

ภาคผนวก ค

ใบรับรองผลการตรวจวิเคราะห์
ผลกระทบสิ่งแวดล้อม



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: 23106014
Date Received : Sep 22, 2023
Date Reported : Sep 28, 2023
Report Number : 2771260-1

Page 1 of 1

Sample Number : 23106014-1
Sample Description : Emission from Stationary Source
Location : HRSs 1
Measurement Date : Sep 22, 2023

Stack Description					
Ambient Temperature	32 °C	Diameter	3.30 m	Oxygen	13.45 %
Ambient Pressure	760 mmHg	Shape	Circle	Carbon dioxide	4.03 %
Type of Process	Combustion	Stack Temperature	141 °C	Gas Velocity	20.31 m/s
Type of Fuel	Natural Gas	Moisture	9.48 %	Flow Rate	407135 Nm ³ /hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm) at Actual O ₂ at 7% O ₂	Sulfur Dioxide (ppm) at Actual O ₂ at 7% O ₂
1	11:15 AM - 11:35 AM	13.45	4.03	9.87 18.41	0.07 0.14
2	11:36 AM - 11:56 AM	13.45	4.03	9.85 18.38	0.07 0.14
3	11:57 AM - 12:17 PM	13.45	4.04	9.72 18.15	0.06 0.11
Average (ppm)		13.45	4.03	9.81 18.31	0.07 0.13
Guideline ⁽¹⁾ (ppm)				26.58	1.66
Guideline ⁽²⁾ (ppm)				120	20
Result (mg/Nm ³)				18.46 34.45	0.18 0.34
Emission Rate at Actual O ₂ (g/s)				2.0882	0.0203
Guideline ⁽¹⁾ (g/s)				3.000	0.255
Method				US EPA Method 7E	US EPA Method 6C

Sampled By : Sakst 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.

Technical Management

Wichan Chonharat
Manager
โทรศัพท์ ๖-๒๐4-๖113

Approved by

Sarayuth Jittranoet
Assistant General Manager
โทรศัพท์ ๖-๒๐4-๔702

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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: 23106021
Date Received : Sep 22, 2023
Date Reported : Sep 29, 2023
Report Number : 2771271-1

Page 1 of 2

Sample Number : 23106021-1
Sampled Date : Sep 22, 2023
Sample Description : Emission from Stationary Source
Location : HRSs 1
Date Analysis Commenced : Sep 23, 2023
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	760 mmHg	Diameter	3.30 m	Oxygen	13.4 %
Ambient Temperature	32.0 °C	Shape	Circle	Carbon Dioxide	4.0 %
Type of Process	Combustion	Stack Temperature	141 °C	Gas Velocity	20.3 m/s
Type of Fuel	Natural Gas	Moisture	9.51 %	Flow Rate (Actual O ₂)	406531 Nm ³ /hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7% O ₂ at 13.4 % O ₂	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate	11:15 AM - 12:15 PM	mg/m ³	-	0.5	<0.5 <0.5	60	7.108	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline :

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

Thanit Kulsuriwong
Scientist (4)
โทรศัพท์ ๖-๓๒๓-๙๔๔๗

Approved by

Dej Changchon
Senior Manager
โทรศัพท์ ๖-๓๒๓-๙๔๔๒

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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: 23106021
Date Received : Sep 22, 2023
Date Reported : Sep 29, 2023
Report Number : 2771271-1

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Sample Number : 23106021-1
Sampled Date : Sep 22, 2023
Sample Description : Emission from Stationary Source
Location : HRSs 1
Date Analysis Commenced : Sep 23, 2023
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	760 mmHg	Diameter	3.30 m	Oxygen	13.4 %
Ambient Temperature	32.0 °C	Shape	Circle	Carbon Dioxide	4.0 %
Type of Process	Combustion	Stack Temperature	141 °C	Gas Velocity	20.3 m/s
Type of Fuel	Natural Gas	Moisture	9.51 %	Flow Rate (Actual O ₂)	406531 Nm ³ /hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate *	11:15 AM - 12:15 PM	g/s	-	-	<0.056	-	0.416	Calculated	Rayong

Guideline :

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 : Supot Salameh

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

Technical Management

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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: 23106001
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number : 2771247-1

Page 1 of 1

Sample Description : Air Quality
Location : ไร่บึงขาคี (GPS 47P 0726443, 1407365)
Parameter : Nitrogen dioxide (ppm)
Measurement Date : Sep 19, 2023 - Sep 26, 2023
Measurement by : Anurak Tongkhajonsakda

Time	23106001-1 Sep 19, 2023	23106001-2 Sep 20, 2023	23106001-3 Sep 21, 2023	23106001-4 Sep 22, 2023	23106001-5 Sep 23, 2023	23106001-6 Sep 24, 2023	23106001-7 Sep 25, 2023
12:00 PM - 01:00 PM	0.010	0.003	0.006	0.002	0.002	0.004	0.003
01:00 PM - 02:00 PM	0.006	0.004	0.004	0.002	0.002	0.002	0.003
02:00 PM - 03:00 PM	0.005	0.004	0.003	0.002	0.002	0.002	0.002
03:00 PM - 04:00 PM	0.005	0.003	0.002	0.002	0.003	0.002	0.002
04:00 PM - 05:00 PM	0.004	0.003	0.002	0.004	0.003	0.002	0.002
05:00 PM - 06:00 PM	0.005	0.003	0.002	0.003	0.004	0.002	0.004
06:00 PM - 07:00 PM	0.006	0.005	0.003	0.003	0.007	0.005	0.007
07:00 PM - 08:00 PM	0.004	0.008	0.007	0.003	0.008	0.005	0.005
08:00 PM - 09:00 PM	0.002	0.006	0.011	0.002	0.006	0.005	0.004
09:00 PM - 10:00 PM	0.002	0.003	0.007	0.002	0.003	0.003	0.004
10:00 PM - 11:00 PM	0.002	0.003	0.003	0.002	0.002	0.003	0.006
11:00 PM - 12:00 AM	0.002	0.004	0.002	0.002	0.003	0.002	0.006
12:00 AM - 01:00 AM	0.002	0.003	0.002	0.002	0.003	0.002	0.007
01:00 AM - 02:00 AM	0.003	0.003	0.002	0.002	0.002	0.002	0.008
02:00 AM - 03:00 AM	0.003	0.003	0.002	0.002	0.002	0.002	0.009
03:00 AM - 04:00 AM	0.007	0.003	0.002	0.002	0.002	0.002	0.011
04:00 AM - 05:00 AM	0.007	0.003	0.002	0.002	0.002	0.002	0.010
05:00 AM - 06:00 AM	0.003	0.004	0.002	0.002	0.002	0.002	0.010
06:00 AM - 07:00 AM	0.002	0.006	0.002	0.002	0.002	0.002	0.009
07:00 AM - 08:00 AM	0.003	0.007	0.003	0.003	0.006	0.002	0.007
08:00 AM - 09:00 AM	0.003	0.008	0.002	0.003	0.006	0.002	0.006
09:00 AM - 10:00 AM	0.003	0.008	0.002	0.003	0.005	0.003	0.005
10:00 AM - 11:00 AM	0.003	0.007	0.002	0.002	0.005	0.003	0.004
11:00 AM - 12:00 PM	0.002	0.007	0.002	0.002	0.004	0.003	0.004
Average	0.004	0.005	0.003	0.002	0.004	0.003	0.006
1hr - Maximum	0.010	0.008	0.011	0.004	0.008	0.005	0.011
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

Approved by

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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: 23106001
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2796526-1

Page 1 of 1

Sample Description	Air Quality						
Location	บ้านนาถนันทน์ (GPS 47P 0728262, 1403382)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Sep 19, 2023 - Sep 26, 2023						
Measurement by	Anurak Tongkhajonsakda						
	23106001-8	23106001-9	23106001-10	23106001-11	23106001-12	23106001-13	23106001-14
Time	Sep 19, 2023	Sep 20, 2023	Sep 21, 2023	Sep 22, 2023	Sep 23, 2023	Sep 24, 2023	Sep 25, 2023
11:00 AM - 12:00 PM	0.002	0.002	0.002	0.002	0.005	0.002	0.002
12:00 PM - 01:00 PM	0.002	0.002	0.002	0.002	0.005	0.002	0.002
01:00 PM - 02:00 PM	0.002	0.002	0.002	0.002	0.004	0.002	0.002
02:00 PM - 03:00 PM	0.002	0.002	0.001	0.002	0.004	0.003	0.002
03:00 PM - 04:00 PM	0.002	0.002	0.002	0.002	0.003	0.002	0.002
04:00 PM - 05:00 PM	0.002	0.002	0.002	0.002	0.003	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	0.002	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	0.003	0.002	0.002
10:00 PM - 11:00 PM	0.002	0.002	0.002	0.002	0.003	0.002	0.002
11:00 PM - 12:00 AM	0.002	0.002	0.002	0.002	0.003	0.002	0.002
12:00 AM - 01:00 AM	0.002	0.002	0.002	0.002	0.004	0.002	0.002
01:00 AM - 02:00 AM	0.002	0.002	0.002	0.002	0.004	0.002	0.002
02:00 AM - 03:00 AM	0.002	0.002	0.002	0.002	0.003	0.002	0.002
03:00 AM - 04:00 AM	0.002	0.002	0.002	0.002	0.003	0.002	0.002
04:00 AM - 05:00 AM	0.002	0.002	0.002	0.002	0.003	0.002	0.002
05:00 AM - 06:00 AM	0.006	0.002	0.002	0.002	0.003	0.003	0.005
06:00 AM - 07:00 AM	0.002	0.002	0.002	0.002	0.003	0.002	0.002
07:00 AM - 08:00 AM	0.002	0.002	0.004	0.003	0.004	0.002	0.002
08:00 AM - 09:00 AM	0.003	0.003	0.003	0.007	0.006	0.002	0.002
09:00 AM - 10:00 AM	0.002	0.003	0.004	0.014	0.004	0.003	0.003
10:00 AM - 11:00 AM	0.002	0.003	0.002	0.005	0.002	0.002	0.002
Average	0.002	0.002	0.002	0.003	0.003	0.002	0.002
1hr - Maximum	0.006	0.003	0.004	0.014	0.006	0.003	0.005
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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Analysis / Test Report

Client : 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: 23106001
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2796528-1

Page 1 of 1

Sample Description	Air Quality						
Location	บ้านนาถนันทน์ (GPS 47P 0730055, 1409674)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Sep 19, 2023 - Sep 26, 2023						
Measurement by	Anurak Tongkhajonsakda						
	23106001-15	23106001-16	23106001-17	23106001-18	23106001-19	23106001-20	23106001-21
Time	Sep 19, 2023	Sep 20, 2023	Sep 21, 2023	Sep 22, 2023	Sep 23, 2023	Sep 24, 2023	Sep 25, 2023
01:00 PM - 02:00 PM	0.005	0.003	0.010	0.004	0.007	0.006	0.012
02:00 PM - 03:00 PM	0.007	0.009	0.007	0.006	0.008	0.006	0.008
03:00 PM - 04:00 PM	0.004	0.006	0.006	0.006	0.006	0.005	0.006
04:00 PM - 05:00 PM	0.004	0.009	0.004	0.006	0.008	0.006	0.006
05:00 PM - 06:00 PM	0.004	0.010	0.005	0.006	0.002	0.005	0.005
06:00 PM - 07:00 PM	0.005	0.010	0.006	0.005	0.003	0.009	0.005
07:00 PM - 08:00 PM	0.006	0.011	0.004	0.006	0.002	0.004	0.005
08:00 PM - 09:00 PM	0.005	0.011	0.011	0.007	0.002	0.004	0.004
09:00 PM - 10:00 PM	0.006	0.008	0.013	0.008	0.002	0.005	0.006
10:00 PM - 11:00 PM	0.005	0.006	0.010	0.010	0.003	0.006	0.006
11:00 PM - 12:00 AM	0.005	0.006	0.006	0.013	0.010	0.007	0.007
12:00 AM - 01:00 AM	0.003	0.004	0.005	0.016	0.020	0.011	0.011
01:00 AM - 02:00 AM	0.002	0.005	0.005	0.011	0.013	0.015	0.014
02:00 AM - 03:00 AM	0.008	0.005	0.008	0.014	0.009	0.011	0.009
03:00 AM - 04:00 AM	0.010	0.007	0.004	0.010	0.007	0.011	0.009
04:00 AM - 05:00 AM	0.006	0.009	0.004	0.008	0.002	0.008	0.004
05:00 AM - 06:00 AM	0.006	0.011	0.005	0.007	0.002	0.007	0.004
06:00 AM - 07:00 AM	0.010	0.011	0.005	0.006	0.002	0.005	0.006
07:00 AM - 08:00 AM	0.013	0.008	0.006	0.005	0.002	0.006	0.006
08:00 AM - 09:00 AM	0.011	0.006	0.009	0.005	0.003	0.004	0.006
09:00 AM - 10:00 AM	0.010	0.005	0.011	0.005	0.004	0.004	0.009
10:00 AM - 11:00 AM	0.009	0.005	0.009	0.007	0.006	0.004	0.016
11:00 AM - 12:00 PM	0.006	0.005	0.007	0.009	0.005	0.010	0.017
12:00 PM - 01:00 PM	0.006	0.009	0.005	0.012	0.004	0.011	0.008
Average	0.006	0.007	0.007	0.008	0.006	0.007	0.008
1hr - Maximum	0.013	0.011	0.013	0.016	0.020	0.015	0.017
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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Analysis / Test Report

Client : 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: 23106001
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2796530-1

Page 1 of 1

Sample Description	Air Quality						
Location	บ้านนาถนันทน์ (GPS 47P 0730821, 1407374)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Sep 19, 2023 - Sep 26, 2023						
Measurement by	Anurak Tongkhajonsakda						
	23106001-22	23106001-23	23106001-24	23106001-25	23106001-26	23106001-27	23106001-28
Time	Sep 19, 2023	Sep 20, 2023	Sep 21, 2023	Sep 22, 2023	Sep 23, 2023	Sep 24, 2023	Sep 25, 2023
10:00 AM - 11:00 AM	0.001	0.003	0.002	0.006	0.008	0.006	0.004
11:00 AM - 12:00 PM	0.002	0.003	0.002	0.002	0.008	0.007	0.004
12:00 PM - 01:00 PM	0.003	0.003	0.002	0.002	0.008	0.004	0.003
01:00 PM - 02:00 PM	0.003	0.002	0.002	0.002	0.006	0.003	0.003
02:00 PM - 03:00 PM	0.004	0.003	0.002	0.002	0.004	0.005	0.003
03:00 PM - 04:00 PM	0.002	0.004	0.002	0.003	0.004	0.004	0.003
04:00 PM - 05:00 PM	0.001	0.004	0.003	0.004	0.003	0.005	0.004
05:00 PM - 06:00 PM	0.001	0.003	0.004	0.003	0.002	0.006	0.006
06:00 PM - 07:00 PM	0.003	0.003	0.006	0.003	0.002	0.005	0.007
07:00 PM - 08:00 PM	0.006	0.010	0.006	0.004	0.002	0.006	0.004
08:00 PM - 09:00 PM	0.003	0.003	0.006	0.004	0.004	0.005	0.003
09:00 PM - 10:00 PM	0.003	0.010	0.006	0.003	0.005	0.004	0.003
10:00 PM - 11:00 PM	<0.001	0.002	0.007	0.003	0.006	0.003	0.004
11:00 PM - 12:00 AM	0.004	0.010	0.005	0.003	0.004	0.003	0.004
12:00 AM - 01:00 AM	0.002	0.001	0.004	0.002	0.003	0.004	0.003
01:00 AM - 02:00 AM	0.002	0.006	0.004	0.002	0.002	0.003	0.002
02:00 AM - 03:00 AM	0.002	0.005	0.002	0.004	0.002	0.003	0.002
03:00 AM - 04:00 AM	0.004	0.004	0.002	0.005	0.003	0.006	0.002
04:00 AM - 05:00 AM	0.005	0.003	0.002	0.010	0.003	0.007	0.002
05:00 AM - 06:00 AM	0.005	0.004	0.002	0.010	0.003	0.004	0.002
06:00 AM - 07:00 AM	0.004	0.003	0.002	0.006	0.003	0.003	0.002
07:00 AM - 08:00 AM	0.003	0.002	0.001	0.003	0.007	0.006	0.005
08:00 AM - 09:00 AM	0.003	0.002	0.002	0.005	0.005	0.006	0.004
09:00 AM - 10:00 AM	0.004	0.002	0.008	0.004	0.004	0.006	0.005
Average	0.003	0.004	0.003	0.004	0.004	0.005	0.004
1hr - Maximum	0.006	0.010	0.008	0.010	0.008	0.007	0.007
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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Approved by

Orawan R.
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6403-74/EMAIL

S:\Report\Air Son\Nok.rpt (6:19PM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, B



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 : CLIP 4

Lot ID: 23106004
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2796532-1

Page 1 of 1

Sample Description	Air Quality						
Location	บ้านนาหินลาด (GPS 47P 0728262, 1403382)						
Parameter	Sulfur Dioxide (ppm)						
Measurement Date	Sep 19, 2023 - Sep 26, 2023						
Measurement by	Anurak Tongkhajonsakda						
	23106004-8	23106004-9	23106004-10	23106004-11	23106004-12	23106004-13	23106004-14
Time	Sep 19, 2023	Sep 20, 2023	Sep 21, 2023	Sep 22, 2023	Sep 23, 2023	Sep 24, 2023	Sep 25, 2023
11:00 AM - 12:00 PM	0.002	<0.001	0.001	<0.001	<0.001	0.001	0.001
12:00 PM - 01:00 PM	0.002	<0.001	<0.001	<0.001	0.001	<0.001	0.001
01:00 PM - 02:00 PM	0.002	<0.001	0.001	<0.001	<0.001	<0.001	0.001
02:00 PM - 03:00 PM	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001
03:00 PM - 04:00 PM	<0.001	0.001	0.001	<0.001	<0.001	<0.001	0.001
04:00 PM - 05:00 PM	<0.001	<0.001	0.001	<0.001	<0.001	0.001	0.001
05:00 PM - 06:00 PM	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
06:00 PM - 07:00 PM	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
07:00 PM - 08:00 PM	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001
08:00 PM - 09:00 PM	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001
09:00 PM - 10:00 PM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
10:00 PM - 11:00 PM	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001
11:00 PM - 12:00 AM	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001
12:00 AM - 01:00 AM	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001
01:00 AM - 02:00 AM	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001
02:00 AM - 03:00 AM	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001
03:00 AM - 04:00 AM	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001
04:00 AM - 05:00 AM	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001
05:00 AM - 06:00 AM	0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001
06:00 AM - 07:00 AM	0.001	0.001	<0.001	0.001	0.001	0.001	0.001
07:00 AM - 08:00 AM	0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001
08:00 AM - 09:00 AM	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001
09:00 AM - 10:00 AM	<0.001	<0.001	<0.001	0.001	0.001	0.001	0.001
10:00 AM - 11:00 AM	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.002
Average	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001
1hr - Maximum	0.002	0.001	0.001	0.001	0.001	0.001	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 SON\Or.rpt (6/22PM)



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 : CLIP 4

Lot ID: 23106004
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2796533-1

Page 1 of 1

Sample Description	Air Quality						
Location	บ้านนาหินลาด (GPS 47P 0730055, 1409674)						
Parameter	Sulfur Dioxide (ppm)						
Measurement Date	Sep 19, 2023 - Sep 26, 2023						
Measurement by	Anurak Tongkhajonsakda						
	23106004-15	23106004-16	23106004-17	23106004-18	23106004-19	23106004-20	23106004-21
Time	Sep 19, 2023	Sep 20, 2023	Sep 21, 2023	Sep 22, 2023	Sep 23, 2023	Sep 24, 2023	Sep 25, 2023
01:00 PM - 02:00 PM	0.003	0.003	0.004	0.003	0.004	0.003	0.002
02:00 PM - 03:00 PM	0.002	0.002	0.004	0.003	0.003	0.003	0.003
03:00 PM - 04:00 PM	0.002	0.002	0.004	0.003	0.003	0.003	0.002
04:00 PM - 05:00 PM	0.002	0.002	0.004	0.003	0.003	0.003	0.002
05:00 PM - 06:00 PM	0.002	0.006	0.004	0.003	0.003	0.003	0.002
06:00 PM - 07:00 PM	0.003	0.005	0.004	0.003	0.003	0.003	0.002
07:00 PM - 08:00 PM	0.003	0.005	0.004	0.003	0.003	0.003	0.002
08:00 PM - 09:00 PM	0.003	0.004	0.004	0.003	0.003	0.003	0.003
09:00 PM - 10:00 PM	0.003	0.004	0.004	0.003	0.003	0.003	0.003
10:00 PM - 11:00 PM	0.003	0.004	0.004	0.003	0.004	0.002	0.003
11:00 PM - 12:00 AM	0.003	0.004	0.003	0.003	0.003	0.002	0.003
12:00 AM - 01:00 AM	0.002	0.005	0.003	0.003	0.003	0.003	0.003
01:00 AM - 02:00 AM	0.002	0.004	0.003	0.003	0.003	0.003	0.003
02:00 AM - 03:00 AM	0.002	0.004	0.003	0.003	0.003	0.003	0.003
03:00 AM - 04:00 AM	0.002	0.004	0.003	0.003	0.003	0.003	0.003
04:00 AM - 05:00 AM	0.002	0.004	0.003	0.003	0.003	0.003	0.002
05:00 AM - 06:00 AM	0.002	0.004	0.003	0.003	0.003	0.003	0.002
06:00 AM - 07:00 AM	0.002	0.004	0.004	0.003	0.003	0.003	0.002
07:00 AM - 08:00 AM	0.002	0.004	0.003	0.003	0.003	0.003	0.002
08:00 AM - 09:00 AM	0.002	0.004	0.003	0.003	0.003	0.003	0.003
09:00 AM - 10:00 AM	0.002	0.004	0.003	0.003	0.003	0.003	0.002
10:00 AM - 11:00 AM	0.002	0.004	0.003	0.003	0.003	0.003	0.002
11:00 AM - 12:00 PM	0.002	0.004	0.003	0.003	0.003	0.003	0.002
12:00 PM - 01:00 PM	0.002	0.004	0.003	0.003	0.003	0.003	0.002
Average	0.003	0.004	0.003	0.003	0.003	0.003	0.003
1hr - Maximum	0.003	0.006	0.004	0.003	0.004	0.003	0.003
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 SON\Or.rpt (6/22PM)



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 : CLIP 4

Lot ID: 23106004
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2796534-1

Page 1 of 1

Sample Description	Air Quality							
Location	บ้านนาหินลาด (GPS 47P 0730821, 1407374)							
Parameter	Sulfur Dioxide (ppm)							
Measurement Date	Sep 19, 2023 - Sep 26, 2023							
Measurement by	Anurak Tongkhajonsakda							
	23106004-22	23106004-23	23106004-24	23106004-25	23106004-26	23106004-27	23106004-28	
Time	Sep 19, 2023	Sep 20, 2023	Sep 21, 2023	Sep 22, 2023	Sep 23, 2023	Sep 24, 2023	Sep 25, 2023	
10:00 AM - 11:00 AM	0.001	0.001	0.002	0.001	0.001	0.001	0.001	
11:00 AM - 12:00 PM	0.001	0.001	0.002	0.001	0.001	0.001	0.001	
12:00 PM - 01:00 PM	0.001	0.001	0.002	0.001	0.001	0.001	0.001	
01:00 PM - 02:00 PM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
02:00 PM - 03:00 PM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
03:00 PM - 04:00 PM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
04:00 PM - 05:00 PM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
05:00 PM - 06:00 PM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
06:00 PM - 07:00 PM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
07:00 PM - 08:00 PM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
08:00 PM - 09:00 PM	0.001	0.001	0.001	0.001	0.001	0.001	0.002	
09:00 PM - 10:00 PM	0.001	0.001	0.001	0.001	0.001	0.001	0.002	
10:00 PM - 11:00 PM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
11:00 PM - 12:00 AM	0.001	0.001	0.001	0.001	0.001	0.001	0.002	
12:00 AM - 01:00 AM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
01:00 AM - 02:00 AM	0.001	0.002	0.001	0.001	0.001	0.001	0.002	
02:00 AM - 03:00 AM	0.001	0.002	0.001	0.001	0.001	0.001	0.001	
03:00 AM - 04:00 AM	0.001	0.002	0.001	0.001	0.001	0.001	0.001	
04:00 AM - 05:00 AM	0.001	0.001	0.001	0.001	0.001	0.001	0.002	
05:00 AM - 06:00 AM	0.001	0.002	0.001	0.001	0.001	0.002	0.002	
06:00 AM - 07:00 AM	0.001	0.002	0.001	0.001	0.001	0.001	0.001	
07:00 AM - 08:00 AM	0.001	0.002	0.001	0.001	0.001	0.001	0.001	
08:00 AM - 09:00 AM	0.001	0.002	0.001	0.001	0.001	0.001	0.001	
09:00 AM - 10:00 AM	0.001	0.002	0.001	0.001	0.001	0.001	0.001	
Average	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
1hr - Maximum	0.001	0.002	0.002	0.001	0.001	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							



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 : CLUP 4

Lot ID: 23106006
Date Received : Sep 27, 2023
Date Reported : Oct 02, 2023
Report Number: 2771256-2

Page 1 of 1

Sample Description Air Quality
Location บ้านนาโพธิ์ (GPS 47P 0728262, 1403382)
Date Analysis Commenced Sep 28, 2023
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/m3)	Particulate Matter (PM-10) (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
23106006-8	Sep 19 - Sep 20, 2023	0.056	0.027	757	32
23106006-9	Sep 20 - Sep 21, 2023	0.037	0.018	757	33
23106006-10	Sep 21 - Sep 22, 2023	0.029	0.014	757	32
23106006-11	Sep 22 - Sep 23, 2023	0.036	0.018	757	32
23106006-12	Sep 23 - Sep 24, 2023	0.020	0.010	757	32
23106006-13	Sep 24 - Sep 25, 2023	0.023	0.013	757	32
23106006-14	Sep 25 - Sep 26, 2023	0.032	0.016	757	32
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 : Anurak Tongkhajonsakda

Remark :

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

Approved by

Thanitak.

Thanita Kulsunwong
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 : DA41002956
Project Name : Monitoring
Project Location : CLUP 4

Lot ID: 23106006
Date Received : Sep 27, 2023
Date Reported : Oct 02, 2023
Report Number: 2771256-3

Page 1 of 1

Sample Description Air Quality
Location บ้านนาโพธิ์ (GPS 47P 0730055, 1409674)
Date Analysis Commenced Sep 28, 2023
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/m3)	Particulate Matter (PM-10) (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
23106006-15	Sep 19 - Sep 20, 2023	0.092	0.036	757	32
23106006-16	Sep 20 - Sep 21, 2023	0.047	0.024	757	33
23106006-17	Sep 21 - Sep 22, 2023	0.027	0.019	757	32
23106006-18	Sep 22 - Sep 23, 2023	0.090	0.032	757	32
23106006-19	Sep 23 - Sep 24, 2023	0.067	0.027	757	32
23106006-20	Sep 24 - Sep 25, 2023	0.053	0.022	757	32
23106006-21	Sep 25 - Sep 26, 2023	0.063	0.028	757	32
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 : Anurak Tongkhajonsakda

Remark :

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

Approved by

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Scientist (4)

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6403-74 / ENGL

S:\Report\Air Ambient\7Days.rpt (4:59PM)



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 : CLUP 4

Lot ID: 23106006
Date Received : Sep 27, 2023
Date Reported : Oct 02, 2023
Report Number: 2771256-4

Page 1 of 1

Sample Description Air Quality
Location บ้านนาโพธิ์ (GPS 47P 0730821, 1407374)
Date Analysis Commenced Sep 28, 2023
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/m3)	Particulate Matter (PM-10) (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
23106006-22	Sep 19 - Sep 20, 2023	0.040	0.035	757	32
23106006-23	Sep 20 - Sep 21, 2023	0.034	0.020	757	33
23106006-24	Sep 21 - Sep 22, 2023	0.025	0.015	757	32
23106006-25	Sep 22 - Sep 23, 2023	0.068	0.034	757	32
23106006-26	Sep 23 - Sep 24, 2023	0.058	0.029	757	32
23106006-27	Sep 24 - Sep 25, 2023	0.031	0.017	757	32
23106006-28	Sep 25 - Sep 26, 2023	0.042	0.024	757	32
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 : Anurak Tongkhajonsakda

Remark :

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

Approved by

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Scientist (4)

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6403-74 / ENGL

S:\Report\Air Ambient\7Days.rpt (5:00PM)



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 : CLUP 4

Lot ID: 23106005
Date Received : Sep 27, 2023
Date Reported : Oct 04, 2023
Report Number: 2771253-1

Page 1 of 2

Sample Number 23106005-1 to 7
Parameter Wind Speed / Wind Direction
Location บ้านนาโพธิ์ (GPS 47P 0726443, 1407365)
Sampling Date Sep 19 - Sep 26, 2023
Sampling by Anurak Tongkhajonsakda

Time	Sep 19 - Sep 20, 2023		Sep 20 - Sep 21, 2023		Sep 21 - Sep 22, 2023		Sep 22 - Sep 23, 2023		Sep 23 - Sep 24, 2023		Sep 24 - Sep 25, 2023		Sep 25 - Sep 26, 2023								
	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)							
12:00 PM - 01:00 PM	1.6	197.0	SSW	1.8	220.0	SW	2.8	259.0	W	0.1	-	-	1.2	249.0	WSW	1.7	264.0	W	0.5	24.0	NNE
01:00 PM - 02:00 PM	1.0	182.0	S	1.3	194.0	SSW	1.0	39.0	NE	1.0	151.0	SSE	0.5	148.0	SSE	0.0	-	-	0.0	-	-
02:00 PM - 03:00 PM	0.3	187.0	S	0.6	234.0	SW	1.2	10.0	N	0.5	170.0	S	0.0	-	-	0.0	-	-	0.0	-	-
03:00 PM - 04:00 PM	1.7	249.0	WSW	0.3	44.0	NE	0.0	-	-	0.4	228.0	SW	0.0	-	-	0.0	-	-	0.0	-	-
04:00 PM - 05:00 PM	0.8	217.0	SW	0.5	30.0	NNE	0.0	-	-	0.6	243.0	WSW	0.0	-	-	0.0	-	-	0.0	-	-
05:00 PM - 06:00 PM	0.1	-	-	0.0	-	-	1.1	59.0	ENE	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-
06:00 PM - 07:00 PM	0.9	344.0	NNW	0.3	359.0	N	1.7	95.0	E	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-
07:00 PM - 08:00 PM	0.1	-	-	0.6	354.0	N	0.6	46.0	NE	0.0	-	-	0.0	-	-	0.0	-	-	0.1	-	-
08:00 PM - 09:00 PM	0.3	343.0	NNW	0.2	-	-	0.5	112.0	ESE	0.0	-	-	0.0	-	-	0.0	-	-	0.2	-	-
09:00 PM - 10:00 PM	0.0	-	-	0.0	-	-	0.4	1.0	N	0.0	-	-	0.0	-	-	0.0	-	-	0.2	-	-
10:00 PM - 11:00 PM	0.0	-	-	1.7	301.0	WNW	0.5	334.0	NNW	0.0	-	-	0.0	-	-	0.0	-	-	0.3	337.0	NNW
11:00 PM - 12:00 AM	0.2	-	-	1.8	307.0	NNW	0.8	286.0	WNW	0.0	-	-	0.2	-	-	0.0	-	-	0.0	-	-
12:00 AM - 01:00 AM	0.0	-	-	0.4	292.0	WNW	0.6	281.0	W	0.0	-	-	0.1	-	-	0.0	-	-	0.0	-	-
01:00 AM - 02:00 AM	0.2	-	-	0.4	326.0	NW	0.1	-	-	0.0	-	-	0.1	-	-	0.0	-	-	1.6	296.0	WNW
02:00 AM - 03:00 AM	0.0	-	-	1.4	292.0	NNW	1.5	280.0	W	0.0	-	-	1.2	291.0	WNW	0.0	-	-	1.2	295.0	WNW
03:00 AM - 04:00 AM	0.3	290.0	WNW	0.2	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-
04:00 AM - 05:00 AM	0.0	-	-	0.8	24.0	NNE	0.4	14.0	NNE	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-
05:00 AM - 06:00 AM	0.5	3.0	N	0.0	-	-	0.4	14.0	NNE	0.5	13.0	NNE	0.0	-	-	0.2	-	-	0.0	-	-
06:00 AM - 07:00 AM	0.7	325.0	NW	0.5	7.0	N	0.2	-	-	0.0	-	-	0.0	-	-	0.3	348.0	NNW	0.0	-	-
07:00 AM - 08:00 AM	0.2	-	-	0.1	-	-	0.6	21.0	NNE	0.0	-	-	0.0	-	-	0.1	-	-	0.3	288.0	WNW
08:00 AM - 09:00 AM	1.7	10.0	N	0.8	21.0	NNE	0.6	261.0	W	0.0	-	-	0.0	-	-	1.0	140.0	SE	0.0	-	-
09:00 AM - 10:00 AM	0.4	331.0	NNW	2.1	356.0	N	1.4	256.0	WSW	0.0	-	-	0.0	-	-	1.3	250.0	WSW	0.0	-	-
10:00 AM - 11:00 AM	0.6	288.0	NNW	0.2	-	-	2.1	283.0	WNW	0.0	-	-	0.0	-	-	0.6	174.0	S	0.0	-	-
11:00 AM - 12:00 PM	0.3	327.0	NNW	0.1	-	-	0.7	235.0	SW	2.1	213.0	SSW	0.0	-	-	0.0	-	-	0.0	-	-

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

Approved by

Saruyuth Jitranant

Saruyuth Jitranant
Assistant General Manager

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6403-74 / ENGL



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: 23106005
Date Received : Sep 27, 2023
Date Reported : Oct 04, 2023
Report Number : 2771253-1

Page 2 of 2

Wind Rose



Date : Sep 19-20, 2023



Date : Sep 20-21, 2023



Date : Sep 21-22, 2023



Date : Sep 22-23, 2023



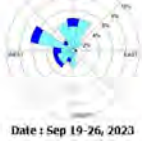
Date : Sep 23-24, 2023



Date : Sep 24-25, 2023



Date : Sep 25-26, 2023



Date : Sep 26-27, 2023

WS(m/s)	%
> 10.0	0.00
8.0-10.0	0.00
5.5-8.0	0.00
3.3-5.5	0.00
1.7-3.3	6.30
0.3-1.7	33.93
Calm	59.52

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Approved by

Sarayu Thirant
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 : DA41002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 23106021
Date Received : Sep 22, 2023
Date Reported : Sep 29, 2023
Report Number : 2771271-2

Page 1 of 1

Sample Number : 23106021-1
Sampled Date : Sep 22, 2023
Sample Description : Emission from Stationary Source
Location : HRSs 1
Date Analysis Commenced : Sep 22, 2023
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	760	mmHg	Diameter	3.30	m
Ambient Temperature	32.0	°C	Shape	Circle	
Type of Process	Combustion		Stack Temperature	141	°C
Type of Fuel	Natural Gas		Moisture	9.51	%
			Flow Rate (Actual O2)		406531 Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 % O ₂	Result at 13.4 % O ₂	Method	Testing Location
Air Testing								
Ammonia	11:15 AM - 11:45 AM	ppm	-	0.02	1.31	0.71	In-house method based on Method of Air Sampling and Analysis, 401	Rayong

Sampled By : Supot Salamteh

Remark :

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

Approved by

Thanitak

Thanita Kulsuriwong
Scientist (4)

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S:\Reports_Air_Stack_O2_NGL.rpt (1:53PM)



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: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number : 2791235-1

Page 1 of 1

Sample Number : 23106009-1
Parameter : Noise (Leq 24 hrs)
Location : บริเวณพื้นที่โรงงานพัฒนาโรงโหลก (GPS 47P 0727958, 1405412)
Measurement Date : Sep 19 - Sep 20, 2023
Measurement by : Anurak Tongkhajonsakda
Sound Level meter : Serial No. 900074

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	62.4	92.5	47.3
11:00 AM - 12:00 PM	63.6	76.6	51.1
12:00 PM - 01:00 PM	53.9	73.3	48.8
01:00 PM - 02:00 PM	53.5	73.8	48.0
02:00 PM - 03:00 PM	50.7	69.1	47.6
03:00 PM - 04:00 PM	55.9	79.8	48.3
04:00 PM - 05:00 PM	54.5	71.2	48.3
05:00 PM - 06:00 PM	54.9	78.0	49.1
06:00 PM - 07:00 PM	52.0	69.4	49.6
07:00 PM - 08:00 PM	50.3	67.7	49.1
08:00 PM - 09:00 PM	51.4	71.8	48.6
09:00 PM - 10:00 PM	50.4	64.0	48.7
10:00 PM - 11:00 PM	51.5	69.9	50.0
11:00 PM - 12:00 AM	50.0	54.8	48.6
12:00 AM - 01:00 AM	49.1	62.8	48.1
01:00 AM - 02:00 AM	50.2	60.3	49.0
02:00 AM - 03:00 AM	51.3	58.1	49.9
03:00 AM - 04:00 AM	50.5	56.5	49.7
04:00 AM - 05:00 AM	53.2	72.0	48.4
05:00 AM - 06:00 AM	59.1	85.4	48.2
06:00 AM - 07:00 AM	56.7	82.9	47.7
07:00 AM - 08:00 AM	54.2	73.2	48.0
08:00 AM - 09:00 AM	53.4	74.5	46.9
09:00 AM - 10:00 AM	54.4	75.9	46.2

Leq Average 24 hrs. (dB(A))

Lmax (dB(A))

L90 (dB(A))

Ldn (dB(A))

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทย เรื่อง ค่าระดับเสียง (พ.ศ. 2540) และกำหนดมาตรฐานการประเมินเสียงในชุมชน
2. ประกาศกระทรวงมหาดไทย เรื่อง กำหนดค่าระดับเสียงในชุมชน และระดับเสียงในลักษณะการประเมินเสียงในชุมชน พ.ศ. 2548

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

Technical Management

Thanitak

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S

Supot Salamteh
Section Head

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S:\Reports_Air_Noise.rpt (10:11AM)



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: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number : 2791236-1

Page 1 of 1

Sample Number : 23106009-2
Parameter : Noise (Leq 24 hrs)
Location : บริเวณพื้นที่โรงงานพัฒนาโรงโหลก (GPS 47P 0727958, 1405412)
Measurement Date : Sep 20 - Sep 21, 2023
Measurement by : Anurak Tongkhajonsakda
Sound Level meter : Serial No. 900074

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	55.0	75.3	47.7
11:00 AM - 12:00 PM	64.9	94.0	50.2
12:00 PM - 01:00 PM	79.3	107.1	65.0
01:00 PM - 02:00 PM	62.1	81.5	54.9
02:00 PM - 03:00 PM	60.0	76.0	52.8
03:00 PM - 04:00 PM	65.0	91.7	51.1
04:00 PM - 05:00 PM	55.7	75.0	50.4
05:00 PM - 06:00 PM	56.6	76.0	50.7
06:00 PM - 07:00 PM	52.7	70.7	49.4
07:00 PM - 08:00 PM	51.5	72.2	49.5
08:00 PM - 09:00 PM	52.3	69.4	49.9
09:00 PM - 10:00 PM	52.5	72.6	50.6
10:00 PM - 11:00 PM	52.3	69.3	50.4
11:00 PM - 12:00 AM	51.5	69.1	49.8
12:00 AM - 01:00 AM	50.4	56.0	49.4
01:00 AM - 02:00 AM	51.3	71.0	49.6
02:00 AM - 03:00 AM	49.4	52.9	48.5
03:00 AM - 04:00 AM	49.1	57.3	47.9
04:00 AM - 05:00 AM	53.3	76.0	48.9
05:00 AM - 06:00 AM	56.3	85.4	48.2
06:00 AM - 07:00 AM	56.3	80.0	49.5
07:00 AM - 08:00 AM	54.9	73.6	48.0
08:00 AM - 09:00 AM	55.3	74.3	47.3
09:00 AM - 10:00 AM	54.8	76.5	46.8

Leq Average 24 hrs. (dB(A))

Lmax (dB(A))

L90 (dB(A))

Ldn (dB(A))

Standard (dB(A))

70

115

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศกระทรวงมหาดไทย เรื่อง ค่าระดับเสียง (พ.ศ. 2540) และกำหนดมาตรฐานการประเมินเสียงในชุมชน
2. ประกาศกระทรวงมหาดไทย เรื่อง กำหนดค่าระดับเสียงในชุมชน และระดับเสียงในลักษณะการประเมินเสียงในชุมชน พ.ศ. 2548

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

Technical Management

Thanitak

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S

Supot Salamteh
Section Head

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S:\Reports_Air_Noise.rpt (10:11AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : 041002956
Project Name : Monitoring
Project Location : CUP 4



TESTING
No.0042
Lot ID: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2791237-1

Page 1 of 1

Sample Number : 23106009-3
Parameter : Noise (Leq 24 hrs)
Location : บริเวณพื้นที่โรงงานด้านทางใต้โครงการ (GPS 47P 0727958, 1405412)
Measurement Date : Sep 21 - Sep 22, 2023
Measurement by : Anurak Tongkhajonsakda
Sound Level meter : Serial No. 900074

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	52.2	69.2	47.0
11:00 AM - 12:00 PM	53.6	70.1	48.1
12:00 PM - 01:00 PM	72.3	100.2	48.6
01:00 PM - 02:00 PM	68.0	88.9	54.2
02:00 PM - 03:00 PM	53.7	74.0	47.9
03:00 PM - 04:00 PM	55.5	78.2	47.7
04:00 PM - 05:00 PM	57.8	74.8	49.0
05:00 PM - 06:00 PM	58.2	77.3	50.1
06:00 PM - 07:00 PM	58.3	75.6	53.6
07:00 PM - 08:00 PM	52.6	56.3	51.5
08:00 PM - 09:00 PM	53.4	70.9	51.7
09:00 PM - 10:00 PM	52.0	59.0	51.1
10:00 PM - 11:00 PM	52.7	75.1	50.5
11:00 PM - 12:00 AM	51.5	64.5	50.4
12:00 AM - 01:00 AM	51.0	60.7	49.9
01:00 AM - 02:00 AM	51.6	60.5	49.4
02:00 AM - 03:00 AM	49.2	57.4	48.1
03:00 AM - 04:00 AM	49.3	63.5	48.0
04:00 AM - 05:00 AM	51.8	70.2	48.7
05:00 AM - 06:00 AM	55.7	76.5	48.8
06:00 AM - 07:00 AM	55.7	77.1	47.6
07:00 AM - 08:00 AM	53.9	71.1	47.6
08:00 AM - 09:00 AM	53.4	73.6	46.7
09:00 AM - 10:00 AM	52.5	73.9	46.6

Leq Average 24 hrs. (dB(A)) : 60.8
Lmax (dB(A)) : 100.2
L90 (dB(A)) : 48.7
Ldn (dB(A)) : 62.6
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานสิ่งแวดล้อมในทาง
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการจราจร และระดับเสียงที่เฝ้าระวังการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanitak.
Thanita Kulsuriwong
Scientist (4)

Approved by

Supt S
Supt Salameh
Section Head

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S:\Reports_Air Noise.rpt (10:11AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : 041002956
Project Name : Monitoring
Project Location : CUP 4



TESTING
No.0042
Lot ID: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2791238-1

Page 1 of 1

Sample Number : 23106009-4
Parameter : Noise (Leq 24 hrs)
Location : บริเวณพื้นที่โรงงานด้านทางใต้โครงการ (GPS 47P 0727958, 1405412)
Measurement Date : Sep 22 - Sep 23, 2023
Measurement by : Anurak Tongkhajonsakda
Sound Level meter : Serial No. 900074

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	53.2	79.6	46.1
11:00 AM - 12:00 PM	53.3	76.2	47.0
12:00 PM - 01:00 PM	53.7	75.4	47.7
01:00 PM - 02:00 PM	53.9	74.7	48.0
02:00 PM - 03:00 PM	52.9	75.5	48.2
03:00 PM - 04:00 PM	53.4	75.9	48.6
04:00 PM - 05:00 PM	54.5	81.4	48.9
05:00 PM - 06:00 PM	54.2	75.1	49.3
06:00 PM - 07:00 PM	54.6	73.1	49.8
07:00 PM - 08:00 PM	52.9	75.9	48.8
08:00 PM - 09:00 PM	50.9	75.7	49.3
09:00 PM - 10:00 PM	51.6	84.1	48.8
10:00 PM - 11:00 PM	50.8	71.3	48.9
11:00 PM - 12:00 AM	50.9	76.7	48.9
12:00 AM - 01:00 AM	50.7	76.6	49.0
01:00 AM - 02:00 AM	50.6	64.3	49.3
02:00 AM - 03:00 AM	50.2	65.7	49.0
03:00 AM - 04:00 AM	50.2	60.7	48.9
04:00 AM - 05:00 AM	51.9	74.1	49.7
05:00 AM - 06:00 AM	54.6	74.6	48.7
06:00 AM - 07:00 AM	57.4	87.0	48.2
07:00 AM - 08:00 AM	52.3	71.4	47.3
08:00 AM - 09:00 AM	52.4	72.5	48.3
09:00 AM - 10:00 AM	53.5	72.3	47.9

Leq Average 24 hrs. (dB(A)) : 53.1
Lmax (dB(A)) : 87.0
L90 (dB(A)) : 48.8
Ldn (dB(A)) : 59.2
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานสิ่งแวดล้อมในทาง
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการจราจร และระดับเสียงที่เฝ้าระวังการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanitak.
Thanita Kulsuriwong
Scientist (4)

Approved by

Supt S
Supt Salameh
Section Head

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S:\Reports_Air Noise.rpt (10:12AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : 041002956
Project Name : Monitoring
Project Location : CUP 4



TESTING
No.0042
Lot ID: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2791239-1

Page 1 of 1

Sample Number : 23106009-5
Parameter : Noise (Leq 24 hrs)
Location : บริเวณพื้นที่โรงงานด้านทางใต้โครงการ (GPS 47P 0727958, 1405412)
Measurement Date : Sep 23 - Sep 24, 2023
Measurement by : Anurak Tongkhajonsakda
Sound Level meter : Serial No. 900074

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	53.0	74.0	48.1
11:00 AM - 12:00 PM	50.3	69.4	47.2
12:00 PM - 01:00 PM	51.6	74.4	48.4
01:00 PM - 02:00 PM	51.7	69.9	48.9
02:00 PM - 03:00 PM	54.3	74.1	49.1
03:00 PM - 04:00 PM	52.9	74.1	49.4
04:00 PM - 05:00 PM	53.8	76.1	49.2
05:00 PM - 06:00 PM	55.6	76.5	50.0
06:00 PM - 07:00 PM	56.3	78.7	50.3
07:00 PM - 08:00 PM	50.3	70.3	48.6
08:00 PM - 09:00 PM	50.5	70.5	48.0
09:00 PM - 10:00 PM	51.4	67.3	49.7
10:00 PM - 11:00 PM	52.5	75.4	49.6
11:00 PM - 12:00 AM	52.1	75.1	49.6
12:00 AM - 01:00 AM	51.5	62.4	50.5
01:00 AM - 02:00 AM	51.5	74.9	50.1
02:00 AM - 03:00 AM	50.1	58.8	48.9
03:00 AM - 04:00 AM	50.6	67.4	49.5
04:00 AM - 05:00 AM	52.6	76.1	50.7
05:00 AM - 06:00 AM	54.9	74.0	50.7
06:00 AM - 07:00 AM	56.4	84.7	48.9
07:00 AM - 08:00 AM	51.5	72.3	46.8
08:00 AM - 09:00 AM	52.4	78.9	47.4
09:00 AM - 10:00 AM	52.1	74.5	46.6

Leq Average 24 hrs. (dB(A)) : 52.9
Lmax (dB(A)) : 84.7
L90 (dB(A)) : 49.1
Ldn (dB(A)) : 59.3
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานสิ่งแวดล้อมในทาง
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการจราจร และระดับเสียงที่เฝ้าระวังการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanitak.
Thanita Kulsuriwong
Scientist (4)

Approved by

Supt S
Supt Salameh
Section Head

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S:\Reports_Air Noise.rpt (10:12AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : 041002956
Project Name : Monitoring
Project Location : CUP 4



TESTING
No.0042
Lot ID: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2791240-1

Page 1 of 1

Sample Number : 23106009-6
Parameter : Noise (Leq 24 hrs)
Location : บริเวณพื้นที่โรงงานด้านทางใต้โครงการ (GPS 47P 0727958, 1405412)
Measurement Date : Sep 24 - Sep 25, 2023
Measurement by : Anurak Tongkhajonsakda
Sound Level meter : Serial No. 900074

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	50.0	77.2	47.3
11:00 AM - 12:00 PM	51.4	71.8	47.8
12:00 PM - 01:00 PM	62.7	76.8	48.2
01:00 PM - 02:00 PM	54.9	87.9	49.2
02:00 PM - 03:00 PM	51.9	71.4	48.0
03:00 PM - 04:00 PM	51.5	79.0	48.8
04:00 PM - 05:00 PM	50.4	72.6	48.6
05:00 PM - 06:00 PM	53.0	76.4	46.7
06:00 PM - 07:00 PM	54.3	81.1	47.5
07:00 PM - 08:00 PM	51.4	68.8	48.7
08:00 PM - 09:00 PM	51.9	73.4	49.1
09:00 PM - 10:00 PM	53.5	79.1	49.3
10:00 PM - 11:00 PM	52.4	81.9	49.3
11:00 PM - 12:00 AM	51.7	77.0	48.9
12:00 AM - 01:00 AM	50.4	67.0	49.4
01:00 AM - 02:00 AM	50.6	66.6	49.5
02:00 AM - 03:00 AM	51.9	78.2	50.3
03:00 AM - 04:00 AM	51.3	55.6	50.3
04:00 AM - 05:00 AM	52.4	73.3	50.8
05:00 AM - 06:00 AM	54.9	75.0	51.4
06:00 AM - 07:00 AM	55.6	79.5	48.4
07:00 AM - 08:00 AM	56.4	86.8	46.8
08:00 AM - 09:00 AM	53.9	78.5	47.1
09:00 AM - 10:00 AM	56.0	85.6	47.6

Leq Average 24 hrs. (dB(A)) : 54.4
Lmax (dB(A)) : 87.9
L90 (dB(A)) : 48.7
Ldn (dB(A)) : 59.6
Standard (dB(A)) : 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานสิ่งแวดล้อมในทาง
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการจราจร และระดับเสียงที่เฝ้าระวังการประกอบกิจการ
โรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanitak.
Thanita Kulsuriwong
Scientist (4)

Approved by

Supt S
Supt Salameh
Section Head

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S:\Reports_Air Noise.rpt (10:12AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : 041002956
Project Name : Monitoring
Project Location : CUP 4



Lot ID: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2791241-1

Page 1 of 1

Sample Number 23106009-7
Parameter Noise (Leq 24 hrs)
Location บ้านป่าต้นมะพร้าว (GPS 47P 0727958, 1405412)
Measurement Date Sep 25 - Sep 26, 2023
Measurement by Anurak Tongkhajonsakda
Sound Level meter Serial No. 900074

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	61.4	90.7	49.1
11:00 AM - 12:00 PM	55.9	73.8	49.1
12:00 PM - 01:00 PM	54.7	78.5	48.9
01:00 PM - 02:00 PM	56.1	77.4	49.8
02:00 PM - 03:00 PM	65.1	90.1	51.5
03:00 PM - 04:00 PM	52.8	75.2	48.6
04:00 PM - 05:00 PM	55.6	79.7	48.8
05:00 PM - 06:00 PM	55.2	76.9	50.1
06:00 PM - 07:00 PM	54.6	77.3	50.0
07:00 PM - 08:00 PM	54.2	76.4	49.8
08:00 PM - 09:00 PM	52.7	74.2	49.7
09:00 PM - 10:00 PM	52.1	76.8	49.7
10:00 PM - 11:00 PM	52.0	74.1	50.3
11:00 PM - 12:00 AM	52.4	76.1	49.7
12:00 AM - 01:00 AM	51.0	73.8	49.3
01:00 AM - 02:00 AM	49.2	68.0	48.0
02:00 AM - 03:00 AM	49.0	60.0	47.4
03:00 AM - 04:00 AM	50.5	63.4	49.6
04:00 AM - 05:00 AM	50.8	78.6	48.2
05:00 AM - 06:00 AM	53.5	74.3	48.4
06:00 AM - 07:00 AM	57.4	77.2	50.3
07:00 AM - 08:00 AM	63.2	78.7	53.0
08:00 AM - 09:00 AM	56.3	76.2	51.5
09:00 AM - 10:00 AM	57.8	80.0	49.4

Leq Average 24 hrs. (dB(A)) 57.1
Lmax (dB(A)) 90.7
L90 (dB(A)) 49.6
Ldn (dB(A)) 60.5
Standard (dB(A)) 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการขนถ่าย และระดับเสียงที่ปล่อยจากอุปกรณ์การขนถ่าย
โรงงา พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanitak.
Thanita Kulsuriwong
Scientist (4)

Approved by

Supt S
Supt Salameh
Section Head

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S:\Reports_Air Noise.rpt (10:12AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : 041002956
Project Name : Monitoring
Project Location : CUP 4



Lot ID: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2791242-1

Page 1 of 1

Sample Number 23106009-8
Parameter Noise (Leq 24 hrs)
Location บ้านป่าต้นมะพร้าว (GPS 47P 0728253, 1403369)
Measurement Date Sep 19 - Sep 20, 2023
Measurement by Anurak Tongkhajonsakda
Sound Level meter Serial No. 900073

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	48.8	85.9	43.0
11:00 AM - 12:00 PM	51.8	77.1	43.8
12:00 PM - 01:00 PM	60.4	74.6	45.7
01:00 PM - 02:00 PM	49.6	69.7	45.0
02:00 PM - 03:00 PM	48.6	80.1	44.6
03:00 PM - 04:00 PM	52.3	81.1	45.8
04:00 PM - 05:00 PM	51.6	79.0	44.9
05:00 PM - 06:00 PM	47.9	70.4	44.8
06:00 PM - 07:00 PM	47.7	60.1	45.0
07:00 PM - 08:00 PM	46.9	65.7	45.4
08:00 PM - 09:00 PM	48.9	80.8	45.1
09:00 PM - 10:00 PM	46.3	74.3	45.2
10:00 PM - 11:00 PM	47.7	74.1	45.3
11:00 PM - 12:00 AM	51.0	80.1	44.9
12:00 AM - 01:00 AM	51.6	79.4	44.7
01:00 AM - 02:00 AM	48.4	77.7	45.5
02:00 AM - 03:00 AM	45.8	63.5	44.1
03:00 AM - 04:00 AM	45.4	63.8	43.8
04:00 AM - 05:00 AM	50.3	87.5	43.8
05:00 AM - 06:00 AM	50.4	69.6	46.1
06:00 AM - 07:00 AM	49.8	62.2	44.6
07:00 AM - 08:00 AM	48.3	61.2	43.8
08:00 AM - 09:00 AM	46.4	66.6	43.1
09:00 AM - 10:00 AM	47.4	64.9	43.4

Leq Average 24 hrs. (dB(A)) 51.0
Lmax (dB(A)) 87.5
L90 (dB(A)) 44.8
Ldn (dB(A)) 56.2
Standard (dB(A)) 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการขนถ่าย และระดับเสียงที่ปล่อยจากอุปกรณ์การขนถ่าย
โรงงา พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanitak.
Thanita Kulsuriwong
Scientist (4)

Approved by

Supt S
Supt Salameh
Section Head

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S:\Reports_Air Noise.rpt (10:13AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : 041002956
Project Name : Monitoring
Project Location : CUP 4



Lot ID: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2791243-1

Page 1 of 1

Sample Number 23106009-9
Parameter Noise (Leq 24 hrs)
Location บ้านป่าต้นมะพร้าว (GPS 47P 0728253, 1403369)
Measurement Date Sep 20 - Sep 21, 2023
Measurement by Anurak Tongkhajonsakda
Sound Level meter Serial No. 900073

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	49.5	85.6	37.9
11:00 AM - 12:00 PM	50.7	77.1	45.1
12:00 PM - 01:00 PM	78.4	114.3	47.1
01:00 PM - 02:00 PM	75.0	104.0	50.4
02:00 PM - 03:00 PM	60.9	87.7	53.0
03:00 PM - 04:00 PM	61.8	94.9	49.2
04:00 PM - 05:00 PM	51.0	70.5	46.7
05:00 PM - 06:00 PM	48.5	60.2	46.1
06:00 PM - 07:00 PM	53.0	69.3	51.3
07:00 PM - 08:00 PM	53.2	72.4	51.9
08:00 PM - 09:00 PM	53.4	68.8	52.4
09:00 PM - 10:00 PM	53.4	64.7	52.0
10:00 PM - 11:00 PM	52.6	73.5	50.1
11:00 PM - 12:00 AM	51.8	77.7	49.0
12:00 AM - 01:00 AM	51.3	73.9	48.5
01:00 AM - 02:00 AM	53.0	69.7	48.4
02:00 AM - 03:00 AM	52.8	61.3	47.5
03:00 AM - 04:00 AM	54.8	61.2	47.3
04:00 AM - 05:00 AM	55.7	67.0	48.4
05:00 AM - 06:00 AM	52.1	71.9	47.0
06:00 AM - 07:00 AM	51.1	77.1	46.8
07:00 AM - 08:00 AM	47.8	68.0	43.9
08:00 AM - 09:00 AM	46.0	66.2	43.3
09:00 AM - 10:00 AM	47.5	67.4	43.3

Leq Average 24 hrs. (dB(A)) 66.5
Lmax (dB(A)) 114.3
L90 (dB(A)) 47.5
Ldn (dB(A)) 67.1
Standard (dB(A)) 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการขนถ่าย และระดับเสียงที่ปล่อยจากอุปกรณ์การขนถ่าย
โรงงา พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanitak.
Thanita Kulsuriwong
Scientist (4)

Approved by

Supt S
Supt Salameh
Section Head

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S:\Reports_Air Noise.rpt (10:13AM)



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : 041002956
Project Name : Monitoring
Project Location : CUP 4



Lot ID: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2791244-1

Page 1 of 1

Sample Number 23106009-10
Parameter Noise (Leq 24 hrs)
Location บ้านป่าต้นมะพร้าว (GPS 47P 0728253, 1403369)
Measurement Date Sep 21 - Sep 22, 2023
Measurement by Anurak Tongkhajonsakda
Sound Level meter Serial No. 900073

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	48.1	73.3	42.2
11:00 AM - 12:00 PM	47.6	65.3	43.1
12:00 PM - 01:00 PM	52.0	80.1	42.9
01:00 PM - 02:00 PM	69.4	92.0	50.5
02:00 PM - 03:00 PM	60.6	79.3	47.9
03:00 PM - 04:00 PM	51.5	70.6	48.4
04:00 PM - 05:00 PM	52.1	79.7	49.6
05:00 PM - 06:00 PM	56.3	88.2	52.2
06:00 PM - 07:00 PM	60.2	74.9	56.1
07:00 PM - 08:00 PM	58.9	63.4	56.8
08:00 PM - 09:00 PM	54.0	63.4	51.8
09:00 PM - 10:00 PM	53.3	63.6	50.7
10:00 PM - 11:00 PM	53.3	74.1	50.6
11:00 PM - 12:00 AM	59.4	97.8	50.2
12:00 AM - 01:00 AM	52.3	64.3	49.1
01:00 AM - 02:00 AM	52.5	60.1	49.1
02:00 AM - 03:00 AM	53.9	78.3	49.2
03:00 AM - 04:00 AM	51.9	59.8	47.6
04:00 AM - 05:00 AM	53.3	63.5	47.5
05:00 AM - 06:00 AM	49.8	70.8	46.5
06:00 AM - 07:00 AM	50.1	72.1	45.0
07:00 AM - 08:00 AM	47.2	69.5	43.3
08:00 AM - 09:00 AM	48.5	72.7	43.6
09:00 AM - 10:00 AM	48.6	75.5	42.8

Leq Average 24 hrs. (dB(A)) 58.1
Lmax (dB(A)) 97.8
L90 (dB(A)) 48.4
Ldn (dB(A)) 61.7
Standard (dB(A)) 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการขนถ่าย และระดับเสียงที่ปล่อยจากอุปกรณ์การขนถ่าย
โรงงา พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanitak.
Thanita Kulsuriwong
Scientist (4)

Approved by

Supt S
Supt Salameh
Section Head

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6403-74/ EMAIL

S:\Reports_Air Noise.rpt (10:13AM)



Analysis / Test Report



TESTING
No.0042

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : 0441002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2791245-1

Page 1 of 1

Sample Number 23106009-11
Parameter Noise (Leq 24 hrs)
Location บ้านป่าหินน้อย (GPS 47P 0728253, 1403369)
Measurement Date Sep 22 - Sep 23, 2023
Measurement by Anurak Tongkhajonsakda
Sound Level meter Serial No. 900073

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	46.2	67.5	42.9
11:00 AM - 12:00 PM	46.5	65.5	43.6
12:00 PM - 01:00 PM	45.6	65.6	43.3
01:00 PM - 02:00 PM	46.1	74.2	43.3
02:00 PM - 03:00 PM	47.8	77.5	43.6
03:00 PM - 04:00 PM	48.0	67.9	44.7
04:00 PM - 05:00 PM	47.8	75.8	44.6
05:00 PM - 06:00 PM	50.0	64.5	46.4
06:00 PM - 07:00 PM	51.6	64.6	49.5
07:00 PM - 08:00 PM	51.6	68.7	50.0
08:00 PM - 09:00 PM	50.1	72.7	48.7
09:00 PM - 10:00 PM	48.9	65.0	47.4
10:00 PM - 11:00 PM	49.0	80.0	46.2
11:00 PM - 12:00 AM	46.8	62.9	45.0
12:00 AM - 01:00 AM	47.0	63.1	45.9
01:00 AM - 02:00 AM	46.1	64.1	44.7
02:00 AM - 03:00 AM	47.8	71.5	45.0
03:00 AM - 04:00 AM	46.8	54.5	44.3
04:00 AM - 05:00 AM	46.4	60.3	43.6
05:00 AM - 06:00 AM	48.7	63.2	45.5
06:00 AM - 07:00 AM	49.0	72.9	45.2
07:00 AM - 08:00 AM	49.3	70.7	43.2
08:00 AM - 09:00 AM	47.0	71.9	42.9
09:00 AM - 10:00 AM	45.2	68.8	38.5

Leq Average 24 hrs. (dB(A)) 48.3
Lmax (dB(A)) 80.0
L90 (dB(A)) 44.7
Ldn (dB(A)) 54.2
Standard (dB(A)) 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานสิ่งแวดล้อมในทาง
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการจราจร และระดับเสียงที่ปลอดภัยจากผลกระทบจาก
จราจร พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanitak.
Thanita Kulsuriwong
Scientist (4)

Approved by

Supt S
Supot Salameth
Section Head

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6403-74/ EMAIL

S:Reports_Air Noise rpt (10:13AM)



Analysis / Test Report



TESTING
No.0042

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : 0441002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2791246-1

Page 1 of 1

Sample Number 23106009-12
Parameter Noise (Leq 24 hrs)
Location บ้านป่าหินน้อย (GPS 47P 0728253, 1403369)
Measurement Date Sep 23 - Sep 24, 2023
Measurement by Anurak Tongkhajonsakda
Sound Level meter Serial No. 900073

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	46.4	66.0	43.6
11:00 AM - 12:00 PM	46.1	67.2	43.3
12:00 PM - 01:00 PM	46.7	67.6	43.5
01:00 PM - 02:00 PM	47.8	70.6	44.5
02:00 PM - 03:00 PM	49.1	69.6	46.1
03:00 PM - 04:00 PM	50.3	72.1	46.1
04:00 PM - 05:00 PM	49.9	72.8	45.3
05:00 PM - 06:00 PM	48.4	65.9	45.7
06:00 PM - 07:00 PM	51.3	66.0	49.6
07:00 PM - 08:00 PM	49.5	68.2	47.8
08:00 PM - 09:00 PM	49.0	69.7	47.8
09:00 PM - 10:00 PM	49.6	73.0	46.5
10:00 PM - 11:00 PM	54.4	85.5	44.7
11:00 PM - 12:00 AM	47.9	80.1	45.5
12:00 AM - 01:00 AM	47.9	69.6	45.3
01:00 AM - 02:00 AM	45.2	68.0	43.2
02:00 AM - 03:00 AM	49.0	78.1	45.7
03:00 AM - 04:00 AM	45.9	61.1	44.0
04:00 AM - 05:00 AM	46.9	60.5	43.8
05:00 AM - 06:00 AM	50.7	69.2	45.5
06:00 AM - 07:00 AM	49.1	66.7	44.2
07:00 AM - 08:00 AM	49.3	65.9	45.8
08:00 AM - 09:00 AM	48.9	67.6	45.4
09:00 AM - 10:00 AM	49.6	70.7	45.4

Leq Average 24 hrs. (dB(A)) 49.2
Lmax (dB(A)) 85.5
L90 (dB(A)) 45.4
Ldn (dB(A)) 55.8
Standard (dB(A)) 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานสิ่งแวดล้อมในทาง
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการจราจร และระดับเสียงที่ปลอดภัยจากผลกระทบจาก
จราจร พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanitak.
Thanita Kulsuriwong
Scientist (4)

Approved by

Supt S
Supot Salameth
Section Head

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S:Reports_Air Noise rpt (10:13AM)



Analysis / Test Report



TESTING
No.0042

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : 0441002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2791247-1

Page 1 of 1

Sample Number 23106009-13
Parameter Noise (Leq 24 hrs)
Location บ้านป่าหินน้อย (GPS 47P 0728253, 1403369)
Measurement Date Sep 24 - Sep 25, 2023
Measurement by Anurak Tongkhajonsakda
Sound Level meter Serial No. 900073

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	48.4	73.4	45.7
11:00 AM - 12:00 PM	48.0	68.1	45.1
12:00 PM - 01:00 PM	59.4	87.0	47.0
01:00 PM - 02:00 PM	51.7	67.5	48.6
02:00 PM - 03:00 PM	50.2	65.0	47.2
03:00 PM - 04:00 PM	50.5	67.0	45.2
04:00 PM - 05:00 PM	49.1	69.5	44.7
05:00 PM - 06:00 PM	48.4	73.9	44.5
06:00 PM - 07:00 PM	49.1	66.4	47.4
07:00 PM - 08:00 PM	49.1	60.5	48.0
08:00 PM - 09:00 PM	47.4	64.9	45.6
09:00 PM - 10:00 PM	47.4	68.7	45.3
10:00 PM - 11:00 PM	52.4	87.7	44.8
11:00 PM - 12:00 AM	46.7	57.0	45.2
12:00 AM - 01:00 AM	47.1	52.6	45.5
01:00 AM - 02:00 AM	46.9	52.5	45.5
02:00 AM - 03:00 AM	46.6	53.6	45.6
03:00 AM - 04:00 AM	46.8	56.5	45.5
04:00 AM - 05:00 AM	47.3	63.8	44.6
05:00 AM - 06:00 AM	49.1	75.2	45.5
06:00 AM - 07:00 AM	49.9	70.0	45.5
07:00 AM - 08:00 AM	49.6	77.6	43.8
08:00 AM - 09:00 AM	45.9	64.5	36.6
09:00 AM - 10:00 AM	43.8	71.5	36.2

Leq Average 24 hrs. (dB(A)) 50.3
Lmax (dB(A)) 87.7
L90 (dB(A)) 45.5
Ldn (dB(A)) 55.4
Standard (dB(A)) 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานสิ่งแวดล้อมในทาง
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการจราจร และระดับเสียงที่ปลอดภัยจากผลกระทบจาก
จราจร พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanitak.
Thanita Kulsuriwong
Scientist (4)

Approved by

Supt S
Supot Salameth
Section Head

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Life Sciences

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S:Reports_Air Noise rpt (10:13AM)



Analysis / Test Report



TESTING
No.0042

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O : 0441002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 23106009
Date Received : Sep 27, 2023
Date Reported : Oct 03, 2023
Report Number: 2791248-1

Page 1 of 1

Sample Number 23106009-14
Parameter Noise (Leq 24 hrs)
Location บ้านป่าหินน้อย (GPS 47P 0728253, 1403369)
Measurement Date Sep 25 - Sep 26, 2023
Measurement by Anurak Tongkhajonsakda
Sound Level meter Serial No. 900073

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	48.2	74.1	38.2
11:00 AM - 12:00 PM	50.9	72.9	45.4
12:00 PM - 01:00 PM	50.9	74.7	45.3
01:00 PM - 02:00 PM	48.4	66.6	44.0
02:00 PM - 03:00 PM	47.1	68.3	43.8
03:00 PM - 04:00 PM	47.8	69.6	43.6
04:00 PM - 05:00 PM	48.4	63.1	44.9
05:00 PM - 06:00 PM	48.2	61.9	45.7
06:00 PM - 07:00 PM	49.1	64.2	47.8
07:00 PM - 08:00 PM	49.6	67.4	47.5
08:00 PM - 09:00 PM	48.2	64.0	46.3
09:00 PM - 10:00 PM	45.9	59.0	44.8
10:00 PM - 11:00 PM	49.3	80.7	44.5
11:00 PM - 12:00 AM	46.1	62.0	44.6
12:00 AM - 01:00 AM	47.0	63.0	45.2
01:00 AM - 02:00 AM	46.1	60.1	44.1
02:00 AM - 03:00 AM	46.1	57.1	44.9
03:00 AM - 04:00 AM	45.8	52.6	44.5
04:00 AM - 05:00 AM	45.6	59.6	43.7
05:00 AM - 06:00 AM	48.5	67.8	44.1
06:00 AM - 07:00 AM	51.0	67.4	47.1
07:00 AM - 08:00 AM	62.1	77.1	48.1
08:00 AM - 09:00 AM	55.2	76.3	49.0
09:00 AM - 10:00 AM	54.2	84.9	44.7

Leq Average 24 hrs. (dB(A)) 51.8
Lmax (dB(A)) 84.9
L90 (dB(A)) 44.8
Ldn (dB(A)) 55.4
Standard (dB(A)) 70
Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานสิ่งแวดล้อมในทาง
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการจราจร และระดับเสียงที่ปลอดภัยจากผลกระทบจาก
จราจร พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management

Thanitak.
Thanita Kulsuriwong
Scientist (4)

Approved by

Supt S
Supot Salameth
Section Head

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S:Reports_Air Noise rpt (10:14AM)



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 : CLP 4

Lot ID: 2371882
Date Received : Jul 11, 2023
Date Reported : Jul 18, 2023
Report Number : 2692159-1

Page 1 of 1

Sample Number 2371882-1
Sampled Date Jul 11, 2023 2:15 PM
Sample Description Wastewater
Location Holding pond 320 m3
Date Analysis Commenced Jul 11, 2023
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	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤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 *	-	-	-	7.9	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
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-C (F)	Rayong
Temperature *	Degree C	-	-	31.1	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	120	≤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 : Sansoen Khuyoksui รหัสประจำตัว 3-323-0-0005, Samart Khumphlee รหัสประจำตัว 3-204-0-7830

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

Technical Management

N. Bangpit

Narumon Banchongkit
Supervisor
รหัสประจำตัว 3-323-0-9445

Approved by

D. Manee

Dej Changchon
Senior Manager
รหัสประจำตัว 3-323-0-9442

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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 : CLP 4

Lot ID: 2371882
Date Received : Jul 11, 2023
Date Reported : Jul 18, 2023
Report Number : 2692159-2

Page 1 of 2

Sample Number 2371882-1
Sampled Date Jul 11, 2023 2:15 PM
Sample Description Wastewater
Location Holding pond 320 m3
Date Analysis Commenced Jul 11, 2023
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	0.50	≤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 CaCO3 *	mg/L	-	1	18	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	203	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	8.6	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-D (C)	Rayong
Flow rate *	m3/s	-	-	0.006	No Standard	Flow meter	Rayong
Silica as SiO2 *	mg/L	0.2	0.5	5.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Rayong
Total Alkalinity as CaCO3 *	mg/L	1	1	34	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	26	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	5.4	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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Approved by

Chanatt L.

Chanattagarn Inchom
Section Head

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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 : CLP 4

Lot ID: 2371882
Date Received : Jul 11, 2023
Date Reported : Jul 18, 2023
Report Number : 2692159-2

Page 2 of 2

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

Approved by

Chanatt L.

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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 : CLP 4

Lot ID: 2389220
Date Received : Aug 08, 2023
Date Reported : Aug 16, 2023
Report Number : 2732917-1

Page 1 of 1

Sample Number 2389220-1
Sampled Date Aug 08, 2023 3:10 PM
Sample Description Wastewater
Location Holding pond 320 m3
Date Analysis Commenced Aug 08, 2023
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	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤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 *	-	-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-C (F)	Rayong
Temperature *	Degree C	-	-	31.3	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	116	≤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 : Paramet Sattayakon รหัสประจำตัว 3-323-0-9476, Thanasson Namakunna รหัสประจำตัว 3-204-0-8592

Remark :
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Technical Management

N. Bangpit

Narumon Banchongkit
Supervisor
รหัสประจำตัว 3-323-0-9445

Approved by

D. Manee

Dej Changchon
Senior Manager
รหัสประจำตัว 3-323-0-9442

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Analysis / Test Report



TESTING
No.0000

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: 2389220
Date Received : Aug 08, 2023
Date Reported : Aug 16, 2023
Report Number : 2732917-2

Page 1 of 2

Sample Number 2389220-1
Sampled Date Aug 08, 2023 3:10 PM
Sample Description Wastewater
Location Holding pond 320 m3
Date Analysis Commenced Aug 08, 2023
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	1.31	≤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	20	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	203	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	6.6	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Flow rate *	m ³ /s	-	-	0.000	No Standard	Flow meter	Rayong
Silica as SiO ₂ *	mg/L	0.2	0.5	5.1	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	53	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	31	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	7.3	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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Approved by

Siriluk P.
Siriluk Puengpaeng
Section Head

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Analysis / Test Report



TESTING
No.0000

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: 2389220
Date Received : Aug 08, 2023
Date Reported : Aug 16, 2023
Report Number : 2732917-2

Page 2 of 2

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 : Paramet Sattayakun , Thanassun Namakunna

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.
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Siriluk Puengpaeng
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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: 23105994
Date Received : Sep 12, 2023
Date Reported : Sep 19, 2023
Report Number : 2771242-1

Page 1 of 1

Sample Number 23105994-1
Sampled Date Sep 12, 2023 2:15 PM
Sample Description Wastewater
Location Holding pond 320 m3
Date Analysis Commenced Sep 12, 2023
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	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O 6	Rayong
COD	mg/L	1.5	25	<25	≤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 5220 B	Rayong
pH at 25 degree C *	-	-	-	8.0	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-C (F)	Rayong
Temperature *	Degree C	-	-	31.1	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	112	≤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 : Chainusorn Lertnathakunchai ๒๓๘๘๒๙๗ -323-๙461, Thanassun Namakunna ๒๓๘๘๒๙๗ -204-๙892

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

N. Bangchokit

Narumon Bangchokit
Supervisor
๒๓๘๘๒๙๗ -323-๙445

Approved by

D. Changchon

Dej Changchon
Senior Manager
๒๓๘๘๒๙๗ -323-๙442

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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: 23105994
Date Received : Sep 12, 2023
Date Reported : Sep 19, 2023
Report Number : 2771242-2

Page 1 of 2

Sample Number 23105994-1
Sampled Date Sep 12, 2023 2:15 PM
Sample Description Wastewater
Location Holding pond 320 m3
Date Analysis Commenced Sep 12, 2023
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	0.61	≤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	14	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	167	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	7.7	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Flow rate *	m ³ /s	-	-	0.004	No Standard	Flow meter	Rayong
Silica as SiO ₂ *	mg/L	0.2	0.5	3.4	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	52	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	28	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	7.0	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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Savitree N.

Savitree Nosangiam
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 : DA41002956
Project Name : Monitoring
Project Location : CLP 4



TESTING
No.0009
Lot ID: 23105994
Date Received : Sep 12, 2023
Date Reported : Sep 19, 2023
Report Number : 2771242-2

Page 2 of 2

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 : Chainurorn Lertnathakunchai , Thanasoun Namakunna

Remark :

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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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Savitree Nolsanglam
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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 : CLP 4



TESTING
No.0042
Lot ID: 23108351
Date Received : Oct 10, 2023
Date Reported : Oct 18, 2023
Report Number : 2777756-1

Page 1 of 1

Sample Number 23108351-1
Sampled Date Oct 10, 2023 2:40 PM
Sample Description Wastewater
Location Holding pond 320 m3
Date Analysis Commenced Oct 10, 2023
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	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤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 *	-	-	-	7.3	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-C (F)	Rayong
Temperature *	Degree C	-	-	30.9	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	860	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong

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 : Chainurorn Lertnathakunchai โทร 09-9461 , Samart Khumpluee โทร 09-204-7830

Remark :

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

N. Banngmit
Narumon Banchongkit
Supervisor
โทร 09-323-9-9445

Approved by

D. Chanchon
Dej Chanchon
Senior Manager
โทร 09-323-9-9442

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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 : CLP 4

Lot ID: 23108351
Date Received : Oct 10, 2023
Date Reported : Oct 18, 2023
Report Number : 2777756-2

Page 1 of 2

Sample Number 23108351-1
Sampled Date Oct 10, 2023 2:40 PM
Sample Description Wastewater
Location Holding pond 320 m3
Date Analysis Commenced Oct 10, 2023
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	0.65	≤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 CaCO3	mg/L	-	1	17	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	1636	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	7.4	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Flow rate	m3/s	-	-	0.006	No Standard	Flow meter	Rayong
Silica as SiO2	mg/L	0.2	0.5	3.8	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Rayong
Total Alkalinity as CaCO3	mg/L	1	1	31	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Rayong
Total Hardness as CaCO3	mg/L	-	1	104	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	2.7	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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Approved by

N. Banngmit
Narumon Banchongkit
Supervisor

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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 : CLP 4

Lot ID: 23108351
Date Received : Oct 10, 2023
Date Reported : Oct 18, 2023
Report Number : 2777756-2

Page 2 of 2

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 : Chainurorn Lertnathakunchai , Samart Khumpluee

Remark :

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

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Approved by

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Narumon Banchongkit
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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 : CLP 4

Lot ID: 23116734
Date Received : Nov 14, 2023
Date Reported : Nov 20, 2023
Report Number : 2797262-1

Page 1 of 1

Sample Number 23116734-1
Sampled Date Nov 14, 2023 3:05 PM
Sample Description Wastewater
Location Holding pond 320 m3
Date Analysis Commenced Nov 14, 2023
Condition of Sample Contained in one amber glass bottle, one BOD bottle and six plastic bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤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 *	-	-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-C (F)	Rayong
Temperature *	Degree C	-	-	31.9	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	130	≤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 : Sansoen Khuyoksui รหัสประจำตัว 3-323-4-0005 , Samart Khumphie รหัสประจำตัว 3-204-4-7830

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

Technical Management

N. Bangmit

Narumon Banchongkit
Supervisor
รหัสประจำตัว 3-323-4-9445

Approved by

D. Chanchon

Dej Chanchon
Senior Manager
รหัสประจำตัว 3-323-4-9442

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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 : CLP 4

Lot ID: 23116734
Date Received : Nov 14, 2023
Date Reported : Nov 21, 2023
Report Number : 2797262-2

Page 1 of 2

Sample Number 23116734-1
Sampled Date Nov 14, 2023 3:05 PM
Sample Description Wastewater
Location Holding pond 320 m3
Date Analysis Commenced Nov 14, 2023
Condition of Sample Contained in one amber glass bottle, one BOD bottle and six plastic bottle, 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	1.30	≤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 CaCO3 *	mg/L	-	1	26	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	184	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	7.3	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-D (C)	Rayong
Flow rate *	m3/s	-	-	0.000	No Standard	Flow meter	Rayong
Silica as SiO2 *	mg/L	0.2	0.5	4.6	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Rayong
Total Alkalinity as CaCO3 *	mg/L	1	1	44	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Rayong
Total Hardness as CaCO3 *	mg/L	-	1	41	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	9.5	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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Approved by

Sawitree N.

Sawitree Nosingiam
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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 : CLP 4

Lot ID: 23116734
Date Received : Nov 14, 2023
Date Reported : Nov 21, 2023
Report Number : 2797262-1

Page 2 of 2

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

Sawitree Nosingiam
Manager

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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 : CLP 4

Lot ID: 23131599
Date Received : Dec 12, 2023
Date Reported : Dec 19, 2023
Report Number : 2832258-1

Page 1 of 1

Sample Number 23131599-1
Sampled Date Dec 12, 2023 2:35 PM
Sample Description Wastewater
Location Holding pond 320 m3
Date Analysis Commenced Dec 12, 2023
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	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	<25	≤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 *	-	-	-	7.4	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
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-C (F)	Rayong
Temperature *	Degree C	-	-	30.7	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	166	≤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 : Tanast Wongsachai รหัสประจำตัว 3-323-4-9460 , Pattarapol Sawangjaitam รหัสประจำตัว 3-204-4-0002

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

N. Bangmit

Narumon Banchongkit
Supervisor
รหัสประจำตัว 3-323-4-9445

Approved by

D. Chanchon

Dej Chanchon
Senior Manager
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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: 23131599
Date Received : Dec 12, 2023
Date Reported : Dec 19, 2023
Report Number : 2832258-2

Page 1 of 2

Sample Number	23131599-1						
Sampled Date	Dec 12, 2023 2:35 PM						
Sample Description	Wastewater						
Location	Holding pond 320 m3						
Date Analysis Commenced	Dec 12, 2023						
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	2.80	≤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	35	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	351	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	9.0	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-O (C)	Rayong
Flow rate *	m ³ /s	-	-	0.000	No Standard	Flow meter	Rayong
Silica as SiO ₂ *	mg/L	0.2	0.5	7.0	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	28	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	131	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	21.0	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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Approved by

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Savitree Naisiangiam
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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: 23131599
Date Received : Dec 12, 2023
Date Reported : Dec 19, 2023
Report Number : 2832258-2

Page 2 of 2

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



TESTING
No.0000

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: 2371886
Date Received : Jul 11, 2023
Date Reported : Jul 19, 2023
Report Number : 2692163-2

Page 1 of 2

Sample Number	2371886-1						
Sampled Date	Jul 11, 2023 1:55 PM						
Sample Description	Wastewater						
Location	Holding pond 1800 m3						
Date Analysis Commenced	Jul 12, 2023						
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	0.01	≤10.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Volatile Organic Compounds							
Bromodichloromethane *	ug/L	0.2	0.5	Not Detected	No Standard	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Bromoform *	ug/L	0.2	0.5	Not Detected	No Standard	In-house method 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	In-house method 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	In-house method 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	In-house method 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	180	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	1151	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Rayong

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Analysis / Test Report



TESTING
No.0000

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: 2371886
Date Received : Jul 11, 2023
Date Reported : Jul 19, 2023
Report Number : 2692163-2

Page 2 of 2

Sample Number	2371886-1						
Sampled Date	Jul 11, 2023 1:55 PM						
Sample Description	Wastewater						
Location	Holding pond 1800 m3						
Date Analysis Commenced	Jul 12, 2023						
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
Water Testing							
Silica as SiO ₂ *	mg/L	0.2	0.5	32.0	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	160	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	240	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 : Sansoen Khuyoksu , Samart Khumplinee
Remark :
- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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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: **2389222**
Date Received : Aug 08, 2023
Date Reported : Aug 17, 2023
Report Number : 2732919-2

Page 1 of 2

Sample Number 2389222-1
Sampled Date Aug 08, 2023 2:40 PM
Sample Description Wastewater
Location Holding pond 1800 m3
Date Analysis Commenced Aug 09, 2023
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	0.007	≤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	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Bromoform *	ug/L	0.2	0.5	Not Detected	No Standard	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Chloroform *	ug/L	0.2	0.5	1.7	No Standard	In-house method 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	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Total Trihalomethanes *	ug/L	0.2	1	1.7	No Standard	In-house method 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	161	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	1020	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Rayong

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Approved by

Savitree N.
Savitree Nolsangiam
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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: **2389222**
Date Received : Aug 08, 2023
Date Reported : Aug 17, 2023
Report Number : 2732919-2

Page 2 of 2

Sample Number 2389222-1
Sampled Date Aug 08, 2023 2:40 PM
Sample Description Wastewater
Location Holding pond 1800 m3
Date Analysis Commenced Aug 09, 2023
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
Water Testing							
Silica as SiO ₂ *	mg/L	0.2	0.5	36.6	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	228	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	234	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	1.2	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 : Paramet Sattayakun , Thanosoun Namakunna

Remark :
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- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
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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: **23105997**
Date Received : Sep 12, 2023
Date Reported : Sep 20, 2023
Report Number : 2771243-2

Page 1 of 2

Sample Number 23105997-1
Sampled Date Sep 12, 2023 2:00 PM
Sample Description Wastewater
Location Holding pond 1800 m3
Date Analysis Commenced Sep 13, 2023
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	0.01	≤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	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Bromoform *	ug/L	0.2	0.5	Not Detected	No Standard	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Chloroform *	ug/L	0.2	0.5	3.6	No Standard	In-house method 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	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Total Trihalomethanes *	ug/L	0.2	1	3.6	No Standard	In-house method 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	174	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	1117	No Standard	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Rayong

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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: **23105997**
Date Received : Sep 12, 2023
Date Reported : Sep 20, 2023
Report Number : 2771243-2

Page 2 of 2

Sample Number 23105997-1
Sampled Date Sep 12, 2023 2:00 PM
Sample Description Wastewater
Location Holding pond 1800 m3
Date Analysis Commenced Sep 13, 2023
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
Water Testing							
Silica as SiO ₂ *	mg/L	0.2	0.5	33.2	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	246	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	248	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	1.0	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 : Chainorsorn Lertnathakunchai , Thanosoun Namakunna

Remark :
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Analysis / Test Report

TESTING
No.0000

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

Lot ID: 23108347
Date Received : Oct 10, 2023
Date Reported : Oct 19, 2023
Report Number : 2777740-2

Page 1 of 2

Sample Number 23108347-1
Sampled Date Oct 10, 2023 2:10 PM
Sample Description Wastewater
Location Holding pond 1800 m3
Date Analysis Commenced Oct 11, 2023
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	0.02	≤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	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Bromoform *	ug/L	0.2	0.5	Not Detected	No Standard	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Chloroform *	ug/L	0.2	0.5	1.8	No Standard	In-house method 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	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Total Trihalomethanes *	ug/L	0.2	1	1.8	No Standard	In-house method 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	159	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	921	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Rayong

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Analysis / Test Report

TESTING
No.0000

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

Lot ID: 23108347
Date Received : Oct 10, 2023
Date Reported : Oct 19, 2023
Report Number : 2777740-2

Page 2 of 2

Sample Number 23108347-1
Sampled Date Oct 10, 2023 2:10 PM
Sample Description Wastewater
Location Holding pond 1800 m3
Date Analysis Commenced Oct 11, 2023
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
Water Testing							
Silica as SiO ₂ *	mg/L	0.2	0.5	31.4	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	224	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	238	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	1.1	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 : Chainusorn Lertnathakunchai , Samart Khumpluee

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Analysis / Test Report

TESTING
No.0009

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

Lot ID: 23116739
Date Received : Nov 14, 2023
Date Reported : Nov 22, 2023
Report Number : 2797263-2

Page 1 of 2

Sample Number 23116739-1
Sampled Date Nov 14, 2023 2:40 PM
Sample Description Wastewater
Location Holding pond 1800 m3
Date Analysis Commenced Nov 15, 2023
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	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	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Bromoform *	ug/L	0.2	0.5	Not Detected	No Standard	In-house method 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	In-house method 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	In-house method 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	In-house method 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	207	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	928	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Rayong

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Analysis / Test Report

TESTING
No.0009

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

Lot ID: 23116739
Date Received : Nov 14, 2023
Date Reported : Nov 22, 2023
Report Number : 2797263-2

Page 2 of 2

Sample Number 23116739-1
Sampled Date Nov 14, 2023 2:40 PM
Sample Description Wastewater
Location Holding pond 1800 m3
Date Analysis Commenced Nov 15, 2023
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
Water Testing							
Silica as SiO ₂ *	mg/L	0.2	0.5	40.1	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	225	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	283	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	1.6	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 : Sansoen Khuyoksu , Samart Khumpluee

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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: 23131602
Date Received : Dec 12, 2023
Date Reported : Dec 20, 2023
Report Number : 2832261-2

Page 1 of 2

Sample Number 23131602-1
Sampled Date Dec 12, 2023 2:15 PM
Sample Description Wastewater
Location Holding pond 1800 m3
Date Analysis Commenced Dec 13, 2023
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	0.02	≤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	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Bromoform *	ug/L	0.2	0.5	Not Detected	No Standard	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Chloroform *	ug/L	0.2	0.5	1.0	No Standard	In-house method 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	In-house method based on United States Environmental Protection Agency, EPA Method 5030 B and 8260 D	Bangkok
Total Trihalomethanes *	ug/L	0.2	1	<1	No Standard	In-house method 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	161	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	828	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Rayong

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Savitree Nongsiam
Manager

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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: 23131602
Date Received : Dec 12, 2023
Date Reported : Dec 20, 2023
Report Number : 2832261-2

Page 2 of 2

Sample Number 23131602-1
Sampled Date Dec 12, 2023 2:15 PM
Sample Description Wastewater
Location Holding pond 1800 m3
Date Analysis Commenced Dec 13, 2023
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
Water Testing							
Silica as SiO ₂ *	mg/L	0.2	0.5	44.5	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	272	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	328	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	0.9	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 : Tanasit Wongsachai , Pattarapol Sawangjaitam

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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: 23106023
Date Received : Sep 18, 2023
Date Reported : Sep 20, 2023
Report Number : 2771278-1

Page 1 of 2

Sample Number 23106023-1
Parameter Heat Stress (Sampling Time :09:00 AM - 11:00 AM)
Measurement Date Sep 18, 2023
Measurement by Tinnakorn Kumapasee
Location มุมใต้ร่มเงา 1 พื้น (ใต้-หมอบ-บันได) (มกราคม - - - - -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
GTG	120	28.9	26.9	33.8	33.1
Average (WBGT)		28.9			
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 Salameth
Assistant Head

Approved by

Wichan Ch.
Wichan Choonharat
Assistant Manager

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S:\Reports\Air Heat pt (8.37PM)



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: 23106023
Date Received : Sep 18, 2023
Date Reported : Sep 20, 2023
Report Number : 2771278-1

Page 2 of 2

Sample Number 23106023-2
Parameter Heat Stress (Sampling Time :09:00 AM - 11:00 AM)
Measurement Date Sep 18, 2023
Measurement by Tinnakorn Kumapasee
Location มุมใต้ร่มเงา 1 พื้น (ใต้-หมอบ-บันได) (มกราคม - - - - -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
HRSG	120	28.5	26.6	33.1	32.6
Average (WBGT)		28.5			
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 Salameth
Assistant Head

Approved by

Wichan Ch.
Wichan Choonharat
Assistant Manager

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6403-74 / EMAIL

S:\Reports\Air Heat pt (8.37PM)



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: 23106026
Date Received : Sep 19, 2023
Date Reported : Sep 22, 2023
Report Number : 2771283-1

Page 1 of 6

Sample Number 23106026-1
Sampled Date Sep 18, 2023
Sample Description Noise dose
Location FO#1 (Day)
Personal Sampling อนุกรมฯ 1 วันแรก
Date Analysis Commenced Sep 20, 2023

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 AM - 07:30 PM	%	-	-	14.8	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 AM - 07:30 PM	%	-	1	13.8	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	07:30 AM - 07:30 PM	dB(A)	-	-	74.7	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 AM - 07:30 PM	dB(A)	-	-	76.4	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 : Tinnakorn Kumpasee

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

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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 : DA41002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 23106026
Date Received : Sep 19, 2023
Date Reported : Sep 22, 2023
Report Number : 2771283-1

Page 2 of 6

Sample Number 23106026-2
Sampled Date Sep 18, 2023
Sample Description Noise dose
Location FO#1 (Night)
Personal Sampling อนุกรมฯ 1 วันแรก
Date Analysis Commenced Sep 20, 2023

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	%	-	-	4.5	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 PM - 07:30 AM	%	-	1	4.3	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)	-	-	69.5	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 PM - 07:30 AM	dB(A)	-	-	71.3	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 : Tinnakorn Kumpasee

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 : DA41002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 23106026
Date Received : Sep 19, 2023
Date Reported : Sep 22, 2023
Report Number : 2771283-1

Page 3 of 6

Sample Number 23106026-3
Sampled Date Sep 18, 2023
Sample Description Noise dose
Location FO#2 (Day)
Personal Sampling อนุกรมฯ 1 วันแรก
Date Analysis Commenced Sep 20, 2023

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 AM - 07:30 PM	%	-	-	2.0	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 AM - 07:30 PM	%	-	1	1.9	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	07:30 AM - 07:30 PM	dB(A)	-	-	65.9	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 AM - 07:30 PM	dB(A)	-	-	67.7	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 : Tinnakorn Kumpasee

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 : DA41002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 23106026
Date Received : Sep 19, 2023
Date Reported : Sep 22, 2023
Report Number : 2771283-1

Page 4 of 6

Sample Number 23106026-4
Sampled Date Sep 18, 2023
Sample Description Noise dose
Location FO#2 (Night)
Personal Sampling อนุกรมฯ 1 วันแรก
Date Analysis Commenced Sep 20, 2023

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	%	-	-	3.4	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 PM - 07:30 AM	%	-	1	3.2	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)	-	-	68.3	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 PM - 07:30 AM	dB(A)	-	-	70.1	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 : Tinnakorn Kumpasee

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: 23106026
Date Received : Sep 19, 2023
Date Reported : Sep 22, 2023
Report Number : 2771283-1

Page 5 of 6

Sample Number 23106026-5
Sampled Date Sep 18, 2023
Sample Description Noise dose
Location CO#1 (Day)
Personal Sampling อุปกรณ์วัดเสียง
Date Analysis Commenced Sep 20, 2023

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 AM - 07:30 PM	%	-	-	1.0	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 AM - 07:30 PM	%	-	1	<1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	07:30 AM - 07:30 PM	dB(A)	-	-	63.1	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 AM - 07:30 PM	dB(A)	-	-	64.8	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 : Tinnakorn Kumpasee

Remark :

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

Approved by

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 : DA41002956
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 23106026
Date Received : Sep 19, 2023
Date Reported : Sep 22, 2023
Report Number : 2771283-1

Page 6 of 6

Sample Number 23106026-6
Sampled Date Sep 18, 2023
Sample Description Noise dose
Location CO#1 (Night)
Personal Sampling อุปกรณ์วัดเสียง
Date Analysis Commenced Sep 20, 2023

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	%	-	-	1.2	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 PM - 07:30 AM	%	-	1	1.1	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)	-	-	63.7	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 PM - 07:30 AM	dB(A)	-	-	65.5	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 : Tinnakorn Kumpasee

Remark :

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

Approved by

Wichan Choonharat
Assistant Manager

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ภาคผนวก ง

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รายการเครื่องมือที่ใช้ในการวิเคราะห์ / พดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Stack (CEM)	Oxides of Nitrogen	Analyzer - System calibration, Star	-	-	-	-
Stack (CEM)	Sulfur Dioxide	Analyzer - System calibration, Star	-	-	-	-
Stack	Total Suspended Particulate	Console Control Unit	BKK_F50507	5-Jul-23	5-Jan-24	6
Stack	Total Suspended Particulate	Digital Balance	RYG_EN0003	1-Mar-23	1-Mar-24	12
Stack	Ammonia	Console Control Unit	BKK_F50507	5-Jul-23	5-Jan-24	6
Stack	Ammonia	Dry Gas	BKK_F50445	31-Jul-23	31-Jan-24	6
Stack	Ammonia	SPECTROPHOTOMETER	RYG_EN0037	18-Sep-23	18-Mar-25	18
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	BKK_F51088	1-Jul-23	1-Jan-24	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	BKK_F51086	1-Jul-23	1-Jan-24	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_F50261	1-Jul-23	1-Jan-24	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	BKK_F50776	1-Jul-23	1-Jan-24	6
Ambient	Sulfur Dioxide	SO ₂ Analyzer	BKK_F51087	2-Jul-23	2-Jan-24	6
Ambient	Sulfur Dioxide	SO ₂ Analyzer	RYG_F50263	2-Jul-23	2-Jan-24	6
Ambient	Sulfur Dioxide	SO ₂ Analyzer	RYG_F50260	2-Jul-23	2-Jan-24	6
Ambient	Sulfur Dioxide	SO ₂ Analyzer	RYG_F50532	2-Jul-23	2-Jan-24	6
Ambient	Particulate Matter (PM-10)	High Volume	RYG_F50189	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_F50666	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_F50190	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_F50667	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	Digital Balance	RYG_EN0001	1-Mar-23	1-Mar-24	12
Ambient	Total Suspended Particulate	High Volume	RYG_F50180	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_F50663	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_F50394	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_F50396	-	-	On site Calibration
Ambient	Total Suspended Particulate	Digital Balance	RYG_EN0001	1-Mar-23	1-Mar-24	12
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_F50329	18-Aug-23	18-Feb-25	18
Noise	Leq 24 hrs	Sound Calibrator	RYG_F50213	26-Jan-23	26-Jan-24	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_F50495	13-Jan-23	13-Jan-24	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_F50494	13-Jan-23	13-Jan-24	12
Noise	Noise Dose, TWA	Dose Badge Reader	RYG_F50440	5-Jan-23	5-Jan-24	12
Heat	Heat Stress	Heat Stress Monitor	RYG_F50521	24-Feb-23	24-Feb-24	12
Heat	Heat Stress	Heat Stress Monitor	RYG_F50522	24-Feb-23	24-Feb-24	12
Rayong Lab	pH at 25 °C	pH meter	RYG_EN0183	27-Feb-23	27-Feb-24	12
Rayong Lab	BOD	DO meter with Sensor	RYG_EN0032	24-Jul-23	24-Jan-25	18
Rayong Lab	BOD	Incubator	RYG_EN0154	29-May-23	29-Nov-24	18
Rayong Lab	Total Dissolved Solids 180°C	Electronic Balance	RYG_EN0002	1-Mar-23	1-Mar-24	12
Rayong Lab	Total Dissolved Solids 180°C	Hot Air Oven	RYG_EN0010	20-Oct-22	20-Apr-24	18
Rayong Lab	Oil & Grease	Electronic Balance	RYG_EN0002	1-Mar-23	1-Mar-24	12
Rayong Lab	Oil & Grease	Hot Air Oven	RYG_EN0006	20-Oct-22	20-Apr-24	18
Rayong Lab	Oil & Grease Bath	Water Bath	RYG_EN0061	20-Oct-22	20-Apr-24	18
Rayong Lab	Temperature	pH meter	RYG_F50425	8-Jun-23	8-Jun-24	12
Rayong Lab	Dissolved Oxygen	Chamber (Cold Room)	RYG_EN0184	25-Jan-23	25-Jul-24	12
Water Lab	Chloroform	Gas Chromatography (MSD)	BKK_EN0059	21-Jun-22	21-Dec-23	18
Water Lab	Bromoform	Gas Chromatography (MSD)	BKK_EN0059	21-Jun-22	21-Dec-23	18
Water Lab	Dibromochloromethane	Gas Chromatography (MSD)	BKK_EN0059	21-Jun-22	21-Dec-23	18
Water Lab	Total Trichloromethanes	Gas Chromatography (MSD)	BKK_EN0059	21-Jun-22	21-Dec-23	18
Water Lab	Bromodichloromethane	Gas Chromatography (MSD)	BKK_EN0059	21-Jun-22	21-Dec-23	18

1

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Lot No. 23106014-1

ANALYZER CALIBRATION DATA

Client : Global Power Synergy PCL Location : HRSGe 1
Date : 22 Sep 23 Test Operator : Sakait 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	7.90	7.92	0.08
Span Gas	16.00	15.97	15.99	0.08

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

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.03	0.01	0.01
Low-Level Gas	82.39	82.42	82.40	0.01
Span Gas	164.40	164.43	164.41	0.01

SO₂ ANALYZER Model : TELEDYNE API 100EH Serial No. : 437
Span (ppm) : 200

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	-0.01	0.00	0.01
Low-Level Gas	78.75	78.74	78.75	0.01
Span Gas	159.90	159.89	159.90	0.01

Calibrated by

Sakait P.

(Mr.Sakait Phalsanphlout)

Environmental Field Scientist (4)

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

ALS Laboratory Group



Lot No. 23106014-1

SYSTEM CALIBRATION BIAS AND DRIFT DATA

Client : Global Power Synergy PCL Location : HRSGe 1
Date : 22 Sep 23 Test Operator : Sakait P.

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

	O ₂ Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	-0.03	-0.03	0.00	-0.01	0.08	0.08
Upscale Gas	15.97	15.97	0.00	15.99	0.08	0.08

NO_x ANALYZER Cylinder Conc. (ppm) : 164.40 Span (ppm) : 200

	NO _x Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.03	0.03	0.00	0.01	0.01	0.01
Upscale Gas	164.43	164.43	0.00	164.41	0.01	0.01

SO₂ ANALYZER Cylinder Conc. (ppm) : 159.90 Span (ppm) : 200

	SO ₂ Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	-0.01	-0.01	0.00	0.00	0.01	0.01
Upscale Gas	159.89	159.89	0.00	159.90	0.01	0.01

Calibrated by

Sakait P.

(Mr.Sakait Phalsanphlout)

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 : 22 Sep 23 Location : HRSGe 1
Start Time : 11:15 Test Operator : Sakait P.
SO₂ Analyzer Model : TELEDYNE API 100EH Finish Time : 11:35
NO_x/O₂ Analyzer Model : TELEDYNE API 200EH Serial No. : 437
CO/CO₂ Analyzer Model : TELEDYNE API 300EM Serial No. : 774
Serial No. : 451

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
11:15	13.44	4.03	9.93	0.08	-	
11:16	13.44	4.04	9.99	0.08	-	
11:17	13.45	4.04	10.03	0.09	-	
11:18	13.45	4.04	9.98	0.08	-	
11:19	13.44	4.04	9.91	0.07	-	
11:20	13.44	4.04	9.95	0.09	-	
11:21	13.44	4.04	9.99	0.08	-	
11:22	13.45	4.04	9.99	0.08	-	
11:23	13.45	4.05	9.89	0.08	-	
11:24	13.45	4.05	9.82	0.08	-	
11:25	13.44	4.04	9.82	0.07	-	
11:26	13.45	4.01	9.81	0.08	-	
11:27	13.45	4.03	9.79	0.08	-	
11:28	13.45	4.03	9.80	0.07	-	
11:29	13.45	4.01	9.88	0.07	-	
11:30	13.45	4.03	9.87	0.08	-	
11:31	13.46	4.04	9.75	0.08	-	
11:32	13.46	4.03	9.67	0.08	-	
11:33	13.46	4.04	9.68	0.08	-	
11:34	13.45	4.05	9.80	0.10	-	
11:35	13.46	4.05	9.88	0.09	-	
Average	13.45	4.03	9.87	0.07	-	

Sakait P.

(Mr.Sakait Phalsanphlout)

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	22 Sep 23	Location	HRSGe 1
Start Time	11:38	Test Operator	Sakait 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
11:36	13.47	4.02	9.84	0.08	-	
11:37	13.46	4.02	9.80	0.08	-	
11:38	13.45	4.02	9.81	0.08	-	
11:39	13.46	4.03	9.85	0.07	-	
11:40	13.47	4.03	9.81	0.08	-	
11:41	13.45	4.03	9.81	0.09	-	
11:42	13.43	4.03	9.86	0.08	-	
11:43	13.45	4.04	9.91	0.07	-	
11:44	13.45	4.04	9.94	0.06	-	
11:45	13.46	4.03	9.94	0.07	-	
11:46	13.44	4.04	9.97	0.09	-	
11:47	13.44	4.04	10.05	0.09	-	
11:48	13.45	4.04	10.08	0.08	-	
11:49	13.45	4.04	9.95	0.08	-	
11:50	13.44	4.04	9.84	0.09	-	
11:51	13.43	4.04	9.77	0.07	-	
11:52	13.44	4.04	9.78	0.07	-	
11:53	13.45	4.04	9.80	0.07	-	
11:54	13.45	4.04	9.79	0.09	-	
11:55	13.45	4.04	9.68	0.07	-	
11:56	13.45	4.04	9.60	0.08	-	
Average	13.46	4.03	9.86	0.07	-	

Sakait P.

(Mr. Sakait Phaisanphut)

Environmental Field Scientist (4)

FORM NO.: F-06-02 REVISION NO.: 2 ISSUE DATE: 306/19

ALS Laboratory Group



EMISSION TEST RESULT

Client	Global Power Synergy PCL	Run #	3
Date	22 Sep 23	Location	HRSGe 1
Start Time	11:57	Test Operator	Sakait 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
11:57	13.44	4.05	9.59	0.07	-	
11:58	13.44	4.06	9.74	0.06	-	
11:59	13.47	4.05	9.80	0.08	-	
12:00	13.47	4.02	9.80	0.07	-	
12:01	13.47	4.02	9.81	0.07	-	
12:02	13.46	4.04	9.98	0.07	-	
12:03	13.45	4.04	10.07	0.06	-	
12:04	13.46	4.05	10.07	0.06	-	
12:05	13.46	4.05	10.09	0.07	-	
12:06	13.46	4.04	10.02	0.07	-	
12:07	13.47	4.01	9.91	0.06	-	
12:08	13.46	4.04	9.80	0.06	-	
12:09	13.46	4.04	9.79	0.05	-	
12:10	13.46	4.04	9.85	0.06	-	
12:11	13.46	4.03	9.76	0.05	-	
12:12	13.45	4.05	9.52	0.05	-	
12:13	13.44	4.06	9.42	0.04	-	
12:14	13.45	4.06	9.35	0.06	-	
12:15	13.44	4.05	9.25	0.06	-	
12:16	13.42	4.05	9.26	0.07	-	
12:17	13.41	4.06	9.33	0.07	-	
Average	13.45	4.04	9.72	0.06	-	

Sakait P.

(Mr. Sakait Phaisanphut)

Environmental Field Scientist (4)

FORM NO.: F-06-02 REVISION NO.: 2 ISSUE DATE: 306/19

ALS Laboratory Group



Airgas Specialty Gases
Airgas USA, LLC
6141 Eastern Road
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Customer:	AIR LIQUIDE	Reference Number:	180-402340013-1
Part Number:	(THAILAND) LTD	Cylinder Volume:	247.2 CF
Cylinder Number:	E04N189E3HAD002	Cylinder Pressure:	2215 PSIG
Laboratory:	124 - Plumsteadville - PA	Valve Outlet:	660
PGVP Number:	A12022	Certification Date:	Feb 11, 2022
Gas Code:	CO,NO,NOX,SO2,BALN		

Expiration Date: Feb 11, 2030

Certification performed in accordance with EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012) document EPA 600/R-12/031, 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 in mole/mole basis unless otherwise noted.

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

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	80.00 PPM	82.39 PPM	G1	+/- 1.0% NIST Traceable	02/04/2022, 02/11/2022
CARBON MONOXIDE	80.00 PPM	79.48 PPM	G1	+/- 0.8% NIST Traceable	02/04/2022
NITRIC OXIDE	80.00 PPM	82.38 PPM	G1	+/- 1.0% NIST Traceable	02/04/2022, 02/11/2022
SULFUR DIOXIDE	80.00 PPM	78.75 PPM	G1	+/- 0.9% NIST Traceable	02/04/2022, 02/11/2022
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	06010212	KAL004777	38.48 PPM CARBON MONOXIDE/NITROGEN	+/- 0.5%	Oct 18, 2024
NTRM	200810-15	CC732106	98.61 PPM NITRIC OXIDE/NITROGEN	+/- 0.9%	Oct 06, 2026
NTRM	200810-04	CC708044	16.61 PPM NITRIC OXIDE/NITROGEN	+/- 0.9%	Oct 06, 2026
GMS	12406869138	CC323707	4.097 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Sep 03, 2024
NTRM	11010418	KAL004813	99.9 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Jul 26, 2023

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicoret ISSO FTIR AUP2010245 CO	FTIR	Feb 03, 2022
Nicoret ISSO FTIR AUP2010245 NO	FTIR	Feb 10, 2022
Nicoret ISSO FTIR AUP2010245 NO2	FTIR	Jan 27, 2022
Nicoret ISSO FTIR AUP2010245 SO2	FTIR	Jan 20, 2022

Triad Data Available Upon Request

NOTES: Gross Weight: 48.5 Kg
Net Weight: 8.1 Kg



Airgas Specialty Gases
Airgas USA, LLC
Airgas Unions Landing Blvd
Concordville, PA 19341-0000
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E04N189E3HAD002	Reference Number:	82-401257890-1
Cylinder Number:	ND52877	Cylinder Volume:	247.2 CF
Laboratory:	124 - Rvarton (SAP) - NJ	Cylinder Pressure:	2215 PSIG
PGVP Number:	BS2018	Valve Outlet:	660
Gas Code:	CO,NO,NOX,SO2,BALN	Certification Date:	Aug 07, 2018

Expiration Date: Aug 07, 2026

Certification performed in accordance with EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012) document EPA 600/R-12/031, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

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

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	160.0 PPM	164.4 PPM	G1	+/- 1.1% NIST Traceable	07/20/2018, 09/07/2018
NITRIC OXIDE	160.0 PPM	164.4 PPM	G1	+/- 1.1% NIST Traceable	07/20/2018, 09/07/2018
SULFUR DIOXIDE	160.0 PPM	164.4 PPM	G1	+/- 1.1% NIST Traceable	07/20/2018, 09/07/2018
CARBON MONOXIDE	400.0 PPM	407.4 PPM	G1	+/- 1.1% NIST Traceable	07/20/2018
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	17090241	E8007987	100.5 PPM NITRIC OXIDE/NITROGEN	+/- 1.0%	May 11, 2019
PRM	12358	580A110	28.86 PPM NITROGEN DIOXIDE/AIR	+/- 1.5%	Jun 02, 2017
GMS	7042010104	CC50841	3.101 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Jun 01, 2020
NTRM	11010414	KAL004782	99.6 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Jul 26, 2023
NTRM	15000539	CC401607	481.9 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jan 08, 2021

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

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicoret 6700 APW1100301 CO	FTIR	Jul 19, 2018
Nicoret 6700 APW1100301 NO	FTIR	Jul 12, 2018
Nicoret 6700 APW1100301 NO2	FTIR	Aug 03, 2018
Nicoret 6700 APW1100301 SO2	FTIR	Aug 02, 2018

Triad Data Available Upon Request

NOTES:
Net weight: 8107 grams
Gross weight: 47060 grams

This calibration std. has been certified in accordance with the May 2012 EPA Traceability Protocol document EPA-600/R-12/031. All testing processes and measurements conform to the requirements of ISO/IEC 17025 and to Airgas ISO 9001:2008 and relate only to items identified on this certificate. This certificate is not valid for use as evidence of conformity unless it is reproduced in full without written approval of the issuer.



ACCREDITED

TESTING CERT NO. 3082-05

Approved for Release

Page 1 of 82-401257890-1

CERTIFICATE OF ANALYSIS

Customer Details:
ALS Laboratory Group (Thailand)Production Order Number: 90132928
Material Number: 478100-J-44
Certification Date: 20-Jan-2016
Expiry Date: 20-Jan-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-800/8-12/531 for the Assay and Certification of Gasous 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:

4676/15

Analyst:

THITIRAT LOYRAT

Cylinder Number:

S50730

Approve:

SUKANYA KAMUTHARAT

Nominal Cylinder Content:

6.520 M³

Nominal Pressure:

145.0 Bar

Valve Outlet:

CGA 590 BRASS

To Re-Order Please Quote:

478100-J-44

Comments:

- 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 14 ถนนพหลโยธิน กม. 6.5 กรุงเทพฯ

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

เบอร์โทร: 105 หมู่ 5, บางนา, กรุงเทพฯ 10760

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

Linde (Thailand) Public Company Limited

15 หมู่ 14 ถนนพหลโยธิน กม. 6.5 กรุงเทพฯ

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

เบอร์โทร: 105 หมู่ 5, บางนา, กรุงเทพฯ 10760

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

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

- Gas Chromatograph
- Paramagnetic Oxygen Analyzer
- Electrochemical Oxygen Analyzer
- Electrochemical Moisture Analyzer
- Total Hydrocarbon Analyzer
- Other specified

Cylinder Number: S50730

Production Order Number: 90132928

Certification Date: 20-Jan-2016

Expiration Date: 20-Jan-2024

Page 2 of 2

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

15 หมู่ 14 ถนนพหลโยธิน กม. 6.5 กรุงเทพฯ

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

เบอร์โทร: 105 หมู่ 5, บางนา, กรุงเทพฯ 10760

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

Linde (Thailand) Public Company Limited

15 หมู่ 14 ถนนพหลโยธิน กม. 6.5 กรุงเทพฯ

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

เบอร์โทร: 105 หมู่ 5, บางนา, กรุงเทพฯ 10760

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

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-800/8-12/531 for the Assay and Certification of Gasous 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

Nominal Pressure:

145.0 Bar

Valve Outlet:

CGA 590 BRASS

To Re-Order Please Quote:

557200-J-44

Comments:

- 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 14 ถนนพหลโยธิน กม. 6.5 กรุงเทพฯ

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

เบอร์โทร: 105 หมู่ 5, บางนา, กรุงเทพฯ 10760

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

Linde (Thailand) Public Company Limited

15 หมู่ 14 ถนนพหลโยธิน กม. 6.5 กรุงเทพฯ

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

เบอร์โทร: 105 หมู่ 5, บางนา, กรุงเทพฯ 10760

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

CERTIFICATE OF ANALYSIS

Analytical Result

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

- Gas Chromatograph
- Paramagnetic Oxygen Analyzer
- Electrochemical Oxygen Analyzer
- Electrochemical Moisture Analyzer
- Total Hydrocarbon Analyzer
- Other specified

Cylinder Number: 363075

Production Order Number: 90137389

Certification Date: 24-Sep-2016

Expiration Date: 24-Sep-2024

Page 2 of 2

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

15 หมู่ 14 ถนนพหลโยธิน กม. 6.5 กรุงเทพฯ

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

เบอร์โทร: 105 หมู่ 5, บางนา, กรุงเทพฯ 10760

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

Linde (Thailand) Public Company Limited

15 หมู่ 14 ถนนพหลโยธิน กม. 6.5 กรุงเทพฯ

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323

เบอร์โทร: 105 หมู่ 5, บางนา, กรุงเทพฯ 10760

เบอร์โทร: 02-570-479-93 โทรสาร: 02-570-323



CONSOLE CONTROL UNIT CALIBRATION TEST REPORT

Calibration of Date : 3 Jul 23 Barometric Pressure (mmHg) : 758
Next Cal. Date : 3 Jan 24 Relative Humidity (%) : 63.0
Temperature (C°) : 33.0
Reference Dry Gas Meter Data :
Calibration No. : C-030723-BKK_FS0507
Dry Gas Meter ID : BKK_FS0507
Serial No. : 1503017
Model No. : XC-572-V
Reference Dry Gas Meter Data :
Calibration No. : BKK_FS0629
Dry Gas Meter ID : 1607009
Serial No. : 10000
Correction Factor (Y) :
Next Calibration Date : 9 Dec 23

ΔH (mm-H ₂ O)	Θ Minutes	Reference Dry Gas Meter Calibration					Console Control : Drygas Meter					Dry Gas Meter Correction Factor (Y)	Orifice Calibration Factor (Δavg)
		Vr (Litres)		Tr (°C)	Vm (Litres)		Ti (°C)	To (°C)	Avg.Im (°C)				
		Final	Initial		Final	Initial							
15	12.30	150.16	0.00	150.16	32.0	1059452.2	1059300.0	152.20	32.0	32.0	0.9852	46.6121	
25	9.36	150.28	0.00	150.28	32.0	1059817.4	1059465.0	152.40	33.0	33.0	0.9869	44.7666	
50	6.53	150.32	0.00	150.32	32.0	1059792.2	1059600.0	152.20	33.0	33.0	0.9861	43.5559	
80	5.13	150.53	0.00	150.53	32.0	1059847.2	1059795.0	152.20	34.0	34.0	0.9878	42.7510	
120	4.12	150.47	0.00	150.47	33.0	1059111.0	1059960.0	151.00	34.0	34.0	0.9882	41.6664	
									Avg.		0.9869	43.2703	

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

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

Calibrated by:

(Mr. Prasert Surakhnan)

Field Scientist(2)

Approved by:

(Mr. Samart Roo-ngan)

Field Specialist(1)

FORM NO.: F 06-024 REVISION NO.: 2 ISSUE DATE: 30 Jan 22



Stopwatch Calibration Test Report

Calibration Date : 3 Jul 23 Next Cal. Date : 3 Jan 23
Barometric Pressure (mmHg) : 759 Temperature (°C) : 27.0
Relative Humidity (%) : 58.0
Reference Stopwatch Data
Stopwatch ID No. : E18061
Model : F808
Serial No. : -
Calibration Date : 8 Sep 20
Certificate No. : E-2009018
Console Control Meter Data
Dry Gas Meter No. : BKK_FS0507
Model : XC-572-V
Serial No. : 1503017

Run No.	Time Actual (m:ss.ms)	Time Reading (m:ss)	Diff. (ms)	Diff. (min)
1	5:00:11	5:00	11	0.00018
2	5:00:12	5:00	12	0.00020
3	5:00:11	5:00	11	0.00018
4	5:00:09	5:00	9	0.00015
5	5:00:07	5:00	7	0.00012
6	5:00:11	5:00	11	0.00018
7	5:00:11	5:00	11	0.00018
8	5:00:09	5:00	9	0.00015
9	5:00:11	5:00	11	0.00018
10	5:00:12	5:00	12	0.00020
			Average	0.00017
			SD	0.00003

Calibrate by :

Mr. Prasert Surakhnan

Field Scientist (3)

Approved by :

Mr. Samart Roo-ngan

Specialist (1)



DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date :		3 Jul 23	Ambient Temperature (°C)		33	
Calibration sheet No. :		C-030723-BKK_FS0508	Relative Humidity (%) :		63	
Digital Temperature ID :			BKK_FS0508	Reference Temperature ID		BKK_FS1144
Serial No. :			1503017	Serial No. :		201090006013
Model :			XC-572-V	Model :		Digicon-CC-VT-MS
			Next Calibrate :		14 Aug 24	
Location	Reference Temperature °C	Digital Temperature °C	Error °C	MPE	Pass / Fail	
Stack	0	-3	-3	±3	Pass	
	25	22	-3	±3	Pass	
	50	47	-3	±3	Pass	
	100	97	-3	±3	Pass	
	150	147	-3	±3	Pass	
	200	197	-3	±3	Pass	
	250	247	-3	±3	Pass	
Probe	300	297	-3	±3	Pass	
	500	497	-3	±3	Pass	
	100	97	-3	±3	Pass	
	120	117	-3	±3	Pass	
	140	137	-3	±3	Pass	
	100	97	-3	±3	Pass	
	120	117	-3	±3	Pass	
Oven	140	137	-3	±3	Pass	
	100	97	-3	±3	Pass	
	120	117	-3	±3	Pass	
Filter	140	137	-3	±3	Pass	
	100	97	-3	±3	Pass	
	120	117	-3	±3	Pass	
Exit	140	137	-3	±3	Pass	
	0	3	3	±3	Pass	
	10	8	-2	±3	Pass	
Meter	20	18	-2	±3	Pass	
	0	3	3	±3	Pass	
	25	23	-2	±3	Pass	
AUX	50	47	-3	±3	Pass	
	0	3	3	±3	Pass	
	25	23	-2	±3	Pass	
	50	47	-3	±3	Pass	

MPE : (Maximum permissible error of measurement) ค่าความผิดพลาดสูงสุดของค่าวัดที่อนุญาต

Calibrated by :

(Mr. Prasert Surakhnan)

Field Scientist (3)

Approved by :

(Mr. Samart Roo-ngan)

Specialist (1)

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



Pitot Tube Calibration Data

Pitot Tube Identification Number : BKK_FS0511 Calibration Date : 3 Jul 23
Lab test duct Number : 258-1-13-01 Standard Pitot ID : BKK_FS0441
Calibration Sheet No. : C-030723-BKK_FS0511 Cp Standard : 0.99

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

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

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

Calibrated by :

(Mr. Worawich Tongphan)

Field Scientist (2)

Approved by :

(Mr. Samart Roo-ngan)

Specialist (1)

FORM NO.: F 06-025 REVISION NO.: 1 ISSUE DATE: 30 Jan 22



Pitot Tube Calibration Data

Pitot Tube Identification Number : BKK_FS0512 Calibration Date : 3 Jul 23
Lab test duct Number : 258-1-13-01 Standard Pitot ID : BKK_FS0441
Calibration Sheet No. : C-030723-BKK_FS0512 Cp Standard : 0.99


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

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

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

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

Calibrated by : 
(Mr. Worawich Tongpoom)
Field Scientist (2)

Approved by : 
(Mr. Samart Roo-ngan)
Specialist (1)

FORM NO. 7 06-025 REVISION NO. 1 ISSUE DATE: 30 Jun 22



PROBE NOZZLE DIAMETER CALIBRATION DATA SHEET

Calibration Date : 3 Jul 23 Nozzle Set ID. : BKK_FS0513
Calibration Sheet No. : C-030723-BKK_FS0513 Vernier Caliper ID. : RYG_FS0539

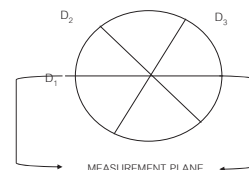
Nozzle ID #	Nozzle Diameter (cm.)			Hi - Lo ΔD	$(D_1 + D_2 + D_3) / 3$ D_{avg}
	D_1	D_2	D_3		
1	0.315	0.315	0.315	0.000	0.315
2	0.475	0.475	0.475	0.000	0.475
3	0.530	0.530	0.530	0.000	0.530
4	0.635	0.635	0.635	0.000	0.635
5	0.790	0.790	0.790	0.000	0.790
6	0.950	0.950	0.950	0.000	0.950
7	1.110	1.110	1.110	0.000	1.110
8	1.270	1.270	1.270	0.000	1.270
9	1.600	1.600	1.600	0.000	1.600

Where :

D_1, D_2, D_3 = There different nozzle diameters at 60 degrees to each other, each measured the nearest 0.025 mm.

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

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



Calibrated by : 
(Mr. Worawich Tongpoom)
Field Scientist (2)

Approved by : 
(Mr. Samart Roo-ngan)
Field Specialist (1)

FORM NO. 7 06-026 REVISION NO. 1 ISSUE DATE: 30 Jun 22

RYG_EN0003

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel +66 2543 8361-6, e-mail: service.thailand@sartorius.com



NSC-TIS-1517025
CALIBRATION 0426

SARTORIUS

Certificate of Calibration

Model Number : MSE224S-100-DU Certificate No. : 23BCI0115
Description : Analytical Balance Issued Date : Friday, March 03, 2023
Serial Number : 0031709552 Reference No. : 204833
ID No. : RYG_EN0003
Manufacturer : Sartorius Page No. : 1 of 2

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

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

Calibrated By : Mr. Chonchai Inthana Calibration Procedure No. : This calibration was conducted by Using in-house calibration procedure number (WI-003)
Calibration Date : Wednesday, March 01, 2023 Based on UKAS LAB 14 : 2019

Metrological data : Ambients Conditions:
Capacity : 220 g Readability : 0.0001 g Temperature : 23.0 °C \pm 5.0 °C
Humidity : 58.0 % RH \pm 10.0 % RH
Pressure : \pm

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

Measurement Method UKAS Publication Ref : Lab 14

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

Traceability:

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

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

Mr. Chonchai Inthana (Technical Manager)



SOP FM 33 03 February 2022

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel +66 2543 8361-6 Fax: +66 2543-8367, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

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

Calibration Results : Without Adjustment

Repeatability			Eccentricity (Off-center loading error)		
The reproducibility is the ability of a weighing instrument to display nearly identical readings under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.			The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).		
Nominal Value : (Low Load)	20.0000	200.0000	Nominal value :	100	g
20 g	20.0001	200.0000	Tolerance	0.0004	g
Tolerance	0.0001 g	0.0001 g	Difference		
Nominal Value : (High Load)	20.0000	200.0001	1	0.0001	
200 g	20.0000	200.0001	2	0.0000	
Tolerance	0.0001 g	0.0001 g	3	0.0000	
Standard Deviation	0.00004	0.00005	4	0.0000	
			5	0.0001	
			6	-	

Linearity

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

Tolerance	0.0002 g			
Nominal Value	Conventional Mass Value	Displayed Value	Deviation	Uncertainty
(g)	(g)	(g)	(g)	(g)
0.01	0.0100	0.0100	0.0000	0.00013
0.05	0.0500	0.0500	0.0000	0.00013
0.1	0.1000	0.1000	0.0000	0.00013
0.5	0.5000	0.5000	0.0000	0.00014
1	1.0000	1.0000	0.0000	0.00014
5	5.0000	5.0000	0.0000	0.00014
10	10.0000	10.0000	0.0000	0.00014
20	20.0000	20.0000	0.0000	0.00024
50	50.0000	50.0000	0.0000	0.00015
100	100.0000	100.0000	0.0000	0.00019
200	200.0000	200.0001	0.0001	0.00032

End of Report

SOP FM 33 03 February 2022



DRY GAS METER CALIBRATION TEST REPORT

Calibration Date : 31 Jul 23 Barometric Pressure (mm.Hg) : 760
Next Calibration Date 31 Jan 24 Relative Humidity (%) : 58.0
Temperature (°C) : 30.0

Dry Gas Meter Data
Calibration sheet No.: C-030123-BKK_FS0445
Dry Gas Meter No.: BKK_FS0445
Console Serial No.: 1902060
Model No.: XC-62-CV

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

Reference Dry Gas Meter Calibration			Dry Gas Meter							Dry Gas Meter Correction Factor (Y)
Vr (Liters)			Vm (Liters)			Ti To Avg. Tm				
Final	Initial	Total	Tr (°C)	Final	Initial	Total	Ti (°C)	To (°C)	Avg. Tm (°C)	
30.01	0.00	30.01	27.0	30.21	0.00	30.21	27.0	27.0	27.0	0.9935
30.01	0.00	30.01	28.0	30.27	0.00	30.27	28.0	28.0	28.0	0.9915
60.01	0.00	60.01	28.0	60.66	0.00	60.66	28.0	28.0	28.0	0.9893
60.01	0.00	60.01	29.0	60.61	0.00	60.61	29.0	29.0	29.0	0.9901
90.12	0.00	90.12	29.0	90.95	0.00	90.95	29.0	29.0	29.0	0.9909
90.02	0.00	90.02	29.0	90.17	0.00	90.17	29.0	29.0	29.0	0.9984
									Avg.	0.9923

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

Calibrate by :

Mr.Prasert Surakhan
Field Scientist (3)

Approved by :

Mr.Samart Roo-ngan
Specialist (1)

FORM NO.: F-06-027 REVISION NO.: 1 ISSUE DATE: 30/03/22



DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date :	31 Jul 23	Ambient Temperature (°C)	30
Calibration sheet No. :	C-310723-BKK_FS0445	Relative Humidity (%) :	62
Digital Temperature ID :	BKK_FS0445	Reference Temperature ID	BKK_FS1144
Serial No. :	1902060	Serial No. :	201090006013
Model :	XC-62-CV	Model :	Digicon-CC-VT-MS
		Next Calibrate :	14 Aug 24

Location	Reference Temperature °C	Digital Temperature °C	Error °C	MPE	Pass / Fail
Slack	0	-2	-2	± 3	Pass
	25	23	-2	± 3	Pass
	50	48	-2	± 3	Pass
	100	98	-2	± 3	Pass
	150	148	-2	± 3	Pass
	200	198	-2	± 3	Pass
Probe	250	248	-2	± 3	Pass
	300	298	-2	± 3	Pass
	500	498	-2	± 3	Pass
	100	98	-2	± 3	Pass
	120	118	-2	± 3	Pass
	140	138	-2	± 3	Pass
Oven	100	-	-	± 3	-
	120	-	-	± 3	-
Filter	140	-	-	± 3	-
	100	98	-2	± 3	Pass
Exit	120	118	-2	± 3	Pass
	140	138	-2	± 3	Pass
Meter	0	-2	-2	± 3	Pass
	25	23	-2	± 3	Pass
AUX	50	48	-2	± 3	Pass
	0	-2	-2	± 3	Pass
	25	23	-2	± 3	Pass
	50	48	-2	± 3	Pass

MPE : (Maximum permissible error of measurement) ค่าความผิดพลาดสูงสุดของการวัด

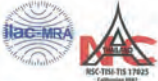
Calibrated by :

(Mr.Prasert Surakhan)
Field Scientist (3)

Approved by :

(Mr.Samart Roo-ngan)
Specialist (1)

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



Certificate of Calibration

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

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

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

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

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

Calibration By: Mr.Nattapat Rungrueang
Calibration Date: 18 September 2023
The Method used: In house method, CAL-WI-24, base on ASTM E 275-08 and ASTM E 387-04
Traceability: This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Stama Scientific Limited.

The standard for Wavelength Certificate No. 111583 and 111584
The standard for Photometric Certificate No. 9114984 and 111588
The standard for Stray light Certificate No. 111586 and 111585
The standard for Spectral resolution Certificate No. 111587

(Mr. Nattapat Rungrueang)
Person in charge

(Mr. Nitinun Srihawan)
Authorized signatory

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

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

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

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Delivering Growth - in Asia and Beyond.

CAL-FM-C06-15: 12 Sep 2022



Certificate No.: C06230441 Page 2 of 3

Calibration Results: Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 2 nm and UUC at 2 nm				
Standard Wavelength	Unit Under Calibration	Correction	Uncertainty	
418.61	418.3	0.31	0.13	
536.66	536.6	0.06	0.13	
637.98	638.3	-0.32	0.13	
748.48	748.7	-0.22	0.13	
807.03	807.4	-0.37	0.13	
Photometric Accuracy (Absorbance)				
Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.2930	0.289	0.0040	0.0045
	0.5168	0.519	-0.0022	0.0045
	1.0298	1.029	0.0008	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.2867	0.283	0.0037	0.0045
	0.5073	0.509	-0.0017	0.0045
	1.0083	1.007	0.0013	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.2516	0.250	0.0016	0.0045
	0.4595	0.462	-0.0025	0.0045
	0.9334	0.933	0.0004	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.2461	0.245	0.0011	0.0045
	0.4652	0.468	-0.0008	0.0045
	0.9468	0.946	0.0008	0.0045
590 nm	0.0000	0.000	0.0000	0.0045
	0.2594	0.259	0.0004	0.0045
	0.5040	0.505	-0.0010	0.0045
	1.0032	1.002	0.0012	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.2579	0.257	0.0009	0.0045
	0.4971	0.497	0.0001	0.0045
	0.9720	0.971	0.0010	0.0045

DKSH Technology Limited
2533 Sukhumvit Road, Bangkok, Thailand 10260
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CAL-FM-C06-15: 12 Sep 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
	0.7355	0.737	-0.0015	0.0080
257 nm	0.0000	0.000	0.0000	0.0080
	0.8574	0.857	0.0004	0.0080
313 nm	0.0000	0.000	0.0000	0.0080
	0.2884	0.290	-0.0036	0.0080
350 nm	0.0000	0.000	0.0000	0.0080
	0.6374	0.637	0.0004	0.0080
Stray light *				
Standard: cut-off	UUC: Wavelength (nm)	UUC: Transmission (%T)	Absorbance (A)	
260.62 +/- 0.11 nm	260.6	1.3	1.886	
391.44 +/- 0.11 nm	391.4	1.3	1.886	
Spectral Resolution *				
Nominal Concentration 0.02 % w/v	Peak	Trough	Ratio	SBW
Standard Wavelength (nm)	268.66	268.69	1.38	2.00
UUC: Wavelength (nm)	268.2	266.1		
Std Absorbance (A)	0.4566	0.2780		
Absorbance (A)	0.413	0.300		

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

The End of Certificate

บริษัท ดีเคเอส อีเซีย จำกัด
DKSH Technology Limited
2533 สุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110
Phone: +66 2069 7000 Email: info.calibration@dksh.com Website: www.dksh.com/calibration-thailand
Delivering Growth - in Asia and Beyond.

CAL-FM-C08-15: 12 Sep 2022

ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: WO-00005382

ชนิดเครื่องมือ: SPECTROPHOTOMETER รุ่น: DR6000

หมายเลขเครื่อง: 1627845

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

เงื่อนไขข้อแนะนำ: *656.1nm=656.1nm

*486.0nm=485.5nm

Mr.Nattapat Rungueang
Service Engineer

บริษัท ดีเคเอส อีเซีย จำกัด
DKSH Technology Limited
2533 สุขุมวิท แขวงคลองเตย เขตคลองเตย กรุงเทพมหานคร 10110
Phone: +66 2069 7000 Email: info.calibration@dksh.com Website: www.dksh.com/calibration-thailand
Delivering Growth - in Asia and Beyond.

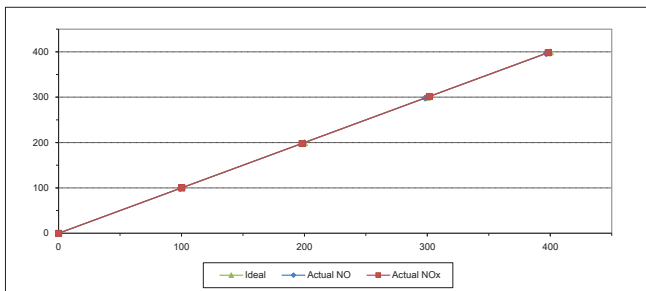
CAL-FM-R31-03: 20 Jul 2022



MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-23	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	PX13CWA0	Equipment ID	BKK_FS1088
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.00	-1.00	-1.00	100.30	0.30	0.30
2	200.00	198.30	-1.70	-0.85	198.10	-1.90	-0.95
3	300.00	298.40	-1.60	-0.53	301.70	1.70	0.57
4	400.00	396.70	-3.30	-0.83	398.30	-1.70	-0.42
AVERAGE (%)				-0.62			-0.08



Calibrated By

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

Approved By

(Mr.Sarayuht Jittrantont)
Assistant General Manager

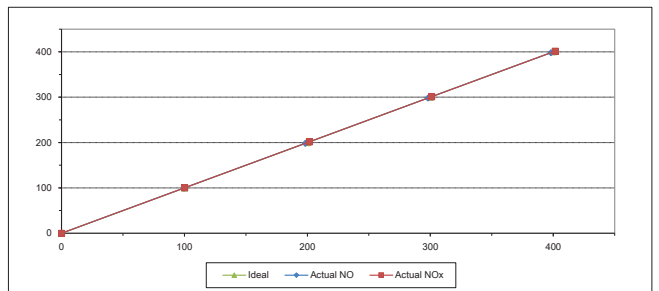
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-23	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	30K18RHM	Equipment ID	BKK_FS1088
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.05	0.05	0.05	0.10	0.10	0.10
1	100.00	99.50	-0.50	-0.50	100.20	0.20	0.20
2	200.00	198.30	-1.70	-0.85	201.60	1.60	0.80
3	300.00	298.10	-1.90	-0.63	301.10	1.10	0.37
4	400.00	398.20	-1.80	-0.45	401.60	1.60	0.40
AVERAGE (%)				-0.48			0.37



Calibrated By

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

Approved By

(Mr.Sarayuht Jittrantont)
Assistant General Manager

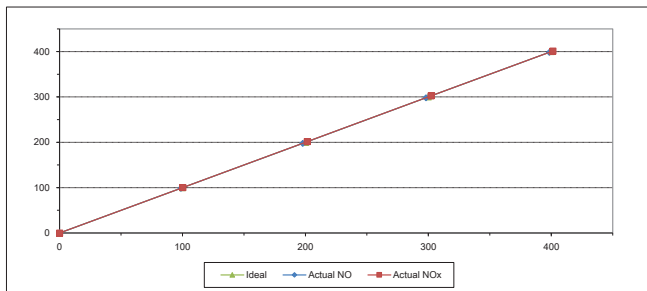
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-23	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	SEEAW53E	Equipment ID	RYG_FS0261
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	98.70	-1.30	-1.30	100.40	0.40	0.40
2	200.00	197.80	-2.20	-1.10	201.50	1.50	0.75
3	300.00	298.10	-1.90	-0.63	302.20	2.20	0.73
4	400.00	398.50	-1.50	-0.38	401.40	1.40	0.35
AVERAGE (%)				-0.66			0.47



Calibrated By

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

Approved By

(Mr.Sarayuth Jitranont)
Assistant General Manager

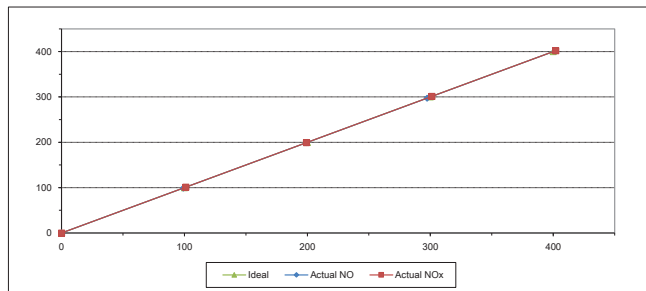
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	1-Jul-23	Equipment Name	NOx Analyzer
Manufacturer	Teledyne API	Model	200E
Serial No.	4379	Equipment ID	BKK_FS0778
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	99.10	-0.90	-0.90	101.20	1.20	1.20
2	200.00	199.30	-0.70	-0.35	199.20	-0.80	-0.40
3	300.00	297.40	-2.60	-0.87	301.40	1.40	0.47
4	400.00	401.50	1.50	0.38	402.10	2.10	0.53
AVERAGE (%)				-0.33			0.38



Calibrated By

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

Approved By

(Mr.Sarayuth Jitranont)
Assistant General Manager

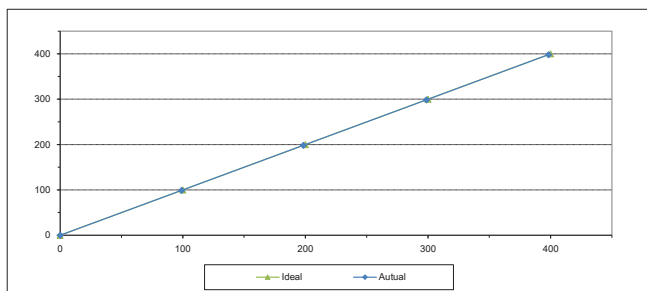
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	2-Jul-23	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	XHV1S59F	Equipment ID	BKK_FS1087
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	99.10	-0.90	-0.90
2	200.00	198.30	-1.70	-0.85
3	300.00	298.70	-1.30	-0.43
4	400.00	398.30	-1.70	-0.42
AVERAGE (%)				-0.50



Calibrated By

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

Approved By

(Mr.Sarayuth Jitranont)
Assistant General Manager

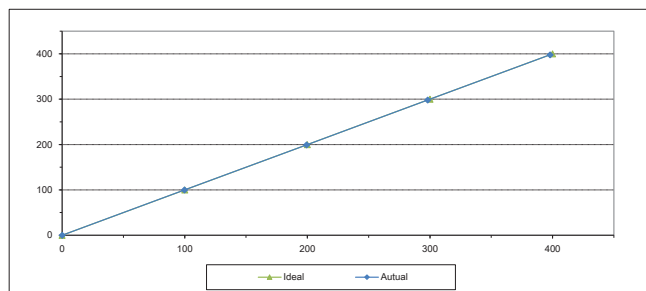
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	2-Jul-23	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	YPRXJJ20	Equipment ID	RYG_FS0263
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	99.80	-0.20	-0.20
2	200.00	199.40	-0.60	-0.30
3	300.00	298.20	-1.80	-0.60
4	400.00	398.00	-2.00	-0.50
AVERAGE (%)				-0.30



Calibrated By

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

Approved By

(Mr.Sarayuth Jitranont)
Assistant General Manager

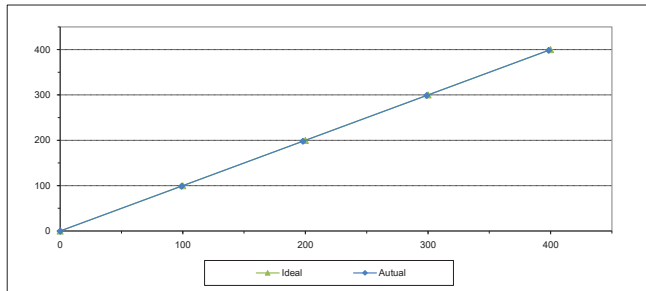
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	2-Jul-23	Equipment Name	SO2 Analyzer
Manufacturer	HORIBA	Model	APSA-370
Serial No.	8HC0DGJF	Equipment ID	RYG_FS0280
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	99.10	-0.90	-0.90
2	200.00	198.00	-2.00	-1.00
3	300.00	299.00	-1.00	-0.33
4	400.00	398.50	-1.50	-0.38
AVERAGE (%)				-0.50



Calibrated By

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

Approved By

(Mr. Sareyuth Jitranont)
Assistant General Manager

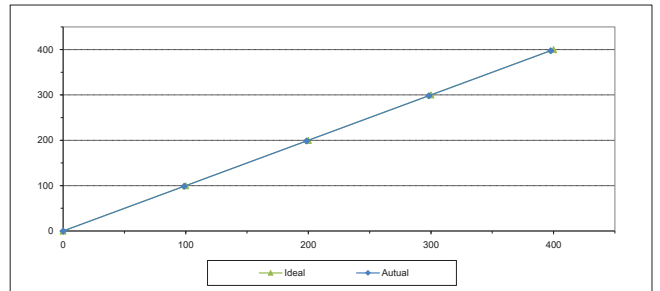
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	2-Jul-23	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	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	98.80	-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

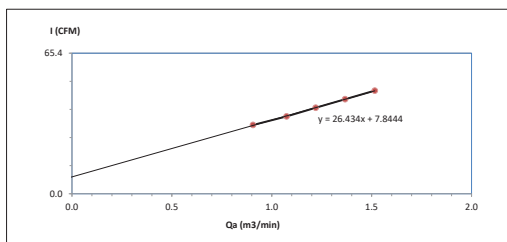
ALS Laboratory Group
FORM NO.: F 06-056 REVISION NO.: - ISSUE DATE: 02/04/12



High Volume Air Sampler Calibration Worksheet

Project Site:	Global Power Synergy Public Company Limited	Barometric Pressure (mm Hg):	757
Calibrate Location:	จังหวัดขอนแก่น	Temperature (°C):	32
Calibrate Date:	19-Sep-23	High Volume ID:	RYG_FS0189
CalibrationSheet No.:	C-190923-RYG_FS0189	High Volume Model:	TE-5009X
Calibrator ID:	RYG_FS0206	High Volume S/N:	4797
Calibrator Model:	TE-5028A	Calibrator Slope:	0.92345
Calibrator S/N:	1543	Calibrator Intercept:	-0.0095

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I : Chart (CFM)	Linear Regression
1	1.7	0.906	32	Slope: 26.4342 Intercept: 7.8444 Correlation Coefficient: 0.9996
2	2.4	1.074	36	
3	3.1	1.220	40	
4	3.9	1.367	44	
5	4.8	1.515	48	



Calibrated by
(Mr. Anurak Tongkhajonsakda)
Field Scientist(1)

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

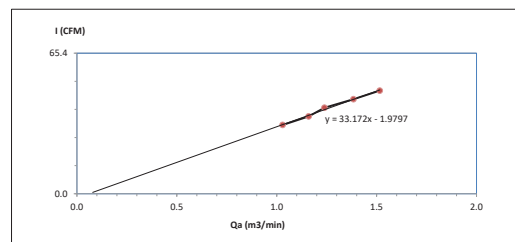
FORM NO.: F 06-074 REVISION NO.: - ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site:	Global Power Synergy Public Company Limited	Barometric Pressure (mm Hg):	757
Calibrate Location:	จังหวัดขอนแก่น	Temperature (°C):	32
Calibrate Date:	19-Sep-23	High Volume ID:	RYG_FS0666
CalibrationSheet No.:	C-190923-RYG_FS0666	High Volume Model:	TE-5009X
Calibrator ID:	RYG_FS0206	High Volume S/N:	6265
Calibrator Model:	TE-5028A	Calibrator Slope:	0.92345
Calibrator S/N:	1543	Calibrator Intercept:	-0.0095

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I : Chart (CFM)	Linear Regression
1	2.2	1.029	32	Slope: 33.1725 Intercept: -1.9797 Correlation Coefficient: 0.9965
2	2.8	1.160	36	
3	3.2	1.239	40	
4	4.0	1.384	44	
5	4.8	1.515	48	



Calibrated by
(Mr. Anurak Tongkhajonsakda)
Field Scientist(1)

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

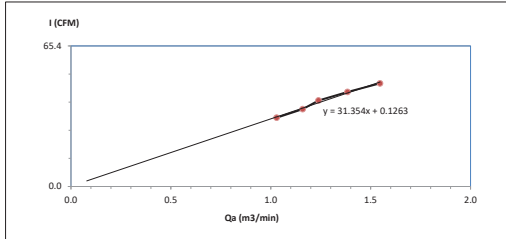
FORM NO.: F 06-074 REVISION NO.: - ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site : Global Power Synergy Public Company Limited
Calibrate Location : กรุงเทพมหานคร
Calibrate Date : 19-Sep-23
CalibrationSheet No.: C-190923-RYG_FS0190
Calibrator ID: RYG_FS0206
Calibrator Model: TE-5028A
Calibrator S/N: 1543
Barometric Pressure (mm Hg) : 757
Temperature (°C) : 32
High Volume ID : RYG_FS0190
High Volume Model : G1051
High Volume S/N : 1625
Calibrator Slope : 0.92345
Calibrator Intercept : -0.0095

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I : Chart (CFM)	Linear Regression
1	2.2	1.029	32	Slope : 31.3544 Intercept : 0.1263 Correlation Coefficient : 0.9936
2	2.8	1.160	36	
3	3.2	1.239	40	
4	4.0	1.384	44	
5	5.0	1.546	48	



Calibrated by : (Mr. Anurak Tongkhajonsakda) Field Scientist(1)
Approved by : (Mr. Noppong Juntarupan) Enviro Field Coordinator Scientist (3)

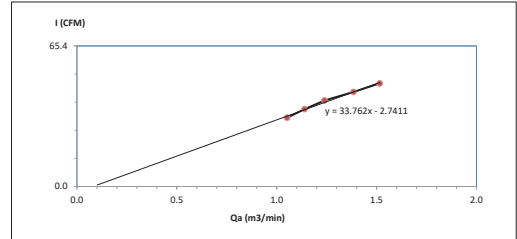
FORM NO.: F 06-074 REVISION NO.: ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site : Global Power Synergy Public Company Limited
Calibrate Location : กรุงเทพมหานคร
Calibrate Date : 19-Sep-23
CalibrationSheet No.: C-190923-RYG_FS0667
Calibrator ID: RYG_FS0206
Calibrator Model: TE-5028A
Calibrator S/N: 1543
Barometric Pressure (mm Hg) : 757
Temperature (°C) : 32
High Volume ID : RYG_FS0667
High Volume Model : TE-5009X
High Volume S/N : 6266
Calibrator Slope : 0.92345
Calibrator Intercept : -0.0095

Test No.	Delta H ₂ O (inch)	Qa (m ³ /min)	I : Chart (CFM)	Linear Regression
1	2.3	1.052	32	Slope : 33.7625 Intercept : -2.7411 Correlation Coefficient : 0.9947
2	2.7	1.139	36	
3	3.2	1.239	40	
4	4.0	1.384	44	
5	4.8	1.515	48	



Calibrated by : (Mr. Anurak Tongkhajonsakda) 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

RYG_EN0001

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



SARTORIUS

REVIEW BY :
APPROVED BY :
NEXT CAL. DATE : 01/03/24

Model Number : LA130S-F
Description : Analytical Balance
Serial Number : 25409864
ID No. : RYG_EN0001
Manufacturer : Sartorius
Certificate No. : 23BCI0110
Issued Date : Friday, March 03, 2023
Reference No. : 204833
Page No. : 1 of 2

Customer Name : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)
618/10 Moo 5 T. Maenam Khu. A. Pluak Daeng, Rayong 21140, Thailand.

Calibrated Place : ALS Laboratory Group (Thailand) Co., Ltd. (Balance Room)
618/10 Moo 5 T. Maenam Khu. A. Pluak Daeng, Rayong 21140, Thailand.

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

Metrological data :
Capacity : 150 g Readability : 0.0001 g
Reasons for calibration :
☐ New Installation ☐ Service / Replaced ☒ Re-calibration / Maintenance
Ambients Conditions :
Temperature : 24.2 °C ± 5.0 °C
Humidity : 60.0 % RH ± 10.0 % RH
Pressure : ±

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

Traceability:

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

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

Mr. Chonchai Inthana (Technical Manager)



SOP FM 33 03 February 2022

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

SARTORIUS

Certificate of Calibration

Model Number : LA130S-F
Description : Analytical Balance
Serial Number : 25409864
ID No. : RYG_EN0001
Manufacturer : Sartorius
Certificate No. : 23BCI0110
Issued Date : Friday, March 03, 2023
Reference No. : 204833
Page No. : 2 of 2

Calibration Results : Without Adjustment

Repeatability	Eccentricity (Off-center loading error)
The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.	The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R118).
Nominal Value : (Low Load) 10 g Tolerance 0.0001 g Nominal Value : (High Load) 100 g Tolerance 0.0001 g Standard Deviation 0.00009 0.00006	Nominal value : 50 g Tolerance 0.0004 g Difference 1 - 2 0.0000 3 -0.0001 4 0.0001 5 0.0000 6 -

Linearity

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

Tolerance	0.0002 g			
Nominal Value	Conventional Mass Value	Displayed Value	Deviation	Uncertainty
(g)	(g)	(g)	(g)	(g)
0.01	0.0100	0.0100	0.0000	0.00022
0.05	0.0500	0.0500	0.0000	0.00023
0.1	0.1000	0.1000	0.0000	0.00023
0.5	0.5000	0.5000	0.0000	0.00023
1	1.0000	1.0000	0.0000	0.00023
2	2.0000	2.0000	0.0000	0.00023
5	5.0000	5.0000	0.0000	0.00022
10	10.0000	10.0001	0.0001	0.00024
20	20.0000	20.0001	0.0001	0.00023
100	100.0000	100.0002	0.0002	0.00026

End of Report

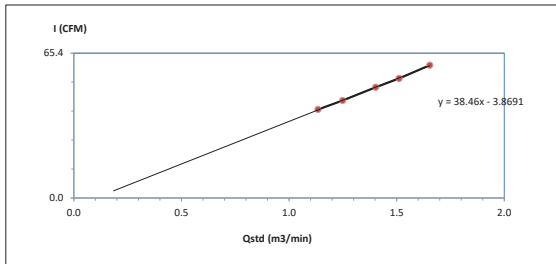
SOP FM 33 03 February 2022



High Volume Air Sampler Calibration Worksheet

Project Site :	Global Power Synergy Public Company Limited	Barometric Pressure (mm Hg) :	757
Calibrate Location :	วัดพระธาตุหนองบัว	Temperature (°C) :	32
Calibrate Date :	19-Sep-23	High Volume ID :	RYG_FS0180
CalibrationSheet No.:	C-190923-RYG_FS0180	High Volume Model :	TE-5170D
Calibrator ID:	RYG_FS0206	High Volume S/N :	1328
Calibrator Model :	TE-5028A	Calibrator Slope :	1.47433
Calibrator S/N :	1543	Calibrator Intercept :	-0.01503

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I : Chart (CFM)	Linear Regression
1	2.8	1.1347	40	Slope : 38.4599 Intercept : -3.8691 Correlation Coefficient : 0.9996
2	3.4	1.2488	44	
3	4.3	1.4025	50	
4	5.0	1.5112	54	
5	6.0	1.6540	60	



Calibrated by :
(Mr.Anurak Tongkhajonsakda)
Field Scientist(1)

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

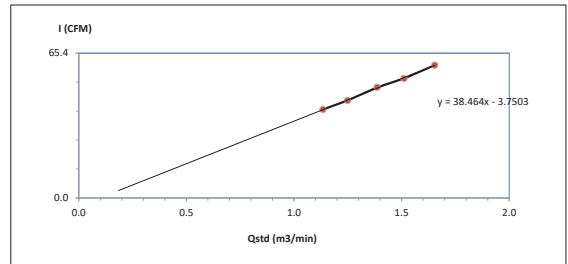
FORM NO.: F 06-073 REVISION NO.: - ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site :	Global Power Synergy Public Company Limited	Barometric Pressure (mm Hg) :	757
Calibrate Location :	บ้านลำกุ่มหนอง	Temperature (°C) :	32
Calibrate Date :	19-Sep-23	High Volume ID :	RYG_FS0663
CalibrationSheet No.:	C-190923-RYG_FS0663	High Volume Model :	TE-5009X
Calibrator ID:	RYG_FS0206	High Volume S/N :	6260
Calibrator Model :	TE-5028A	Calibrator Slope :	1.47433
Calibrator S/N :	1543	Calibrator Intercept :	-0.01503

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I : Chart (CFM)	Linear Regression
1	2.8	1.1347	40	Slope : 38.4643 Intercept : -3.7503 Correlation Coefficient : 0.9991
2	3.4	1.2488	44	
3	4.2	1.3863	50	
4	5.0	1.5112	54	
5	6.0	1.6540	60	



Calibrated by :
(Mr.Anurak Tongkhajonsakda)
Field Scientist(1)

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

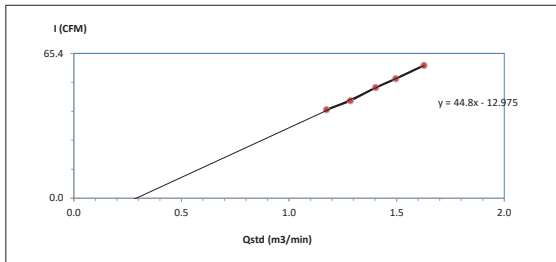
FORM NO.: F 06-073 REVISION NO.: - ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site :	Global Power Synergy Public Company Limited	Barometric Pressure (mm Hg) :	757
Calibrate Location :	วัดเขาหลวง	Temperature (°C) :	32
Calibrate Date :	19-Sep-23	High Volume ID :	RYG_FS0394
CalibrationSheet No.:	C-190923-RYG_FS0394	High Volume Model :	TE-5170D
Calibrator ID:	RYG_FS0206	High Volume S/N :	5690
Calibrator Model :	TE-5028A	Calibrator Slope :	1.47433
Calibrator S/N :	1543	Calibrator Intercept :	-0.01503

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I : Chart (CFM)	Linear Regression
1	3.0	1.1740	40	Slope : 44.8003 Intercept : -12.9749 Correlation Coefficient : 0.9990
2	3.6	1.2846	44	
3	4.3	1.4025	50	
4	4.9	1.4962	54	
5	5.8	1.6265	60	



Calibrated by :
(Mr.Anurak Tongkhajonsakda)
Field Scientist(1)

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

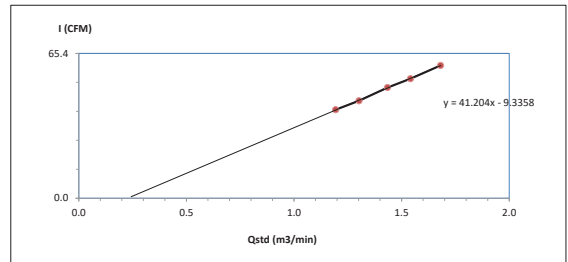
FORM NO.: F 06-073 REVISION NO.: - ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site :	Global Power Synergy Public Company Limited	Barometric Pressure (mm Hg) :	757
Calibrate Location :	วัดนาบูน	Temperature (°C) :	32
Calibrate Date :	19-Sep-23	High Volume ID :	RYG_FS0396
CalibrationSheet No.:	C-190923-RYG_FS0396	High Volume Model :	TE-5170D
Calibrator ID:	RYG_FS0206	High Volume S/N :	5688
Calibrator Model :	TE-5028A	Calibrator Slope :	1.47433
Calibrator S/N :	1543	Calibrator Intercept :	-0.01503

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I : Chart (CFM)	Linear Regression
1	3.1	1.1931	40	Slope : 41.2044 Intercept : -9.3358 Correlation Coefficient : 0.9996
2	3.7	1.3021	44	
3	4.5	1.4344	50	
4	5.2	1.5409	54	
5	6.2	1.6811	60	



Calibrated by :
(Mr.Anurak Tongkhajonsakda)
Field Scientist(1)

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

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

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM: Cup anemometer
MANUFACTURER: Novallyst
MODEL/TYPE: Sensor: WS-02F
Data logger: 200-WS-25LB
SERIAL NUMBER: Sensor: WSD-AS190
Data logger: AS190
ID NUMBER: RYE_F30329
CONDITION AS-RECEIVED: Used item
CUSTOMER: ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand.

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

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature: 23.0 ± 3.0 °C
Relative Humidity: 55.0 ± 15.0 %RH
Atmospheric Pressure: 1010 ± 10 hPa

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

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

Preconditioning: 24 hours at ambient conditions.
Measurement Condition: The average values during measurement are (24.3) °C, (43.1) %RH and (1005.5) hPa.

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:
☒ Mr. Sorawit Thuchald
☐ Miss Jittragoon Lertsomphol



Approved signatory: *Mr. P*
Mr. Parinya Booncharoen
Calibration Department Manager

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

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

Page 2 of 2 Pages

MEASUREMENT RESULTS¹

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

V_{ref} (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	V_{meas} (m/s)	Error (m/s)	U (k=2) (m/s)
1.032	24.10	24.30	0.9	-0.1	0.31
2.095	24.54	24.30	1.9	-0.2	0.31
3.066	24.08	24.30	2.9	-0.1	0.31
4.220	24.04	24.30	4.0	-0.2	0.31
5.00	23.78	24.30	4.9	-0.1	0.31
5.97	23.82	24.30	5.9	-0.1	0.31
7.01	23.78	24.30	6.9	-0.1	0.31
8.13	24.00	24.30	8.0	-0.1	0.31
9.07	23.82	24.30	9.0	-0.1	0.31
10.07	23.90	24.30	9.9	-0.1	0.31
11.13	23.84	24.30	11.1	0.0	0.31
12.13	23.80	24.30	12.0	-0.1	0.31
13.19	23.82	24.30	13.2	0.0	0.31
14.24	23.74	24.30	14.3	-0.1	0.31
15.20	23.80	24.30	15.2	0.0	0.31
16.26	23.74	24.30	16.1	-0.2	0.31

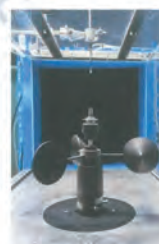
Remark:

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

² Velocity of standard

³ Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP



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



CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM: Wind Direction Sensor
MANUFACTURER: Novallyst
MODEL/TYPE: Sensor: WS-02F
Data logger: 200-WS-25LB
SERIAL NUMBER: Sensor: WSD-AS190
Data logger: AS190
ID NUMBER: RYE_F30329
CONDITION AS-RECEIVED: Used item
CUSTOMER: ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang,
Khet Suan Luang, Bangkok 10250 Thailand.

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

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:
Temperature: 23.0 ± 3.0 °C
Relative Humidity: 55.0 ± 15.0 %RH
Atmospheric Pressure: 1010 ± 10 hPa

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

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

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

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibrated by:
☒ Mr. Sorawit Thuchald
☐ Miss Jittragoon Lertsomphol



Approved signatory: *Mr. P*
Mr. Parinya Booncharoen
Calibration Department Manager

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

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

Page 2 of 2 Pages

MEASUREMENT RESULTS¹

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

Air speed m/s	D _{90°} Degree (°)	D _{0°} Degree (°)	Error Degree (°)	U (k=2) Degree (°)
5.00	45.000	41	-4	1.0
	90.000	87	-3	1.0
	135.001	132	-3	1.0
	180.000	178	-2	1.0
	225.000	226	1	1.0
	270.000	272	2	1.0
	315.000	319	4	1.0
	360.000	359	-1	1.0

Remark:

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

² Direction of standard

³ Direction of Unit Under Calibration



SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

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



Cert. No. : ACC23009
Pages : 1 of 3

Calibration Certificate

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

Condition As Found : GOOD

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

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

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

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petchurai
(Thanakul Petchurai)

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

QF-TS12-04-04-020664

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACC23009
Job No. : VC66AC0031
Pages : 2 of 3

Calibration Procedure : CP-AC-03

Calibration Method :

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

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33511B	MY52302742	EF-0008-22	04-Feb-23
Digital Multimeter	33461A	MY53220104	EEL_BP_04/0265	09-Feb-23
Digital Multimeter	33461A	MY53220076	EEL_BP_03/0265	09-Feb-23
Digital Multimeter	33461A	MY60024273	EEL_BP_05/0265	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	EF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAI	34560495	AA-3005-22	22-Feb-23
Audio Analyzer	AVR-3360A	V744B6069	EF-0010-22	07-Feb-23

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

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

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

QF-TS12-04-04-020664

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

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

Result of calibration :

1. Sound pressure level

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

2. Frequency

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

3. Total distortion

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

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

End of Calibration Certificate

QF-TS12-04-04-020664

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

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



Cert. No. : ACL23045
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00900074 / 188467 / 01736
ID No.: RYG_FS0495

Condition As Found : GOOD

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

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

Received Date : 06 JANUARY 2023
Calibration Date : 13-18 JANUARY 2023
Date of Issue : 19 JANUARY 2023

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petchurai
(Thanakul Petchurai)

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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23045
Job No. : VC66AC0024
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

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

Condition of this result of calibration :

1. Reference Standard Instruments :

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

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

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

3.1 National Institute of Metrology (Thailand).

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

QF-TS12-04-04-020664

P. L. N.

Continuation of Calibration Certificate

Cert. No. : ACL23045
Job No. : VC66AC0024
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

P. L. N.

Continuation of Calibration Certificate

Cert. No. : ACL23045
Job No. : VC66AC0024
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.8

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

Frequency Weighting	Measured value (dB)
A - weight	9.9
C - weight	16.8
Flat	22.8

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.4	0.4	0.4	± 1.5
1000	0.1	0.1	0.1	± 1.0
8000	-2.0	-1.9	-1.9	±5.0

QF-TS12-04-04-020664

P. L. N.

Continuation of Calibration Certificate

Cert. No. : ACL23045
Job No. : VC66AC0024
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	-0.1	-0.1	±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	0.0	0.0	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

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

QF-TS12-04-04-020664

P. L. N.

Cert. No. : ACL23045
Job No. : VC66AC0024
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.1	0.1	±1.1
136.0	136.1	0.1	±1.1
135.0	135.1	0.1	±1.1
134.0	134.1	0.1	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.1	0.1	±1.1
124.0	124.0	0.0	±1.1
119.0	119.1	0.1	±1.1
114.0	114.1	0.1	±1.1
109.0	109.1	0.1	±1.1
104.0	104.1	0.1	±1.1
99.0	99.1	0.1	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
30.0	30.0	0.0	±1.1
29.0	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

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Job No. : VC66AC0024
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8. Level linearity including the level range control

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

9. Tone burst response

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

10. Peak C sound level

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

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Cert. No. : ACL23045
Job No. : VC66AC0024
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
89.6	89.5		

12. High level stability

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

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

End of Calibration Certificate

QF-TS12-04-04-020664

451-451/1 Sirinthon Rd., Bangumru, Bangplud Bangkok 10700 THAILAND.
Tel:0-2435-8800 Fax:0-2433-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.comCert. No. : ACL23044
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00900073 / 188466 / 01735
ID No.: RYG_FS0494

Condition As Found : GOOD

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

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

Received Date : 06 JANUARY 2023
Calibration Date : 13-18 JANUARY 2023
Date of Issue : 19 JANUARY 2023

Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchurai
(Thanakul Petchurai)

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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23044
Job No. : VC66AC0024
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.

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

Condition of this result of calibration :

1. Reference Standard Instruments :

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

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

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

3.1 National Institute of Metrology (Thailand).

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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23044
Job No. : VC66AC0024
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. : ACL23044
Job No. : VC66AC0024
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.8

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

Frequency Weighting	Measured value (dB)
A - weight	11.6
C - weight	17.8
Flat	23.7

3. Acoustical signal tests of frequency weightings

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

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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23044
Job No. : VC66AC0024
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	0.0	±2.0
125	0.0	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.1	0.0	±3.0
8000	0.0	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	94.1	0.1	± 0.3

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23044
Job No. : VC66AC0024
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	119.1	0.1	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.1	0.1	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
30.0	29.9	-0.1	±1.1
29.0	28.9	-0.1	±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. R. L. H.

Continuation of Calibration Certificate

Cert. No. : ACL23044
Job No. : VC66AC0024
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	108.0	0.0	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	136.1	-0.3	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	132.9	-0.1	-
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

T. R. L. H.

Continuation of Calibration Certificate

Cert. No. : ACL23044
Job No. : VC66AC0024
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

T. R. L. H.

CERTIFICATE OF CALIBRATION

ISSUED BY: Cirrus Research plc
DATE OF ISSUE: 05 January 2023
CERTIFICATE NUMBER: 185460REVIEW BY: Alan P
APPROVED BY: [Signature]
EXT CAL DATE: 6/1/24Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 1

Test engineer:
Terry Goodrich
Electronically signed:

T. A. Goodrich

doseBadge Reader

Instrument

Manufacturer: Cirrus Research plc
Model Number: RC:110A
Serial Number: 89107
Notes:

Calibration Procedure

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

Date of Calibration: 05 January 2023

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	113.97	1002.2	0.13
Uncertainty	± 0.11	± 0.14	± 0.10
Tolerances	± 0.60	± 2.00	± 4.00

No adjustments were made during this calibration.

Environmental Conditions

Pressure: 100.38 kPa
Temperature: 23.6 °C
Humidity: 41.7 %

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%.

CERTIFICATE OF CALIBRATION

Certificate No. : CL-043-66
Page 1 of 2

Equipment Name: Heat Stress Monitor
Manufacturer: Delta OHM
Model: HD32.2
Serial No: 20032241
ID No: RYG_FS0521

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

Received date: 21 Feb 2023
Calibration date: 24 Feb 2023
Issue date: 28 Feb 2023

Reference 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 2023

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 Thailand (NIMT) Certificate
number: TT-0034-22, Certificate number: ER-0092-
22



Calibrated by
☐ Mr. Soravit Thachalad
☒ Miss Jitraporn Lertsomphol



Approved Signatory: 
Mr. Parinya Booncharoen
Calibration Department Manager

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

Certificate No. : CL-043-66
Page 2 of 2

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: 21001217.
Dimension: Diameter 14 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
60	20.045	20.1	0.1	0.099
60	25.055	25.1	0.0	0.099
60	30.055	30.1	0.0	0.099
60	35.048	35.1	0.1	0.099
60	40.043	40.1	0.1	0.099

Table 2: This equipment was connected with temperature probe Model: TP3207.2 S/N: 21001783.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.045	20.2	0.2	0.099
70	25.055	25.1	0.0	0.099
70	30.055	30.0	-0.1	0.099
70	35.048	35.0	0.0	0.099
70	40.043	39.9	-0.1	0.099

Table 3: This equipment was connected with Globe thermometer probe Model: TP3276.2 S/N: 21001242.
Dimension: Diameter 8 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.045	20.0	0.0	0.099
110	25.055	25.0	-0.1	0.099
110	30.055	30.0	0.0	0.14
110	35.048	35.0	0.0	0.099
110	40.043	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-044-66
Page 1 of 2

Equipment Name: Heat Stress Monitor
Manufacturer: Delta OHM
Model: HD32.2
Serial No: 20032242
ID No: RYG_FS0522

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

Received date: 21 Feb 2023
Calibration date: 24 Feb 2023
Issue date: 28 Feb 2023

Reference 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 2023

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 Thailand (NIMT) Certificate
number: TT-0034-22, Certificate number: ER-0092-
22



Calibrated by
☐ Mr. Soravit Thachalad
☒ Miss Jitraporn Lertsomphol



Approved Signatory: 
Mr. Parinya Booncharoen
Calibration Department Manager

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

Certificate No. : CL-044-66
Page 2 of 2

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: 21001206.
Dimension: Diameter 14 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
60	20.046	20.0	0.0	0.099
60	25.056	25.0	-0.1	0.099
60	30.055	30.1	0.0	0.099
60	35.048	35.1	0.1	0.099
60	40.043	40.1	0.1	0.099

Table 2: This equipment was connected with temperature probe Model: TP3207.2 S/N: 21001796.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.046	20.2	0.2	0.099
70	25.055	25.0	-0.1	0.099
70	30.055	29.9	-0.2	0.099
70	35.048	34.8	-0.2	0.099
70	40.044	39.7	-0.3	0.099

Table 3: This equipment was connected with Globe thermometer probe Model: TP3276.2 S/N: 21001250.
Dimension: Diameter 8 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.046	20.0	0.0	0.099
110	25.056	25.0	-0.1	0.099
110	30.055	30.1	0.0	0.099
110	35.048	35.1	0.1	0.099
110	40.043	40.1	0.1	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 ★





Cert.No.: 23CH275
Page.: 1 of 3

Certificate of Calibration

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : SevenCompact S220
Serial No. : C104059460
ID No. : RYG_EN0183
Condition As-Received: Used Item
Received Date : 24 February 2023
Calibration Date : 27 February 2023
Reference : 2302-0886DSC-2
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.
(Rayong Branch)
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng,
Rayong 21140, Thailand
Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In-house method :
- CP-CH5 by direct measurement with standard
voltage calibrator and direct measurement with
certified reference material (CRM)
- CP-CH8 by comparison with standard thermometer

REVIEW BY *N. Banit*
APPROVED BY *D. K.*
NEXT CAL. DATE *27/2/24*

Calibrated by : Walalak Sirithean

Approved by : *Sathip*
Approved Signatory

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

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

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A 0051538



Cert.No.: 23CH275
Page.: 2 of 3

Condition of this calibration result

1. Reference Standard Instrument : -

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	22E2769	24 Aug 2023
2) Ref. Standard Thermometer	4982054	110RC044	2211306	27 Oct 2023

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

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

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	826588	09 July 2024
pH 6.987	CPA chem	826589	09 July 2023
pH 10.010	CPA chem	863835	28 Dec 2023

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

Calibration Results

Function : mV Measurement

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

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement	Coverage factor
	pH	mV	mV	pH	(±mV)	k
pH Meter	4.000	177.48	177.4	4.000	0.058	2.00
S/N.: C104059460	7.000	0.00	-0.1	7.000	0.058	2.00
	10.000	-177.48	-177.5	10.000	0.058	2.00

a 1149925



Cert.No.: 23CH275
Page.: 3 of 3

Calibration Results

Function : pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (±)	Coverage factor k
pH Electrode S/N.: 1453404	4.008 6.987 10.010	4.008 6.988 10.013	179.1 4.7 -172.4	0.0046 0.0084 0.0069	2.00 2.00 2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLabExpert Pro-ISM

- Serial No. : 1453404

Dimension of probe;

- Length : 120 mm.

- Diameter : 12 mm.

- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor k
25.0	25.001	24.8	-0.201	0.13	2.00

Remark : - UUC* = Unit Under Calibration

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

-000-

Sathip

a 1149924

Certificate of Calibration

Certificate No. : 23E753
Page : 1 of 2

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : SevenCompact S220
Serial No. : C104059460
ID No. : RYG_EN0183
Condition As-Received: Used Item
Received Date : 24 February 2023
Calibration Date : 28 February 2023

Reference : 2302-0886DSC

Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 10) %

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

616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng,
Rayong 21140, Thailand

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

Condition of this result of calibration

1. Reference standards Instruments :

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

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

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

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

-National Institute of Metrology Thailand (NIMT)

Calibrated by : Wulchareporn Wongchulkrane
Issue Date : 02 March 2023

Approved Signatory :

() Phalinee Prabpaipai
(✓) Nuntawat Khamchai
() Pornhippa Tameyakul

B 0309672



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

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

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

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

UUC* = Unit Under Calibration.

-o-o-

a 1150477



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Cert.No.: 23TW168
Page.: 1 of 2

Certificate of Testing

Equipment : DO Meter
Manufacturer : YSI
Model : 5000-115V
Serial No. : 15E102796
ID No. : RYG_EN0032
Received Date : 21 July 2023
Test Date : 24 July 2023
Reference : 2307-0713DSC-1
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.
Rayong Branch
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng,
Rayong 21140, Thailand
Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method
Tested by : Walalak Sirithean
Approved by :
Approved Signatory
() Malee Butkruea
() Saitthip Meangmai
() Warakorn Lemgagtrakul
Issue Date : 26 July 2023



B 0320211



Cert.No.: 23TW168
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :

This certification is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1) Burette	-	130BU10	23CG1172	22 Mar 2025
2) Balance	1126143764	140RC004	22MM50	20 Sep 2023

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: 15E100464

Titration Method (Azide Modification Method)	DO Meter Reading	Standard Deviation
(mg/L)	(mg/L)	(mg/L)
8.18	8.17	0.0055

This report was certified only for the instrument we tested. It is allowable to use for study the system efficiency, The environmental impact control and present to organization it may concerned. Intend to use for advertising and referral purpose is prohibited. This report may not be reproduced other in full, without written approval of the laboratory

-o-o-

Saitthip

a 1172155



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Cert. No.: 23LM125
Page.: 1 of 2

Certificate of Calibration

Equipment : DO Meter with Sensor
Manufacturer : YSI
Model : 5000-115V
Serial No. : 15E102796
ID No. : RYG_EN0032
Submitted by : ALS Laboratory Group (Thailand) Co., Ltd.
Rayong Branch
616/10 Moo 5 T. Maenam Khu, A. Pluakdaeng,
Rayong 21140 Thailand
Location : TPA On Site Calibration Laboratory
Received Order : 25 July 2023
Calibrated Date : 27 July 2023
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V
Calibrated by : Preecha Hiahb
Approved by :
Approved Signatory
() Pornthippa Tameyakul
() Malee Butkruea
() Suwit Imjai
Issue Date : 31 July 2023

The Uncertainties are for a confidence probability of approximately 95%

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A 0053616



Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2307-0713DSC-2

Cert. No.: 23LM125
Page: 2 of 2

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Serial No.	Cert. No.	Traceable	Due Date
1) Digital Thermometer	2188080	2211285	TPA	21 Oct 2023

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

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

Remark : TPA : Technology Promotion Association (Thailand - Japan)

Result of Calibration :- (*) Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 1228475367

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
20.00	100	20.011	19.91	-0.101	0.15	2.00

UUC* : Unit Under Calibration

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

-oOo-

a 1159515



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Cert. No.: 23TM962
Page : 1 of 3

Certificate of Calibration

Equipment : Low Temp. Incubator

Manufacturer : Memmert

Model : IPP750

Serial No. : V818.0084

ID No. : RYG_EN0154

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

Location : BOD Room

Received Order : 29 May 2023

Calibration Date : 29 May 2023

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Man Pattanapongpaiboon

Approved by :

[Signature]

Approved Signatory

() Ponthipha Tameyakul

() Malee Buikrua

(✓) Suwit Imjai

Issue Date : 7 June 2023

The Uncertainties are for a confidence probability of approximately 95%

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A 0054967



Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2305-0898OC-2

Cert. No.: 23TM962
Page : 2 of 3

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34972A	MY57013711	22LM93	02 Jul 2023

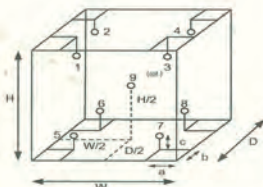
2. This certificate is valid only to the item calibrated on date and place of calibration.

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

Result of Calibration :- (*) Without Adjustment

Function of UUC* : Temperature Source

Fresh air setting : Close



Probe installation Details :

a = 10 cm
b = 10 cm
c = 10 cm

Dimension of Chamber :

D = 0.60 m
W = 1.0 m
H = 1.2 m
Capacity = 0.75 m³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	23	23
REL.Humid. (%)	54	56
AC Supply (Volt)	223	222

Position :	Ref. Std. ID No.:
1	18-18RTD-01
2	18-18RTD-02
3	18-18RTD-03
4	18-18RTD-04
5	18-18RTD-05
6	18-18RTD-10
7	18-18RTD-07
8	22-18RTD-08
9 (ref.)	18-18RTD-09

a 1165130



Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2305-0898OC-2
Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Cert. No.: 23TM962
Page : 3 of 3

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Coverage Factor k
20.0	20.0	20.0	0.019	0.72	1.0	2

Calibration Point (°C)	Measured Temperature (°C)									Uncertainty (± °C)
	1	2	3	4	5	6	7	8	9 (ref.)	
20.0	19.547	19.780	19.487	19.529	19.408	20.139	20.112	20.406	20.116	0.30

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

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

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

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

UUC* : Unit Under Calibration

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

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

-oOo-

a 1165129



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

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

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

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

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

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

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

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

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

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a 1132465



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

Certificate of Calibration

Equipment : Hot Air Oven

Manufacturer : Menmert

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 : 
 Approved Signatory

() Ponthippa 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 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

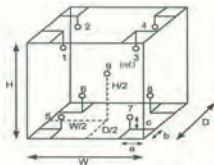
2. This certificate is valid only to the item calibrated on date and place of calibration.

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



Probe Installation Details : Dimension of Chamber :
 a = 5.0 cm D = 0.33 m
 b = 5.0 cm W = 0.40 m
 c = 5.0 cm H = 0.40 m
 Capacity = 0.053 m³

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

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

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								
	1	2	3	4	5	6	7	8	9 (ref.)
70.0	70.262	69.995	70.079	70.177	70.664	70.039	70.688	70.149	70.328

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

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

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

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

UUC* : Unit Under Calibration

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

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

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a 1132472



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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 Hiahib
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 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

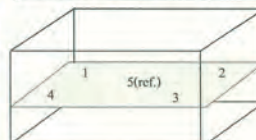
2. This certificate is valid only to the item calibrated on date and place of calibration.

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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a 1132470



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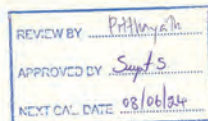


Cert.No.: 23CH721
Page.: 1 of 2

Certificate of Calibration

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : Seven2Go S2
Serial No. : B851952376
ID No. : RYG_FS0425
Condition As-Received : Used Item
Received Date : 07 June 2023
Calibration Date : 08 June 2023
Reference : 2306-0162DSC-1
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. Rayong Branch
616/10 Moo 5, T.Maenam Khu, A.Pluakdaeng,
Rayong 21140, Thailand

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



Calibrated by : Uthen Kankawi

Approved by :
Approved Signatory

() Malee Butkruea
() Saitip Meangmai
() Warakorn Lemgagtrakul

Issue Date : 12 June 2023

The Uncertainties are for a confidence probability of approximately 95%

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

A 0055209



Cert. No.: 23CH721
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	43160066	130RC092	23E1284	09 Apr 2024

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

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

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	863832	28 Dec 2024
pH 6.986	CPA chem	863833	28 Dec 2023
pH 10.010	CPA chem	863835	28 Dec 2023

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

Calibration Results

Function : mV Measurement

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

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor k
	pH	mV	mV	pH		
pH Meter	4.00	177.48	178	4.00	0.58	2.00
S/N.: B851952376	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-178	10.00	0.58	2.00

Function : pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (±)	Coverage factor k
pH Electrode	4.008	4.01	170	0.0099	2.11
S/N.: 1190753	6.986	6.99	-3	0.012	2.05
	10.010	10.01	-176	0.014	2.13

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

-000-

Sailip

1162921



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 2380

Website : www.sci-eco.co.th

E-Mail : calibration@scg.com



Certificate No. T230116

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Certificate of Calibration

Equipment : Chamber (Cooling Room)
Manufacturer : MODULAR
Model : IREVOHCOO
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 : 23 January 2023
Calibrated By : Atiphong Rongrat (Technician)
Approved By : Boonchai Suriyawong / Boonchai Suriyawong (Site Calibration Manager)
Date of Issue : 07 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.

PM-L1010101-QP-01



Metrological Center

SCI ECO Services Company Limited

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



Certificate No. T230116

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Calibration Report

Equipment : Chamber (Cooling Room)
Date of Calibration : 25 January 2023
Environment : Temperature : 23.4-24.9 °C
Line Voltage : 221.4-230.2 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	T222123	5 October 2023
TC	TYPE T	TN151-TN160	T222123	5 October 2023
DATA LOGGER	34970A	T159	T222123	5 October 2023

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 : 1 Hour
Fresh Air Damper : ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available

5. Adjustment :

(X) without adjustment () after adjustment

Approved By. Boonchai Suriyawong



Metrological Center

SCI ECO Services Company Limited

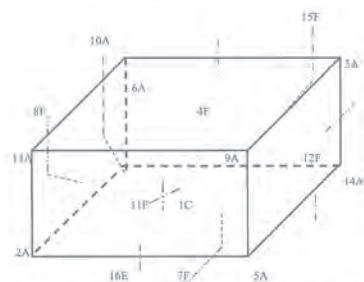
33/2 Moo 3, T. Banpa, A. Kaengkhoh, Saraburi 18110, Thailand.



Certificate No. T230116

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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. Boonchai Suriyawong



Certificate No. T230116

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Calibration Report

Measurement Results

Calibration Point	Average Standard Reading at each position (°C)											
	TN141	TN142	TN143	TN144	TN145	TN146	TN147	TN148	TN149	TN150	TN151	TN152
3.0	3.03	3.16	3.15	3.19	3.45	3.47	3.21	3.35	3.34	3.45	3.24	3.34
	TN153	TN154	TN155	TN156								
	3.28	3.22	3.28	3.21								

Chamber (Cooling Room)		Temperature Distribution				
Setting (°C)	Reading (°C)		Stability (± °C)	Uniformity (°C)	Uncertainty (± °C)	Coverage Factor k
	Min	Max				
3.0	2.8	4.1	3.5	1.20	1.20	1.90

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:

PM-1.1.3 (17/13/03-01)

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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 rd., Khwang 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: Actual
Inlet Pressure: 25.0 psi 25.0 psi
Accuracy: 0.0 psi
Agilent Recommended: <= 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 7890

Date: 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
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
Temperature: 100.0 100.4 °C
Accuracy: 0.4 °C
Agilent Recommended: >= -1.0 % setpoint in K (-3.7 °C)
<= 1.0 % setpoint in K (3.7 °C)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: 7890
Setpoint Status: Pass
Setpoint/Average
Temperature: 100.0 100.0333 °C
Stability: 0.1 °C
Agilent Recommended: <= 0.5

Overall GC Oven Temperature Stability Test Status

Pass

Log Amp

Tested Combination1 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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Agilent CrossLab Compliance Services

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

Date: June 21, 2022 2:04:12 PM
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	7890
Tested Combination1	
Injection Technique	Manual Injection
Inlet	Front
Detector	External
LTM Included?	No
Sampler 1	
Manufacturer	Agilent Technologies
Type	Manual Injection
Usage	Sample Injection
Syringe Volume (µL)	10
Mainframe 1	
Manufacturer	Agilent Technologies
Name	7890
Model Number	G3442B
Serial Number	CN14133181
Firmware Revision	B.02.03
Oven Type	Standard

Date: 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	US1415M209
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	2

Date: 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: GM-7

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User Name: nupachh, nrmangalshetti
Host Name: SCG1159K02
System ID: DM-7
Print Date: June 21, 2022 2:04:17 PM

ALS-DM7-2022 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 First Engineer and does not support an unlock code.
June 21, 2022 10:25:05 AM	Audit	ExpLoaded	Session	EDP exists for primary technique [50] - File path: (P:\Data\Facility\GC\Conf\unlocks\02.50\02.50.exp) EDP File Name: (02.50.02.50.exp), EDP Name: (AgilentRecommended) EDP exists for systemwide technique [50] - File path: (P:\Data\Facility\GC\Conf\unlocks\02.50\02.50.exp) EDP File Name: (02.50.02.50.exp), EDP Name: (AgilentRecommended)
June 21, 2022 10:25:39 AM	End	Configuration	Session	None
June 21, 2022 10:25:43 AM	Start	Qualification	Session	OG
June 21, 2022 10:25:43 AM	Start	Execution	System Inspection and Basic Safety and Operation - 7800 - Qualitative Test - No suspens associated	None
June 21, 2022 10:25:54 AM	End	Execution	System Inspection and Basic Safety and Operation - 7800 - Qualitative Test - No suspens associated	Run Count: 1

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

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User Name: nupachh, nrmangalshetti
Host Name: SCG1159K02
System ID: DM-7
Print Date: June 21, 2022 2:04:17 PM

ALS-DM7-2022 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 21, 2022 10:26:00 AM	Start	Execution	Init Pressure Accuracy - Front SSU - Pressure Controlled Inlet - S: 25.0 psi - L: +/- 1.2 psi	None
June 21, 2022 10:26:10 AM	End	Execution	Init Pressure Accuracy - Front SSU - Pressure Controlled Inlet - S: 25.0 psi - L: +/- 1.2 psi	Run Count: 1
June 21, 2022 10:30:12 AM	Start	Execution	GC Oven Temperature Accuracy - 7800 - Temperature - Oven - S: 230.0°C - L: +/- 1.0 AND +/- 1.0 % setpoint in K	None
June 21, 2022 10:34:06 AM	Audit	Data	GC Oven Temperature Accuracy - 7800 - Temperature - 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 - Temperature - 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 - Temperature - Oven - S: 100.0°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 - Temperature - Oven - S: 100.0°C - L: +/- 1.0 AND +/- 1.0 % setpoint in K	Manual Data Entry
June 21, 2022 10:38:44 AM	End	Execution	GC Oven Temperature Accuracy - 7800 - Temperature - Oven - S: 100.0°C - L: +/- 1.0 AND +/- 1.0 % setpoint in K	Run Count: 1
June 21, 2022 10:38:46 AM	Start	Execution	GC Oven Temperature Accuracy - 7800 - Temperature - Oven - S: 100.0°C - L: +/- 1.0 AND +/- 1.0 % setpoint in K	None

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

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User Name: nupachh, nrmangalshetti
Host Name: SCG1159K02
System ID: DM-7
Print Date: June 21, 2022 2:04:17 PM

ALS-DM7-2022 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 21, 2022 11:01:00 AM	Audit	AppClosed	Session	None
June 21, 2022 11:01:47 AM	Audit	AppRestarted	Session	None
June 21, 2022 11:01:48 AM	Audit	SessionReloaded	Session	None
June 21, 2022 11:01:51 AM	Start	Qualification	Session	OG
June 21, 2022 11:01:51 AM	Start	Execution	GC Oven Temperature Stability - 7800 - Temperature - Oven - S: 100.0°C - L: +/- 0.5°C	None
June 21, 2022 11:03:14 AM	Audit	Data	DataManager	DataManager was in a data verification state but the user chose to start over.
June 21, 2022 11:04:19 AM	Audit	Data	GC Oven Temperature Stability - 7800 - Temperature - Oven - S: 100.0°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: 100.0°C - L: +/- 0.5°C	Run Count: 1
June 21, 2022 11:04:24 AM	Start	Execution	Log Amp - 5877A SQ - Source: None, EI - Evaporator	None
June 21, 2022 11:04:34 AM	End	Execution	Log Amp - 5877A SQ - Source: EI - Evaporator	Run Count: 1
June 21, 2022 11:04:37 AM	Start	Execution	RIPA - 5877A SQ - Source: EI - Evaporator	None
June 21, 2022 11:07:49 AM	End	Execution	RIPA - 5877A SQ - Source: EI - Evaporator	Run Count: 1
June 21, 2022 11:07:52 AM	Start	Execution	Tune EI - 5877A SQ - Source: None, EI - Evaporator	None

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

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User Name: nupachh, nrmangalshetti
Host Name: SCG1159K02
System ID: DM-7
Print Date: June 21, 2022 2:04:17 PM

ALS-DM7-2022 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 21, 2022 11:08:35 AM	End	Execution	Tune EI - 5877A SQ - Source: None, EI - Evaporator	Run Count: 1
June 21, 2022 11:14:59 AM	Start	Execution	Tune EI - 5877A SQ - Source: None, EI - Evaporator	None
June 21, 2022 11:16:48 AM	End	Execution	Tune EI - 5877A SQ - Source: None, EI - Evaporator	Run Count: 1
June 21, 2022 11:18:49 AM	Start	Execution	Signal to Noise EI - Liquid Injection, Front SSU, SQ - Source: EI - Evaporator using Filament 1 - L: +/- 1000	None
June 21, 2022 11:17:55 AM	Start	Execution	Signal to Noise EI - Liquid Injection, Front SSU, SQ - Source: EI - Evaporator using Filament 2 - L: +/- 1000	None
June 21, 2022 11:17:10 AM	Start	Execution	Signal to Noise EI - Liquid Injection, Front SSU, SQ - Source: EI - Evaporator using Filament 1 - L: +/- 1000	None
June 21, 2022 11:20:09 AM	Audit	AppClosed	Session	None
June 21, 2022 12:30:20 PM	Audit	AppRestarted	Session	None
June 21, 2022 12:30:22 PM	Audit	SessionReloaded	Session	None
June 21, 2022 12:30:29 PM	Start	Qualification	Session	OG
June 21, 2022 12:30:29 PM	Start	Execution	Signal to Noise EI - Liquid Injection, Front SSU, SQ - Source: EI - Evaporator using Filament 1 - L: +/- 1000	None

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

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User Name: ksupalak.sriwongtham
Hostname: SC011159KC

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 12:57:07 PM Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L1=1200	None	
June 21, 2022 12:59:50 PM Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L1=1200	None	
June 21, 2022 12:58:54 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L1=1200	Data File Path: EVALSGM7_2022GMF1_001.D	
June 21, 2022 12:59:24 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L1=1200	Data File Path: EVALSGM7_2022GMF1_001.D	
June 21, 2022 12:40:08 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L1=1200	Data File Path: EVALSGM7_2022GMF1_001.D	
June 21, 2022 12:42:04 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L1=1200	Data File Path: EVALSGM7_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	Sensor/Reactor	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 - Extractor using Filament 1 - L1=1200	None	

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User Name: ksupalak.sriwongtham
Hostname: SC011159KC

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 - Extractor using Filament 1 - L1=1200	Data File Path: EVALSGM7_2022GMF1_001.D	
June 21, 2022 12:30:26 PM End	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 1 - L1=1200	Run Count: 1	
June 21, 2022 12:57:11 PM Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor 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 - Extractor using Filament 2 - L1=1200	Data File Path: EVALSGM7_2022GMF2_001.D	
June 21, 2022 12:38:30 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L1=1200	Data File Path: EVALSGM7_2022GMF2_001.D	
June 21, 2022 12:38:45 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L1=1200	Data File Path: EVALSGM7_2022GMF2_001.D	
June 21, 2022 12:39:20 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L1=1200	Data File Path: EVALSGM7_2022GMF2_001.D	
June 21, 2022 12:39:14 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L1=1200	Data File Path: EVALSGM7_2022GMF2_001.D	

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

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

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User Name: ksupalak.sriwongtham
Hostname: SC011159KC

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 - Extractor using Filament 2 - L1=1200	Data File Path: EVALSGM7_2022GMF2_001.D	
June 21, 2022 12:40:15 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L1=1200	Data File Path: EVALSGM7_2022GMF2_001.D	
June 21, 2022 12:40:40 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L1=1200	Data File Path: EVALSGM7_2022GMF2_001.D	
June 21, 2022 12:41:09 PM Audit	Data	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L1=1200	Data File Path: EVALSGM7_2022GMF2_001.D	
June 21, 2022 12:41:39 PM End	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L1=1200	Run Count: 1	
June 21, 2022 12:42:30 PM Audit	Acquisition	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L1=1200	Deviation Smaller than Count: 1	
June 21, 2022 12:42:30 PM Start	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor 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 - Extractor using Filament 2 - L1=1200	Data File Path: EVALSGM7_2022GMF2_001.D	

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System ID: GM-7

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User Name: ksupalak.sriwongtham
Hostname: SC011159KC

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 12:42:45 PM End	Execution	Signal to Noise E1 - Liquid Injection, Front SSL, SQ - Source: E1 - Extractor using Filament 2 - L1=1200	Run Count: 2	
June 21, 2022 12:42:05 PM End	Qualification	Session	QC	
June 21, 2022 12:42:50 PM Start	Reporting	Session	None	
June 21, 2022 12:45:17 PM Audit	Acquisition	Session	None	
June 21, 2022 1:57:47 PM Audit	Acquisition	Session	None	
June 21, 2022 1:57:50 PM Audit	Sensor/Reactor	Session	None	
June 21, 2022 1:57:56 PM Start	Qualification	Session	QC	
June 21, 2022 2:02:42 PM Audit	Reporting	Session	Report Generated: 1 Calibrate	

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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 คัดสรรหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
เรียน กรรมการผู้จัดการ บริษัท เอนเนอเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด
อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๓๐ กรกฎาคม ๒๕๖๓

สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผน
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ แผน
๓. ขอบข่ายสารเคมีที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๓ แผน
ตามหนังสือที่อ้างถึง บริษัท เอนเนอเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุ/ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร กรุงเทพมหานคร กรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอนเนอเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด คัดสรรหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้
ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓๖๖ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารเคมีที่ได้รับขึ้นทะเบียนไว้มีจำนวน ๓๓ แผน รายการ นำได้เป็นจำนวน ๑๒๖ รายการ อาทาสเสีย ๑๖ รายการ สิ่งปลูกสร้างหรือตู้ที่ไม่ใช้แล้ว จำนวน ๓๕ รายการ และดินจำนวน ๑๒๕ รายการ รวมทั้งหมดจำนวน ๓๖๖ รายการ ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะมีผลย้อนกลับในวันที่ ๒ กันยายน ๒๕๖๖ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายศิระ จันทร์เกิด)

อธิบดีกรมโรงงานอุตสาหกรรม
ผู้อำนวยการกองใบอนุญาตขึ้นทะเบียนห้องปฏิบัติการ
ปฏิบัติการทางเคมีและชีวเคมี กรมโรงงานอุตสาหกรรม

กองวิจัยและพัฒนายุทธศาสตร์โรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๒๐๒ ๔๕๕๖ ๐ ๒๒๐๒ ๔๐๐๒

โทรสาร ๐ ๒๒๕๔ ๒๒๐๔ ๐ ๒๒๕๔ ๔๔๕๔

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

- | | |
|--------------------------------|----------------------------|
| ๑) นางสาวยุพพร จันทร์ปลั่ง | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๐๐ |
| ๒) นางสาวจิติน โภมากรกุล ณ นคร | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๐๑ |
| ๓) นายศราวุธ จิตธรรมนันท | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๐๒ |
| ๔) นางสาวกนกพร เอนก | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๐๓ |
| ๕) นายสุริยา สอนแก้ว | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๐๔ |
| ๖) นายวิชัย ชุมหวัด | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๐๕ |

(นายศิระ จันทร์เกิด)

อธิบดีกรมโรงงานอุตสาหกรรม
ผู้อำนวยการกองใบอนุญาตขึ้นทะเบียนห้องปฏิบัติการ
ปฏิบัติการทางเคมีและชีวเคมี กรมโรงงานอุตสาหกรรม

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓๖๖ ราย

- | | |
|---|----------------------------|
| ๑) นางสาวจินดา โยสุธรรม | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๐๖ |
| ๒) นางสาวจิติน น้อยเสียม | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๐๗ |
| ๓) นางสาวยุพพร จิตธรรมนันท | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๐๘ |
| ๔) นางสาวจิติน สายเสียม | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๐๙ |
| ๕) นางสาวนันทวิ สมบูรณ์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๑๐ |
| ๖) นางสาวศรัณยา เณนิธินันท์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๑๑ |
| ๗) นางสาวสุวิมล มงคลจิตรวิทย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๑๒ |
| ๘) นางสาวศิริลักษณ์ พึ่งแพง | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๑๓ |
| ๙) นายอภินันท์ จันทร์พันธุ์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๑๔ |
| ๑๐) นายพนมกร ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๑๕ |
| ๑๑) นายอริยา จันทา | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๑๖ |
| ๑๒) นางสาวสุวิมล แก้วมณี | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๑๗ |
| ๑๓) นางสาวสุวิมล ชัยเรืองฤทธิ์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๑๘ |
| ๑๔) นางสาวสุวิมล อรรณวนาร | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๑๙ |
| ๑๕) นางสาวเมธิกา ชัยพรหมกุล | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๒๐ |
| ๑๖) นางสาวศศิธร หนูสวัสดิ์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๒๑ |
| ๑๗) นางสาวเสาวลักษณ์ ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๒๒ |
| ๑๘) นายอภิสิทธิ์ สิงหา | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๒๓ |
| ๑๙) นายศักดิ์สิทธิ์ โพธิ์ทอง | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๒๔ |
| ๒๐) ว่าที่ร้อยตรีหญิง พรรณิภา จำเจริญ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๒๕ |
| ๒๑) นางจิติน คำบุญ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๒๖ |
| ๒๒) นางสาวอรรณพ ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๒๗ |
| ๒๓) นางสาวพนิดา คุ้มภานันท์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๒๘ |
| ๒๔) นายจุลพงษ์ วารินทร์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๒๙ |
| ๒๕) นางสาวสุวิมล รุ่งคำ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๓๐ |
| ๒๖) นายสมร สุขเจริญ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๓๑ |
| ๒๗) นายบุญตา นามเขตต์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๓๒ |
| ๒๘) นายพนม ศรีปิ่นนคร | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๓๓ |
| ๒๙) นายสุชาติ อุ่นนิม | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๓๔ |
| ๓๐) ว่าที่ร้อยตรี เณนิธินันท์ อมรศรีเสริม | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๓๕ |
| ๓๑) นางสาววิภา สร้างนา | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๓๖ |
| ๓๒) นายอภินันท์ รัตนศรีประเสริฐ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๓๗ |
| ๓๓) นางสาวจุฬารัตน์ โอนสินทิพย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๓๘ |
| ๓๔) นางสาวจารุวรรณ พิมพ์สุกัญญา | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๓๙ |

(นายศิระ จันทร์เกิด)

อธิบดีกรมโรงงานอุตสาหกรรม
ผู้อำนวยการกองใบอนุญาตขึ้นทะเบียนห้องปฏิบัติการ
ปฏิบัติการทางเคมีและชีวเคมี กรมโรงงานอุตสาหกรรม

๓๕) นางสาวปราณีทิพย์

- ๒ -

- | | |
|--------------------------------|----------------------------|
| ๓๕) นางสาวปราณีทิพย์ กิ่งโพธิ์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๔๐ |
| ๓๖) นางสาวจิติน ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๔๑ |
| ๓๗) นางสาวจิราพร ศิริเวช | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๔๒ |
| ๓๘) นายวรวิทย์ สุทธิรักษ์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๔๓ |
| ๓๙) นายพนม วิริยะสุนทกิจ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๔๔ |
| ๔๐) นายอภินันท์ เจริญ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๔๕ |
| ๔๑) นายศศิธร ชัยพร | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๔๖ |
| ๔๒) นายอรรณพ ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๔๗ |
| ๔๓) นายสุวิมล พรมมณี | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๔๘ |
| ๔๔) นายอรรณพ ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๔๙ |
| ๔๕) นายอรรณพ ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๕๐ |
| ๔๖) นายอภินันท์ ศรีสุน | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๕๑ |
| ๔๗) นายเจริญพงศ์ ศรีศิริไทย | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๕๒ |
| ๔๘) นายจิรุต บุญย | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๕๓ |
| ๔๙) นายอรรณพ ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๕๔ |
| ๕๐) นายอภินันท์ ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๕๕ |
| ๕๑) นางสาวสุวิมล ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๕๖ |
| ๕๒) นางสาวจิติน ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๕๗ |
| ๕๓) นางสาวจิติน ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๕๘ |
| ๕๔) นางสาวกนกพร ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๕๙ |
| ๕๕) นางสาวจิติน ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๖๐ |
| ๕๖) นางสาวจิติน ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๖๑ |
| ๕๗) นางสาวจิติน ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๖๒ |
| ๕๘) นางสาวจิติน ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๖๓ |
| ๕๙) นางสาวจิติน ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๖๔ |
| ๖๐) นายอภินันท์ ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๖๕ |
| ๖๑) นายอภินันท์ ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๖๖ |
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| ๖๓) นางสาวจิติน ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๖๘ |
| ๖๔) นางสาวจิติน ภิรมย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๔๗๖๙ |
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(นายศิระ จันทร์เกิด)

อธิบดีกรมโรงงานอุตสาหกรรม
ผู้อำนวยการกองใบอนุญาตขึ้นทะเบียนห้องปฏิบัติการ
ปฏิบัติการทางเคมีและชีวเคมี กรมโรงงานอุตสาหกรรม

๓๖) นายสมบุญ

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⁾

วิธีใหม่
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44 Methomyl...

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⁾

วิธีใหม่ 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⁾

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3 Aldrin...

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⁾

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18 Bis(2-ethylhexyl)phthalate...

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⁾

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34 Chromium (III)...

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⁾

51 cis-1,2-Dichloroethylene...

(นางริกาญจน์ ชัยตระกูลวิไล)

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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-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
57	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
58	Diethyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
63	Di-n-Octyl Phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

68 Fluorene...

(นางริกาญจน์ ชัยตระกูลวิไล)

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

84 Methanol...

(นางริกาญจน์ ชัยตระกูลวิไล)

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
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⁾

97 Pentachlorophenol...

(นางริกาญจน์ ชัยตระกูลวิไล)

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ลำดับที่	สารเคมี	วิธีวิเคราะห์
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁾
98	pH	Electrometric Method ⁽¹⁾
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁾
100	Phenol	1) Distillation, Direct Photometric Method ⁽¹⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁾
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁾
102	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽¹⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽¹⁾
103	Silver	1) Digestion, Inductively Coupled Plasma Method ⁽¹⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽¹⁾
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁾
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁾
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁾
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁾
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁾
109	TPH (C ₉ -C ₉)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,2,3)
110	TPH (C ₁₀ -C ₁₆)	Solvent Extraction, Gas Chromatographic Method ^(2,3)
111	TPH (C ₁₇ -C ₃₃)	Solvent Extraction, Gas Chromatographic Method ^(2,3)
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁾
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽¹⁾



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 กระทรวงทรัพยากรธรรมชาติและสิ่งแวดล้อม

114 1,1,2-Trichloroethane...

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


รายการเสีย (ปล่องระบาย) จำนวน 16 รายการ

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


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3 Carbon Monoxide...


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


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สิ่งปฏิกูล...

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารเคมี	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,2,3) 2) Soxhlet Extraction, Gas Chromatographic Method ^(1,2,3) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(2,3)
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,5) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,5) 3) Digestion, Inductively Coupled Plasma Method ^(7,14) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,14)
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,5) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,5) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,14)
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,5) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,5) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,14)
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,5) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,5) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,14)


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
6 Cadmium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
6	Cadmium	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)
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 ^(1.4.15) 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)
9	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1.4.15, 17) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method ^(7.4.15, 17) 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7.4.15, 17) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7.4.15, 17)
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method ^(1.4.17) 2) Alkaline Digestion, Colorimetric Method ^(1.4.17)


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
11 Cobalt...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
11	Cobalt	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)
12	Copper	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)
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	DDO	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 ^(1.4.15) 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)
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 ^(1.4.18)


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2) Waste Extraction...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
23	Methoxychlor	2) Waste Extraction, Thermal Decomposition, Atomic Absorption Spectrometric Method ^(1.4.19) 3) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^(1.4.20) 4) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(1.4) 5) Thermal Decomposition, Atomic Absorption Spectrometric Method ^(1.4) 6) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^(1.4)
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 ^(1.4.15) 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)
26	Nickel	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)


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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',5,6-Nonachlorobiphenyl	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^(1,5,23) 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 ^(1,5,23) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,23) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
29	pH	Electrometric Method ^(9,30)
30	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,4,13) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,16)
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,15) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,25) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15)

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4) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
35	Zinc	4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16) 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,4,16) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)

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 ^(14,24)
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
4	Anthracene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
8	Barium	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)

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9 Benz(a)anthracene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Benz(a)anthracene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
11	Benzo(b)fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
12	Benzo(k)fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
13	Benzoic acid	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
14	Benzo(a)pyrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
15	Benzo(g,h,i)perylene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
17	Bis(2-chloroethyl)ether	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
18	Bis(2-ethylhexyl)phthalate	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
20	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
21	Butanol	Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ^(12,24)
22	Butyl Benzyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
23	Cadmium	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
24	Carbazole	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)

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26 Carbon tetrachloride...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic/ 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 ^(7,16,17)
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^(8,17)
36	Chrysene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
37	Cyanide	Extraction, Distillation, Colorimetric Method ^(25,27,28)
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) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
41	DDT	1) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(16,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
42	Dibenz(a,h)anthracene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
43	Di-n-Butyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
47	3,3-Dichlorobenzidine	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
53	2,4-Dichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)

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57 Dieldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic/ 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)

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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⁾

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2) Thermal...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
84	Methanol	2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry ⁽¹¹⁾ 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽²⁰⁾ Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ^(12,24)
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31)
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
88	2-methylphenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31)
89	2-Methylnaphthalene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31)
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
91	Naphthalene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31)
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
93	Nitrobenzene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31)
94	N-Nitrosodiphenylamine	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31)
95	N-Nitrosodi-n-propylamine	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31)
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic Method ^(23,31)

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- 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',3,4,4',5,5',6'-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6'-Nonachlorobiphenyl 97 Pentachlorophenol 98 Phenanthrene 99 Phenol 100 Pyrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31)

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101 Selenium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
101	Selenium	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
102	Silver	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
103	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
106	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31)
108	TPH (C ₈ -C ₆)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
109	TPH (C ₁₀ -C ₁₆)	1) Solvent Extraction, Gas Chromatographic Method ^(11,21) 2) Automated Soxhlet Extraction, Gas Chromatographic Method ^(23,31)
110	TPH (C ₁₆ -C ₃₅)	1) Solvent Extraction, Gas Chromatographic Method ^(11,21) 2) Automated Soxhlet Extraction, Gas Chromatographic Method ^(23,31)
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
115	2,4,5-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31)

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116 2,4,6-Trichlorophenol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
116	2,4,6-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(23,31)
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
121	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
122	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
123	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
125	Zinc	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,16)

เอกสารอ้างอิง

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- กระทรวงอุตสาหกรรม, ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549, เรื่อง กำหนดค่าปริมาณและหน่วยที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงไฟฟ้าที่เกินและเป็นเชื้อเพลิง, ราชกิจจานุเบกษา, 4 ธันวาคม 2549, เล่มที่ 123 ตอนพิเศษ 125.
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การศึกษาระดับปริญญาตรี

20. United States...



ที่ ธก ๐๓๑๐(๑)/ ๕๕๗ ๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๐๙ มีนาคม ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอนแอส แลบริทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขอคืนตำแหน่งของห้องปฏิบัติการวิเคราะห์แผนก
พลังงานที่ ๔ กุมภาพันธ์ ๒๕๖๖

ตามที่บริษัทฯอ้างถึง บริษัท เอนแอส แลบริทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการ
วิเคราะห์แผนก เสนอขอเปลี่ยน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ
เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๔ ราย

- | | |
|---------------------------------|----------------------------|
| ๑) นายเนตร สุขเจริญ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๑๒ |
| ๒) นายวิชา นามเขตต์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๑๓ |
| ๓) นายอรรถพล นิยมวิทยาพันธ์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๑๔ |
| ๔) นางสาวพัชรียา พงษ์สมิตี | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๑๕ |
| ๕) นางสาวภาณุศา สุวรรณศิริกุล | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๑๖ |
| ๖) นางสาวศรณีย์ ยี่งศ์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๑๗ |
| ๗) นายสมโภช วันสา | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๑๘ |
| ๘) นายณัฐนันท์ ปาประเสริฐ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๑๙ |
| ๙) ว่าที่ร้อยตรีภาณุพงศ์ แสนศรี | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๒๐ |
| ๑๐) นายณัฐนันท์ พุทธิศิริ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๒๑ |
| ๑๑) นายณัฐนันท์ เจริญทอง | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๒๒ |
| ๑๒) นางสาวภาณุชญา คงสุน | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๒๓ |
| ๑๓) นางสาววันนิกร นิยมกลาง | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๒๔ |
| ๑๔) นางสาวภาณุชญาวัน ศรีนิลพา | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๒๕ |
| ๑๕) นายศิริวัฒน์ พานิชย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๒๖ |
| ๑๖) นางสาวกนกกรณีย์ สุระ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๒๗ |
| ๑๗) นางสาวจิตสุภา ประเทืองสุข | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๒๘ |
| ๑๘) นางสาวอรุณสา รวิชัยนิตยธรรม | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๒๙ |
| ๑๙) นางสาวพินดา ขยออินทร์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๓๐ |

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วิมล
(นางวิมล นักรสสุริยา)
ผู้อำนวยการศูนย์บริการวิชาการและส่งเสริม
การศึกษาระดับปริญญาตรี

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบผลิตภัณฑ์และทะเบียนห้องปฏิบัติการ ก่อตั้งและดำเนินงานตามโครงการ กรมโรงงานอุตสาหกรรม โทร. ๐ ๒๐๔๖ ๔๐๐๕, ๔๐๑๕

๒. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ ราย

- | | |
|-------------------------------|----------------------------|
| ๑) นายภาณุวิชญ์ ฤทธิกุลมณีชัย | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๐๑ |
| ๒) นายภัทรพล สุวโรจน์ธรรม | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๐๒ |
| ๓) นายณัฐวิทย์ เทียนทิพย์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๐๓ |
| ๔) นายศิริโชค พงษ์ประสม | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๐๔ |
| ๕) นายณัฐวุฒิ ตั้งวงษ์ | ทะเบียนเลขที่ ๖-๒๐๔-๙-๖๑๐๕ |

อนึ่ง หนังสือฉบับนี้จะมีผลตั้งแต่วันที่ออกมายังมีผลบังคับใช้ของห้องปฏิบัติการวิเคราะห์แผนก
ที่ ธก ๐๓๑๐(๑)/๑๐๖๔ ลงวันที่ ๒๔ มกราคม ๒๕๖๔ คือในวันที่ ๒ กันยายน ๒๕๖๖ ทั้งนี้ สามารถยื่นคำขอ
ผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Codeท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

วิมล
(นางวิมล นักรสสุริยา)
นักวิทยาศาสตร์ชำนาญการพิเศษ วิชาการวางแผน
ผู้อำนวยการกองวิจัยและพัฒนาส่งเสริม
การศึกษาระดับปริญญาตรี กรมโรงงานอุตสาหกรรม

กองวิจัยและพัฒนาส่งเสริมโครงการ
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบผลิตภัณฑ์และทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๐๔๖ ๔๐๑๕ ต่อ ๒๐๑๕-๕
โทรสาร ๐ ๒๐๔๖ ๔๐๑๕ ต่อ ๒๐๑๕-๕
ไปรษณีย์อิเล็กทรอนิกส์ sarabandw@mail.go.th



“กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบผลิตภัณฑ์และทะเบียนห้องปฏิบัติการ กรมโรงงานอุตสาหกรรม”



อนึ่ง: หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือรับขึ้นทะเบียนเพื่อปฏิบัติการวิเคราะห์แอลกอฮอล์ ที่ ๑๓ ๑๓๓๖๐(๑๖)๖๔๗๖ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๔ คือในวันที่ ๒๘ มิถุนายน ๒๕๖๗ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรมตาม QR Code ท้ายหนังสือนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายทวี อำพาพันธ์)

ผู้อำนวยการศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐๖ ๓๓๘๘๓ ๓๖๕๙ ต่อ ๕๐๐๑-๒
ไปรษณีย์อิเล็กทรอนิกส์: ewv@ddw.go.th, ewv.m



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์



* Gulfstream บริการทั่วโลก ประสิทธิภาพเยี่ยมล้ำหน้า ยกระดับขีดความสามารถขององค์กร *





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104 ซอยพัฒนาการ 40 ถนนพัฒนาการ
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ติดต่อเรา

