
06:00 PM - 07:00 PM	49.6	62.3	46.5
07:00 PM - 08:00 PM	52.0	67.9	47.7
08:00 PM - 09:00 PM	55.4	63.7	54.7
09:00 PM - 10:00 PM	54.3	70.2	53.0
10:00 PM - 11:00 PM	52.5	64.0	51.9
11:00 PM - 12:00 AM	50.8	56.3	49.9
12:00 AM - 01:00 AM	50.3	61.2	49.6
01:00 AM - 02:00 AM	50.4	61.1	49.3
02:00 AM - 03:00 AM	50.7	63.0	49.3
03:00 AM - 04:00 AM	51.5	63.4	50.5
04:00 AM - 05:00 AM	51.0	57.4	50.1
05:00 AM - 06:00 AM	50.9	61.5	50.0
06:00 AM - 07:00 AM	50.7	69.4	49.4
07:00 AM - 08:00 AM	51.8	69.9	49.4
08:00 AM - 09:00 AM	53.0	76.5	49.2
09:00 AM - 10:00 AM	54.6	84.8	48.2
10:00 AM - 11:00 AM	50.0	67.9	43.0

Leq Average 24 hrs. (dB(A))

51.5

Lmax (dB(A))

84.8

L90 (dB(A))

49.2

Ltn (dB(A))

57.6

Standard (dB(A))

70

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540 (ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540) 2. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540 (ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540)

Technical Management

Saranya C.
Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.
Supot Salameth
Section Head

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S:\Reports_Air Noise opt (4 SPK)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number: 2478449-1

Page 1 of 1

Sample Number : 22107117-12
Parameter : Noise (Leq 24 hrs.)
Location : บ้านท่าหินโงน (GPS 47P 0728246, 1403366)
Measurement Date : Oct 20 - Oct 21, 2022
Measurement by : Puvant Pimpan
Sound Level meter : Serial No. 1122607

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	49.9	80.1	43.5
12:00 PM - 01:00 PM	49.3	76.2	45.7
01:00 PM - 02:00 PM	49.7	70.5	45.5
02:00 PM - 03:00 PM	61.8	88.9	45.9
03:00 PM - 04:00 PM	54.4	81.3	46.2
04:00 PM - 05:00 PM	50.9	74.5	46.1
05:00 PM - 06:00 PM	49.5	71.0	46.1
06:00 PM - 07:00 PM	49.1	66.3	46.5
07:00 PM - 08:00 PM	54.3	69.5	48.6
08:00 PM - 09:00 PM	56.3	82.4	56.2
09:00 PM - 10:00 PM	56.2	67.2	54.5
10:00 PM - 11:00 PM	51.9	61.3	52.8
11:00 PM - 12:00 AM	52.1	57.0	51.5
12:00 AM - 01:00 AM	58.9	86.0	53.3
01:00 AM - 02:00 AM	58.4	59.7	50.9
02:00 AM - 03:00 AM	58.2	72.3	50.2
03:00 AM - 04:00 AM	50.1	57.5	49.2
04:00 AM - 05:00 AM	50.8	61.8	50.2
05:00 AM - 06:00 AM	49.8	66.8	47.6
06:00 AM - 07:00 AM	58.7	72.6	47.9
07:00 AM - 08:00 AM	57.8	86.7	48.1
08:00 AM - 09:00 AM	54.4	85.4	47.8
09:00 AM - 10:00 AM	53.0	76.4	46.9
10:00 AM - 11:00 AM	52.1	75.8	46.1

Leq Average 24 hrs. (dB(A))

39.9

Lmax (dB(A))

88.9

L90 (dB(A))

47.6

Ltn (dB(A))

59.7

Standard (dB(A))

70

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540 (ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540) 2. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540 (ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540)

Technical Management

Saranya C.
Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.
Supot Salameth
Section Head

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S:\Reports_Air Noise opt (4 SPK)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number: 2478449-1

Page 1 of 1

Sample Number : 22107117-13
Parameter : Noise (Leq 24 hrs.)
Location : บ้านท่าหินโงน (GPS 47P 0728246, 1403366)
Measurement Date : Oct 21 - Oct 22, 2022
Measurement by : Puvant Pimpan
Sound Level meter : Serial No. 1122607

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	50.9	72.2	42.8
12:00 PM - 01:00 PM	47.8	66.9	45.9
01:00 PM - 02:00 PM	48.9	67.2	45.9
02:00 PM - 03:00 PM	52.7	80.4	45.8
03:00 PM - 04:00 PM	54.4	65.9	45.6
04:00 PM - 05:00 PM	50.0	67.6	45.7
05:00 PM - 06:00 PM	50.9	76.9	47.0
06:00 PM - 07:00 PM	48.9	66.4	46.9
07:00 PM - 08:00 PM	54.2	65.2	46.9
08:00 PM - 09:00 PM	56.2	68.3	52.1
09:00 PM - 10:00 PM	54.3	63.1	51.6
10:00 PM - 11:00 PM	54.2	59.8	52.2
11:00 PM - 12:00 AM	54.8	58.6	51.2
12:00 AM - 01:00 AM	54.4	62.5	48.9
01:00 AM - 02:00 AM	53.2	62.7	50.6
02:00 AM - 03:00 AM	54.9	59.5	53.9
03:00 AM - 04:00 AM	53.5	58.9	52.7
04:00 AM - 05:00 AM	50.7	59.6	49.2
05:00 AM - 06:00 AM	49.2	57.2	47.4
06:00 AM - 07:00 AM	50.5	66.6	47.6
07:00 AM - 08:00 AM	52.8	82.7	47.6
08:00 AM - 09:00 AM	62.0	90.2	47.1
09:00 AM - 10:00 AM	49.4	73.1	45.8
10:00 AM - 11:00 AM	52.0	81.9	45.7

Leq Average 24 hrs. (dB(A))

50.9

Lmax (dB(A))

90.2

L90 (dB(A))

47.4

Ltn (dB(A))

59.5

Standard (dB(A))

70

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540 (ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540) 2. ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540 (ประกาศกระทรวงมหาดไทย เรื่อง ค่ามาตรฐานเสียงรบกวนในชุมชน พ.ศ. 2540)

Technical Management

Saranya C.
Saranya Chalerthamrong
Scientist (4)

Approved by

Supot S.
Supot Salameth
Section Head

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S:\Reports_Air Noise opt (4 SPK)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CLP 4

Lot ID: 22107117
Date Received : Oct 24, 2022
Date Reported : Oct 31, 2022
Report Number: 2478452-1

Page 1 of 1

Sample Number : 22107117-14
Parameter : Noise (Leq 24 hrs.)
Location : บ้านหินปูน (GPS 47P 0728246, 140E366)
Measurement Date : Oct 22 - Oct 23, 2022
Measurement by : Puwanart Pimpan
Sound Level meter : Serial No. 1122607

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	49.2	69.2	46.0
12:00 PM - 01:00 PM	48.4	70.4	46.0
01:00 PM - 02:00 PM	47.3	72.4	46.6
02:00 PM - 03:00 PM	46.8	66.9	45.8
03:00 PM - 04:00 PM	48.6	77.9	45.7
04:00 PM - 05:00 PM	53.5	78.4	45.8
05:00 PM - 06:00 PM	63.8	76.7	47.8
06:00 PM - 07:00 PM	48.8	63.4	47.5
07:00 PM - 08:00 PM	52.2	62.4	50.5
08:00 PM - 09:00 PM	54.7	65.6	50.7
09:00 PM - 10:00 PM	54.6	61.1	50.5
10:00 PM - 11:00 PM	53.0	61.9	51.1
11:00 PM - 12:00 AM	52.2	57.8	49.8
12:00 AM - 01:00 AM	50.6	57.4	49.3
01:00 AM - 02:00 AM	49.9	60.2	49.1
02:00 AM - 03:00 AM	55.8	65.6	49.2
03:00 AM - 04:00 AM	69.3	76.8	51.9
04:00 AM - 05:00 AM	69.0	78.7	50.0
05:00 AM - 06:00 AM	63.4	72.6	50.6
06:00 AM - 07:00 AM	51.7	73.0	48.9
07:00 AM - 08:00 AM	54.0	74.8	49.1
08:00 AM - 09:00 AM	52.5	70.9	49.0
09:00 AM - 10:00 AM	50.1	74.1	48.1
10:00 AM - 11:00 AM	53.8	72.2	50.3

Leq Average 24 hrs. (dB(A)) : 60.1
Lmax (dB(A)) : 76.7
L90 (dB(A)) : 49.1
L95 (dB(A)) : 69.3
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประกาศกระทรวงอุตสาหกรรม ฉบับที่ 15 (พ.ศ. 2540) เรื่อง กำหนดค่ามาตรฐานเสียงในโรงงานอุตสาหกรรม
2. ประกาศกระทรวงอุตสาหกรรม ฉบับที่ 15 (พ.ศ. 2540) เรื่อง กำหนดค่ามาตรฐานเสียงในโรงงานอุตสาหกรรม และกำหนดวิธีวัดและประเมินผลเสียงในโรงงานอุตสาหกรรม
โดย พ.ร.บ. พ.ศ. 2548

Technical Management

Saranyat C.
Saranyat Chalerthamrong
Scientist (4)

Approved by

Supat S.
Supat Salameh
Section Head

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2 (Report), Air Noise (pt 1) 23P40



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CLP 4



TESTING
No.0042
Lot ID: 2285383
Date Received : Jul 12, 2022
Date Reported : Jul 21, 2022
Report Number : 2381222-1

Page 1 of 1

Sample Number : 2285383-1
Sampled Date : Jul 12, 2022 2:30 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : Jul 12, 2022
Condition of Sample : Contained in one amber glass bottle, two glass vials and six 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	11	≤500	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	57	≤750	APHA (2017), 5220 D	Rayong
Oil & Grease	mg/L	-	3	4	≤10	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
Residual Free Chlorine *	mg/L	-	0.1	0.1	≤1	Based on APHA (2017), 4500-ClF	Rayong
Temperature *	Degree C	-	-	30.4	≤45	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	284	≤3000	APHA (2017), 2540 C	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampled By : Chainusorn Lertnathakunchai, Panupong Manit

Remark :

- LOD : Limit of Detection
- "C" : 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

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2 (Report), Air Noise (pt 1) 23P40



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CLP 4

TESTING
No.0009
Lot ID: 2285383
Date Received : Jul 12, 2022
Date Reported : Jul 21, 2022
Report Number : 2381222-2

Page 1 of 1

Sample Number : 2285383-1
Sampled Date : Jul 12, 2022 2:30 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : Jul 12, 2022
Condition of Sample : Contained in one amber glass bottle, two glass vials and six plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	1.57	≤10.0	Based on APHA (2017), 3125	Bangkok
Water Testing							
Calcium Hardness as CaCO3 *	mg/L	-	1	34	No Standard	Based on APHA (2017), 3500-Ca (B)	Bangkok
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	355	No Standard	Based on APHA (2017), 2510 B	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.7	No Standard	Based on APHA (2017), 4500-DO	Rayong
Flow rate *	m3/s	-	-	0.000	No Standard	Flow meter	Rayong
Silica as SiO2 *	mg/L	0.2	0.5	6.7	No Standard	Based on APHA (2017), 4500-SiO2(D)	Rayong
Total Alkalinity as CaCO3 *	mg/L	1	1	75	No Standard	Based on APHA (2017), 2320 B	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	40	No Standard	Based on APHA (2017), 2340 C	Rayong
Turbidity *	NTU	-	0.1	10.8	No Standard	Based on APHA (2017), 2130 B	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampled By : Chainusorn Lertnathakunchai, Panupong Manit

Remark :

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

Approved by

Savitree N.
Savitree Nongkham
Manager

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2 (Report), Air Noise (pt 1) 23P40



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CLP 4



TESTING
No.0042
Lot ID: 2293187
Date Received : Aug 09, 2022
Date Reported : Aug 18, 2022
Report Number : 2478452-1

Page 1 of 1

Sample Number : 2293187-1
Sampled Date : Aug 09, 2022 3:05 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : Aug 09, 2022
Condition of Sample : Contained in one amber glass bottle, one BOD bottle and six 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	≤500	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	8	≤750	APHA (2017), 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	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
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Based on APHA (2017), 4500-ClF	Rayong
Temperature *	Degree C	-	-	28.8	≤45	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	42	≤3000	APHA (2017), 2540 C	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampled By : Panamet Sotayakun, Thanasorn Namakulna

Remark :

- LOD : Limit of Detection
- "C" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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2 (Report), Air Noise (pt 1) 23P40



Analysis / Test Report

TESTING
No.0009Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130P/O :
Project Name : Monitoring
Project Location : CLP 4Lot ID: 2293187
Date Received : Aug 09, 2022
Date Reported : Aug 18, 2022
Report Number : 2407801-2

Page 1 of 1

Sample Number	2293187-1						
Sampled Date	Aug 09, 2022 3:05 PM						
Sample Description	Wastewater						
Location	Holding pond 320 m3						
Date Analysis Commenced	Aug 09, 2022						
Condition of Sample	Contained in one amber glass bottle, one BOD bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.36	≤10.0	Based on APHA (2017), 3125	Bangkok
Water Testing							
Calcium Hardness as CaCO3 *	mg/L	-	1	9	No Standard	Based on APHA (2017), 3500-Ca (B)	Bangkok
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	102	No Standard	Based on APHA (2017), 2510 B	Rayong
Dissolved Oxygen *	mg/L	-	0.1	6.7	No Standard	Based on APHA (2017), 4500-OC	Rayong
Flow rate *	m3/s	-	-	0.000	No Standard	Flow meter	Rayong
Silica as SiO2 *	mg/L	0.2	0.5	1.8	No Standard	Based on APHA (2017), 4500-SiO2(D)	Rayong
Total Alkalinity as CaCO3 *	mg/L	1	1	32	No Standard	Based on APHA (2017), 2320 B	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	16	No Standard	Based on APHA (2017), 2340 C	Rayong
Turbidity *	NTU	-	0.1	4.1	No Standard	Based on APHA (2017), 2130 B	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampled By : Paramet Sattayakun , Thanasoun NamakunnaRemark :
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Analysis / Test Report

TESTING
No.0042Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130P/O :
Project Name : Monitoring
Project Location : CLP 4Lot ID: 2298296
Date Received : Sep 13, 2022
Date Reported : Sep 22, 2022
Report Number : 2440857-1

Page 1 of 1

Sample Number	2298296-1						
Sampled Date	Sep 13, 2022 11:15 AM						
Sample Description	Wastewater						
Location	Holding pond 320 m3						
Date Analysis Commenced	Sep 13, 2022						
Condition of Sample	Contained in one amber glass bottle, one BOD bottle and six 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	≤500	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	13	≤750	APHA (2017), 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	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
Residual Free Chlorine *	mg/L	-	0.1	0.2	≤1	Based on APHA (2017), 4500-Cl(F)	Rayong
Temperature *	Degree C	-	-	29.7	≤45	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	122	≤3000	APHA (2017), 2540 C	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampled By : Chainusorn Lertrathakunchai , Panupong ManitRemark :
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Dej Chanchon
Senior Manager
หมายเลขโทรศัพท์ 323-9-9442

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Analysis / Test Report

TESTING
No.0009Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130P/O :
Project Name : Monitoring
Project Location : CLP 4Lot ID: 2298296
Date Received : Sep 13, 2022
Date Reported : Sep 22, 2022
Report Number : 2440857-2

Page 1 of 1

Sample Number	2298296-1						
Sampled Date	Sep 13, 2022 11:15 AM						
Sample Description	Wastewater						
Location	Holding pond 320 m3						
Date Analysis Commenced	Sep 13, 2022						
Condition of Sample	Contained in one amber glass bottle, one BOD bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	1.19	≤10.0	Based on APHA (2017), 3125	Bangkok
Water Testing							
Calcium Hardness as CaCO3 *	mg/L	-	1	37	No Standard	Based on APHA (2017), 3500-Ca (B)	Bangkok
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	204	No Standard	Based on APHA (2017), 2510 B	Rayong
Dissolved Oxygen *	mg/L	-	0.1	7.8	No Standard	Based on APHA (2017), 4500-OC	Rayong
Flow rate *	m3/s	-	-	0.000	No Standard	Flow meter	Rayong
Silica as SiO2 *	mg/L	0.2	0.5	6.6	No Standard	Based on APHA (2017), 4500-SiO2(D)	Rayong
Total Alkalinity as CaCO3 *	mg/L	1	1	28	No Standard	Based on APHA (2017), 2320 B	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	49	No Standard	Based on APHA (2017), 2340 C	Rayong
Turbidity *	NTU	-	0.1	25.0	No Standard	Based on APHA (2017), 2130 B	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampled By : Chainusorn Lertrathakunchai , Panupong ManitRemark :
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Analysis / Test Report

TESTING
No.0042Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130P/O :
Project Name : Monitoring
Project Location : CLP 4Lot ID: 22120425
Date Received : Oct 11, 2022
Date Reported : Oct 20, 2022
Report Number : 2466677-1

Page 1 of 1

Sample Number	22120425-1						
Sampled Date	Oct 11, 2022 2:24 PM						
Sample Description	Wastewater						
Location	Holding pond 320 m3						
Date Analysis Commenced	Oct 11, 2022						
Condition of Sample	Contained in one BOD bottle, one amber glass bottle and six 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	8	≤500	APHA (2017), 5210 B	Rayong
COD	mg/L	1.5	5	41	≤750	APHA (2017), 5220 D	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C	-	-	-	7.9	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Residual Free Chlorine *	mg/L	-	0.1	0.1	≤1	Based on APHA (2017), 4500-Cl(F)	Rayong
Temperature *	Degree C	-	-	32.6	≤45	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	222	≤3000	APHA (2017), 2540 C	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampled By : Chainusorn Lertrathakunchai , Panupong ManitRemark :
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Analysis / Test Report

TESTING
No.0009

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22120425
Date Received : Oct 11, 2022
Date Reported : Oct 20, 2022
Report Number : 2468847-2

Page 1 of 1

Sample Number : 22120425-1
Sampled Date : Oct 11, 2022 2:24 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : Oct 11, 2022
Condition of Sample : Contained in one BOD bottle, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	2.28	≤10.0	Based on APHA (2017), 3125	Bangkok
Water Testing							
Calcium Hardness as CaCO ₃ *	mg/L	-	1	37	No Standard	Based on APHA (2017), 3500-Ca (B)	Bangkok
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	290	No Standard	Based on APHA (2017), 2510 B	Rayong
Dissolved Oxygen *	mg/L	-	0.1	7.8	No Standard	Based on APHA (2017), 4500-DO(C)	Rayong
Flow rate *	m3/s	-	-	0.000	No Standard	Flow meter	Rayong
Silica as SiO ₂ *	mg/L	0.2	0.5	6.6	No Standard	Based on APHA (2017), 4500-SiO ₂ (D)	Rayong
Total Alkalinity as CaCO ₃ *	mg/L	1	1	43	No Standard	Based on APHA (2017), 2320 B	Rayong
Total Hardness as CaCO ₃ *	mg/L	-	1	68	No Standard	Based on APHA (2017), 2340 C	Rayong
Turbidity *	NTU	-	0.1	15.0	No Standard	Based on APHA (2017), 2130 B	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Chaiyosorn Lerthanthakunchai, Panapong Manit

Remark :
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Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22140268
Date Received : Dec 13, 2022
Date Reported : Dec 22, 2022
Report Number : 2526996-1

Page 1 of 1

Sample Number : 22140268-1
Sampled Date : Dec 13, 2022 2:40 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : Dec 13, 2022
Condition of Sample : Contained in one amber glass bottle, one BOD bottle and six 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	7	≤500	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B	Rayong
COO	mg/L	1.5	5	38	≤750	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease *	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C *	-	-	-	9.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-H (B)	Rayong
Residual Free Chlorine *	mg/L	-	0.1	0.2	≤1	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Cl (F)	Rayong
Temperature *	Degree C	-	-	29.7	≤45	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2500 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	388	≤3000	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Chaiyosorn Lerthanthakunchai, Panapong Manit

Remark :
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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22140268
Date Received : Dec 13, 2022
Date Reported : Dec 22, 2022
Report Number : 2526996-2

Page 2 of 2

Sample Number : 22140268-1
Sampled Date : Dec 13, 2022 2:40 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : Dec 13, 2022
Condition of Sample : Contained in one amber glass bottle, one BOD bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.12	≤10.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Calcium Hardness as CaCO ₃	mg/L	-	1	97	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3500-Ca (B)	Bangkok
Conductivity at 25 Degree C	micromhos/cm	-	0.5	586	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Rayong
Dissolved Oxygen	mg/L	-	0.1	8.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-DO (C)	Rayong
Flow rate	m3/s	-	-	0.000	No Standard	Flow meter	Rayong
Silica as SiO ₂	mg/L	0.2	0.5	21.6	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO ₂ (D)	Rayong
Total Alkalinity as CaCO ₃	mg/L	1	1	103	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Rayong
Total Hardness as CaCO ₃	mg/L	-	1	140	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Rayong
Turbidity	NTU	-	0.1	9.9	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2130 B	Rayong

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Analysis / Test Report



Lot ID: 22140268
Date Received : Dec 13, 2022
Date Reported : Dec 22, 2022
Report Number : 2526996-2

Page 2 of 2

Sample Number : 22140268-1
Sampled Date : Dec 13, 2022 2:40 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : Dec 13, 2022
Condition of Sample : Contained in one amber glass bottle, one BOD bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.12	≤10.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Water Testing							
Calcium Hardness as CaCO ₃	mg/L	-	1	97	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3500-Ca (B)	Bangkok
Conductivity at 25 Degree C	micromhos/cm	-	0.5	586	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Rayong
Dissolved Oxygen	mg/L	-	0.1	8.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-DO (C)	Rayong
Flow rate	m3/s	-	-	0.000	No Standard	Flow meter	Rayong
Silica as SiO ₂	mg/L	0.2	0.5	21.6	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO ₂ (D)	Rayong
Total Alkalinity as CaCO ₃	mg/L	1	1	103	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Rayong
Total Hardness as CaCO ₃	mg/L	-	1	140	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Rayong
Turbidity	NTU	-	0.1	9.9	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2130 B	Rayong

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0103791902

0103791902



Analysis / Test Report

TESTING
No.0009Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130P/O :
Project Name : Monitoring
Project Location : CLP 4Lot ID: 2285383
Date Received : Jul 12, 2022
Date Reported : Jul 21, 2022
Report Number : 2381223-2

Page 1 of 1

Sample Number	2285383-2						
Sampled Date	Jul 12, 2022 2:15 PM						
Sample Description	Wastewater						
Location	Holding pond 1800 m3						
Date Analysis Commenced	Jul 12, 2022						
Condition of Sample	Contained in one amber glass bottle, two glass vials and six plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.06	≤10.0	Based on APHA (2017), 3125	Bangkok
Volatile Organics Compounds							
Bromodichloromethane *	ug/L	0.2	0.5	1.7	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Bromoform *	ug/L	0.2	0.5	NOT DETECTED	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Chloroform *	ug/L	0.2	0.5	3.9	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Dibromochloromethane *	ug/L	0.2	0.5	1.2	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Trihalomethanes *	ug/L	0.2	1	6.7	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Calcium Hardness as CaCO3 *	mg/L	-	1	175	No Standard	Based on APHA (2017), 3500-Ca (B)	Bangkok
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	1077	No Standard	Based on APHA (2017), 2510 B	Rayong
Silica as SiO2 *	mg/L	0.2	0.5	27.6	No Standard	Based on APHA (2017), 4500-SiO2(D)	Rayong
Total Alkalinity as CaCO3 *	mg/L	1	1	227	No Standard	Based on APHA (2017), 2320 B	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	236	No Standard	Based on APHA (2017), 2340 C	Rayong
Turbidity *	NTU	-	0.1	1.1	No Standard	Based on APHA (2017), 2130 B	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant.

Sampled By : Chaisorn Lertranthakunchai, Panupong Manit

Remark :
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S (Internal), AL, CL, on (1/3/2021)



Analysis / Test Report

TESTING
No.0009Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130P/O :
Project Name : Monitoring
Project Location : CLP 4Lot ID: 2293187
Date Received : Aug 09, 2022
Date Reported : Aug 18, 2022
Report Number : 2407802-2

Page 1 of 1

Sample Number	2293187-2						
Sampled Date	Aug 09, 2022 2:45 PM						
Sample Description	Wastewater						
Location	Holding pond 1800 m3						
Date Analysis Commenced	Aug 10, 2022						
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.04	≤10.0	Based on APHA (2017), 3125	Bangkok
Volatile Organics Compounds							
Bromodichloromethane *	ug/L	0.2	0.5	7.5	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Bromoform *	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Chloroform *	ug/L	0.2	0.5	15.0	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Dibromochloromethane *	ug/L	0.2	0.5	4.6	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Trihalomethanes *	ug/L	0.2	1	27.2	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Calcium Hardness as CaCO3 *	mg/L	-	1	182	No Standard	Based on APHA (2017), 3500-Ca (B)	Bangkok
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	1152	No Standard	Based on APHA (2017), 2510 B	Rayong
Silica as SiO2 *	mg/L	0.2	0.5	28.5	No Standard	Based on APHA (2017), 4500-SiO2(D)	Rayong
Total Alkalinity as CaCO3 *	mg/L	1	1	227	No Standard	Based on APHA (2017), 2320 B	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	224	No Standard	Based on APHA (2017), 2340 C	Rayong
Turbidity *	NTU	-	0.1	0.8	No Standard	Based on APHA (2017), 2130 B	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant.

Sampled By : Paramet Sattayakun, Thanasorn Namakuma

Remark :
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Analysis / Test Report

TESTING
No.0009Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130P/O :
Project Name : Monitoring
Project Location : CLP 4Lot ID: 2298296
Date Received : Sep 13, 2022
Date Reported : Sep 22, 2022
Report Number : 240838-2

Page 1 of 1

Sample Number	2298296-2							Page 3 of 11
Sampled Date	Sep 13, 2022 11:00 AM							
Sample Description	Wastewater							
Location	Holding pond 1800 m3							
Date Analysis Commenced	Sep 13, 2022							
Condition of Sample	Contained in two glass vials, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)							
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location	
Metals Testing								
Iron	mg/L	0.003	0.005	0.21	≤10.0	Based on APHA (2017), 3125	Bangkok	
Volatile Organics Compounds								
Bromodichloromethane *	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok	
Bromoform *	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok	
Chloroform *	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok	
Dibromochloromethane *	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok	
Total Trihalomethanes *	ug/L	0.2	1	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok	
Water Testing								
Calcium Hardness as CaCO3 *	mg/L	-	1	61	No Standard	Based on APHA (2017), 3500-Ca (B)	Bangkok	
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	350	No Standard	Based on APHA (2017), 2510 B	Rayong	
Silica as SiO2 *	mg/L	0.2	0.5	11.8	No Standard	Based on APHA (2017), 4500-SiO2(D)	Rayong	
Total Alkalinity as CaCO3 *	mg/L	1	1	49	No Standard	Based on APHA (2017), 2320 B	Rayong	
Total Hardness as CaCO3 *	mg/L	-	1	88	No Standard	Based on APHA (2017), 2340 C	Rayong	
Turbidity *	NTU	-	0.1	4.4	No Standard	Based on APHA (2017), 2130 B	Rayong	

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant.

Sampled By : Chaisorn Lertranthakunchai, Panupong Manit

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Analysis / Test Report

TESTING
No.0009Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130P/O :
Project Name : Monitoring
Project Location : CLP 4Lot ID: 22120425
Date Received : Oct 11, 2022
Date Reported : Oct 20, 2022
Report Number : 2466648-2

Page 1 of 1

Page 4 of 7

Sample Number	22120425-2						
Sampled Date	Oct 11, 2022 2:10 PM						
Sample Description	Wastewater						
Location	Holding pond 1800 m3						
Date Analysis Commenced	Oct 12, 2022						
Condition of Sample	Contained in one BOD bottle, one amber glass bottle and six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.66	≤10.0	Based on APHA (2017), 3125	Bangkok
Volatile Organics Compounds							
Bromodichloromethane *	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Bromoform *	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Chloroform *	ug/L	0.2	0.5	1.5	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Dibromochloromethane *	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Trihalomethanes *	ug/L	0.2	1	1.5	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Calcium Hardness as CaCO ₃ *	mg/L	-	1	127	No Standard	Based on APHA (2017), 3500-Ca (B)	Bangkok
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	610	No Standard	Based on APHA (2017), 2510 B	Rayong
Silica as SiO ₂ *	mg/L	0.2	0.5	24.2	No Standard	Based on APHA (2017), 4500-SiO ₂ (D)	Rayong
Total Alkalinity as CaCO ₃ *	mg/L	1	1	120	No Standard	Based on APHA (2017), 2320 B	Rayong
Total Hardness as CaCO ₃ *	mg/L	-	1	156	No Standard	Based on APHA (2017), 2340 C	Rayong
Turbidity *	NTU	-	0.1	6.4	No Standard	Based on APHA (2017), 2130 B	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant.

Sampled By : Chaisorn Lertranthakunchai, Panupong Manit

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Analysis / Test Report

TESTING
No.0009

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22124345
Date Received : Nov 08, 2022
Date Reported : Nov 16, 2022
Report Number : 2493561-2

Page 1 of 1

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.05	≤10.0	Based on APHA (2017), 3125	Bangkok
Volatile Organics Compounds							
Bromodichloromethane *	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Bromotoluene *	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Chloroform *	ug/L	0.2	0.5	2.0	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Dibromochloromethane *	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Trihalomethanes *	ug/L	0.2	1	2.0	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Water Testing							
Calcium Hardness as CaCO ₃ *	mg/L	-	1	172	No Standard	Based on APHA (2017), 3500-Ca (B)	Bangkok
Conductivity at 25 Degree C *	micromhos/cm	-	0.5	844	No Standard	Based on APHA (2017), 2510 B	Rayong
Silica as SiO ₂ *	mg/L	0.2	0.5	21.0	No Standard	Based on APHA (2017), 4500-SiO ₂ (D)	Rayong
Total Alkalinity as CaCO ₃ *	mg/L	1	1	196	No Standard	Based on APHA (2017), 2320 C	Rayong
Total Hardness as CaCO ₃ *	mg/L	-	1	208	No Standard	Based on APHA (2017), 2340 C	Rayong
Turbidity *	NTU	-	0.1	1.4	No Standard	Based on APHA (2017), 2130 B	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater treatment plant
Sampling By : Chaisorn Lerbanthakunchai, Thanassun Namakunna

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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22140268
Date Received : Dec 13, 2022
Date Reported : Dec 22, 2022
Report Number : 2526997-2

Page 1 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.02	≤10.0	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Volatile Organics Compounds							
Bromodichloromethane	ug/L	0.2	0.5	Not Detected	No Standard	Based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Bromotoluene	ug/L	0.2	0.5	Not Detected	No Standard	Based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Chloroform	ug/L	0.2	0.5	1.6	No Standard	Based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Dibromochloromethane	ug/L	0.2	0.5	Not Detected	No Standard	Based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Total Trihalomethanes	ug/L	0.2	1	1.6	No Standard	Based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Water Testing							
Calcium Hardness as CaCO ₃	mg/L	-	1	175	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3500-Ca (B)	Bangkok
Conductivity at 25 Degree C	micromhos/cm	-	0.5	917	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Rayong
Silica as SiO ₂	mg/L	0.2	0.5	42.7	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO ₂ (D)	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater treatment plant
Sampling By : Chaisorn Lerbanthakunchai, Thanassun Namakunna

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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22140268
Date Received : Dec 13, 2022
Date Reported : Dec 22, 2022
Report Number : 2526997-2

Page 2 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Total Alkalinity as CaCO ₃	mg/L	1	1	194	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 C	Rayong
Total Hardness as CaCO ₃	mg/L	-	1	216	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Rayong
Turbidity	NTU	-	0.1	0.6	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2130 B	Rayong

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater treatment plant
Sampling By : Chaisorn Lerbanthakunchai, Thanassun Namakunna

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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107119
Date Received : Sep 22, 2022
Date Reported : Sep 26, 2022
Report Number : 2418860-1

Page 1 of 2

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
พื้นที่ GTG	120	27.6	25.9	31.6	31.5
Average (WBGT)		27.6			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

- Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
- Ministerial Regulation on Prescribing of Standard for Administration and Management of Occupational Safety, Health and Environment relation to Heat, Light and Noise, B.E.2559

Technical Management

Supt S
Supt Salienteh
Section Head

Approved by

Wichan Choonharat
Wichan Choonharat
Assistant Manager

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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22107119
Date Received : Sep 22, 2022
Date Reported : Sep 26, 2022
Report Number: 2418860-1

Page 2 of 2

Sample Number	22107119-2				
Parameter	Heat Stress (Sampling Time : 10.00 AM - 12.00 PM)				
Measurement Date	Sep 21, 2022				
Measurement by	Sathaporn Thakorn				
Location	บริเวณงาน 1 ชั้น (โต๊ะทำงาน บริเวณ : นอก -)				
Location	Duration (min)	WBGT (°C)	NWS (°C)	GT (°C)	DB (°C)
พื้นที่ HRSG	120	27.2	25.4	31.3	31.2
Average (WBGT)		27.2			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

- Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
- Ministerial Regulation on Prescribing of Standard for Administration and Management of Occupational Safety, Health and Environment relation to Heat, Light and Noise, B.E.2559

Technical Management

Supot S.
Supot Salanteth
Section Head

Approved by

Wichan Ch.
Wichan Choonharat
Assistant Manager

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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22134757
Date Received : Nov 25, 2022
Date Reported : Nov 29, 2022
Report Number : 2483071-1

Page 1 of 8

Sample Number	22134757-1								
Sampled Date	Nov 24, 2022								
Sample Description	Noise Dose								
Location	COF1 (Day)								
Personal Sampling	ณห้องประชุม								
Date Analysis Commenced	Nov 28, 2022								
Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	07:00 AM - 07:00 PM	%	-	-	<1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:00 AM - 07:00 PM	%	-	1	<1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	07:00 AM - 07:00 PM	dB(A)	-	-	60.9	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:00 AM - 07:00 PM	dB(A)	-	-	62.6	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :

- Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
- Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)

* MOL Recommended guideline limit for 12 working hours should not be over 83 dB(A)

Sampled By : Natthaporn Jengwareewong

Remark :

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

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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22134757
Date Received : Nov 25, 2022
Date Reported : Nov 29, 2022
Report Number : 2483071-1

Page 2 of 6

Sample Number	22134757-2								
Sampled Date	Nov 24, 2022								
Sample Description	Noise Dose								
Location	COF1 (Night)								
Personal Sampling	ณห้องประชุม								
Date Analysis Commenced	Nov 28, 2022								
Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	07:30 PM - 07:30 AM	%	-	-	<1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 PM - 07:30 AM	%	-	1	<1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	07:30 PM - 07:30 AM	dB(A)	-	-	54.3	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 PM - 07:30 AM	dB(A)	-	-	54.9	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :

- Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
- Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)

* MOL Recommended guideline limit for 12 working hours should not be over 83 dB(A)

Sampled By : Natthaporn Jengwareewong

Remark :

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

Approved by

Wichan Ch.
Wichan Choonharat
Assistant Manager

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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22134757
Date Received : Nov 25, 2022
Date Reported : Nov 29, 2022
Report Number : 2483071-1

Page 3 of 6

Sample Number	22134757-3									Page 2 of 2
Sampled Date	Nov 24, 2022									
Sample Description	Noise Dose									
Location	FOH1 (Day)									
Personal Sampling	บริเวณห้องประชุม									
Date Analysis Commenced	Nov 28, 2022									
Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location	
Air Testing										
Noise Dose (12 hrs.) (Calculated from Lavg)	07:00 AM - 07:00 PM	%	-	-	19.5	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok	
Noise Dose (8 hrs.)	07:00 AM - 07:00 PM	%	-	1	18.2	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok	
TWA (12 hrs.) (Calculated from Lavg)	07:00 AM - 07:00 PM	dB(A)	-	-	75.9	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok	
TWA (8 hrs.)	07:00 AM - 07:00 PM	dB(A)	-	-	77.6	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok	

Guideline :

- Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
- Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)

* MOL Recommended guideline limit for 12 working hours should not be over 83 dB(A)

Sampled By : Natthaporn Jengwareewong

Remark :

- LOD : Limit of Detection
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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22134757
Date Received : Nov 25, 2022
Date Reported : Nov 29, 2022
Report Number : 2483071-1

Page 4 of 6

Sample Number : 22134757-4
Sampled Date : Nov 24, 2022
Sample Description : Noise Dose
Location : FO#1 (Night)
Personal Sampling : ณพื้นที่ปฏิบัติงาน
Date Analysis Commenced : Nov 28, 2022

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	07:30 PM - 07:30 AM	%	-	-	38.0	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 PM - 07:30 AM	%	-	-	34.7	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	07:30 PM - 07:30 AM	dB(A)	-	-	78.8	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 PM - 07:30 AM	dB(A)	-	-	80.4	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :

- MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)

Sampled By : Natthapon Jengwareewong

Remark :
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Wichan Choonharat
Assistant Manager

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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22134757
Date Received : Nov 25, 2022
Date Reported : Nov 29, 2022
Report Number : 2483071-1

Page 5 of 6

Sample Number : 22134757-5
Sampled Date : Nov 24, 2022
Sample Description : Noise Dose
Location : FO#2 (Day)
Personal Sampling : ณพื้นที่ปฏิบัติงาน
Date Analysis Commenced : Nov 28, 2022

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	07:00 AM - 07:00 PM	%	-	-	3.6	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:00 AM - 07:00 PM	%	-	-	3.4	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	07:00 AM - 07:00 PM	dB(A)	-	-	68.6	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:00 AM - 07:00 PM	dB(A)	-	-	70.3	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :

- MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)

Sampled By : Natthapon Jengwareewong

Remark :
- LOD : Limit of Detection
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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130

P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 22134757
Date Received : Nov 25, 2022
Date Reported : Nov 29, 2022
Report Number : 2483071-1

Page 6 of 6

Sample Number : 22134757-6
Sampled Date : Nov 24, 2022
Sample Description : Noise Dose
Location : FO#2 (Night)
Personal Sampling : ณพื้นที่ปฏิบัติงาน
Date Analysis Commenced : Nov 28, 2022

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	07:30 PM - 07:30 AM	%	-	-	7.4	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 PM - 07:30 AM	%	-	-	5.9	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	07:30 PM - 07:30 AM	dB(A)	-	-	71.7	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 PM - 07:30 AM	dB(A)	-	-	72.7	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :

- MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)

Sampled By : Natthapon Jengwareewong

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

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ภาคผนวก ง

ใบรับรองการสอบเทียบเครื่องมือ



Lot No. 22107054-1

ANALYZER CALIBRATION DATA

Client : Global Power Synergy PCL. Location : HRSGa 1
Date : 21 Oct 22 Test Operator : Sakalt P.

O₂ ANALYZER
Model : TELEDYNE API 200EH Serial No. : 774
Span (%) : 25

	Cylinder Value (%)	Initial Analyzers Calibration Response (%)	Final Analyzers Calibration Response (%)	Difference (Percent of Span)
Zero Gas	0.00	0.03	0.01	0.08
Low-Level Gas	7.93	7.96	7.94	0.08
Span Gas	16.00	16.03	16.01	0.08

NO_x ANALYZER
Model : TELEDYNE API 200EH Serial No. : 774
Span (ppm) : 100

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.06	0.02	0.04
Low-Level Gas	50.41	50.47	50.43	0.04
Span Gas	80.27	80.33	80.29	0.04

SO₂ ANALYZER
Model : TELEDYNE API 100EH Serial No. : 437
Span (ppm) : 100

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.02	0.00	0.02
Low-Level Gas	51.61	51.63	51.61	0.02
Span Gas	79.00	79.02	79.00	0.02

CO ANALYZER
Model : TELEDYNE API 300EM Serial No. : 461
Span (ppm) : 100

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.02	0.00	0.02
Low-Level Gas	50.31	50.33	50.31	0.02
Span Gas	80.53	80.55	80.53	0.02

Calibrated by

(Mr.Sakalt Phaisanphlout)
Environmental Field Scientist (4)

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



Lot No. 22107054-1

SYSTEM CALIBRATION BIAS AND DRIFT DATA

Client : Global Power Synergy PCL. Location : HRSGa 1
Date : 21 Oct 22 Test Operator : Sakalt P.

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

	O ₂ Analyzer Calibration Response	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	0.03	0.03	0.00	0.01	0.08	0.08
Upscale Gas	16.03	16.03	0.00	16.01	0.08	0.08

NO_x ANALYZER
Cylinder Conc. (ppm) : 80.27 Span (ppm) : 100

	NO _x Analyzer Calibration Response	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	0.06	0.06	0.00	0.02	0.04	0.04
Upscale Gas	80.33	80.33	0.00	80.29	0.04	0.04

SO₂ ANALYZER
Cylinder Conc. (ppm) : 79.00 Span (ppm) : 100

	SO ₂ Analyzer Calibration Response	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	0.02	0.02	0.00	0.00	0.02	0.02
Upscale Gas	79.02	79.02	0.00	79.00	0.02	0.02

CO ANALYZER
Cylinder Conc. (ppm) : 80.53 Span (ppm) : 100

	CO Analyzer Calibration Response	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	0.02	0.02	0.00	0.00	0.02	0.02
Upscale Gas	80.55	80.55	0.00	80.53	0.02	0.02

Calibrated by

(Mr.Sakalt Phaisanphlout)
Environmental Field Scientist (4)

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



EMISSION TEST RESULT

Client : Global Power Synergy PCL. Run # : 1
Date : 21 Oct 22 Location : HRSGa 1
Start Time : 11:40 Test Operator : Sakalt P.
SO₂ Analyzer Model : TELEDYNE API 100EH Serial No. : 437
NO_x/O₂ Analyzer Model : TELEDYNE API 200EH Serial No. : 774
CO/CO₂ Analyzer Model : TELEDYNE API 300EM Serial No. : 461

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
11:40	13.62	4.26	9.00	0.02	-	
11:41	13.63	4.25	9.00	0.03	-	
11:42	13.62	4.25	9.01	0.03	-	
11:43	13.62	4.25	9.00	0.02	-	
11:44	13.63	4.26	8.92	0.03	-	
11:45	13.62	4.26	8.90	0.03	-	
11:46	13.62	4.26	8.94	0.03	-	
11:47	13.62	4.27	9.08	0.03	-	
11:48	13.62	4.28	9.13	0.03	-	
11:49	13.62	4.28	9.12	0.02	-	
11:50	13.62	4.29	9.09	0.03	-	
11:51	13.63	4.27	9.10	0.03	-	
11:52	13.64	4.26	9.14	0.02	-	
11:53	13.63	4.26	9.16	0.04	-	
11:54	13.62	4.26	9.17	0.04	-	
11:55	13.64	4.26	9.20	0.03	-	
11:56	13.64	4.26	9.14	0.04	-	
11:57	13.62	4.26	9.15	0.02	-	
11:58	13.61	4.26	9.19	0.03	-	
11:59	13.61	4.25	9.11	0.02	-	
12:00	13.63	4.26	9.07	0.02	-	
Average	13.62	4.26	9.08	0.03	-	

(Mr.Sakalt Phaisanphlout)
Environmental Field Scientist (4)

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



EMISSION TEST RESULT

Client : Global Power Synergy PCL. Run # : 2
Date : 21 Oct 22 Location : HRSGa 1
Start Time : 12:01 Test Operator : Sakalt P.
SO₂ Analyzer Model : TELEDYNE API 100EH Serial No. : 437
NO_x/O₂ Analyzer Model : TELEDYNE API 200EH Serial No. : 774
CO/CO₂ Analyzer Model : TELEDYNE API 300EM Serial No. : 461

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
12:01	13.64	4.26	9.02	0.02	-	
12:02	13.64	4.27	9.06	0.02	-	
12:03	13.62	4.27	9.10	0.02	-	
12:04	13.62	4.27	9.14	0.01	-	
12:05	13.63	4.27	9.10	0.01	-	
12:06	13.63	4.26	9.08	0.02	-	
12:07	13.63	4.27	9.11	0.01	-	
12:08	13.62	4.27	9.14	0.01	-	
12:09	13.63	4.27	9.15	0.02	-	
12:10	13.63	4.25	9.20	0.03	-	
12:11	13.64	4.25	9.22	0.03	-	
12:12	13.63	4.26	9.26	0.04	-	
12:13	13.62	4.26	9.27	0.03	-	
12:14	13.61	4.25	9.29	0.03	-	
12:15	13.59	4.25	9.29	0.02	-	
12:16	13.61	4.24	9.25	0.01	-	
12:17	13.62	4.25	9.23	0.03	-	
12:18	13.62	4.26	9.18	0.03	-	
12:19	13.61	4.25	9.20	0.03	-	
12:20	13.63	4.25	9.18	0.02	-	
12:21	13.63	4.25	9.10	0.01	-	
Average	13.62	4.26	9.17	0.02	-	

(Mr.Sakalt Phaisanphlout)
Environmental Field Scientist (4)

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



EMISSION TEST RESULT

Client	Global Power Synergy PCL.	Run #	3
Date	21 Oct 22	Location	HRS06 1
Start Time	12:22	Test Operator	Sekait P.
SO ₂ Analyzer Model	TELEDYNE API 100EH	Serial No.	437
NO _x /O ₂ Analyzer Model	TELEDYNE API 200EH	Serial No.	774
CO/CO ₂ Analyzer Model	TELEDYNE API 300EH	Serial No.	451

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
12:22	13.63	4.25	8.95	0.01	-	
12:23	13.62	4.26	8.92	0.01	-	
12:24	13.61	4.27	8.96	0.00	-	
12:25	13.61	4.27	9.08	0.02	-	
12:26	13.63	4.26	9.14	0.01	-	
12:27	13.63	4.25	9.07	-0.01	-	
12:28	13.63	4.26	8.97	0.01	-	
12:29	13.63	4.26	8.94	0.01	-	
12:30	13.62	4.26	8.94	0.02	-	
12:31	13.59	4.25	8.97	-0.01	-	
12:32	13.62	4.25	8.95	0.00	-	
12:33	13.62	4.24	8.93	0.00	-	
12:34	13.61	4.26	8.95	0.01	-	
12:35	13.62	4.27	9.01	0.02	-	
12:36	13.64	4.23	9.02	0.00	-	
12:37	13.64	4.23	8.89	0.00	-	
12:38	13.63	4.23	8.87	0.01	-	
12:39	13.63	4.23	8.85	0.01	-	
12:40	13.62	4.24	8.83	-0.01	-	
12:41	13.63	4.24	8.84	0.00	-	
12:42	13.64	4.23	8.84	0.01	-	
Average	13.62	4.25	8.95	0.01	-	

Sekait P.

(M. Sekait Phalanphat)

Environmental Field Scientist (4)

FORM NO.: F-06-02 REVISION NO.: 2 ISSUE DATE: 3/06/19

ALS Laboratory Group



Airgas Specialty Gases
Airgas USA, LLC
400 Union Landing Road
Channahon, IL 60917-0000
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04N199E3H40023 Reference Number: 82-401123105-1
Cylinder Number: N033083 Cylinder Volume: 247.2 CF
Laboratory: 124 - Riverton (SAP) - NJ Cylinder Pressure: 2215 PSIG
PGVP Number: E03018 Valve Outlet: 860
Gas Code: CO,NO,NOX,SO2,BALN Certification Date: Feb 26, 2018
Expiration Date: Feb 26, 2025

Certification performed in accordance with EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012) document EPA 8200R-12051, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volumetric basis unless otherwise noted.

Do Not Use This Cylinder Below 100 psig, i.e. 6.7 megapascals

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	50.00 PPM	50.41 PPM	G1	+/- 1.5% NIST Traceable	02/16/2018, 02/26/2018
CARBON MONOXIDE	50.00 PPM	50.31 PPM	G1	+/- 0.7% NIST Traceable	02/16/2018
NITRIC OXIDE	50.00 PPM	50.39 PPM	G1	+/- 1.0% NIST Traceable	02/16/2018, 02/26/2018
SULFUR DIOXIDE	50.00 PPM	51.81 PPM	G1	+/- 1.2% NIST Traceable	02/16/2018, 02/26/2018
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	1490705	CC43493	49.89 PPM CARBON MONOXIDE/NITROGEN	+/- 0.8%	Feb 22, 2020
PRM	13497	APFC1080237	8.85 PPM NITROGEN DIOXIDE/NOX	+/- 2.0%	Jun 15, 2017
NTRM	1800607	CC42854	50.42 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Jun 17, 2020
QMS	501501004	CC503505	4.875 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.6%	Mar 15, 2019
NTRM	14911025	CC472148	49.82 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Jun 17, 2022

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nissel 6708 APV1100381 CO	FTR	Feb 08, 2018
Nissel 6708 APV1100381 NO	FTR	Feb 16, 2018
Nissel 6708 APV1100381 NO2	FTR	Feb 16, 2018
Nissel 6708 APV1100381 SO2	FTR	Feb 05, 2018

Triad Data Available Upon Request

NOTES:
This calibration std. has been certified in accordance with the May 2012 EPA Traceability Protocol, Document EPA-8200R-12051. All testing processes and measurements conform to the requirements of ISO/IEC 17025 and to Airgas ISO 9001:2000 and relate only to items identified on this certificate. We are certified to be NIST Traceable with total uncertainty as detailed under Analytical Uncertainty. This document shall not be reproduced in full without written approval of the issuer.



TESTING CERT No. 3082.05

Approved for Release

Page 1 of 82-401123105-1



Airgas Specialty Gases
Airgas USA, LLC
6141 Eastern Road
Bldg 1
Plantation, FL 33449
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04N199E15A0440 Reference Number: 160-401907847-1
Cylinder Number: E00137377 Cylinder Volume: 144.4 Cubic Feet
Laboratory: 124 - Plumsteadville - PA Cylinder Pressure: 2015 PSIG
PGVP Number: A12020 Valve Outlet: 860
Gas Code: CO,NO,NOX,SO2,BALN Certification Date: Oct 06, 2020
Expiration Date: Oct 06, 2028

Certification performed in accordance with EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012) document EPA 8200R-12051, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volumetric basis unless otherwise noted.

Do Not Use This Cylinder Below 100 psig, i.e. 6.7 megapascals

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	50.00 PPM	50.27 PPM	G1	+/- 1.4% NIST Traceable	05/29/2020, 10/06/2020
CARBON MONOXIDE	50.00 PPM	50.53 PPM	G1	+/- 1.2% NIST Traceable	05/29/2020
NITRIC OXIDE	50.00 PPM	50.27 PPM	G1	+/- 1.4% NIST Traceable	05/29/2020, 10/06/2020
SULFUR DIOXIDE	50.00 PPM	79.00 PPM	G1	+/- 1.0% NIST Traceable	05/29/2020, 10/06/2020
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	11010130	KAL004536	57.31 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	Oct 04, 2022
PRM	12386	D655025	9.81 PPM AIR/NITROGEN DIOXIDE	2.0%	Feb 20, 2020
NTRM	17060226	E06079109	100.3 PPM NITRIC OXIDE/NITROGEN	+/- 1.0%	Jul 23, 2023
QMS	12400689	CC323707	4.928 PPM NITROGEN DIOXIDE/NITROGEN	2.1%	Aug 15, 2021
NTRM	07060227	E06079116	100.6 PPM NO/NITROGEN	+/- 1.0%	Jul 23, 2023
NTRM	16010235	KAL004419	57.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Dec 23, 2021
NTRM	11010416	KAL004302	59.6 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Jul 23, 2023

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nissel 1550 FTR AUP2010245 CO	FTR	Sep 21, 2020
Nissel 1550 FTR AUP2010245 NO	FTR	Sep 14, 2020
Nissel 1550 FTR AUP2010245 NO2	FTR	Sep 22, 2020
Nissel 1550 FTR AUP2010245 SO2	FTR	Sep 18, 2020

Triad Data Available Upon Request

NOTES: Gross Weight: 27.8 Kg Net Weight: 4.6 Kg



Approved for Release

Page 1 of 160-401907847-1



CERTIFICATE OF ANALYSIS

Customer Detail:		Production Order Number: 90132928	
ALS Laboratory Group (Thailand)		Material Number: 478100-J-44	
		Certification Date: 20-Jan-2016	
		Expiry Date: 20-Jan-2024	
Cylinder Description:			
Std 47.1			
The measurement of this reference material is traceable to SI through the above standard which is traceable to Swiss National Standard of Mass. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-8200R-12051 for the Assay and Certification of Gaseous Calibration Standards using procedure G1. The results are expressed on a mole/mole basis, unless otherwise specified. The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k=2, providing a level of confidence of approximately 95%.			
Certificate Number:	Analyst:		
4676/15			
Cylinder Number:			
850730			
Nominal Cylinder Content:	Approver:		
6.520 M ³			
Nominal Pressure:			
145.0 Bar			
Valve Outlet:			
CGA 590 BRASS			
	To Re-Order Please Quote:		
	478100-J-44		
Comment:	<ul style="list-style-type: none"> It is recommended that this product be not used below 5% of actual contents or should not be used when its gas pressure is below 150psig. Other impurities that detect by analytical condition of this mixture shall be report if it is more than 10% of minimum minor component. Keep and use in well-ventilated and secure area. 		

Page 1 of 2

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

15 หมู่ 15 ถนนพหลโยธิน กม. 13/4 หมู่ 14 บางนา ถนนสุขุมวิท กม. 6.5 กรุงเทพฯ
ศูนย์บริการลูกค้า 10540 โชคชัย 4 กรุงเทพฯ โทร (02) 2338-4100 โทร (02) 2338-4333
โทรสาร (02) 105 400 5 อีเมล: sales@linde.co.th โทร (02) 2338-4100
กรุงเทพฯ โทร (02) 38.570-479-93 โทร (02) 38.570-1223

Linde (Thailand) Public Company Limited

15 หมู่ 15 ถนนพหลโยธิน กม. 13/4 หมู่ 14 บางนา ถนนสุขุมวิท กม. 6.5 กรุงเทพฯ
Bangkok, Sampran Road 10540, Tel (66) 2338-4100 Fax (66) 2338-4333
Bangkok Plant: 105 Moo 5, Bangna Road, Bangkok, Thailand 10540
Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-1223

CERTIFICATE OF ANALYSIS

Analytical Result

Component	Request Concentration	Certified Concentration	Certified Uncertainty	Method	Assay Date
Oxygen in Nitrogen	8.00 %	7.93 %	± 1% relative	(2) I-PB-354	20-Jan-2015

Reference Standard used in Assay

Reference Standard	Cylinder No.	Concentration	Expired Date
Oxygen in Nitrogen	24362SSG	25.08 ± 0.13 %	19-Aug-2017

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Servomex 4100 O2 Analyzer	Paramagnetic	23-Dec-2015

Method of Analysis

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

Cylinder Number: 850730
Production Order Number: 90132928

Certification Date: 20-Jan-2016
Expiration Date: 20-Jan-2024

Page 2 of 2

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

Individual contact information



At 15, rue de la Paix, 75001 Paris, France
Tel: +33 (0)1 42 38 50 00 Fax: +33 (0)1 42 38 50 01
Email: info@linde.com

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Email: info@linde.com

CERTIFICATE OF ANALYSIS

Customer Details: ALS Laboratory Group (Thailand)		Production Order Number: 90137389 Material Number: 557200-J-44 Certification Date: 24-Sep-2016 Expiry Date: 24-Sep-2024	
Cylinder Description: STEEL 47 L			
The measurement of this reference material is traceable to SI through the reference standard which is traceable to Swiss National Standard of Mass. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gas Calibration Standards using procedure C1. The results are expressed on a mole/mole basis, unless otherwise specified. The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k=2, providing a level of confidence of approximately 95%.			
Certificate Number: 2857/16	Analyst:  THITIRAT LOYRAT		
Cylinder Number: 363075	Approve:  SUKANYA KAMUTHARAT		
Nominal Cylinder Content: 6,560 M³	Valve Outlet: CGA 590 BRASS		
Nominal Pressure: 145.0 Bar	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 5% of actual contents or should not be used when its 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. 			

Page 1 of 2

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

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Email: info@linde.com

CERTIFICATE OF ANALYSIS

Analytical Result

Component	Request Concentration	Certified Concentration	Certified Uncertainty	Method	Assay Date
Oxygen in Nitrogen	16.0 %	16.0 %	± 1% relative	(2) I-PB-354	24-Sep-2016

Reference Standard used in Assay

Reference Standard	Cylinder No.	Concentration	Expired Date
Oxygen in Nitrogen	24362SSG	25.08 ± 0.13 %	19-Aug-2017

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Servomex 4100 O2 Analyzer	Paramagnetic	24-Sep-2016

Method of Analysis

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

Cylinder Number: 363075
Production Order Number: 90137389

Certification Date: 24-Sep-2016
Expiration Date: 24-Sep-2024

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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

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Linde (Thailand) Public Company Limited

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Tel: +33 (0)1 42 38 50 00 Fax: +33 (0)1 42 38 50 01
Email: info@linde.com

CONSULE CONTROL UNIT CALIBRATION TEST REPORT

Calibration Date : 12 Jun 22
Next Cal. Date : 12 Jan 23

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

Serial No. : 1807009
Model No. : SK2BXSQR-Q06
Correction Factor (Yr) : 1.0080
Next Calibration Date : 7 Oct 22

Reference Dry Gas Meter Data

Calibration No. : C-120722-BK-FS0488
Dry Gas Meter No. : BK-K-FS0488
Console Serial No. : 1302005
Console Model No. : XC-572-V

ΔH (mm H ₂ O)	Θ Minutes	Reference Dry Gas Meter Calibration				Console Control / Dry Gas Meter								Dry Gas Meter Correction Factor (Y)	Office Calibration Correction Factor (Y)	Avg
		Vr (Liters)		Tr (°C)		Vm (Liters)		Tt (°C)		To (°C)		Avg Tm (°C)				
		Final	Initial	Total		Final	Initial	Total								
15	12.80	150.00	0.00	150.00	31.0	31.0	344.0	191.0	153.00	30.0	30.0	30.0	0.9876	50.7651		
25	9.60	150.00	0.00	150.00	31.0	31.0	511.4	358.0	153.40	30.0	30.0	30.0	0.9761	47.6138		
50	6.68	150.00	0.00	150.00	31.0	31.0	673.4	520.0	153.40	31.0	31.0	31.0	0.9789	45.9560		
100	4.62	150.00	0.00	150.00	32.0	32.0	842.0	689.0	153.00	31.0	31.0	31.0	0.9736	44.2543		
150	3.77	150.00	0.00	150.00	32.0	32.0	1005.5	853.0	152.46	32.0	32.0	32.0	0.9756	44.0575		
													0.9756	46.5338		

Y : Ratio of reading of reference to dry gas meter tolerance for individual values ± 0.02 from average.
ΔH : Office pressure differential that equates to 21.24 in of air @ 25 °C and 760 mm of mercury, mmH₂O; tolerance for individual values ± 5.08 from average.

Procedure: 40 CFR 80 APP A METH. SEC 5.3 & 7

Approved by: 
(Mr. Nattaporn Jangwong)
Field Specialist (T)

Calibrated by: 
(Mr. Sakit Pongpanphat)
Field Scientist (G)

15, rue de la Paix, 75001 Paris, France



DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date : 12-Jul-22		Ambient Temperature (°C) : 30	
Calibration sheet No. : C-120722-BKK_FS0469		Relative Humidity (%) : 70	
Digital Temperature ID BKK_FS0469		Reference Temperature ID BKK_FS0609	
Serial No. : 1302005		Serial No. : 7688004	
Model : XC-572-V		Model : FLUKE 714	
		Next Calibrate : 26 Jul 23	

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

Calibrated by

Saksit Phaisanphisit

(Mr.Saksit Phaisanphisit)
Field Scientist (4)

Approved by

Nattapon Jengwarewong

(Mr.Nattapol Jengwarewong)
Manager

Form 281-046 (02/03/02)



Pitot Tube Calibration Data

Pitot Tube Identification Number : BKK_FS0472 Calibration Date : 12 Jul 22
Lab test duct Number : 258-1-13-01 Standard Pitot ID : BKK_FS0441
Calibration Sheet No. : C-120722-BKK_FS0472 Cp Standard : 0.99

Type S Pitot Tube Coefficient Data					
	Type s pitot tube Leg A,B	Standard pitot tube (ΔP, mm.H ₂ O)	Type s pitot tube (ΔP, mm.H ₂ O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	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
C _p				0.842	0.842

$$C_p(S) = C_{p,std} \sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

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

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

Calibrated by

Saksit Phaisanphisit

(Mr.Saksit Phaisanphisit)
Field Scientist (4)

Approved by

Nattapon Jengwarewong

(Mr.Nattapol Jengwarewong)
Field Specialist(1)

Form 281-046 (04/03/02)



Pitot Tube Calibration Data

Pitot Tube Identification Number : BKK_FS0473 Calibration Date : 12 Jul 22
Lab test duct Number : 258-1-13-01 Standard Pitot ID : BKK_FS0441
Calibration Sheet No. : C-120722-BKK_FS0473 Cp Standard : 0.99

Type S Pitot Tube Coefficient Data					
	Type s pitot tube Leg A,B	Standard pitot tube (ΔP, mm.H 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
C _p				0.842	0.842

$$C_p(S) = C_{p,std} \sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

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

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

Calibrated by

Saksit Phaisanphisit

(Mr.Saksit Phaisanphisit)
Field Scientist (4)

Approved by

Nattapon Jengwarewong

(Mr.Nattapol Jengwarewong)
Field Specialist(1)

Form 281-046 (04/03/02)



PROBE NOZZLE DIAMETER CALIBRATION DATA SHEET

Calibration Date 12 Jul 22 Nozzle Set ID. : BKK_FS0474
Calibration Sheet No. : C-120722-BKK_FS0474 Vernier Caliper ID. : BKK_FS0626

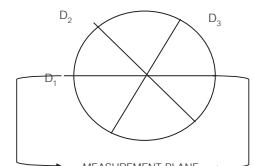
Nozzle ID #	Nozzle Diameter (cm.)			Hi - Lo ΔD	(D ₁ + D ₂ + D ₃) / 3 D _{avg}
	D ₁	D ₂	D ₃		
1	0.300	0.300	0.300	0.000	0.300
2	0.450	0.450	0.450	0.000	0.450
3	0.600	0.600	0.600	0.000	0.600
4	0.780	0.780	0.780	0.000	0.780
5	0.932	0.932	0.932	0.000	0.932
6	1.094	1.094	1.094	0.000	1.094
7	1.264	1.264	1.264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

Where :

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

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

D_{avg} = (D₁ + D₂ + D₃) / 3



Calibrated by

Saksit Phaisanphisit

(Mr.Saksit Phaisanphisit)
Field Scientist (4)

Approved by

Nattapon Jengwarewong

(Mr.Nattapol Jengwarewong)
Field Specialist(1)

Form No. Q6 281-025 (13/01/03)

Certificate of Calibration

Represent to Certificate of Calibration ,PTC/07/22099

Certificate No.: PTC/07/22099 Page: 1 of 2
 Equipment: Digital Balance Condition: Normal
 Manufacturer: Sartorius Serial No: 31709552
 Model: MSJ2245-100-DU ID No: RYG_EN0003
 Type of Balance: Single Interval



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

REVIEW BY: *Thantit*
 APPROVED BY: *D. [Signature]*
 NEXT CAL. DATE: 09/03/2023

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-ONS Accreditation No.: Calibration 0189

Date Received: March 23, 2022

Calibration Date: March 23, 2022

Issued Date: March 25, 2022

Calibration By: Mr. Rungroje Metakul



Mr. Kriangsak Kalasri
 (Mr.Kriangsak Kalasri)
 Reviewed by

Approved By: *Mr. Keattisak Kercho*
 (Mr. Keattisak Kercho)
 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). The effect that the results relate only to the items calibrated.

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

PTC-FMC-07-02-21 Rev. 2020

Represent to Certificate of Calibration ,PTC/07/22099

Certificate No.: PTC/07/22099

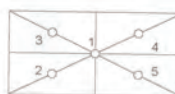
Page: 2 of 2

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	-0.0001	-0.0001	0.0001
Maximum deviation: 0.0001				

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

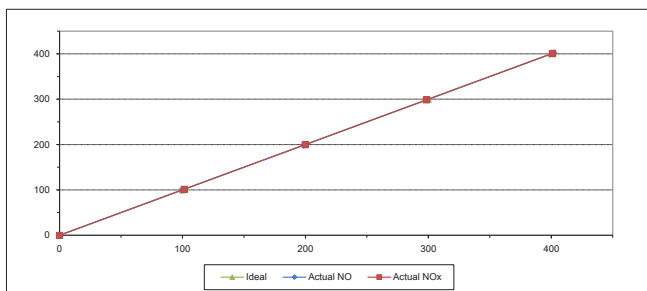
PTC-FMC-07-02-21 Rev. 2020



MULTIPOINT CALIBRATION REPORT

Calibration Date: 1-Jul-22 Equipment Name: NOx Analyzer
 Manufacturer: HORIBA Model: APNA-370
 Serial No.: AWXG87CR Equipment ID: RYG_FS0453
 Calibrator Manufacturer: Teledyne API Model: 700
 Serial No.: 947
 Std. Gas Concentration (PPM): 55.88 Cylinder No.: GN0027222
 Cylinder Pressure (psi): 1800 Certified By: Airgas Inc.
 Certified Date: 9-Feb-22 Expired Date: 9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	101.40	1.40	1.40
2	200.00	198.60	-1.40	-0.70	199.80	-0.20	-0.10
3	300.00	299.00	-1.00	-0.33	298.50	-1.50	-0.50
4	400.00	402.10	2.10	0.53	401.20	1.20	0.30
AVERAGE (%)				-0.16			0.24



Calibrated By

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

Approved By

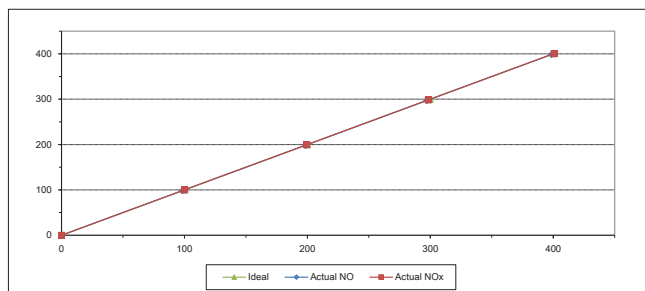
Mr. Sarayuth Jitranont
 (Mr.Sarayuth Jitranont)
 Assistant General Manager

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


MULTIPOINT CALIBRATION REPORT

Calibration Date: 1-Jul-22 Equipment Name: NOx Analyzer
 Manufacturer: HORIBA Model: APNA-370
 Serial No.: T2T8YRLL Equipment ID: RYG_FS0457
 Calibrator Manufacturer: Teledyne API Model: 700
 Serial No.: 947
 Std. Gas Concentration (PPM): 55.88 Cylinder No.: GN0027222
 Cylinder Pressure (psi): 1800 Certified By: Airgas Inc.
 Certified Date: 9-Feb-22 Expired Date: 9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	98.30	-1.70	-1.70	100.20	0.20	0.20
2	200.00	198.40	-1.60	-0.80	199.60	-0.40	-0.20
3	300.00	297.10	-2.90	-0.97	298.50	-1.50	-0.50
4	400.00	398.60	-1.40	-0.35	400.70	0.70	0.17
AVERAGE (%)				-0.74			-0.05



Calibrated By

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

Approved By

Mr. Sarayuth Jitranont
 (Mr.Sarayuth Jitranont)
 Assistant General Manager

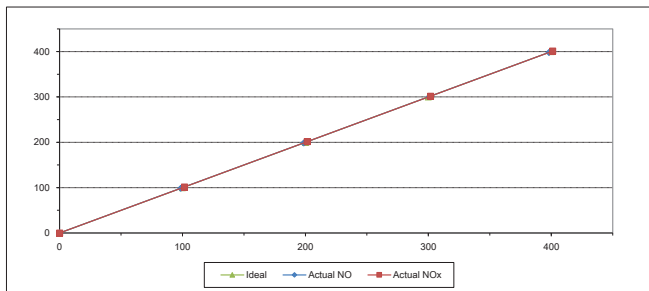
 ALS Laboratory Group
 FORM NO.: F 06-056 REVISION NO.: ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-22	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	ALPOVOWY	Equipment ID	RYG_FS0455
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	98.60	-1.40	-1.40	101.60	1.60	1.60
2	200.00	198.70	-1.30	-0.65	201.40	1.40	0.70
3	300.00	301.00	1.00	0.33	301.80	1.80	0.60
4	400.00	398.20	-1.80	-0.45	401.20	1.20	0.30
AVERAGE (%)				-0.41			0.66



Calibrated By

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

Approved By

(Mr.Sarayuth Jitranont)
Assistant General Manager

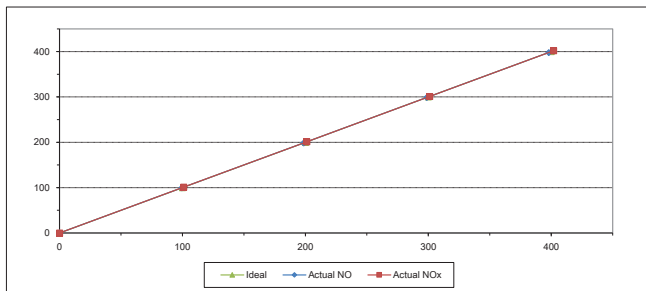
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-22	Equipment Name	NOx Analyzer
Manufacturer	Teledyne API	Model	T200
Serial No.	7238	Equipment ID	RYG_FS0533
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.50	-0.50	-0.50	101.10	1.10	1.10
2	200.00	198.70	-1.30	-0.65	201.20	1.20	0.60
3	300.00	298.80	-1.20	-0.40	301.10	1.10	0.37
4	400.00	398.00	-2.00	-0.50	402.00	2.00	0.50
AVERAGE (%)				-0.39			0.53



Calibrated By

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

Approved By

(Mr.Sarayuth Jitranont)
Assistant General Manager

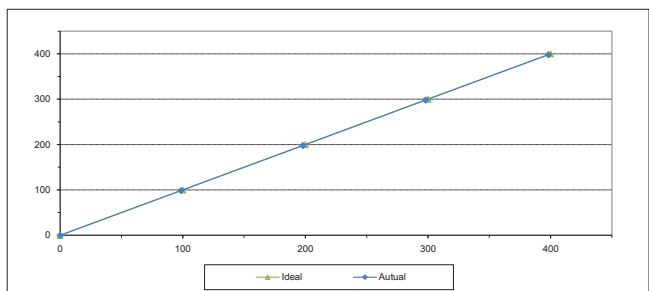
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FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-22	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	90U0XJ31	Equipment ID	RYG_FS0452
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	56.3	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	98.60	-1.40	-1.40
2	200.00	198.00	-2.00	-1.00
3	300.00	298.10	-1.90	-0.63
4	400.00	398.20	-1.80	-0.45
AVERAGE (%)				-0.68



Calibrated By

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

Approved By

(Mr.Sarayuth Jitranont)
Assistant General Manager

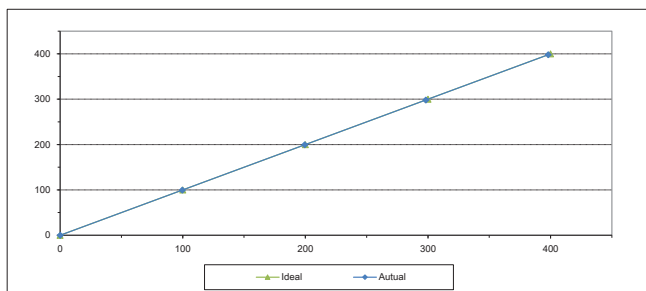
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-22	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	ROHWYDVW	Equipment ID	RYG_FS0456
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	56.3	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	99.70	-0.30	-0.30
2	200.00	199.50	-0.50	-0.25
3	300.00	298.30	-1.70	-0.57
4	400.00	398.10	-1.90	-0.47
AVERAGE (%)				-0.30



Calibrated By

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

Approved By

(Mr.Sarayuth Jitranont)
Assistant General Manager

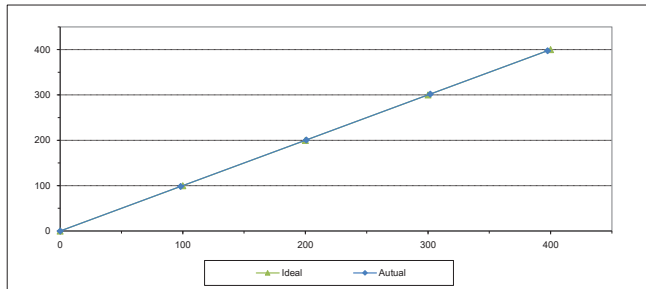
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-22	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	H0S3D9FA	Equipment ID	RYG_FS0454
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	56.3	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Algus Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	98.30	-1.70	-1.70
2	200.00	200.80	0.80	0.40
3	300.00	301.90	1.90	0.63
4	400.00	397.50	-2.50	-0.63
AVERAGE (%)				-0.24



Calibrated By

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

Approved By

(Mr. Sareyuth Jitranont)
Assistant General Manager

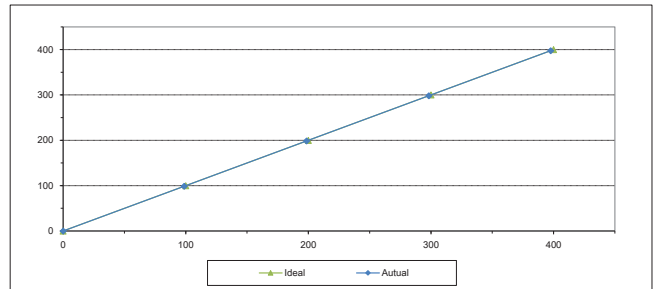
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-22	Equipment Name	SO2 Analyzer
Manufacturer	Teledyne API	Model	T100
Serial No.	6080	Equipment ID	RYG_FS0532
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	56.3	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Algus Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	98.80	-1.20	-1.20
2	200.00	198.60	-1.40	-0.70
3	300.00	298.30	-1.70	-0.57
4	400.00	397.60	-2.40	-0.60
AVERAGE (%)				-0.59



Calibrated By

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

Approved By

(Mr. Sareyuth Jitranont)
Assistant General Manager

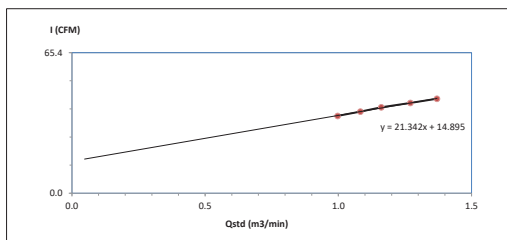
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



High Volume Air Sampler Calibration Worksheet

Project Site:	Global Power Synergy Public Company Limited	Barometric Pressure (mm Hg):	757
Calibrate Location:	วัดป่าสักหนองบัว	Temperature (°C):	28
Calibrate Date:	16-Oct-22	High Volume ID:	RYG_FS0187
CalibrationSheet No.:	C-161022-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 _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.2	0.9974	36	Slope: 21.3422 Intercept: 14.8948 Correlation Coefficient: 0.9981
2	2.6	1.0825	38	
3	3.0	1.1613	40	
4	3.6	1.2702	42	
5	4.2	1.3703	44	



Calibrated by: (Mr. Nontachai Uppathamp)
Field Scientist(1)

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

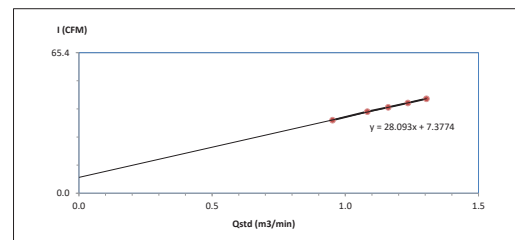
FORM NO.: F 06-074 REVISION NO.: - ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site:	Global Power Synergy Public Company Limited	Barometric Pressure (mm Hg):	757
Calibrate Location:	บ้านลำกุ่มหนองบัว	Temperature (°C):	28
Calibrate Date:	16-Oct-22	High Volume ID:	RYG_FS0400
CalibrationSheet No.:	C-161022-RYG_FS0400	High Volume Model:	TE-5009X
Calibrator ID:	RYG_FS0205	High Volume S/N:	5691
Calibrator Model:	TE-5028A	Calibrator Slope:	1.50765
Calibrator S/N:	1166	Calibrator Intercept:	-0.02043

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.0	0.9519	34	Slope: 28.0928 Intercept: 7.3774 Correlation Coefficient: 0.9995
2	2.6	1.0825	38	
3	3.0	1.1613	40	
4	3.4	1.2349	42	
5	3.8	1.3044	44	



Calibrated by: (Mr. Nontachai Uppathamp)
Field Scientist(1)

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

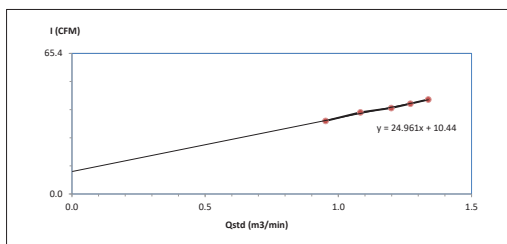
FORM NO.: F 06-074 REVISION NO.: - ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site : Global Power Synergy Public Company Limited
Calibrate Location : กรุงเทพมหานคร
Calibrate Date : 16-Oct-22
Calibration Sheet No.: C-161022-RYG_FS0295
Calibrator ID: RYG_FS0205
Calibrator Model: TE-5028A
Calibrator S/N: 1166
Barometric Pressure (mm Hg) : 757
Temperature (°C) : 28
High Volume ID : RYG_FS0295
High Volume Model : TE-5009X
High Volume S/N : 5502
Calibrator Slope : 1.50765
Calibrator Intercept : -0.02043

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.0	0.9519	34	Slope: 24.9611 Intercept: 10.4405 Correlation Coefficient: 0.9957
2	2.6	1.0825	38	
3	3.2	1.1987	40	
4	3.6	1.2702	42	
5	4.0	1.3378	44	



Calibrated by :
(Mr. Nontchai Uppathamp)
Field Scientist (1)

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

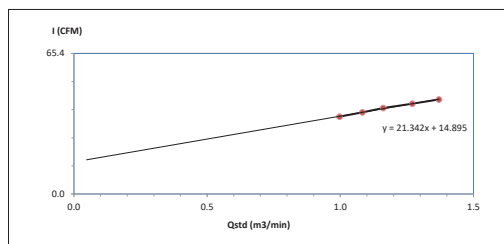
FORM NO.: F 06-074 REVISION NO.: - ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site : Global Power Synergy Public Company Limited
Calibrate Location : กรุงเทพมหานคร
Calibrate Date : 16-Oct-22
Calibration Sheet No.: C-161022-RYG_FS0399
Calibrator ID: RYG_FS0205
Calibrator Model: TE-5028A
Calibrator S/N: 1166
Barometric Pressure (mm Hg) : 757
Temperature (°C) : 28
High Volume ID : RYG_FS0399
High Volume Model : TE-5009X
High Volume S/N : 5683
Calibrator Slope : 1.50765
Calibrator Intercept : -0.02043

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.2	0.9974	36	Slope: 21.3422 Intercept: 14.8948 Correlation Coefficient: 0.9981
2	2.6	1.0825	38	
3	3.0	1.1613	40	
4	3.6	1.2702	42	
5	4.2	1.3703	44	



Calibrated by :
(Mr. Nontchai Uppathamp)
Field Scientist (1)

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

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



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

Certificate of Calibration

Represent to Certificate of Calibration ,PTC/07/22102

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



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

REVIEW BY :
APPROVED BY :
NEXT CAL. DATE : 23/09/23

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. Rungroj Metakul



(Mr. Kriangsak Kalasri)
Reviewed by

Approved By :
(Mr. 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). The effect that the results relate only to the items calibrated.

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PTC/MC/07/22102/2022



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

Represent to Certificate of Calibration ,PTC/07/22102

Certificate No.: PTC/07/22102

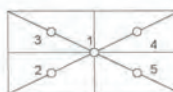
Page: 2 of 2

Measurement Results:

Without Adjustment :

Function Calibration: Non Adjustment

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



Eccentricity test 50 (g)				
Position (g)				
1	2	3	4	5
0.0000	0.0000	-0.0001	0.0000	0.0001
Maximum deviation: 0.0001				

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

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

Nominal test value (g)	Standard Deviation
10	0.00047
100	0.000089

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

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

Note: Weight of adjust (g)

The End of Certificate

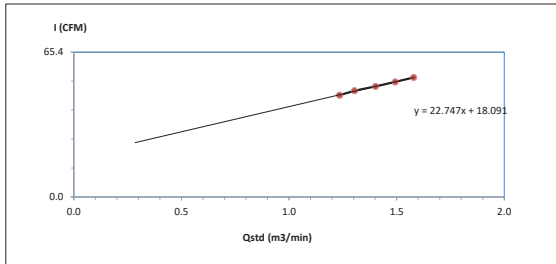
PTC/MC/07/22102/2022



High Volume Air Sampler Calibration Worksheet

Project Site : Global Power Synergy Public Company Limited
Calibrate Location : วัดประจักษ์ศิลปาคม
Calibrate Date : 16-Oct-22
CalibrationSheet No.: C-161022-RYG_FS0174
Calibrator ID: RYG_FS0205
Calibrator Model : TE-5028A
Calibrator S/N : 1166
Barometric Pressure (mm Hg) : 757
Temperature (°C) : 28
High Volume ID : RYG_FS0174
High Volume Model : TE-5170D
High Volume S/N : 4800
Calibrator Slope : 1.50765
Calibrator Intercept : -0.02043

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	3.4	1.2349	46	Slope : 22.7471 Intercept : 18.0915 Correlation Coefficient : 0.9988
2	3.8	1.3044	48	
3	4.4	1.4021	50	
4	5.0	1.4932	52	
5	5.6	1.5791	54	



Calibrated by hlypt
(Mr.Nontachai Uppathamp)
Field Scientist(1)

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

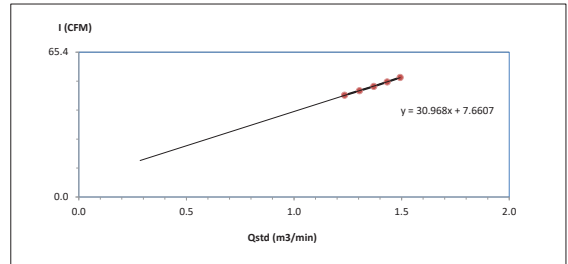
FORM NO.: F 06-073 REVISION NO.: ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site : Global Power Synergy Public Company Limited
Calibrate Location : บ้านสำโรงหลวง
Calibrate Date : 16-Oct-22
CalibrationSheet No.: C-161022-RYG_FS0394
Calibrator ID: RYG_FS0205
Calibrator Model : TE-5028A
Calibrator S/N : 1166
Barometric Pressure (mm Hg) : 757
Temperature (°C) : 28
High Volume ID : RYG_FS0394
High Volume Model : TE-5170D
High Volume S/N : 5690
Calibrator Slope : 1.50765
Calibrator Intercept : -0.02043

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	3.4	1.2349	46	Slope : 30.9680 Intercept : 7.6607 Correlation Coefficient : 0.9996
2	3.8	1.3044	48	
3	4.2	1.3703	50	
4	4.6	1.4331	52	
5	5.0	1.4932	54	



Calibrated by hlypt
(Mr.Nontachai Uppathamp)
Field Scientist(1)

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

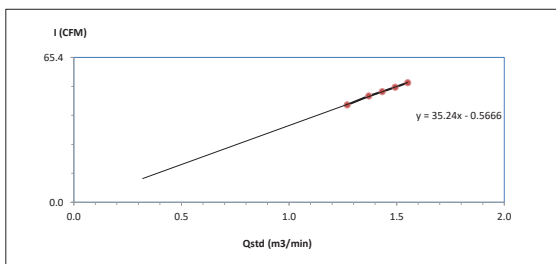
FORM NO.: F 06-073 REVISION NO.: ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site : Global Power Synergy Public Company Limited
Calibrate Location : วัดเขาหลวง
Calibrate Date : 16-Oct-22
CalibrationSheet No.: C-161022-RYG_FS0182
Calibrator ID: RYG_FS0205
Calibrator Model : TE-5028A
Calibrator S/N : 1166
Barometric Pressure (mm Hg) : 757
Temperature (°C) : 28
High Volume ID : RYG_FS0182
High Volume Model : TE-5170D
High Volume S/N : 5335
Calibrator Slope : 1.50765
Calibrator Intercept : -0.02043

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	3.6	1.2702	44	Slope : 35.2402 Intercept : -0.5666 Correlation Coefficient : 0.9989
2	4.2	1.3703	48	
3	4.6	1.4331	50	
4	5.0	1.4932	52	
5	5.4	1.5510	54	



Calibrated by hlypt
(Mr.Nontachai Uppathamp)
Field Scientist(1)

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

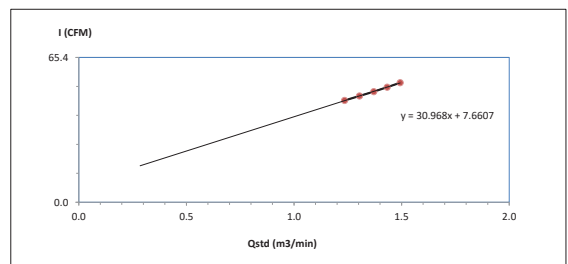
FORM NO.: F 06-073 REVISION NO.: ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site : Global Power Synergy Public Company Limited
Calibrate Location : วัดนาบะหมื่น
Calibrate Date : 16-Oct-22
CalibrationSheet No.: C-161022-RYG_FS0396
Calibrator ID: RYG_FS0205
Calibrator Model : TE-5028A
Calibrator S/N : 1166
Barometric Pressure (mm Hg) : 757
Temperature (°C) : 28
High Volume ID : RYG_FS0396
High Volume Model : TE-5170D
High Volume S/N : 5688
Calibrator Slope : 1.50765
Calibrator Intercept : -0.02043

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	3.4	1.2349	46	Slope : 30.9680 Intercept : 7.6607 Correlation Coefficient : 0.9996
2	3.8	1.3044	48	
3	4.2	1.3703	50	
4	4.6	1.4331	52	
5	5.0	1.4932	54	



Calibrated by hlypt
(Mr.Nontachai Uppathamp)
Field Scientist(1)

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

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

CERTIFICATE OF CALIBRATION

Certificate No: WS-03072021
Page 1 of 2 pages

Measurement Item : Cup anemometer with data logger.
Manufacturer : Data logger: Novalyne.
: Cup anemometer: Novalyne.
Model/Type : Data logger: 200-WS-20DL.
: Cup anemometer: WS-02P.
Serial Number : Data logger: A4986.
: Cup anemometer: -
ID No. : Data logger: RY0_F50087.
: Cup anemometer: -
Customer : ALS laboratory group (Thailand) co., Ltd.
: 104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.
Test Conditions : Wind tunnel cross test section area: 900 cm²
: Anemometer frontal area: 100 cm²
: Diameter of mounting plate: - mm
: Blockage ratio of test object: 0.111 %
Test Conditions : Air temperature: 24.1 ±0.8 °C
: Air pressure: 1005.3 ±0.4 hPa
: Relative air humidity: 50.2 ±3.5 %RH
Calibration Procedure : Calibration was carried out based on:
ISO 91400-12-1 Ed.1: 2005-POWER Performance Measurements of Electricity Producing Wind Turbines.
MGSNET Anemometer Calibration Procedure - Version 2: 2009.
Traceability : This calibration documents the traceability to national standard, which realize the unit of measurement according to the international system of units (SI) through National Institute of Metrology Thailand (NIMT).
Measurement Date : Jul. 13, 2021.
Issued Date : Jul. 14, 2021.

REVIEW BY *Prinya P.*
APPROVED BY *Prinya P.*
NEXT CAL DATE 11/1/23



Approved Signatory: *Prinya P.*
Mr. Prinya Booncharoen
Technical Support
and Calibration Manager

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

Continuation of Certificate of Calibration Number

Certificate No: WS-03072021
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:

V _{ref} Reading m/s	V _{unc} Reading m/s	Error (m/s)	Uncertainty (m)
2.087	2.0	-0.1	2.4
4.150	4.1	-0.1	1.2
5.99	5.9	0.0	1.1
8.01	8.0	0.0	0.73
10.02	10.2	0.2	0.58
11.98	12.3	0.3	0.56
13.97	14.3	0.3	0.55
16.02	16.6	0.6	0.48
14.95	15.5	0.5	0.37
13.03	13.4	0.4	0.65
10.97	11.2	0.2	0.69
9.02	9.1	0.1	0.65
7.02	7.0	0.0	0.81
5.155	5.0	-0.2	0.88
3.018	3.0	0.0	1.5
1.037	0.9	-0.1	4.7

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

Appendix 1: Instrumentations

NO	Sensor	Manufacturer	Model/Type	Calibration Date	Certificate Report Number	Range
1	Plot MATE	TESTO INC.	06352145	July 15, 2020	MW-0035-20	5 - 30 m/s
2	Precision Differential Pressure Meter	Zorgas	DM2500	July 16, 2020	MW-0035-20	5 - 30 m/s
3	Air velocity transducer (hot wire)	TSR INC.	8455-12	July 20, 2020	MW-0035M-20	0 - 5 m/s
4	Temperature	Zorgas	DS9-TMP	March 30, 2021	IR-0271-21	-30 - 70°C
5	Relative humidity	Zorgas	DS9-TMP	March 30, 2021	IR-0333-2021	5 - 100 %RH
6	Atmospheric pressure	Zorgas	DS9-TMP	March 30, 2021	IR-0153-2021	500 - 1100 hPa
7	Wind tunnel	GM30M	MP3303	-	-	0 - 80 m/s



CERTIFICATE OF CALIBRATION

Certificate No: WD-03072021
Page 1 of 2 pages

Measurement Item : Wind direction sensor with data logger.
Manufacturer : Data logger: Novalyne.
: Wind direction sensor: Novalyne.
Model/Type : Data logger: 200-WS-25DL.
: Wind direction sensor: WS-02P.
Serial Number : Data logger: A4986.
: Wind direction sensor: -
ID No. : Data logger: RY0_F50087.
: Wind direction sensor: -
Customer : ALS laboratory group (Thailand) Co.Ltd.
: 104 Phatthanakan 40, Phatthanakan Rd,Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.
Environmental Condition : The measurement was carried out in an ambient temperature of (23±3)°C and relative humidity of (40±10%).
Measurement Method : The wind direction sensor calibration according to comparison method with reference angle measurement electronic theodolite and line laser is used for axis control. The measurement were taken at 45° intervals in clockwise and counterclockwise directions.
Note : The UUC was warmed up for 1 hour prior to the calibration being performed.
Traceability : The measurement results are traceable to the international system of units (SI) through Certificate No: CC563-07-0045.
Certificate No: KWS63/0044.
Measurement Date : Jul. 14, 2021.
Issued Date : Jul. 14, 2021.



Approved Signatory: *Prinya P.*
Mr. Prinya Booncharoen
Technical Support
and Calibration Manager

Performed by
☒ Mr. Sorawit Thachalad
☐ Miss Orathai Wivattabhaiya

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

Continuation of Certificate of Calibration Number

Certificate No: WD-03072021
Page 2 of 2 pages

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

NO	Turning Direction	Nominal Angle (°)	Standard Reading (°)	UUC* Reading (°)	Error (°)	Uncertainty ±(°)
1	Clockwise	0/360	360	359	-1	3.0
2		45	45	42	-3	3.0
3		90	90	87	-3	3.0
4		135	135	132	-3	3.0
5		180	180	178	-2	3.0
6		225	225	227	2	3.0
7		270	270	273	3	3.0
8	Counter Clockwise	315	315	318	3	3.0
9		0/360	360	359	-1	3.0
10		45	45	42	-3	3.0
11		90	90	87	-3	3.0
12		135	135	132	-3	3.0
13		180	180	178	-2	3.0
14		225	225	227	2	3.0
15		270	270	273	3	3.0
16		315	315	318	3	3.0

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

End of Certificate of Calibration





DRY GAS METER CALIBRATION TEST REPORT

Calibration of Date : 12 Jul 22 Barometric Pressure (mm.Hg) : 755
Next Calibration Date : 12 Jan 23 Relative Humidity (%) : 70.0
Temperature (°C) : 30.0

Dry Gas Meter Data

Calibration sheet No.: C-120722-BKK_FS0465
Dry Gas Meter No.: BKK_FS0465
Serial No.: 1302005
Model No.: XC-60C-V

Reference Dry Gas Meter Data

Serial No. : 1607009
Model No. : SK25XSR-QC
Correction Factor (Yr) : 1.0060
Next Calibration Date : 7 Oct 22

Reference Dry Gas Meter Calibration				Dry Gas Meter						Dry Gas Meter Correction Factor (Y)
Vr (Liters)			Tr (°C)	Vm (Liters)			Ti (°C)	To (°C)	Avg. Tm (°C)	
Final	Initial	Total		Final	Initial	Total				
30.00	0.00	30.00	26.0	29.78	0.00	29.78	25.0	25.0	25.0	1.0101
30.00	0.00	30.00	26.0	29.70	0.00	29.70	25.0	25.0	25.0	1.0127
60.00	0.00	60.00	26.0	58.77	0.00	58.77	26.0	26.0	26.0	1.0271
60.00	0.00	60.00	26.0	58.79	0.00	58.79	27.0	27.0	27.0	1.0301
90.00	0.00	90.00	25.0	87.68	0.00	87.68	27.0	27.0	27.0	1.0396
90.00	0.00	90.00	25.0	87.80	0.00	87.80	28.0	28.0	28.0	1.0416
Avg.										1.0269

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

Calibrated by :

(Mr.Warawut Pubpa)
Field Scientist (3)

Approved by :

(Mr.Natthapol Jengwarewong)
Field Specialist(1)

Form No. 281-022. xls (08/02/02)



Rotameter Calibration Report

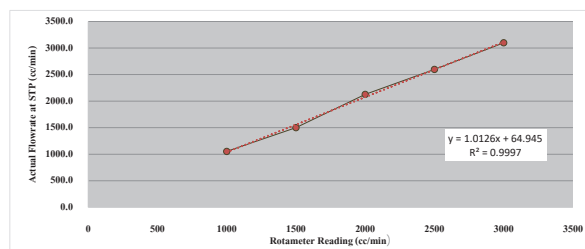
Calibration Date : 12-Jul-22 Relative Humidity (%) : 70.0
Rotameter ID : BKK_FS0466 Barometric Pressure (mmHg) : 755
Calibration Sheet No : C-120722-BKK_FS0466 Temperature (°C) : 30.0

Primary Equipment Data

Brand : Bios Model : Defender 520 M
Serial No. : 129958 ID : RYG_FS0209

Calibration Data

Rotameter Reading(cc/min)	Actual Flowrate (cc/min)				Actual Flowrate at STP (cc/min)
	1	2	3	Avg.	
1000	1076.5	1085.9	1074.3	1078.9	1054.1
1500	1536.7	1539.6	1530.6	1535.6	1500.3
2000	2195.7	2165.7	2174.0	2178.5	2128.4
2500	2607.3	2682.6	2690.8	2660.2	2599.1
3000	3167.6	3183.4	3161.5	3170.8	3098.0



Calibrated by :

(Mr.Warawut Pubpa)
Field Scientist (3)

Approved By :

(Mr.Natthapol Jengwarewong)
Field Specialist(1)



DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date : 12-Jul-22 Ambient Temperature (°C) : 30
Calibration sheet No. : C-120722-BKK_FS0467 Relative Humidity (%) : 70
Digital Temperature ID : BKK_FS0467 Reference Temperature ID : BKK_FS0609
Serial No. : 1302005 Serial No. : 7688004
Model : XC-572-V Model : FLUKE 714
Next Calibrate : 26 Jul 23

Location	Reference Temperature °C	Digital Temperature °C	Error °C	Remark
Stack	0	-2	-2	
	25	24	-1	
	50	49	-1	
	100	100	0	
	150	150	0	
	200	199	-1	
	250	249	-1	
	300	300	0	
	500	498	-2	
Probe	1000	998	-2	
	1200	1191	-9	
	100	100	0	
	125	124	-1	
Filter	150	149	-1	
	100	98	-2	
	125	123	-2	
Exit	150	148	-2	
	0	0	0	
	10	9	-1	
Meter	20	18	-2	
	0	0	0	
	25	24	-1	
AUX	50	48	-2	
	0	0	0	
	25	24	-1	
	50	49	-1	

Calibrated by

(Mr.Warawut Pubpa)
Field Scientist (3)

Approved by

(Mr.Natthapol Jengwarewong)
Field Specialist(1)

Form 281-048 (02/05/02)



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.Pluaekdaeng, Rayong 21140, Thailand.

Environment Condition: Temperature 23.1 °C \pm 3.2 °C
Humidity 85.4 %RH \pm 3.2 %RH

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

Calibration By: Mr. Chattaphon Fothong
27 September 2022

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

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

(Mr. Chattaphon Fothong)
Person in charge

(Mr. Thalerkwest Pongnam)
Authorized signatory

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

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

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

DKSH Technology Limited
2533 Moo 10/10, Bangna-Phra Pradaeng Road, Bangna, Phra Pradaeng, Bangkok 10260
Phone: +66 2839 7000 Email: info.calibration@dksh.com Website: www.dksh.com/calibration-thailand

Delivering Growth - In Asia and Beyond.

CALFM-C06-13: 20 Jul 2022

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	
536.66	536.7	-0.04	0.14	
637.98	638.3	-0.32	0.14	
748.48	748.8	-0.32	0.14	
807.03	807.4	-0.37	0.13	
Photometric Accuracy (Absorbance)				
Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.5605	0.563	-0.0025	0.0045
	0.7334	0.737	-0.0036	0.0045
	1.0534	1.057	-0.0036	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.5503	0.553	-0.0027	0.0045
	0.7179	0.720	-0.0021	0.0045
	1.0312	1.034	-0.0028	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.5024	0.506	-0.0036	0.0045
	0.6693	0.672	-0.0027	0.0045
	0.9604	0.964	-0.0036	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.5168	0.519	-0.0022	0.0045
	0.6903	0.691	-0.0007	0.0045
	0.9604	0.962	-0.0016	0.0045
590 nm	0.0000	0.000	0.0000	0.0045
	0.5525	0.554	-0.0015	0.0045
	0.7175	0.718	-0.0005	0.0045
	1.0301	1.031	-0.0009	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.5367	0.538	-0.0013	0.0045
	0.6847	0.685	-0.0003	0.0045
	0.9823	0.983	-0.0007	0.0045

บริษัท ดีเคเอสเอช จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพฯ 10260
2533 Sukhumvit Road, Bangkok, Pratinthong, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/calibration-thailand

Delivering Growth - In Asia and Beyond.

CALFM-C06-13: 20 Jul 2022

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
	0.8606	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)
260.67 +/- 0.11 nm		260.7	2.1	1.678
391.94 +/- 0.11 nm		391.9	1.7	1.770
Spectral Resolution *				
Nominal Concentration 0.02 % v/v		Peak	Trough	Ratio
Standard Wavelength (nm)		268.60	266.63	1.39
UUC: Wavelength (nm)		268.2	266.1	
Std Absorbance (A)		0.4810	0.3176	
Absorbance (A)		0.373	0.268	

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

The End of Certificate

บริษัท ดีเคเอสเอช จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพฯ 10260
2533 Sukhumvit Road, Bangkok, Pratinthong, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/calibration-thailand

Delivering Growth - In Asia and Beyond.

CALFM-C06-13: 20 Jul 2022

ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: KSPR2212224

ชนิดเครื่องมือ: SPECTROPHOTOMETER รุ่น: DR6000

หมายเลขเครื่อง: 1627845

ตรวจสอบ (วัน)		รายการตรวจเช็ค	ตรวจสอบ (ครั้ง)		หมายเหตุ
27 Sep 2022			27 Sep 2022		
ปกติ	ไม่ปกติ		ปกติ	ไม่ปกติ	
General					
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. ความสมบูรณ์เครื่อง	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิตช์ ปิด – เปิด เครื่อง (On-Off Switch)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Spectrophotometer					
<input type="checkbox"/>	<input type="checkbox"/>	6. แรงดันไฟฟ้า (Battery Backup) >= 2.5 VDC	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	7. ตัวคูณเลือกความยาวคลื่น (Wavelength Control)	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. ความยาวคลื่น (Wavelength Check)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	656.1 น้ 656.1 nm
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. แสงผ่านรังสีแสง (UV < 3,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. แสงผ่านรังสีแสง (Visible < 5,000 hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	11. ช่องใส่หลอดตัวอย่าง (Carousel Module)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
pH Meter and Conductivity Meter					
<input type="checkbox"/>	<input type="checkbox"/>	12. อิเล็กโทรด (Electrode and Connection Cable)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	13. ระดับสารละลายใน Electrode (Level KCl)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	15. ขาตั้งอิเล็กโทรด (Stand)	<input type="checkbox"/>	<input type="checkbox"/>	
Turbidimeter					
<input type="checkbox"/>	<input type="checkbox"/>	16. ค่าความขุ่นที่ทดสอบ (No Sample)	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	17. ระดับการส่องสว่างของแสง (>= 2.5 ไม่นเกิน 3.0)	<input type="checkbox"/>	<input type="checkbox"/>	
Automatic titrator					
<input type="checkbox"/>	<input type="checkbox"/>	18. สภาพ Piston Burettes	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	19. Function Rinsing and Dosing	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	<input type="checkbox"/>	<input type="checkbox"/>	

เขียนโดย/ตรวจสอบโดย:

Mr. Chaituporn Folthong
Service Engineer

บริษัท ดีเคเอสเอช จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพฯ 10260
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Delivering Growth - In Asia and Beyond.

CAL-FM-R31-03: 20 Jul 2022

SITHIPHORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Rd.,Bangbunru, Bangplud Bangkok 10700 THAILAND.
Tel:0-2435-8890 Fax:0-2433-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.com



Cert. No.: ACC22001
Pages: 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-75
Serial No.: 35002736
ID No.: - 8188049

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 JANUARY 2022
Date of Issue : 13 JANUARY 2022

Calibrated by : Nathakorn Pisutpaisan

Approved by : 
(Thanakul Petchurai)

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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACC22001
Job No. : VC65AC0040
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-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	33461A	MY60024273	1-15180725251-1	15-Sep-22
Programmable Attenuator	MAT-1070	62100114	1500-07774E	08-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KAI	34560495	AA-3003-21	16-Feb-22
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-TS12-04-04-020664

T. Petch.

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

QF-TS12-04-04-020664

T. Petch.

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

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



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,
KHWANG PHATTHANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

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

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petch.
(Thanakul Petchurai)

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

QF-TS12-04-04-020664

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	1-15180725251-1	15-Sep-22
Programmable Attenuator	MAT-1070	62100114	1500-07774E	08-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KAI	34560495	AA-3003-21	16-Feb-22

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

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

3.1 National Institute of Metrology (Thailand).

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

QF-TS12-04-04-020664

T. Petch.

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

QF-TS12-04-04-020664

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	Acceptance Limits
125	0.7	0.7	0.7	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-2.1	-2.0	-2.0	±5.0

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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	Acceptance Limits
63	0.0	0.0	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL22031
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	0.0	± 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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL22031
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	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5; -5.0
	2	8	108.0	108.0	0.0	1.0; -2.5
	200	800	128.0	128.1	0.1	±1.0

10. Peak C sound level

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

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

QF-TS12-04-04-020664

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

QF-TS12-04-04-020664

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



Cert. No. : 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_FSO019

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN 40, PHATTANAKAN ROAD,
KHWAENG PHATTANAKAN, 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 : Natthakorn Pisutpaisan

Approved by :

(Thanakul Petchurani)

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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	MY52302742	EF-0011-21	10-Feb-22
Digital Multimeter	33461A	MY53220104	EEL-BP_05/0264	10-Feb-22
Digital Multimeter	33461A	MY53220076	EEL-BP_03/0264	08-Feb-22
Digital Multimeter	34461A	MY60024273	1-15180725251-1	15-Sep-22
Programmable Attenuator	MAT-1070	62100114	1500-07774E	08-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KAI	34560495	AA-3003-21	16-Feb-22

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

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

3.1 National Institute of Metrology (Thailand).

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

QF-TS12-04-04-020664

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

QF-TS12-04-04-020664

T. Ratan

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	Acceptance Limits
125	0.5	0.5	0.6	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-1.7	-1.7	-1.6	±5.0

QF-TS12-04-04-020664

T. Ratan

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	Acceptance Limits
63	-0.1	-0.1	-0.1	±2.0
125	-0.1	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

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

QF-TS12-04-04-020664

T. Ratan

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	84.1	0.1	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.1	0.1	± 1.1
69.0	69.1	0.1	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.1	0.1	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.9	-0.1	± 1.1

QF-TS12-04-04-020664

T. Ratan

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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL22030
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	0.1	±1.5
89.5	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

QF-TS12-04-04-020664

CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc
DATE OF ISSUE 07 October 2022 CERTIFICATE NUMBER 181216

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 1

Test engineer:
Nigel Smith
Electronically signed:

doseBadge Reader

Instrument

Manufacturer: Cirrus Research plc
Model Number: RC:110A
Serial Number: 92612
Notes:

Calibration Procedure

The tests were carried out in accordance with the requirements of IEC 60942:2003 where applicable.

Date of Calibration: 07 October 2022

Functionality Results

Function	Result
Keypad	Pass
Battery Power	Pass
Display	Pass
Communication	Pass
2 way IR link	Pass
Clock	Pass

Calibration Results

	Level (dB)	Frequency (Hz)	Distortion (% THD + Noise)
Result	113.99	1004.5	0.47
Uncertainty	± 0.11	± 0.14	± 0.10
Tolerances	± 0.60	± 2.00	± 4.00

No adjustments were made during this calibration.

Environmental Conditions

Pressure: 100.27 kPa
Temperature: 23.6 °C
Humidity: 45.3 %

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

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

CERTIFICATE OF CALIBRATION

Certificate No. : CL-137-65
Page 1 of 2Equipment Name: Heat Stress Monitor
Manufacturer: DeltaOHM
Model: HD32.2
Serial No: 15020734
ID No: RYG_FS0230Customer
Name: ALS laboratory group (thailand) Co.,Ltd.
Address: 104 Phatthanakan 40, Phatthanakan
Rd, Khwaeng Suan Luang, Khet Suan Luang, Bangkok
10250 Thailand.Received date: 23 Aug 2022
Calibration date: 25 Aug 2022
Issue date: 9 Sep 2022Reference Used During Calibration
1. Standard Temperature Probe Model: STS-100 A500,
Serial No.: 667682-09, Due date: 23 Mar 2023
2. Digital Temperature Indicator Model: DTI-1000-A Mk
II, Serial No.: 671407-00591 Due date: 22 July 2023Calibration Condition
Temperature: (23±3) °C
Relative Humidity: (55±15)%Calibration Procedure
The temperature calibration was done by In-House
calibration method as WI-CL-001 according to
comparison method with standard digital temperature
indicator and standard temperature probe. The
temperature scale use was based on ITS-90.Traceability
The measurement results are traceable to the
international system of units (SI) through National
Institute of Metrology Thailand (NIMT) Certificate
number: TT-0034-22, Certificate number: ER-0092-
22REVIEW BY: *Narumon P.*
APPROVED BY: *[Signature]*
NEXT CAL DATE: 24/8/23Calibrated by
☐ Mr. Sorawit Thachalad
☒ Miss Jittrapon LertsompholApproved Signatory: *[Signature]*
Mr. Parinya Booncharoen
Calibration Department Manager

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 - 40 °C

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2 S/N: 17015112.
Dimension: Diameter 14 mm. Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
30	20.044	20.0	0.0	0.099
30	25.038	25.0	-0.1	0.14
30	30.032	29.9	-0.1	0.099
30	35.025	34.9	-0.1	0.099
30	40.019	39.9	-0.1	0.099

Table 2: This equipment was connected with temperature probe Model: TP3207.2 S/N: 15033222.
Dimension: Diameter 14 mm. Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.044	20.2	0.2	0.099
70	25.038	25.0	0.0	0.099
70	30.032	29.8	-0.2	0.099
70	35.025	34.6	-0.4	0.099
70	40.018	39.4	-0.6	0.099

Table 3: This equipment was connected with Globe thermometer probe Model: TP3276.2 S/N: 15028482.
Dimension: Diameter 8 mm. Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.044	20.1	0.1	0.099
110	25.038	25.1	0.1	0.099
110	30.032	30.1	0.1	0.099
110	35.025	35.1	0.1	0.099
110	40.019	40.0	0.0	0.099

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 ★



CERTIFICATE OF CALIBRATION

Certificate No.: CL-073-64
Page 1 of 2

Equipment Name: Heat Stress Monitor with Sensor
Manufacturer: DeltaOHM
Model: HD32.2
Serial No: 15030244
ID No: RYG_F50236

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

Received date: 8 SEP 2021
Calibration date: 30 SEP 2021
Issue date: 4 OCT 2021

Reference Used During Calibration
1. Standard Temperature Probe Model: STS-100 A500, Serial No: 667682-09, Due date: 25 Mar 2022
2. Digital Temperature Indicator Model: DTI-1000-A MK II, Serial No: 671407-00591 Due date: 04 June 2022

Calibration Condition
Temperature: (23±3) °C
Relative Humidity: (55±15)%

Calibration Procedure
The temperature calibration was done by In-House calibration method as WI-CL-001 according to comparison method with standard digital temperature indicator and standard temperature probe. The temperature scale use was based on ITS-90.

Traceability
The measurement results are traceable to the international system of units (SI) through National Institute of Metrology (NIMT) Certificate number: TT-0036-21, Certificate number: ER-0032-21

REVIEW BY	<i>Warakorn P.</i>
APPROVED BY	<i>[Signature]</i>
NEXT CAL. DATE	30/9/22

Calibrated by
☐ Mr. Sorawit Thachalad
☒ Miss Orathai Wipawattayana



Approved Signatory: *[Signature]*
Mr. Parinya Booncharoen
Technical Support and Calibration Manager

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

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C - 40 °C

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2 S/N: 20030506.
Dimension: Diameter 14 mm. Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
30	20.051	20.1	0.0	0.099
30	25.047	25.1	0.1	0.099
30	30.041	30.1	0.1	0.099
30	35.028	35.1	0.1	0.099
30	40.017	40.1	0.1	0.099

Table 2: This equipment was connected with temperature probe Model: TP3207.2 S/N: 15033223.
Dimension: Diameter 14 mm. Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.053	20.2	0.0	0.099
70	24.872	24.8	-0.1	0.10
70	29.826	29.6	-0.2	0.099
70	34.797	34.5	-0.3	0.099
70	39.707	39.3	-0.4	0.099

Table 3: This equipment was connected with Globe thermometer probe Model: TP3276.2 S/N: 17009684.
Dimension: Diameter 8 mm. Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.051	20.0	-0.1	0.099
110	25.047	25.0	0.0	0.099
110	30.041	30.0	0.0	0.099
110	35.028	35.0	0.0	0.099
110	40.017	40.0	0.0	0.099

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 ★



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
5344 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL: 0-2717-3880-27 FAX: 0-2719-9484



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: 2203-0811DSC-4
Submitted by: ALS Laboratory Group (Thailand) Co.,Ltd.
Rayong Branch
618/10 Moo 5 T.Maenam Khu.
A.Pluakdaeng, Rayong 21140, Thailand

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

REVIEW BY	<i>N. Banerji</i>
APPROVED BY	<i>[Signature]</i>
NEXT CAL. DATE	17/3/23

Calibrated by: Warakorn Lemgagrakul

Approved by: *[Signature]*
Approved Signatory

(/) Malee Butkrus
() Sathip Meangmai
() Warakorn Lemgagrakul

Issue Date: 22 March 2022

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full, except with the prior written approval of the head of Corporate Services 3: Equipment Calibration and Testing Services.



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

Condition of this calibration result

1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	21E2682	25 Aug 2022
2) Ref. Standard Thermometer	4982054	110RC044	21I1201	26 Oct 2022

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

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

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	788995	01 Jan 2024
pH 6.982	CPA chem	761017	02 Aug 2022
pH 10.015	CPA chem	766824	04 Sep 2022

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

Calibration Results

Function : mV Measurement

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

Unit Under Calibration	Nominal Value		Standard Voltage Input		Actual Reading		Uncertainty of Measurement (\pm mV)	Coverage factor k
	pH	mV	mV	pH	mV	pH		
pH Meter S/N.: C104059460	4.000	177.48	177.4	4.000	0.058	4.000	0.058	2.00
	7.000	0.00	-0.1	7.000	0.058	7.000	0.058	2.00
	10.000	-177.48	-177.5	10.000	0.058	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 (\pm)	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 (\pm °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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TEL. 0-2717-3000-24 FAX. 0-2719-9484



Certificate of Calibration

Certificate No.: 22E986
Page : 1 of 2

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : SevenCompact S220
Serial No.: C104059460
ID No.: RYG_EN0183

Condition As-Received: Used Item
Received Date: 16 March 2022
Calibration Date: 21 March 2022

Reference: 2203-0611DSC
Ambient Temperature: (23 \pm 2) °C
Relative Humidity: (50 \pm 10) %

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

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

Condition of this result of calibration

1. Reference standards instruments :

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

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

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

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

-National Institute of Metrology Thailand (NIMT)

REVIEW BY *M. B...*
APPROVED BY *D. ...*
NEXT CAL. DATE 8/13/23

Calibrated by : Pongsagorn Boonyasorn
Issue Date : 22 March 2022

Approved Signatory : *92*
[] Phalinee Prabpaipal
[] Nuntawat Khanchai
[] Pornthippa Tanmayakul

B 0284414



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

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

Function:	DC voltage measurement	Range:	2000 mV	
	Standard Value	UUC* Reading	Error	Uncertainty
	(mV)	(mV)	(mV)	(\pm μ 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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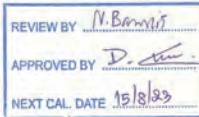
a 1101070



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

Certificate of Testing

Equipment : DO Meter
Manufacturer : YSI
Model : 5000-115V
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.Pluakdaeng,
Rayong 21140, Thailand
Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method
Tested by : Walalak Sirthean
Approved by :
Approved Signatory
() Malee Butkruea
(✓) Saithip Meangmai
() Warakorn Lemgagatrakul
Issue Date : 18 February 2022



B 0281285



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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Saithip

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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 :
Approved Signatory
() Pornthippa Tameyakul
(✓) Malee Butkruea
() 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



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

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

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-
- | Instrument | Model | Serial No. | Cert. No. | Due Date |
|------------------------|-------|------------|-----------|-------------|
| 1) Digital Thermometer | 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.: 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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Malee

a 1095714

Represent to Certificate of Calibration ,PTC/07/22103

Certificate No.: PTC/07/22103

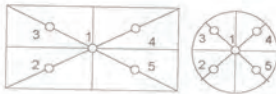
Page: 2 of 2

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 $1/2 \leq L_1 \leq$ Maximum capacity

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

Nominal test value (g)	Standard Deviation
200	0.00003

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

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

Note: Weight of adjust - (g)

The End of Certificate

PTC/MC-01-01: 2 Feb. 2020

RYG_EN0010



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

Certificate of Calibration

Equipment : Hot Air Oven

Manufacturer : Memmert

Model : UFE 500

Serial No. : GS11.1572

ID No. : RYG_EN0010

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

Location : Oven Room

Received Order : 20 October 2022

Calibration Date : 20 October 2022

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Man Pattanapongpaiboon

Approved by :

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

Issue Date : 2 November 2022

The Uncertainties are for a confidence probability of approximately 95%

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A 0046908



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2210-03760C-2

Cert. No.: 22TM1517
Page : 2 of 3

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

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

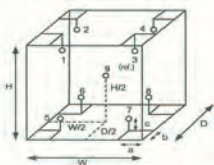
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration :- (°) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



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

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

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



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2210-03760C-2
Result of Calibration :- (°) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

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

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

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

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

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

Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation
UUC* : Unit Under Calibration

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

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

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TEL: 0-2717-3000-27 FAX: 0-2719-9484



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

Certificate of Calibration

Equipment : Hot Air Oven
Manufacturer : Memmert
Model : UM 400
Serial No. : b495.0899
ID No. : RYG_EN0006
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5, T. Maenam Khu,
A. Pluakdaeng,
Rayong 21140, Thailand
Location : Oven Room
Received Order : 20 October 2022
Calibration Date : 20 October 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Preecha Hlahib
Approved by :
() Pornthippa Tameyakul
(✓) Malee Butkruea
() Suwit Imjai

Issue Date : 2 November 2022

The Uncertainties are for a confidence probability of approximately 95%

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A 0046905



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2210-0376OC-1

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

Procedure Used :-

Calibration were conducted using calibration procedure CP-OT02 according to direct measurement method with Data Acquisition which connected with Resistance Temperature Detector (RTD).
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY44035217	21LM30	23 Dec 2022

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

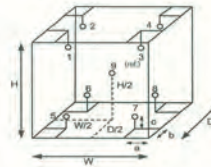
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	29
REL.Humid. (%)	43	47
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

a 1132473



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2210-0376OC-1
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

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

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

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
70.0	1	2	3	4	5	6	7	8	9 (ref.)
	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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Cert. No.: 22TM1491
Page: 1 of 3

Certificate of Calibration

Equipment : Water Bath
Manufacturer : Memmert
Model : WNB22
Serial No. : L513.0648
ID No. : RYG_EN0061
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch)
616/10 Moo 5, T. Maenam Khu,
A. Pluakdaeng,
Rayong 21140, Thailand
Location : Wet Chemistry Lab
Received Order : 20 October 2022
Calibration Date : 20 October 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Preecha Hlahib
Approved by :
() Pornthippa Tameyakul
(✓) Malee Butkruea
() Suwit Imjai

Issue Date : 2 November 2022

The Uncertainties are for a confidence probability of approximately 95%

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

A 0046906



Equipment : Water Bath
Condition As-Received : Used Item
Reference : 2210-0376OC-4
Procedure Used :-

Cert. No.: 22TM1491
Page : 2 of 3

Calibration were conducted using in-house calibration procedure CP-OT04 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (IPRT).

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY44035217	21LM30	23 Dec 2022

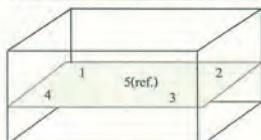
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration:- (*) Without Adjustment

Function of UUC* : Temperature Source

	Environmental		AC Voltage Supply
	(°C)	(%R.H.)	(Volt)
Beginning of Calibration	24	53	222
Finished of Calibration	24	50	221



Front

Position :	Ref. Std. S/N.:
1	N37P300726
2	N37P300727
3	N37P300728
4	N37P300729
5(ref.)	N37P300730

a 1132471



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

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

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)				
			Position				
			1	2	3	4	5 (ref.)
85.0	85.0	85.0	84.527	84.563	84.628	84.516	84.580

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Uncertainty (± °C)	Coverage Factor k
85.0	0.12	0.081	0.18	2

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

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

Stability : One-half of the greatest maximum difference of measured temperature at any one probe.

UUC* : Unit Under Calibration

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

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

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TEL: 0-2717-3000-27 FAX: 0-2719-4084



Cert. No.: ZZGH377
Page: 1 of 2

Certificate of Calibration

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : Seven2Go
Serial No. : B5312563/1
ID No. : RYG_FS0420
Condition As-Received : Used Item
Received Date : 11 March 2022
Calibration Date : 14 March 2022
Reference : 2203-0495OSC-1
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd. Rayong Branch
610/10 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)

REVIEW BY: P. Khamrui
APPROVED BY: S. S.
NEXT CAL DATE: 14/03/23

Calibrated by : Worakorn Lomgaglakul

Approved by :
Approved Signatory

() Malee Butkruea
() Seilip Meangmai
() Worakorn Lomgaglakul

Issue Date : 17 March 2022

The Uncertainties are for a confidence probability of approximately 95%

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a 0039308



Cert. No.: 22CI077
Page: 2 of 2

Condition of this calibration result

1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	64030049	130RC116	21E2682	26 Aug 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	766820	23 Sep 2023
pH 6.863	CPA chem	766822	04 Sep 2022
pH 10.015	CPA chem	766824	04 Sep 2022

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

Calibration Results

Function : mV Measurement

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

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (mV)	Coverage factor k
			pH	mV		
pH Meter	4.00	177.48	177	4.00	0.58	2.00
S/N : B5312563/1	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-178	10.00	0.58	2.00

Function : pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (z)	Coverage factor k
pH Electrode S/N : 1311407	4.008	4.01	181	0.0079	2.00
	6.863	6.88	7	0.0093	2.00
	10.015	10.01	-171	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: 0-2711-8889-27 FAX: 0-2718-9484



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. : KYG-JS0420
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 March 2022
Calibrated Date : 15 March 2022
Ambient Temperature : $(26 \pm 10) ^\circ\text{C}$
Relative Humidity : $(50 \pm 30) \%$
AC Line Voltage : $(220 \pm 22) \text{ V}$
Calibrated by : Malee Butiruee
Approved by :
() Pornthippa Tameyakul
(✓) Suwit Injai
Issue Date : 17 March 2022

The Uncertainties are for a confidence probability of approximately 95%.

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A 0039307



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

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

Procedure Used :-

Calibration were conducted using in-house calibration procedure CP-OT01 according to comparison with Industrial Platinum Resistance Thermometer (IPRT) into Temperature Bath.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Digital Thermometer	1023	2100000	2111273	22 Nov 2022

2) This certificate is valid only for 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, Q/N.: 1311407

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor #
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 %.

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RYG_EN0184



Metrological Center SCI ECO Services Company Limited

33/2 Moo 3, T. Banpa, A. Kaengkhoh, Saraburi 18110, Thailand.
Saraburi Tel : +66 3627 3096 Fax : +66 3627 3100
Bangkok Tel : +668 9205 6851, +669 8247 2360
Website : www.scieco.co.th E-Mail : calibrate@scg.co.th



Certificate No. T220384101 "Substitute for Calibration Certificate Number T220384" Page 1 of 4

Certificate of Calibration

Equipment : Chamber (Cold Room)
Manufacturer : MODULAR
Model : IREVCOHCOO
Serial No. : C00351459
Customer Code : RYG_EN0184
ID No. : T1939A5
Customer : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)
616/10 Moo 5 T. Maenam Khu,
A. Pluakdaeng, Rayong 21140
Customer Location : Laboratory
Date of Receipt : 18 February 2022
Calibrated By : Boonchai Suriyawong (Site Calibration Manager)
Approved By : / Sujjar Nakhakred (Site Calibration Manager)
Date of Issue : 18 MAR 2022

REVIEW BY :
APPROVED BY :
NEXT CAL. DATE : 12 Feb 2023

The uncertainties are for a confidence probability of approximately 95%.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation Scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standard laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the Metrological Center.

FM-E14 117/01-02-64



Metrological Center SCI ECO Services Company Limited

33/2 Moo 3, T. Banpa, A. Kaengkhoh, Saraburi 18110, Thailand.



Certificate No. T220384101

Page 2 of 4

Calibration Report

Equipment : Chamber (Cold Room)
Date of Calibration : 22 February 2022
Environment : Temperature : $23.2-24.3 ^\circ\text{C}$
Line Voltage : 221.8-227.2 V
Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert 16 standard thermocouples type T into its chamber, the other one standard thermocouples type T use for ambient temperature measurement. The calibration was done in according to WI-T20 (based on ASTM E145-94 (Reapproved 2001) and AS2853-1986).

All data show below were final values and the initial data from customer request. The temperature scale used was based on ITS - 90.

2. Reference Standard Instrument :

Instrument	Model	Instrument No.	Certificate No.	Due Date
TC	TYPE T	TN141-TN150	T210743	21 April 2022
TC	TYPE T	TN151-TN160	T210743	21 April 2022
DATA LOGGER	34970A	T150	T210743	21 April 2022

3. This certificate is traceable to :

National Institute of Metrology (Thailand) through Metrological Center (NSC-TISI-TIS 17025 CALIBRATION 0244).

4. Condition of calibrated item : good

Equipment Description :

Time Constant : Hour 40 Minute At 3 $^\circ\text{C}$
Fresh Air Damper ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available

5. Adjustment :

(X) without adjustment () after adjustment

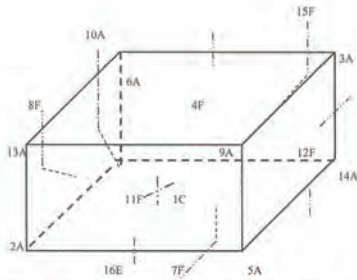
Approved By :

FM-E15117/15-05-61

Certificate No. T220384101

Page 3 of 4

Calibration Report



C = Centre, F = Centre of Face, A = Corner, E = Centre of Edge

1C = TN141	12F = TN152
2A = TN142	13A = TN153
3A = TN143	14A = TN154
4F = TN144	15F = TN155
5A = TN145	16E = TN156
6A = TN146	
7F = TN147	
8F = TN148	
9A = TN149	
10A = TN150	
11F = TN151	

Approved By:

FM-L15117/15-05-03

Certificate No. T220384101

Page 4 of 4

Calibration Report

Measurement Results

Calibration Point	Average Standard Reading at each position (°C)									
	TN141	TN142	TN143	TN144	TN145	TN146	TN147	TN148	TN149	TN150
3.0	2.80	2.96	2.98	2.97	3.16	3.29	2.95	3.14	3.10	3.45
	TN151	TN152	TN153	TN154	TN155	TN156				
	3.04	3.19	3.03	3.34	3.21	3.11				

Chamber (Cold Room)			Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (± °C)	Uniformity (°C)	Uncertainty (± °C)	Coverage Factor k
	Min	Max					
3.0	2.7	4.1	3.5	3.11	1.30	1.30	2.05

* The Assessed uncertainty exclude "uniformity"

The calibration result apply only the above calibrated item.

The result of test was found accurate as shown on date and place of test only.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k which for a t-distribution, providing a level of confidence of approximately 95 %.

Approved By:

FM-L15117/15-05-03

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Certificate of System Qualification

GC-OQ + GCMS-OQ

System ID: GM-7
Organization Name: ALS Laboratory Group (Thailand) Co., Ltd.
Organization Location: 104 Pathanakarn 40, Pathanakarn rd., Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250

Date: June 21, 2022 2:04:12 PM
EQP Name: AgilentRecommended, AgilentRecommended
EQP Revision: GC.02.50, GCMS.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 Accuracy

Name: 7890
Front: SSL

Setpoint Status: Pass

Setpoint: 25.0 psi
Actual: 25.0 psi
Accuracy: 0.0 psi
Agilent Recommended: ≤ 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 7890

Date: June 21, 2022 2:04:12 PM
System ID: GM-7

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Agilent CrossLab Compliance Services

Setpoint Status: Pass
Zone: Oven
Setpoint/Actual: 230.0 / 230.0 °C
Temperature: 230.0 / 230.0 °C
Accuracy: 0.0 °C
Agilent Recommended: ≥ -1.0 % setpoint in K (-5.0 °C)
≤ 1.0 % setpoint in K (5.0 °C)

Setpoint Status: Pass
Zone: Oven
Setpoint/Actual: 100.0 / 100.4 °C
Temperature: 100.0 / 100.4 °C
Accuracy: 0.4 °C
Agilent Recommended: ≥ -1.0 % setpoint in K (-3.7 °C)
≤ 1.0 % setpoint in K (3.7 °C)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: 7890

Setpoint Status: Pass

Setpoint/Average: 100.0 / 100.0333 °C
Temperature: 100.0 / 100.0333 °C
Stability: 0.1 °C
Agilent Recommended: ≤ 0.5

Overall GC Oven Temperature Stability Test Status

Pass

Log Amp

Tested Combination: Front SSL / External SQ

Name: 5977A

Setpoint Status: Pass

Date: June 21, 2022 2:04:12 PM
System ID: GM-7

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Overall Log Amp Test Status

Pass

RFPA

Tested Combination1 Front: SSL / External SQ

Name: 5977A

Setpoint Status: Pass

Amu: 1050 m/z Drift After Five Minutes: 22 mV RFPA Voltage: 568 mV

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

Overall RFPA Test Status

Pass

Tune EI

Tested Combination1 Front: SSL / External SQ

Name: 5977A

Setpoint Status: Pass

Filament: 1

Setpoint Status: Pass

Filament: 2

Overall Tune EI Test Status

Pass

Signal to Noise EI

Tested Combination1 Front: SSL / External SQ

Name: 5977A

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System ID: GM-7

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Source: EI - Extractor Filament: 1

Setpoint Status: Pass

Signal to Noise: 51283

Agilent Recommended: >= 1200

Source: EI - Extractor Filament: 2

Setpoint Status: Pass

Signal to Noise: 7038

Agilent Recommended: >= 1200

This test's 0 comment(s) and 1 deviation(s) are available in the Attachments section.

Overall Signal to Noise EI Test Status

Pass

Date: June 21, 2022 2:04:12 PM
System ID: GM-7

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Instrument Details

Purpose

This section describes the as found system configuration

Details

System

System ID: GM-7
Manufacturer: Agilent Technologies
Name: 7890Tested Combination1
Injection Technique: Manual Injection
Inlet: Front
Detector: External
LTM Included?: NoSampler 1
Manufacturer: Agilent Technologies
Type: Manual Injection
Usage: Sample Injection
Syringe Volume (µL): 10Mainframe 1
Manufacturer: Agilent Technologies
Name: 7890
Model Number: G3442B
Serial Number: CN14133181
Firmware Revision: B.02.03
Oven Type: StandardDate: June 21, 2022 2:04:12 PM
System ID: GM-7

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Inlet 1

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

Detector 1

Manufacturer: Agilent Technologies
Name: Mass Spectrometer
Type: Mass Spectrometer
Location: External

Mass Spectrometer 1

Manufacturer: Agilent Technologies
Type: SQ
Name: 5977A
Serial Number: U61415M209
Firmware Revision: 5977 E.00.21
High Vacuum System: Turbo Pump
Scouting Run Standard: OFN Std

MS EI Source 1

Manufacturer: Agilent Technologies
Source Type: EI - Extractor
Number of filaments: 2Date: June 21, 2022 2:04:12 PM
System ID: GM-7

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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:	June 21, 2022
Reason for Signature:	Executed protocol and published this original version of document

Regulatory Disclaimer

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

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Date: June 21, 2022 2:04:12 PM
System ID: QM-7

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User Name: supasak.nimsongtham Hostname: SCG1115H6C		System ID: QM-7 Print Date: June 21, 2022 2:04:17 PM		
ALS-QM7-2022 Transaction Log:				
Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 21, 2022 10:25:05 AM	Audit	SessionCreated	Session	None
June 21, 2022 10:25:05 AM	Start	Configuration	Session	None
June 21, 2022 10:25:05 AM	Audit	Enrollment	Licensing	User is FirstSigner and does not require an unique code.
June 21, 2022 10:25:05 AM	Audit	EtcLoaded	Session	EDP exists for primary technique [50] - File path: (Process\Facets\G20\Config\unlocked\G20Data\G20Exp). EDP File Name: (G20-24 Exp), (EDP Name: [AgilentRecommend]) EDP exists for systemwide technique [50] - File path: (Process\Facets\G20\Config\unlocked\G20Data\G20Exp). EDP File Name: (G20-24 Exp), (EDP Name: [AgilentRecommend])
June 21, 2022 10:25:39 AM	End	Configuration	Session	None
June 21, 2022 10:25:43 AM	Start	Qualification	Session	QG
June 21, 2022 10:25:43 AM	Start	Execution	System Inspection and Basic Safety and Operation - 7800 - Qualitative Test - No samples associated	None
June 21, 2022 10:25:54 AM	End	Execution	System Inspection and Basic Safety and Operation - 7800 - Qualitative Test - No samples associated	Run Count: 1

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Date: June 21, 2022 2:04:12 PM
System ID: QM-7

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User Name: supasak.nimsongtham

Hostname: SCG1115H6C

System ID: QM-7

Print Date: June 21, 2022 2:04:17 PM

ALS-QM7-2022 Transaction Log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 21, 2022 10:25:05 AM	Start	Execution	Init Pressure Accuracy - 7800 - SCL - Pressure Controlled Test - S: 25.0 psi - L: +/- 1.2 psi	None
June 21, 2022 10:25:10 AM	End	Execution	Init Pressure Accuracy - 7800 - SCL - Pressure Controlled Test - S: 25.0 psi - L: +/- 1.2 psi	Run Count: 1
June 21, 2022 10:26:12 AM	Start	Execution	GC Oven Temperature Accuracy - 7800 - Oven - S: 230.0°C - L: +/- 1.0 AND +/- 1.0 % setpoint in K	None
June 21, 2022 10:34:09 AM	Audit	Data	GC Oven Temperature Accuracy - 7800 - Oven - S: 230.0°C - L: +/- 1.0 AND +/- 1.0 % setpoint in K	Manual Data Entry
June 21, 2022 10:34:10 AM	End	Execution	GC Oven Temperature Accuracy - 7800 - Oven - S: 230.0°C - L: +/- 1.0 AND +/- 1.0 % setpoint in K	Run Count: 1
June 21, 2022 10:34:11 AM	Start	Execution	GC Oven Temperature Accuracy - 7800 - Oven - S: 180.0°C - L: +/- 1.0 AND +/- 1.0 % setpoint in K	None
June 21, 2022 10:38:42 AM	Audit	Data	GC Oven Temperature Accuracy - 7800 - Oven - S: 180.0°C - L: +/- 1.0 AND +/- 1.0 % setpoint in K	Manual Data Entry
June 21, 2022 10:38:44 AM	Start	Execution	GC Oven Temperature Accuracy - 7800 - Oven - S: 180.0°C - L: +/- 1.0 AND +/- 1.0 % setpoint in K	Run Count: 1
June 21, 2022 10:38:45 AM	Start	Execution	GC Oven Temperature Stability - 7800 - Oven - S: 180.0°C - L: +/- 0.5°C	None

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Date: June 21, 2022 2:04:12 PM
System ID: QM-7

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User Name: supasak.nimsongtham

Hostname: SCG1115H6C

System ID: QM-7

Print Date: June 21, 2022 2:04:17 PM

ALS-QM7-2022 Transaction Log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 21, 2022 11:01:00 AM	Audit	AcqClosed	Session	None
June 21, 2022 11:01:47 AM	Audit	AcqResumed	Session	None
June 21, 2022 11:01:48 AM	Audit	SessionResumed	Session	None
June 21, 2022 11:01:51 AM	Start	Qualification	Session	QG
June 21, 2022 11:01:51 AM	Start	Execution	GC Oven Temperature Stability - 7800 - Temperature: Oven - S: 180.0°C - L: +/- 0.5°C	None
June 21, 2022 11:03:14 AM	Audit	Data	DataManager	DataManager was in a state verification state for the year. Close in start time.
June 21, 2022 11:04:19 AM	Audit	Data	GC Oven Temperature Stability - 7800 - Temperature: Oven - S: 180.0°C - L: +/- 0.5°C	Manual Data Entry
June 21, 2022 11:04:22 AM	End	Execution	GC Oven Temperature Stability - 7800 - Temperature: Oven - S: 180.0°C - L: +/- 0.5°C	Run Count: 1
June 21, 2022 11:04:24 AM	Start	Execution	Log Amp - 5877A SQ - Source: E1 - E1 - Extractor	None
June 21, 2022 11:04:34 AM	End	Execution	Log Amp - 5877A SQ - Source: E1 - E1 - Extractor	Run Count: 1
June 21, 2022 11:04:37 AM	Start	Execution	RIPA - 5877A SQ - Source: E1 - E1 - Extractor	None
June 21, 2022 11:07:49 AM	End	Execution	RIPA - 5877A SQ - Source: E1 - E1 - Extractor	Run Count: 1
June 21, 2022 11:07:52 AM	Start	Execution	Tune E1 - 5877A SQ - Source: E1 - E1 - Extractor	None

Qualitative - No systems associated

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Date: June 21, 2022 2:04:12 PM
System ID: QM-7

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User Name: ksuparak.almcompliance
Hostname: SC01159KNC
System ID: GM-7
Print Date: June 21, 2022 2:04:17 PM

ALS-GM7-2022 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 21, 2022 11:08:35 AM End	Execution	Turn E1 - 5077A, SQ - Source: E1 - Extruder Filament 1 (Qualitative - No separate acquisition)	Run Count: 1	
June 21, 2022 11:14:59 AM Start	Execution	Turn E1 - 5077A, SQ - Source: E1 - Extruder Filament 2 (Qualitative - No separate acquisition)		
June 21, 2022 11:16:48 AM End	Execution	Turn E1 - 5077A, SQ - Source: E1 - Extruder Filament 2 (Qualitative - No separate acquisition)	Run Count: 1	
June 21, 2022 11:18:43 AM Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 1 - L1 = 1200	None	
June 21, 2022 11:17:55 AM Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 1 - L1 = 1200	None	
June 21, 2022 11:17:10 AM Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 1 - L1 = 1200	None	
June 21, 2022 11:20:09 AM Audit	Acquisition	Session	None	
June 21, 2022 12:36:20 PM Audit	Acquisition	Session	None	
June 21, 2022 12:36:22 PM Audit	Session/Released	Session	None	
June 21, 2022 12:36:35 PM Start	Qualification	Session	QC	
June 21, 2022 12:36:28 PM Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 1 - L1 = 1200	None	

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System ID: GM-7

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User Name: ksuparak.almcompliance
Hostname: SC01159KNC
System ID: GM-7
Print Date: June 21, 2022 2:04:17 PM

ALS-GM7-2022 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 21, 2022 12:37:07 PM Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	None	
June 21, 2022 12:37:00 PM Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 1 - L1 = 1200	None	
June 21, 2022 12:36:54 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 1 - L1 = 1200	Data File Path: HVALSGM7_2022GMF1_001.D	
June 21, 2022 12:36:24 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 1 - L1 = 1200	Data File Path: HVALSGM7_2022GMF1_001.D	
June 21, 2022 12:40:05 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 1 - L1 = 1200	Data File Path: HVALSGM7_2022GMF1_001.D	
June 21, 2022 12:42:04 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 1 - L1 = 1200	Data File Path: HVALSGM7_2022GMF1_001.D	
June 21, 2022 12:42:17 PM Audit	Acquisition	Session	None	
June 21, 2022 12:33:31 PM Audit	Acquisition	Session	None	
June 21, 2022 12:33:33 PM Audit	Session/Released	Session	None	
June 21, 2022 12:33:37 PM Start	Qualification	Session	QC	
June 21, 2022 12:33:37 PM Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 1 - L1 = 1200	None	

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System ID: GM-7

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User Name: ksuparak.almcompliance
Hostname: SC01159KNC
System ID: GM-7
Print Date: June 21, 2022 2:04:17 PM

ALS-GM7-2022 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 21, 2022 12:34:48 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 1 - L1 = 1200	Data File Path: HVALSGM7_2022GMF1_001.D	
June 21, 2022 12:30:26 PM End	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 1 - L1 = 1200	Run Count: 1	
June 21, 2022 12:31:11 PM Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	None	
June 21, 2022 12:38:15 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	Data File Path: HVALSGM7_2022GMF2_001.D	
June 21, 2022 12:38:30 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	Data File Path: HVALSGM7_2022GMF2_001.D	
June 21, 2022 12:38:45 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	Data File Path: HVALSGM7_2022GMF2_001.D	
June 21, 2022 12:39:30 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	Data File Path: HVALSGM7_2022GMF2_001.D	
June 21, 2022 12:39:14 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	Data File Path: HVALSGM7_2022GMF2_001.D	

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Date: June 21, 2022 2:04:12 PM
System ID: GM-7

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User Name: ksuparak.almcompliance
Hostname: SC01159KNC
System ID: GM-7
Print Date: June 21, 2022 2:04:17 PM

ALS-GM7-2022 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 21, 2022 12:39:45 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	Data File Path: HVALSGM7_2022GMF2_001.D	
June 21, 2022 12:40:15 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	Data File Path: HVALSGM7_2022GMF2_001.D	
June 21, 2022 12:40:40 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	Data File Path: HVALSGM7_2022GMF2_001.D	
June 21, 2022 12:41:09 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	Data File Path: HVALSGM7_2022GMF2_001.D	
June 21, 2022 12:41:29 PM End	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	Run Count: 1	
June 21, 2022 12:42:30 PM Audit	Session/Released	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	Deviation Greater than Count: 1	
June 21, 2022 12:42:30 PM Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	None	
June 21, 2022 12:42:35 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extruder using Filament 2 - L1 = 1200	Data File Path: HVALSGM7_2022GMF2_001.D	

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Date: June 21, 2022 2:04:12 PM
System ID: GM-7

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User Name: support@winninglabs
Hardware: SCC1150000

System ID: GM-7
Print Date: June 21, 2022 2:04:17 PM

AUS-GM7-2022 Transaction Log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 21, 2022 12:42:45 PM	End	Execution	Signal to Noise EI - Liquid Injection, Purity 85%, 80% Source: EI - Evaporator only Flamelet 2 - L: 14-1200	Run Count: 2
June 21, 2022 12:42:00 PM	End	Qualification	Session	DQ
June 21, 2022 12:42:00 PM	Start	Reporting	Session	None
June 21, 2022 12:41:17 PM	Auto	AutoClosed	Session	None
June 21, 2022 1:57:47 PM	Auto	AutoResumed	Session	None
June 21, 2022 1:57:50 PM	Auto	SessionResumed	Session	None
June 21, 2022 1:57:56 PM	Start	Qualification	Session	DQ
June 21, 2022 2:02:42 PM	Auto	Reporting	Session	Report Generated Certificate

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Date: June 21, 2022 2:04:12 PM
System ID: GM-7

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ภาคผนวก จ

สำเนาหนังสืออนุญาตขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน

เรื่อง คัดอาชญาหนึ่งสืบทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด
อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอรับผลการทดสอบห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๓๐ กรกฎาคม ๒๕๖๓

- สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผน
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ แผน
๓. ขอบข่ายสารเคมีที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๓ แผน


ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุ
หนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๑๔-๑-๑๐๑๔ สถานที่ตั้งเลขที่ ๓๐๔
ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร
ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย)
จำกัด คัดอาชญาหนึ่งสืบทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖๒ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารเคมีที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๕๙ รายการ น้ำเสีย
จำนวน ๑๖๒ รายการ อากาศเสีย ๑๖ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๑๕ รายการ และดิน
จำนวน ๑๒๕ รายการ รวมทั้งสิ้นจำนวน ๓๖๖ รายการ ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้แจ้งหมดอายุในวันที่ ๒ กันยายน ๒๕๖๖ หากประสงค์จะต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุหรือเอกสารประกอบคำขอ
ต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์
เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายคิระ จันทรจิตร)
อธิบดีกรมโรงงานอุตสาหกรรม
ผู้อำนวยการกองบริหารและส่งเสริมโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและพัฒนากิจการโรงงาน


กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๒๐๒ ๔๔๔๖ - ๐ ๒๒๐๒ ๔๐๐๒

โทรสาร ๐ ๒๒๕๔ ๓๒๐๘ - ๐ ๒๒๕๔ ๓๖๐๔

๓. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

- | | |
|--------------------------------|-----------------------------|
| ๑) นางสาวยุพพร จันทน์ปลั่ง | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๐ |
| ๒) นางสาวจันทน์ โกมารกุล ณ นคร | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๑ |
| ๓) นายศราวุธ จิตราชนันท์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๒ |
| ๔) นางสาวกนกพร เอนก | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๓ |
| ๕) นายสุริยา สอนแก้ว | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๔ |
| ๖) นายวิฑูรย์ ชุมพร | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๕ |


(นายคิระ จันทรจิตร)
อธิบดีกรมโรงงานอุตสาหกรรม
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ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๔. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖๒ ราย

- | | |
|---------------------------------------|-----------------------------|
| ๑) นางสาวจินดา โขกุลธรรม | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๑ |
| ๒) นางสาววิภาวี น้อยเสถียร | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๒ |
| ๓) นางสาวชัญญาญณี อัมม | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๓ |
| ๔) นางสาววันพร สอนแก้ว | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๔ |
| ๕) นางสาวนันทิณี สมบูรณ์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๕ |
| ๖) นางสาวศรีมา อธิษฐาน | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๖ |
| ๗) นางสาววราภรณ์ มงคลจิตร | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๗ |
| ๘) นางสาวศิริลักษณ์ พึ่งแพ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๘ |
| ๙) นายพนมกร จันทน์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๑๙ |
| ๑๐) นายธนเศรษฐ์ โกมล | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๐ |
| ๑๑) นายธนากร อธิษฐาน | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๑ |
| ๑๒) นางสาวนันทิณี สอนแก้ว | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๒ |
| ๑๓) นางสาวสุวิมล ชัยเจริญ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๓ |
| ๑๔) นางสาวสุภาวดี อรรถน | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๔ |
| ๑๕) นางสาวเป็กร อธิษฐาน | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๕ |
| ๑๖) นางสาวศศิธร พูลสวัสดิ์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๖ |
| ๑๗) นางสาวเสาวลักษณ์ ภูพานา | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๗ |
| ๑๘) นายอภิสิทธิ์ สิงหา | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๘ |
| ๑๙) นายศักดิ์สิทธิ์ โพธิ์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๒๙ |
| ๒๐) ว่าที่ร้อยตรีหญิง พรรณีมา ชำเจริญ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๐ |
| ๒๑) นางจิตตา คำแก้ว | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๑ |
| ๒๒) นางสาวอรรณพ ธิกุล | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๒ |
| ๒๓) นางสาวนันทิณี อัมม | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๓ |
| ๒๔) นายจุลเชษฐ์ วาริน | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๔ |
| ๒๕) นางสาวสุวิมล ชัยเจริญ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๕ |
| ๒๖) นายบุญตา นามะ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๖ |
| ๒๗) นายพนมกร จันทน์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๗ |
| ๒๘) นายสุวิมล ชัยเจริญ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๘ |
| ๒๙) ว่าที่ร้อยตรี อธิษฐาน อัมม | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๓๙ |
| ๓๐) นางสาววิภาวี น้อยเสถียร | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๐ |
| ๓๑) นางสาวสุวิมล ชัยเจริญ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๑ |
| ๓๒) นางสาวอรรณพ ธิกุล | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๒ |
| ๓๓) นางสาวนันทิณี อัมม | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๓ |
| ๓๔) นางสาวสุวิมล ชัยเจริญ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๔ |
| ๓๕) นางสาวอรรณพ ธิกุล | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๕ |

(นายคิระ จันทรจิตร)

อธิบดีกรมโรงงานอุตสาหกรรม
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๓๕) นางสาวปราณีทิพย์...

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| ๓๕) นางสาวปราณีทิพย์ กิจไพศาลศักดิ์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๖ |
| ๓๖) นางสาวเดือนใจ พากุล | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๗ |
| ๓๗) นางสาวจิราพร ศิริเว | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๘ |
| ๓๘) นายวรวิทย์ สุทธิ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๔๙ |
| ๓๙) นายพนม วิริยะสิทธิ์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๐ |
| ๔๐) นายธนิต เจนจบ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๑ |
| ๔๑) นายคณิศร จำเริญ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๒ |
| ๔๒) นายอรรถพล บิณฑิยาพันธ์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๓ |
| ๔๓) นายสุวิทย์ พรมเสถียร | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๔ |
| ๔๔) นายสมเดช โกวิทพันธ์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๕ |
| ๔๕) นายชวฤทธิ์ วงษ์จันทร์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๖ |
| ๔๖) นายอาทิตย์ ศรีสน | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๗ |
| ๔๗) นายเจตนาถ ศรีกิติโย | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๘ |
| ๔๘) นายจรูญ บุญ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๕๙ |
| ๔๙) นายสมศักดิ์ เอนก | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๐ |
| ๕๐) นายอภิสิทธิ์ ภูพานา | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๑ |
| ๕๑) นางสาวสุภาวดี อรรถน | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๒ |
| ๕๒) นางสาวทิพย์ ชวาลสมบูรณ์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๓ |
| ๕๓) นางสาววิภาวี น้อยเสถียร | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๔ |
| ๕๔) นางสาวกนกพร เอนก | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๕ |
| ๕๕) นางสาวพัชรีมา พงษ์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๖ |
| ๕๖) นางสาวภาณุมาศ สุวรรณ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๗ |
| ๕๗) นางสาวภาณุมาศ นามะ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๘ |
| ๕๘) นางสาวสุวิมล ชัยเจริญ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๖๙ |
| ๕๙) นายสุวิมล ชัยเจริญ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๐ |
| ๖๐) นายอภิสิทธิ์ ภูพานา | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๑ |
| ๖๑) นายประพนธ์ วรรณ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๒ |
| ๖๒) นายชรัส พงษ์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๓ |
| ๖๓) นางสาวกนกพร เอนก | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๔ |
| ๖๔) นางสาวนันทิณี อัมม | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๕ |
| ๖๕) นางสาวสิริโชค ธง | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๖ |
| ๖๖) นางสาวกนกพร เอนก | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๗ |
| ๖๗) นางสาวพรนิตา พันธ์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๘ |
| ๖๘) นางสาวสุวิมล ชัยเจริญ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๗๙ |
| ๖๙) นายพนมกร จันทน์ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๘๐ |
| ๗๐) นายสุวิมล ชัยเจริญ | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๘๑ |
| ๗๑) นายวิฑูรย์ ชุมพร | ทะเบียนเลขที่ ๖-๒๐๑๔-๑-๑๐๘๒ |

(นายคิระ จันทรจิตร)

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๓๖) นายสมบูรณ์...

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

44 Methomyl...

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ลำดับที่	สารเคมี	วิธีวิเคราะห์
44	Methomyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
45	Nickel	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ⁽⁴⁾ 2) Soxhlet Extraction Method ⁽⁴⁾
47	Oxamyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
48	Propoxur	High-Performance Liquid Chromatographic Method ⁽⁴⁾
49	pH	Electrometric Method ⁽⁴⁾
50	Phenols	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾
51	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
52	Sulfide	Iodometric Method ⁽⁴⁾
53	Temperature	Laboratory and Field Methods ⁽⁴⁾
54	Total Dissolved Solids	Dried at 180 °C ⁽⁴⁾
55	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ⁽⁴⁾
56	Total Suspended Solids	Dried at 103-105 °C ⁽⁴⁾
57	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
58	Trivalent Chromium	1) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Colorimetric Method; Calculation ⁽⁴⁾
59	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁴⁾

น้ำใต้ดิน จำนวน 126 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

3 Aldrin...

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

18 Bis(2-ethylhexyl)phthalate...


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ลำดับที่	สารเคมี	วิธีวิเคราะห์
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
22	Butyl Benzyl Phthalate	Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾

34 Chromium (III)...


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


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51 cis-1,2-Dichloroethylene...

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


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
68 Fluorene...

ลำดับที่	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⁾


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84 Methanol...

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⁾


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97 Pentachlorophenol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
98	pH	Electrometric Method ⁽⁴⁾
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
100	Phenol	1) Distillation, Direct Photometric Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
102	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
103	Silver	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
109	TPH (C ₈ -C ₁₀)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(13,24)
110	TPH (C ₁₀ -C ₁₆)	Solvent Extraction, Gas Chromatographic Method ^(8,21)
111	TPH (C ₁₅ -C ₂₅)	Solvent Extraction, Gas Chromatographic Method ^(8,21)
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

วิทย์กุล

114 1,1,2-Trichloroethane...

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กรมส่งเสริมการค้าระหว่างประเทศ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
114	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
115	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁸⁾
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁸⁾
118	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
119	Vanadium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
120	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
121	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
122	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
123	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
124	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
125	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
126	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾

ตารางรายชื่อ (ปล่องระบาย) จำนวน 16 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Antimony	Isokinetic, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾
2	Arsenic	Isokinetic, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾

วิทย์กุล

3 Carbon Monoxide...

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กรมส่งเสริมการค้าระหว่างประเทศ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
3	Carbon Monoxide	1) Sampling Bag Non-Dispersive Infrared Method ⁽³⁾ 2) Non-Dispersive Infrared Method ⁽⁵⁾ 3) Instrumental Analyzer Method ⁽⁵⁾
4	Chlorine	1) Absorption Sampling, Ion Chromatographic, Method ⁽⁵⁾ 2) Isokinetic Sampling, Ion Chromatographic Method ⁽⁵⁾
5	Copper	Isokinetic, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾
6	Dioxins	Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory or Analysis by Department of Industrial Works Registered Laboratory (Dioxins/Furans Analysis Approved) ⁽⁵⁾
7	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method ⁽⁵⁾ 2) Isokinetic Sampling, Ion Chromatographic Method ⁽⁵⁾
8	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁽⁵⁾
9	Lead	Isokinetic, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾
10	Mercury	1) Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽⁵⁾ 2) Isokinetic, Digestion, Inductively Coupled Plasma Method ⁽⁵⁾
11	Opacity	Ringelmann's Method ⁽⁴⁾
12	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ⁽⁵⁾ 2) Chemiluminescence Method ⁽⁵⁾ 3) Instrumental Analyzer Method ⁽⁵⁾
13	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ⁽⁵⁾ 2) UV Fluorescence Method ⁽⁵⁾ 3) Instrumental Analyzer Method ⁽⁵⁾
14	Sulfuric Acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ⁽⁵⁾
15	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ⁽³⁾
16	Xylene	Absorption Sampling, Gas Chromatographic Method ⁽⁵⁾

วิทย์กุล

สิ่งปฏิกูล...

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ผู้อำนวยการศูนย์มาตรฐานวิธีการวิเคราะห์สิ่งแวดล้อม
กรมส่งเสริมการค้าระหว่างประเทศ

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,3,25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,16)
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,16)
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,16)
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,16)

วิทย์กุล

6 Cadmium...

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กรมส่งเสริมการค้าระหว่างประเทศ

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 ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.16)
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.16) 3) Digestion, Inductively Coupled Plasma Method ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.16)
9	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1.6.15,17) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1.6.16,17) 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7.15,17) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7.16,17)
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method ^(1.6.17) 2) Alkaline Digestion, Colorimetric Method ^(8.17)

วิมล
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กรมการแพทย์แผนงาและการแพทย์ทางเลือก

11 Cobalt....

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 ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.16)
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.16) 3) Digestion, Inductively Coupled Plasma Method ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.16)
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25)

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2) Soxhlet....

ลำดับที่	สารเคมี	วิธีวิเคราะห์
17	Dieldrin	2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.16) 3) Digestion, Inductively Coupled Plasma Method ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.16)
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(1.6.18)

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2) Waste Extraction...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
23	Methoxychlor	2) Waste Extraction, Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ^(1.6.19) 3) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^(1.6.20) 4) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(1.6) 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ^(1.9) 6) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽²⁰⁾
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.16) 3) Digestion, Inductively Coupled Plasma Method ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.16)
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.16) 3) Digestion, Inductively Coupled Plasma Method ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.16)

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
27 Polychlorinated...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,3-Dichlorobiphenyl - 2,2',5-Trichlorobiphenyl - 2,4',5-Trichlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5,6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1,9,23) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,23) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)


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28 Pentachlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,23) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,23) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
29	pH	Electrometric Method ^(29,30)
30	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,13) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,13) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,14)
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,13) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14)
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,13) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,13) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,14)
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 ^(22,31)
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,13) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,13)


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4) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
35	Zinc	4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,14) 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,13) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,13) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,14)

เพิ่ม จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,20)
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,23) 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 ^(7,13) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,14)
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^(7,13) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,14)
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,23) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
8	Barium	1) Digestion, Inductively Coupled Plasma Method ^(7,13) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,14)


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
9 Benz(a)anthracene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Benz(a)anthracene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,20)
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	Benzofluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^(7,13) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,14)
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 ^(14,20)
20	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,20)
21	Butanol	Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ^(14,20)
22	Butyl Benzyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^(7,13) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,14)
24	Carbazole	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,20)


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
26 Carbon tetrachloride...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(16,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
28	p-Chloroaniline	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
32	2-Chlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,16)
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,15,17) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,15,17)
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 ^(26,28)
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(16,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
39	DDD	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(16,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)


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
40 DDE...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
40	DDE	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(16,22)
41	DDT	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31) 1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(16,22)
42	Dibenz(a,h)anthracene	2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
43	Di-n-Butyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
47	3,3-Dichlorobenzidine	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
53	2,4-Dichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)


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
57 Dieldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(16,22) 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/ Mass Spectrometric Method ^(16,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(16,22) 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/ Mass Spectrometric Method ^(16,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
70	Heptachlor Epoxide	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(16,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)


 (นางริกาญูน นัครกุลสวัสดิ์)
 ผู้อำนวยการศูนย์มาตรฐานวิธีการวิเคราะห์สิ่งแวดล้อมพิษ

71 Hexachlorobenzene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(16,22) 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/ Mass Spectrometric Method ^(16,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
75	β-HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(16,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
76	γ-HCH	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(16,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
77	Hexachlorocyclopentadiene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
78	Hexachloroethane	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
79	Indeno(1,2,3-cd)pyrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
80	Isophorone	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
81	Lead	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,16)
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,16)
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁸⁾


 (นางริกาญูน นัครกุลสวัสดิ์)
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2) Thermal...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
84	Methanol	2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry ⁽¹⁾⁽⁹⁾ 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽²⁰⁾ Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ⁽¹²⁾⁽²¹⁾
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²²⁾ 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
88	2-methylphenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾
89	2-Methylnaphthalene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
91	Naphthalene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ⁽⁷⁾⁽¹³⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁷⁾⁽¹⁶⁾
93	Nitrobenzene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾
94	N-Nitrosodiphenylamine	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾
95	N-Nitrosodi-n-propylamine	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232	1) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²³⁾ 2) Automated Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²³⁾

วิทย์
(นางวิภาดา ชัยกุลกิจ)

- 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 - 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',3,4',5,5',6'-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6'-Nonachlorobiphenyl	
97	Pentachlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾
98	Phenanthrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾
99	Phenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾
100	Pyrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾

วิทย์
(นางวิภาดา ชัยกุลกิจ)

101 Selenium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
101	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁷⁾⁽¹³⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁷⁾⁽¹⁶⁾
102	Silver	1) Digestion, Inductively Coupled Plasma Method ⁽⁷⁾⁽¹³⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁷⁾⁽¹⁶⁾
103	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
106	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic Method ⁽¹⁾⁽²²⁾ 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾
108	TPH (C ₉ -C ₁₀)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
109	TPH (C ₁₀ -C ₁₅)	1) Solvent Extraction, Gas Chromatographic Method ⁽¹⁾⁽²¹⁾ 2) Automated Soxhlet Extraction, Gas Chromatographic Method ⁽²³⁾⁽¹⁾
110	TPH (C ₁₆ -C ₂₀)	1) Solvent Extraction, Gas Chromatographic Method ⁽¹⁾⁽²¹⁾ 2) Automated Soxhlet Extraction, Gas Chromatographic Method ⁽²³⁾⁽¹⁾
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
115	2,4,5-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾

วิทย์
(นางวิภาดา ชัยกุลกิจ)

116 2,4,6-Trichlorophenol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
116	2,4,6-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²³⁾⁽¹⁾
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method ⁽⁷⁾⁽¹³⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁷⁾⁽¹⁶⁾
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
121	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
122	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
123	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ⁽¹⁾⁽²⁴⁾
125	Zinc	1) Digestion, Inductively Coupled Plasma Method ⁽⁷⁾⁽¹³⁾ 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ⁽⁷⁾⁽¹⁶⁾

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กรมโรงงานอุตสาหกรรม

กรมโรงงานอุตสาหกรรมมีหน้าที่และอำนาจในการออกใบอนุญาตประกอบกิจการโรงงานตามกฎหมายว่าด้วยการออกใบอนุญาตประกอบกิจการโรงงาน พ.ร.บ. ๒๕๖๑ และ พ.ร.บ. ๒๕๖๒

ที่ อ.ก.๓๓๐(๓) ๖๔๗๐



กรมโรงงานอุตสาหกรรม
ถนนพหลโยธิน ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๔ มิถุนายน ๒๕๖๕

เรื่อง ขันทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอลแอล แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขีดความสามารถของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๔ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท เอลแอล แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๖ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอลแอล แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ และรายการสารเคมีที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอลแอล แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขันทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ๖-๒๒๒๓ สถานที่ยื่นขอขึ้นทะเบียน ๖๒๖/๓๐ หมู่ที่ ๕ ตำบลแม่ไม้ อำเภอบางบาล จังหวัดพระนครศรีอยุธยา โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

- | | |
|--------------------------|-----------------------------|
| ๑) นายเดช ช้างชน | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๔๖ |
| ๒) นางวิลาวัลย์ บริรักษ์ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๔๗ |
| ๓) นายสุพจน์ สดามะ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๔๘ |

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

- | | |
|-------------------------------|-----------------------------|
| ๑) นางสาวมณฑล บรรจงกิจ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๔๙ |
| ๒) นางพจนา สีตา | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๕๐ |
| ๓) นางสาวนิตา กุลสุวิวงศ์ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๕๑ |
| ๔) นายพิทยา ทองแดง | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๕๒ |
| ๕) นางชลธิชา สุนทร | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๕๓ |
| ๖) ว่าที่ ร.ต.รณชัย ม่วงมา | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๕๔ |
| ๗) นายวรวิทย์ ทัพพา | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๕๕ |
| ๘) นายคณิศรวันพร จรัสกาย | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๕๖ |
| ๙) นายสุรศักดิ์ สาขิน | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๕๗ |
| ๑๐) นางสาวเพชรคุณ ภาวพัฒน์ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๕๘ |
| ๑๑) นายสราวุธ ถานแก้ว | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๕๙ |
| ๑๒) นายสุทธิดำรง โชคิทธิพันธ์ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๖๐ |

(๑๑) นายวิลาวัลย์...

- | | |
|-----------------------------------|-----------------------------|
| ๑๓) นายวิลาวัลย์ หันไชยเนาว์ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๕๙ |
| ๑๔) นางสาวนาถิเรก เจริญคุณกุล | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๕๙ |
| ๑๕) นางสาวนิตา หงษ์จิตต์ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๕๙ |
| ๑๖) นายธนเชษฐา วงศ์ไชย | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๖๐ |
| ๑๗) นายชัยบุรินทร์ เลิศนันทกุลชัย | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๖๑ |
| ๑๘) นายสิริจาง เพ็ชรแสง | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๖๒ |
| ๑๙) นายกันตภณ มณีสัมพันธ์ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๖๓ |
| ๒๐) นางสาวจันทิพย์ โกเมนชนะ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๖๔ |
| ๒๑) นายอริณันท์ อธิจินดา | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๖๕ |
| ๒๒) นายคุณฉัตร พิสมัยพันธ์ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๖๖ |
| ๒๓) นายคุณชัย วงศ์สุริยธาย | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๖๗ |
| ๒๔) นายปฐมพงศ์ กรสวัสดิ์ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๖๘ |
| ๒๕) นายโสธร ต้นโพธิ์ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๖๙ |
| ๒๖) นางสาวกิตติยา สันญาธิยาภิรมย์ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๗๐ |
| ๒๗) นางสาวเจษฎาพร ศรีบุญเรือง | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๗๑ |
| ๒๘) นางสาวสุนิษาพร สิงห์เงา | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๗๒ |
| ๒๙) นางสาวอริศราพร ศรีมงคลโร | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๗๓ |
| ๓๐) นายพิพัฒน์ นิกิตร์เศรษฐี | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๗๔ |
| ๓๑) นายศิริวิทย์ เรืองสม | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๗๕ |
| ๓๒) นายปารเมศ สัตยาคุณ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๗๖ |
| ๓๓) นายณัฐพล ธรรมะโร | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๗๗ |
| ๓๔) นางสาวศุภกานต์ โสจันทร์ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๗๘ |
| ๓๕) นายเพชรกร อินทรเสนา | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๗๙ |
| ๓๖) นายจิรากร เขื่อนมาก | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๘๐ |
| ๓๗) นายอนุชิต ทองจรรจิดดา | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๘๑ |
| ๓๘) นายอภิชาติ วิลาศ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๘๒ |
| ๓๙) นายจักรวรรดิ ศรีวิเศษ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๘๓ |
| ๔๐) นายประสพสมิตร์ เขื่อนเพชร | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๘๔ |
| ๔๑) นายภาณุวัฒน์ รังง | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๘๕ |
| ๔๒) นายสันติ ชัยชนะ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๘๖ |
| ๔๓) นายสิทธิชัย แก้วมุก | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๘๗ |
| ๔๔) นายทิมกร กุศลชาติ | ทะเบียนเลขที่ ๖-๒๒๒๓-๖-๑๔๘๘ |

ค. ขอขานสารเคมีที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในแล็บ จำนวน ๑๔ รายการ
จากสารเคมี (ป่องระบยา) จำนวน ๗ รายการ และไม่ได้ขึ้น จำนวน ๗ รายการ รวมทั้งสิ้นจำนวน ๑๔ รายการ
ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้มีอายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นสุดอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางจินดา สะตะกรณ)
ผู้อำนวยการฝ่ายสิ่งแวดล้อมและกัมมันตรังสี
กรมโรงงานอุตสาหกรรม
๒๘ มิ.ย. ๒๕๖๕

กองวิจัยและเตือนภัยมลพิษโรงงาน
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๘๐๕ ๙๐๖๑-๓
ไปรษณีย์อิเล็กทรอนิกส์ eww@dlw.mail.go.th


เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท แอ๊ดดอส แล็บราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๖-๓๒๓
ที่ อก ๐๓๑๐(๓)/ ๖๔๗๐ ลงวันที่ ๒๔ มิถุนายน ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ
น้ำเสีย จำนวน 14 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method ⁽²⁾ 2) 5-Day BOD Test, Azide Modification Method ⁽²⁾
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method ⁽²⁾ 2) Closed Reflux, Colorimetric Method ⁽²⁾ 3) Closed Reflux, Titrimetric Method ⁽²⁾
3	Color	ADMI Weighted - Ordinate Spectrophotometric Method ⁽²⁾
4	Cyanide	Distillation, Colorimetric Method ⁽²⁾
5	Formaldehyde	Distillation, Colorimetric Method ⁽¹⁾
6	Free Chlorine	DPD-Ferrous Titrimetric Method ⁽²⁾
7	Oil and Grease	Liquid-Liquid Partition-Gravimetric Method ⁽²⁾
8	pH	Electrometric Method ⁽²⁾
9	Phenols	1) Distillation, Chloroform Extraction Method ⁽²⁾ 2) Distillation, Direct Photometric Method ⁽²⁾
10	Sulfide	ZnS Precipitation, Iodometric Method ⁽²⁾
11	Temperature	Laboratory and Field Method ⁽²⁾
12	Total Dissolved Solids	Dried at 180 °C ⁽²⁾
13	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ⁽²⁾
14	Total Suspended Solids	Dried at 103-105 °C ⁽²⁾

อากาศเสีย (ปล่อยระบาย) จำนวน 7 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Carbon Monoxide	1) Sampling Bag, Non-Dispersive Infrared Method ⁽³⁾ 2) Instrumental Analyzer Method ⁽³⁾
2	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁽³⁾
3	Opacity	Ringelmann's Method ^(3,4)
4	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ⁽⁴⁾ 2) Instrumental Analyzer Method ⁽³⁾
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ⁽³⁾ 2) Instrumental Analyzer Method ⁽¹⁰⁾


(นางสาววิชุดา สัมฤทธิ์ผล)
ผู้อำนวยการ
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก Sulfuric Acid...


ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Sulfuric Acid	Isokinetic Sampling, Barium - Thorin Titrimetric Method ⁽⁴⁾
7	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ⁽¹⁾

น้ำใต้ดิน จำนวน 3 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method ⁽²⁾
2	pH	Electrometric Method ⁽²⁾
3	Phenols	Distillation, Direct Photometric Method ⁽²⁾

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(นางสาววิชุดา สัมฤทธิ์ผล)
ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก กรมโรงงานอุตสาหกรรม โทร ๐ ๓๘๐๕ ๙๐๖๑-๔



บริษัท เอแอลเอส แลборาทอรี กรุ๊ป (ประเทศไทย) จำกัด

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