

ภาคผนวก ค

ใบรับรองผลการตรวจวิเคราะห์

ผลกระทบสิ่งแวดล้อม



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4
Lot ID: 2217853
Date Received : Mar 16, 2022
Date Reported : Mar 21, 2022
Report Number : 2227750-1

Page 1 of 1

Sample Number 2217853-1
Sample Description Emission from Stationary Source
Location HRSGs 1
Measurement Date Mar 15, 2022

		Stack Description			
Ambient Temperature	32 °C	Diameter	3.30 m	Oxygen	13.99 %
Ambient Pressure	758 mmHg	Shape	Circle	Carbon dioxide	3.93 %
Type of Process	Combustion	Stack Temperature	131 °C	Gas Velocity	18.93 m/s
Type of Fuel	Natural Gas	Moisture	9.34 %	Flow Rate	388516 Nm3/hr
Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen at Actual O ₂ at 7% O ₂	Sulfur Dioxide (ppm) at Actual O ₂ at 7% O ₂
1	11:00 AM - 11:20 AM	13.98	3.92	8.54	17.14
2	11:21 AM - 11:41 AM	14.00	3.93	8.49	17.10
3	11:42 AM - 12:02 PM	13.99	3.93	8.41	16.91
Average (ppm)		13.99	3.93	8.48	17.05
Guideline ^{1/} (ppm)		-	-	26.58	-
Guideline ^{2/} (ppm)		-	-	120	-
Guideline ^{3/} (ppm)		-	-	120	-
Result (mg/m ³)				15.95	32.07
Emission Rate at Actual O ₂ (g/s)				1.7214	0.0035
Guideline ^{4/} (g/s)				3.000	0.255
Method				US EPA Method 7E	US EPA Method 6C

Sampled By : Sakset Phatphanisut
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 Choonharat
Manager
โทรศัพท์ ๖-๒๐4-๖113
Approved by Sarayuth Jitranont
Assistant General Manager
โทรศัพท์ ๖-๒๐4-๖702

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ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Thue Suan Luang, Bangkok 10250, THAILAND | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
1/2 Moo 2, Banchang, Banchang, Rayong 21130
P/O :
Project Name : Monitoring
Project Location : CUP 4
Lot ID: 2217862
Date Received : Mar 17, 2022
Date Reported : Mar 24, 2022
Report Number : 2227759-1

Page 1 of 2

Sample Number 2217862-1
Sample Date Mar 15, 2022
Sample Description Emission from Stationary Source
Location HRSGs
Date Analysis Commenced Mar 18, 2022
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one amber plastic bottle, refrigerated

		Stack Description			
Ambient Pressure	758 mmHg	Diameter	3.30 m	Oxygen	14.0 %
Ambient Temperature	32.0 °C	Shape	Circle	Carbon Dioxide	3.9 %
Type of Process	Combustion	Stack Temperature	131 °C	Gas Velocity	18.9 m/s
Type of Fuel	Natural Gas	Moisture	9.27 %	Flow Rate (Actual O ₂)	388282 Nm3/hr
Analyte	Sampled Time	Unit	LOQ (LOR)	Result at 7 % O ₂ at 14.0 % O ₂	Guideline (1) (2) Method Testing Location
Total Suspended Particulate	11:00 AM - 11:48 AM	mg/m3	-	0.5	<0.5 60 7.108 US 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 Thanitak.
Thanita Kulsuriwong
Scientist (4)
โทรศัพท์ ๖-๓๒3-๙๙๔๗
Approved by Dhanu
Dej Changchoti
Senior Manager
โทรศัพท์ ๖-๓๒3-๙๙๔๗

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ADDRESS 616/10 Moo 5 T. Maenam Khui A. Phakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
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6403-74/ EMAIL

S:\Reports\Air Stack_02_2021.rpt (2227759-1)



Analysis / Test Report

TESTING
No.0042

Lot ID: 2217862

Date Received : Mar 17, 2022

Date Reported : Mar 24, 2022

Report Number: 2227759-1

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

P/O :

Project Name : Monitoring

Project Location : CUP 4

Sample Number : 2217862-1

Sample Date : Mar 15, 2022

Sample Description : Emission from Stationary Source

Location : HRSGs

Date Analysis Commenced : Mar 18, 2022

Condition of Sample : Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one amber plastic bottle, refrigerated

Stack Description

Ambient Pressure	758	mmHg	Diameter	3.30	m	Oxygen	14.0	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	3.9	%
Type of Process	Combustion		Stack Temperature	131	°C	Gas Velocity	18.9	m/s
Type of Fuel	Natural Gas		Moisture	9.27	%	Flow Rate (Actual O2)	388282	Nm ³ /hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate *	11:00 AM - 11:48 AM	g/s	-	-	<0.054	-	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 : Kantaphon Maneesampan

Remark :

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

Technical Management

Thanita Kulsriwong
Scientist (4)
โทรศัพท์ 3-323-99447

Approved by

Dej Changchon
Senior Manager
โทรศัพท์ 3-323-99442

Thanitak.

D. J. J. J.

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S:\Report\Air Stack_O2_3GL.pdf (3/25PM)



Analysis / Test Report

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

Lot ID: 2217902
Date Received : Mar 23, 2022
Date Reported : Mar 29, 2022
Report Number: 2273904-1

Page 1 of 1

Sample Description	Air Quality						
Location	สถานีวัดคุณภาพ (GPS 47P 0726292, 1407282)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Mar 15, 2022 - Mar 22, 2022						
Measurement by	Nontachai Uppathamp						
Time	2217902-1 Mar 15, 2022	2217902-2 Mar 16, 2022	2217902-3 Mar 17, 2022	2217902-4 Mar 18, 2022	2217902-5 Mar 19, 2022	2217902-6 Mar 20, 2022	2217902-7 Mar 21, 2022
10:00 AM - 11:00 AM	0.004	0.004	0.004	0.005	0.004	0.006	0.028
11:00 AM - 12:00 PM	0.004	0.004	0.004	0.005	0.004	0.005	0.008
12:00 PM - 01:00 PM	0.004	0.004	0.004	0.005	0.004	0.004	0.004
01:00 PM - 02:00 PM	0.004	0.005	0.004	0.005	0.005	0.005	0.006
02:00 PM - 03:00 PM	0.004	0.005	0.004	0.004	0.006	0.004	0.005
03:00 PM - 04:00 PM	0.004	0.004	0.004	0.004	0.005	0.004	0.005
04:00 PM - 05:00 PM	0.004	0.004	0.004	0.004	0.020	0.005	0.006
05:00 PM - 06:00 PM	0.004	0.004	0.004	0.004	0.015	0.004	0.005
06:00 PM - 07:00 PM	0.004	0.004	0.004	0.004	0.011	0.004	0.004
07:00 PM - 08:00 PM	0.004	0.004	0.004	0.004	0.007	0.004	0.004
08:00 PM - 09:00 PM	0.004	0.004	0.004	0.004	0.007	0.004	0.004
09:00 PM - 10:00 PM	0.004	0.004	0.004	0.004	0.006	0.004	0.004
10:00 PM - 11:00 PM	0.004	0.004	0.004	0.004	0.006	0.004	0.004
11:00 PM - 12:00 AM	0.004	0.004	0.004	0.004	0.005	0.004	0.004
12:00 AM - 01:00 AM	0.004	0.004	0.004	0.004	0.005	0.004	0.004
01:00 AM - 02:00 AM	0.004	0.004	0.004	0.004	0.004	0.004	0.005
02:00 AM - 03:00 AM	0.004	0.004	0.004	0.004	0.005	0.004	0.004
03:00 AM - 04:00 AM	0.004	0.004	0.004	0.004	0.004	0.004	0.004
04:00 AM - 05:00 AM	0.004	0.004	0.004	0.004	0.004	0.004	0.004
05:00 AM - 06:00 AM	0.004	0.004	0.004	0.004	0.005	0.004	0.004
06:00 AM - 07:00 AM	0.004	0.004	0.004	0.004	0.005	0.005	0.004
07:00 AM - 08:00 AM	0.004	0.004	0.009	0.006	0.008	0.006	0.005
08:00 AM - 09:00 AM	0.004	0.005	0.032	0.019	0.019	0.012	0.005
09:00 AM - 10:00 AM	0.004	0.005	0.008	0.010	0.017	0.015	0.005
Average	0.004	0.004	0.006	0.005	0.008	0.005	0.006
1hr - Maximum	0.004	0.005	0.032	0.019	0.020	0.015	0.028
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

Saranya C.
Saranya Chalermsathorn
Scientist (4)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand PHONE +66 2 2760 3000 FAX +66 2 2760 3197
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Analysis / Test Report

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

Lot ID: 2217902
Date Received : Mar 23, 2022
Date Reported : Mar 29, 2022
Report Number: 2273905-1

Page 1 of 1

Sample Description	Air Quality						
Location	หน่วยวัดคุณภาพ (GPS 47P 0728261, 1403387)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Mar 15, 2022 - Mar 22, 2022						
Measurement by	Nontachai Uppathamp						
Time	2217902-8 Mar 15, 2022	2217902-9 Mar 16, 2022	2217902-10 Mar 17, 2022	2217902-11 Mar 18, 2022	2217902-12 Mar 19, 2022	2217902-13 Mar 20, 2022	2217902-14 Mar 21, 2022
09:00 AM - 10:00 AM	0.004	0.004	0.003	0.003	0.009	0.006	0.006
10:00 AM - 11:00 AM	0.004	0.003	0.003	0.004	0.003	0.004	0.007
11:00 AM - 12:00 PM	0.004	0.002	0.003	0.003	0.002	0.004	0.006
12:00 PM - 01:00 PM	0.004	0.003	0.003	0.003	0.002	0.003	0.003
01:00 PM - 02:00 PM	0.004	0.004	0.003	0.003	0.004	0.003	0.003
02:00 PM - 03:00 PM	0.003	0.006	0.002	0.003	0.003	0.003	0.003
03:00 PM - 04:00 PM	0.003	0.005	0.002	0.003	0.006	0.004	0.003
04:00 PM - 05:00 PM	0.003	0.003	0.003	0.003	0.010	0.003	0.003
05:00 PM - 06:00 PM	0.003	0.003	0.002	0.002	0.005	0.003	0.003
06:00 PM - 07:00 PM	0.003	0.003	0.002	0.003	0.007	0.003	0.003
07:00 PM - 08:00 PM	0.002	0.004	0.003	0.002	0.006	0.002	0.003
08:00 PM - 09:00 PM	0.003	0.003	0.003	0.002	0.012	0.002	0.002
09:00 PM - 10:00 PM	0.003	0.005	0.002	0.003	0.009	0.002	0.002
10:00 PM - 11:00 PM	0.003	0.003	0.002	0.002	0.011	0.004	0.002
11:00 PM - 12:00 AM	0.003	0.003	0.002	0.004	0.005	0.003	0.003
12:00 AM - 01:00 AM	0.003	0.002	0.002	0.002	0.006	0.003	0.002
01:00 AM - 02:00 AM	0.003	0.002	0.002	0.002	0.005	0.003	0.002
02:00 AM - 03:00 AM	0.003	0.002	0.002	0.002	0.005	0.003	0.002
03:00 AM - 04:00 AM	0.003	0.002	0.002	0.002	0.005	0.003	0.002
04:00 AM - 05:00 AM	0.003	0.002	0.002	0.002	0.006	0.003	0.002
05:00 AM - 06:00 AM	0.003	0.002	0.002	0.002	0.005	0.003	0.002
06:00 AM - 07:00 AM	0.004	0.002	0.002	0.002	0.005	0.004	0.002
07:00 AM - 08:00 AM	0.005	0.002	0.004	0.008	0.009	0.005	0.002
08:00 AM - 09:00 AM	0.006	0.003	0.004	0.007	0.011	0.010	0.008
Average	0.003	0.003	0.003	0.003	0.007	0.004	0.003
1hr - Maximum	0.006	0.006	0.004	0.008	0.010	0.010	0.008
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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Approved by

Saranya C.
Saranya Chalermsathorn
Scientist (4)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand PHONE +66 2 2760 3000 FAX +66 2 2760 3197
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Analysis / Test Report

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

Lot ID: 2217902
Date Received : Mar 23, 2022
Date Reported : Mar 29, 2022
Report Number: 2273908-1

Page 1 of 1

Sample Description	Air Quality							
Location	สถานีวัดคุณภาพ (GPS 47P 0730056, 1406679)							
Parameter	Nitrogen dioxide (ppm)							
Measurement Date	Mar 15, 2022 - Mar 22, 2022							
Measurement by	Nontachai Uppathamp							
Time	2217902-15 Mar 15, 2022	2217902-16 Mar 16, 2022	2217902-17 Mar 17, 2022	2217902-18 Mar 18, 2022	2217902-19 Mar 19, 2022	2217902-20 Mar 20, 2022	2217902-21 Mar 21, 2022	2217902-21 Mar 22, 2022
12:00 PM - 01:00 PM	0.005	0.007	0.004	0.016	0.010	0.002	0.002	0.002
01:00 PM - 02:00 PM	0.008	0.007	0.013	0.034	0.007	0.006	0.003	0.003
02:00 PM - 03:00 PM	0.009	0.039	0.021	0.034	0.014	0.016	0.003	0.003
03:00 PM - 04:00 PM	0.010	0.010	0.012	0.016	0.007	0.004	0.003	0.003
04:00 PM - 05:00 PM	0.004	0.018	0.003	0.007	0.004	0.002	0.002	0.002
05:00 PM - 06:00 PM	0.003	0.032	0.002	0.006	0.002	0.002	0.001	0.018
06:00 PM - 07:00 PM	0.002	0.014	0.002	0.004	0.002	0.002	0.001	0.002
07:00 PM - 08:00 PM	0.002	0.017	0.002	0.005	0.002	0.002	0.001	0.001
08:00 PM - 09:00 PM	0.002	0.018	0.002	0.007	0.002	0.002	0.001	0.001
09:00 PM - 10:00 PM	0.002	0.001	0.002	0.006	0.015	0.002	0.001	0.001
10:00 PM - 11:00 PM	0.002	0.001	0.002	0.002	0.002	0.002	0.001	0.001
11:00 PM - 12:00 AM	0.003	0.001	0.002	0.003	0.002	0.001	0.001	0.001
12:00 AM - 01:00 AM	0.002	0.003	0.004	0.004	0.002	0.001	0.001	0.001
01:00 AM - 02:00 AM	0.002	0.003	0.007	0.005	0.006	0.002	0.001	0.001
02:00 AM - 03:00 AM	0.002	0.010	0.004	0.006	0.002	0.002	0.001	0.002
03:00 AM - 04:00 AM	0.003	0.002	0.019	0.007	0.010	0.002	0.002	0.002
04:00 AM - 05:00 AM	0.006	0.002	0.009	0.004	0.014	0.002	0.002	0.002
05:00 AM - 06:00 AM	0.003	0.002	0.004	0.008	0.005	0.002	0.002	0.002
06:00 AM - 07:00 AM	0.003	0.002	0.022	0.007	0.007	0.002	0.002	0.002
07:00 AM - 08:00 AM	0.009	0.002	0.015	0.005	0.003	0.002	0.002	0.002
08:00 AM - 09:00 AM	0.017	0.003	0.019	0.008	0.006	0.002	0.011	0.011
09:00 AM - 10:00 AM	0.008	0.003	0.022	0.004	0.008	0.003	0.013	0.013
10:00 AM - 11:00 AM	0.009	0.004	0.026	0.026	0.006	0.002	0.010	0.010
11:00 AM - 12:00 PM	0.007	0.008	0.017	0.033	0.009	0.002	<0.001	<0.001
Average	0.005	0.008	0.010	0.010	0.006	0.003	0.004	0.004
1hr - Maximum	0.017	0.039	0.026	0.034	0.015	0.016	0.018	0.018
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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Approved by

Saranya C.
Saranya Chalermsathorn
Scientist (4)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand PHONE +66 2 2760 3000 FAX +66 2 2760 3197
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Analysis / Test Report

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

Lot ID: 2217902
Date Received : Mar 23, 2022
Date Reported : Mar 29, 2022
Report Number: 2273910-1

Page 1 of 1

Sample Description	Air Quality						
Location	สถานีวัดคุณภาพ (GPS 47P 0730826, 1407360)						
Parameter	Nitrogen dioxide (ppm)						
Measurement Date	Mar 15, 2022 - Mar 22, 2022						
Measurement by	Nontachai Uppathamp						
Time	2217902-22 Mar 15, 2022	2217902-23 Mar 16, 2022	2217902-24 Mar 17, 2022	2217902-25 Mar 18, 2022	2217902-26 Mar 19, 2022	2217902-27 Mar 20, 2022	2217902-28 Mar 21, 2022
08:00 AM - 09:00 AM	0.004	0.004	0.022	0.004	0.004	0.021	0.004
09:00 AM - 10:00 AM	0.006	0.005	0.009	0.004	0.004	0.004	0.004
10:00 AM - 11:00 AM	0.010	0.005	0.004	0.005	0.004	0.004	0.004
11:00 AM - 12:00 PM	0.007	0.005	0.004	0.005	0.004	0.004	0.005
12:00 PM - 01:00 PM	0.006	0.005	0.005	0.004	0.005	0.004	0.006
01:00 PM - 02:00 PM	0.008	0.006	0.005	0.005	0.004	0.004	0.005
02:00 PM - 03:00 PM	0.009	0.007	0.005	0.005	0.004	0.004	0.006
03:00 PM - 04:00 PM	0.011	0.006	0.006	0.005	0.004	0.004	0.006
04:00 PM - 05:00 PM	0.014	0.006	0.007	0.006	0.005	0.005	0.007
05:00 PM - 06:00 PM	0.013	0.006	0.007	0.006	0.005	0.005	0.008
06:00 PM - 07:00 PM	0.014	0.026	0.007	0.008	0.005	0.005	0.009
07:00 PM - 08:00 PM	0.010	0.010	0.007	0.012	0.005	0.005	0.010
08:00 PM - 09:00 PM	0.007	0.009	0.007	0.013	0.005	0.005	0.010
09:00 PM - 10:00 PM	0.006	0.006	0.010	0.010	0.007	0.005	0.010
10:00 PM - 11:00 PM	0.007	0.007	0.008	0.010	0.006	0.006	0.010
11:00 PM - 12:00 AM	0.008	0.006	0.008	0.010	0.007	0.008	0.010
12:00 AM - 01:00 AM	0.008	0.008	0.009	0.007	0.008	0.008	0.012
01:00 AM - 02:00 AM	0.006	0.006	0.006	0.005	0.008	0.008	0.007
02:00 AM - 03:00 AM	0.006	0.004	0.005	0.005	0.005	0.005	0.005
03:00 AM - 04:00 AM	0.004	0.004	0.004	0.006	0.007	0.004	0.005
04:00 AM - 05:00 AM	0.004	0.004	0.005	0.004	0.004	0.005	0.004
05:00 AM - 06:00 AM	0.004	0.004	0.004	0.004	0.004	0.004	0.004
06:00 AM - 07:00 AM	0.004	0.004	0.004	0.004	0.004	0.004	0.004
07:00 AM - 08:00 AM	0.004	0.013	0.004	0.004	0.004	0.004	0.005
Average	0.008	0.007	0.007	0.006	0.005	0.006	0.007
1hr - Maximum	0.014	0.026	0.022	0.013	0.008	0.021	0.012
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170



Analysis / Test Report

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

Lot ID: 2217908
Date Received : Mar 23, 2022
Date Reported : Mar 29, 2022
Report Number: 2273912-1

Page 1 of 1

Sample Description	Air Quality							
Location	ท่าเรือขลุ่ย (GPS 47P 0726292, 1407282)							
Parameter	Sulfur Dioxide (ppm)							
Measurement Date	Mar 15, 2022 - Mar 22, 2022							
Measurement by	Nontachai Uppathamp							
Time	2217908-1 Mar 15, 2022	2217908-2 Mar 16, 2022	2217908-3 Mar 17, 2022	2217908-4 Mar 18, 2022	2217908-5 Mar 19, 2022	2217908-6 Mar 20, 2022	2217908-7 Mar 21, 2022	2217908-8 Mar 22, 2022
10:00 AM - 11:00 AM	0.001	<0.001	0.001	0.001	0.001	0.001	0.001	0.002
11:00 AM - 12:00 PM	0.001	<0.001	0.001	0.001	0.001	0.001	0.001	0.001
12:00 PM - 01:00 PM	0.001	<0.001	0.001	0.001	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	0.001
02:00 PM - 03:00 PM	<0.001	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	0.001
04:00 PM - 05:00 PM	<0.001	<0.001	0.001	0.001	0.002	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	0.001
06:00 PM - 07:00 PM	<0.001	<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	0.001
08:00 PM - 09:00 PM	0.001	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	0.001
10:00 PM - 11:00 PM	0.002	<0.001	0.001	0.001	0.001	0.001	0.001	0.001
11:00 PM - 12:00 AM	0.002	<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	0.001
01:00 AM - 02:00 AM	<0.001	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	0.001
03:00 AM - 04:00 AM	<0.001	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	0.001
05:00 AM - 06:00 AM	0.001	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	0.001
07:00 AM - 08:00 AM	<0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
08:00 AM - 09:00 AM	0.002	0.001	0.001	0.001	0.002	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	0.001
Average	0.001	<0.001	0.001	0.001	0.001	0.001	0.001	0.001
1hr - Maximum	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.002
Standard 1hr - Average	0.3	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	0.12
Standard	: Notification of the National Environmental 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							

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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Approved by

Saranyu C.
Saranyu Chalerthamrong
Scientist (4)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand. PHONE +66 0 2760 3000 FAX +66 0 2760 3197
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S:\Reports_Air_SONIX rpt (7.03PM)



Analysis / Test Report

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

Lot ID: 2217908
Date Received : Mar 23, 2022
Date Reported : Mar 29, 2022
Report Number: 2273913-1

Page 1 of 1

Sample Description	Air Quality							
Location	ท่าเรือขลุ่ย (GPS 47P 0728261, 1403387)							
Parameter	Sulfur Dioxide (ppm)							
Measurement Date	Mar 15, 2022 - Mar 22, 2022							
Measurement by	Nontachai Uppathamp							
Time	2217908-8 Mar 15, 2022	2217908-9 Mar 16, 2022	2217908-10 Mar 17, 2022	2217908-11 Mar 18, 2022	2217908-12 Mar 19, 2022	2217908-13 Mar 20, 2022	2217908-14 Mar 21, 2022	
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	0.001	
11:00 AM - 12:00 PM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
12:00 PM - 01:00 PM	0.001	0.001	0.001	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	0.001	
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	
Average	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
1hr - Maximum	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
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							

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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Approved by

Saranyu C.
Saranyu Chalerthamrong
Scientist (4)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand. PHONE +66 0 2760 3000 FAX +66 0 2760 3197
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Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217911
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2227884-1

Page 1 of 1

Sample Number	Sampled Date	Total Suspended Particulate (mg/m ³)	Particulate Matter (PM-10) (mg/m ³)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2217911-1	Mar 15 - Mar 16, 2022	0.021	0.011	757	31
2217911-2	Mar 16 - Mar 17, 2022	0.030	0.020	757	31
2217911-3	Mar 17 - Mar 18, 2022	0.031	0.019	757	30
2217911-4	Mar 18 - Mar 19, 2022	0.044	0.028	757	30
2217911-5	Mar 19 - Mar 20, 2022	0.034	0.025	757	30
2217911-6	Mar 20 - Mar 21, 2022	0.024	0.019	757	29
2217911-7	Mar 21 - Mar 22, 2022	0.017	0.011	757	29
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 : Nontachai Upathamp

Approved by

Thanita K.

Thanita Kulswong
Scientist (4)

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RIGHT SOLUTIONS PRECISION IN ANALYSIS

4403-79 / 0904

3 Vapors / Air Ambient / Days off (9/27AM)



Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217911
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2227884-2

Page 1 of 1

Sample Number	Sampled Date	Total Suspended Particulate (mg/m ³)	Particulate Matter (PM-10) (mg/m ³)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2217911-8	Mar 15 - Mar 16, 2022	0.025	0.012	757	31
2217911-9	Mar 16 - Mar 17, 2022	0.030	0.013	757	31
2217911-10	Mar 17 - Mar 18, 2022	0.027	0.015	757	30
2217911-11	Mar 18 - Mar 19, 2022	0.052	0.029	757	30
2217911-12	Mar 19 - Mar 20, 2022	0.026	0.020	757	30
2217911-13	Mar 20 - Mar 21, 2022	0.021	0.014	757	29
2217911-14	Mar 21 - Mar 22, 2022	0.014	0.010	757	29
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 : Nontachai Upathamp

Approved by

Thanita K.

Thanita Kulswong
Scientist (4)

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RIGHT SOLUTIONS PRECISION IN ANALYSIS

4403-79 / 0904

3 Vapors / Air Ambient / Days off (9/27AM)



Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217911
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2227884-3

Page 1 of 1

Sample Number	Sampled Date	Total Suspended Particulate (mg/m ³)	Particulate Matter (PM-10) (mg/m ³)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2217911-15	Mar 15 - Mar 16, 2022	0.077	0.036	757	31
2217911-16	Mar 16 - Mar 17, 2022	0.102	0.030	757	31
2217911-17	Mar 17 - Mar 18, 2022	0.129	0.042	757	30
2217911-18	Mar 18 - Mar 19, 2022	0.060	0.029	757	30
2217911-19	Mar 19 - Mar 20, 2022	0.097	0.038	757	30
2217911-20	Mar 20 - Mar 21, 2022	0.069	0.027	757	29
2217911-21	Mar 21 - Mar 22, 2022	0.083	0.026	757	29
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 : Nontachai Upathamp

Approved by

Thanita K.

Thanita Kulswong
Scientist (4)

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4403-79 / 0904

3 Vapors / Air Ambient / Days off (9/27AM)



Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217911
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2227884-4

Page 1 of 1

Sample Number	Sampled Date	Total Suspended Particulate (mg/m ³)	Particulate Matter (PM-10) (mg/m ³)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2217911-22	Mar 15 - Mar 16, 2022	0.066	0.030	757	31
2217911-23	Mar 16 - Mar 17, 2022	0.053	0.024	757	31
2217911-24	Mar 17 - Mar 18, 2022	0.064	0.028	757	30
2217911-25	Mar 18 - Mar 19, 2022	0.062	0.034	757	30
2217911-26	Mar 19 - Mar 20, 2022	0.053	0.033	757	30
2217911-27	Mar 20 - Mar 21, 2022	0.036	0.023	757	29
2217911-28	Mar 21 - Mar 22, 2022	0.035	0.013	757	29
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 : Nontachai Upathamp

Approved by

Thanita K.

Thanita Kulswong
Scientist (4)

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RIGHT SOLUTIONS PRECISION IN ANALYSIS

4403-79 / 0904

3 Vapors / Air Ambient / Days off (9/27AM)



Analysis / Test Report

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

Lot ID : 2217910
Date Received : Mar 23, 2022
Date Reported : Mar 30, 2022
Report Number : 2227870-1

Page 1 of 2

Sample Number : 2217910-1 to 7
Parameter : Wind Speed / Wind Direction
Location : ทิศทางและอัตราเร็วลม (GPS 47P 0726292, 1407282)
Sampling Date : Mar 15 - Mar 22, 2022
Sampling by : Nontachai Uppathamp

Time	Mar 15 - Mar 16, 2022		Mar 16 - Mar 17, 2022		Mar 17 - Mar 18, 2022		Mar 18 - Mar 19, 2022		Mar 19 - Mar 20, 2022		Mar 20 - Mar 21, 2022		Mar 21 - Mar 22, 2022								
	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)							
10:00 AM - 11:00 AM	1.0	39.0	NE	4.0	341.0	NNW	1.2	72.0	ENE	0.6	152.0	SSW	1.4	55.0	NE	1.1	226.0	SW	0.4	14.0	NNE
11:00 AM - 12:00 PM	0.0	40.0	NE	1.0	0.0	N	1.3	74.0	ENE	0.4	253.0	WSW	1.7	279.0	W	2.0	228.0	NNW	2.4	201.0	SSW
12:00 PM - 01:00 PM	0.8	356.0	N	1.4	294.0	WNW	2.9	62.0	ENE	0.5	219.0	SW	1.6	59.0	ENE	1.6	201.0	SSW	0.7	202.0	SSW
01:00 PM - 02:00 PM	0.0	298.0	WNW	1.9	335.0	NNW	1.9	76.0	ENE	0.9	253.0	WSW	1.0	58.0	ENE	2.6	272.0	W	0.5	252.0	WSW
02:00 PM - 03:00 PM	1.1	253.0	N	1.0	396.0	SSW	0.4	97.0	E	0.1	-	-	1.0	59.0	ENE	0.6	252.0	WSW	0.0	-	-
03:00 PM - 04:00 PM	2.7	20.0	NNE	0.4	315.0	NW	0.9	62.0	ENE	0.0	-	-	1.5	61.0	ENE	0.7	260.0	W	0.2	-	-
04:00 PM - 05:00 PM	2.8	75.0	ENE	2.0	189.0	S	1.0	50.0	NE	0.0	-	-	0.9	47.0	NE	0.2	-	-	1.2	61.0	ENE
05:00 PM - 06:00 PM	1.0	75.0	ENE	2.2	314.0	NW	1.1	63.0	ENE	0.8	267.0	W	0.7	72.0	ENE	0.0	-	-	0.9	66.0	ENE
06:00 PM - 07:00 PM	1.1	75.0	E	0.7	167.0	SSE	1.2	32.0	NNE	0.0	-	-	1.0	66.0	ENE	0.6	259.0	W	0.6	59.0	ENE
07:00 PM - 08:00 PM	0.5	76.0	ENE	1.2	259.0	W	1.7	47.0	NE	0.6	152.0	SSE	0.1	-	-	0.2	-	-	1.2	48.0	NE
08:00 PM - 09:00 PM	0.0	-	-	1.9	10.0	N	1.3	196.0	SSW	0.9	68.0	ENE	0.0	-	-	0.7	73.0	ENE	2.6	247.0	WSW
09:00 PM - 10:00 PM	0.4	120.0	ESE	0.8	239.0	WSW	0.0	-	-	1.1	75.0	ENE	0.0	-	-	0.8	66.0	ENE	2.4	189.0	S
10:00 PM - 11:00 PM	0.0	-	-	0.0	-	-	0.1	-	-	1.2	71.0	ENE	0.0	-	-	1.1	118.0	ESE	2.0	189.0	S
11:00 PM - 12:00 AM	0.0	-	-	0.3	145.0	SE	0.0	-	-	1.7	59.0	ENE	0.9	63.0	ENE	0.6	73.0	ENE	2.3	154.0	SSE
12:00 AM - 01:00 AM	0.2	-	-	0.6	224.0	SW	0.0	-	-	1.3	72.0	ENE	0.5	80.0	E	1.5	52.0	NE	0.5	151.0	SSE
01:00 AM - 02:00 AM	0.4	76.0	ENE	0.2	-	-	0.5	62.0	ENE	1.3	78.0	ENE	0.6	66.0	ENE	2.0	50.0	NE	0.9	187.0	S
02:00 AM - 03:00 AM	0.8	215.0	SW	0.0	-	-	0.9	69.0	ENE	1.7	71.0	ENE	0.6	71.0	ENE	2.5	72.0	ENE	0.6	82.0	E
03:00 AM - 04:00 AM	1.4	222.0	SW	0.2	-	-	0.0	-	-	1.3	81.0	E	0.9	58.0	ENE	1.8	73.0	ENE	0.8	190.0	S
04:00 AM - 05:00 AM	1.7	356.0	N	0.0	-	-	0.1	-	-	2.3	62.0	ENE	0.7	71.0	ENE	2.4	43.0	NE	1.4	188.0	S
05:00 AM - 06:00 AM	1.3	308.0	NW	0.0	-	-	0.0	-	-	1.9	84.0	E	1.2	83.0	E	1.2	50.0	NE	1.2	82.0	E
06:00 AM - 07:00 AM	2.8	305.0	NW	0.0	-	-	1.2	76.0	ENE	1.9	113.0	ESE	1.0	89.0	E	3.0	67.0	ENE	0.1	-	-
07:00 AM - 08:00 AM	1.7	338.0	NNW	0.3	60.0	ENE	2.5	246.0	WSW	2.3	84.0	E	0.2	-	-	0.8	77.0	ENE	0.0	-	-
08:00 AM - 09:00 AM	1.9	355.0	N	0.8	27.0	NNE	0.8	274.0	W	1.5	52.0	NE	3.9	190.0	SSW	1.0	46.0	NE	0.9	78.0	ENE
09:00 AM - 10:00 AM	2.2	235.0	NNW	0.8	70.0	ENE	0.9	150.0	SSE	1.2	63.0	ENE	1.4	196.0	SSW	1.0	200.0	WSW	0.0	-	-

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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Approved by

Sarayu Jitranont
Assistant General Manager

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10210 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
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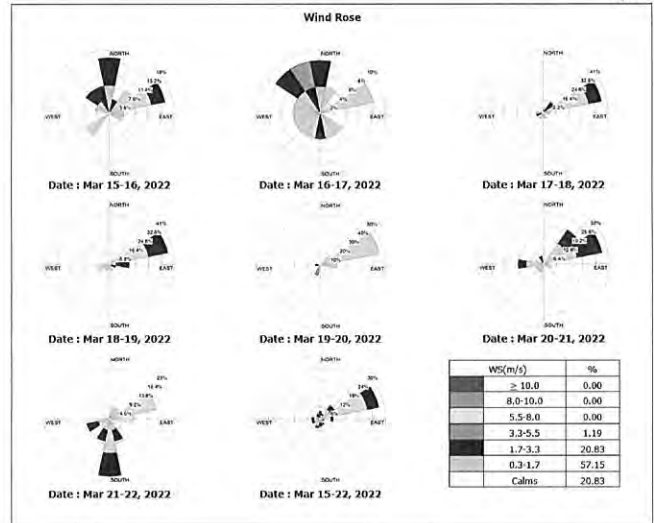


Analysis / Test Report

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

Lot ID : 2217910
Date Received : Mar 23, 2022
Date Reported : Mar 30, 2022
Report Number : 2227870-1

Page 2 of 2



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Sarayu Jitranont
Assistant General Manager

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10210 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
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Analysis / Test Report

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

Lot ID: 2217862
Date Received : Mar 17, 2022
Date Reported : Mar 24, 2022
Report Number: 2227759-2

Page 1 of 2

Sample Number 2217862-1
Sampled Date Mar 15, 2022
Sample Description Emission from Stationary Source
Location HRSOs
Date Analysis Commenced Mar 18, 2022
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one amber plastic bottle, refrigerated

		Stack Description					
Ambient Pressure	758	mmHg	Diameter	3.30	m	Oxygen	14.0
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	3.9
Type of Process	Combustion		Stack Temperature	131	°C	Gas Velocity	18.9
Type of Fuel	Natural Gas		Moisture	9.27	%	Flow Rate (Actual O2)	388282
Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O ₂	Method	Testing Location

Air Testing
Ammonia
11:00 AM - 11:30 AM
ppm
0.02
Based on Method of Air Sampling and Analysis, 401
<0.02
Rayong

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Approved by

Thanitak.

Thanita Kulurwong
Scientist (4)

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Phukdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556
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6403741 EMAIL

S. Vopora/Air Stack_NGL.rpt (3.36PM)



Analysis / Test Report

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

Lot ID: 2217862
Date Received : Mar 17, 2022
Date Reported : Mar 24, 2022
Report Number: 2227759-2

Page 2 of 2

Sample Number 2217862-1
Sampled Date Mar 15, 2022
Sample Description Emission from Stationary Source
Location HRSOs
Date Analysis Commenced Mar 18, 2022
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one amber plastic bottle, refrigerated

		Stack Description					
Ambient Pressure	758	mmHg	Diameter	3.30	m	Oxygen	14.0
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	3.9
Type of Process	Combustion		Stack Temperature	131	°C	Gas Velocity	18.9
Type of Fuel	Natural Gas		Moisture	9.27	%	Flow Rate (Actual O2)	388282
Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location

Air Testing
Ammonia
11:00 AM - 11:30 AM
g/s
<0.001
Calculated
Rayong

Sampled By : Kantaphon Manesampan

Remark :

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

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Thanita Kulurwong
Scientist (4)

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Phukdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556
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6403741 EMAIL

S. Vopora/Air Stack_NGL.rpt (3.36PM)



Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217942
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2270977-1

Page 1 of 1

Sample Number : 2217942-1
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณศูนย์รวมพลังงานไฟฟ้าโครงการ (GPS 47P 0727956, 1405409)
Measurement Date : Mar 15 - Mar 16, 2022
Measurement by : Nontachai Uppathamp
Sound Level meter : Serial No. 233184

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	55.4	80.1	47.5
11:00 AM - 12:00 PM	54.1	79.1	47.2
12:00 PM - 01:00 PM	52.5	75.9	46.0
01:00 PM - 02:00 PM	54.5	75.5	48.9
02:00 PM - 03:00 PM	53.8	78.4	48.6
03:00 PM - 04:00 PM	55.2	76.6	49.2
04:00 PM - 05:00 PM	54.8	75.3	49.3
05:00 PM - 06:00 PM	54.2	78.2	49.5
06:00 PM - 07:00 PM	53.6	76.8	48.0
07:00 PM - 08:00 PM	57.3	82.6	47.8
08:00 PM - 09:00 PM	50.7	70.5	47.5
09:00 PM - 10:00 PM	49.8	79.0	48.0
10:00 PM - 11:00 PM	49.8	63.3	48.7
11:00 PM - 12:00 AM	50.5	73.1	48.4
12:00 AM - 01:00 AM	49.3	71.0	48.1
01:00 AM - 02:00 AM	49.0	66.8	48.0
02:00 AM - 03:00 AM	48.6	54.4	47.8
03:00 AM - 04:00 AM	49.2	59.3	48.3
04:00 AM - 05:00 AM	49.9	69.8	48.2
05:00 AM - 06:00 AM	53.8	77.1	48.9
06:00 AM - 07:00 AM	56.1	75.2	49.6
07:00 AM - 08:00 AM	55.9	76.6	48.9
08:00 AM - 09:00 AM	54.2	74.4	49.3
09:00 AM - 10:00 AM	54.4	79.4	49.3
Leq Average 24 hrs. (dB(A))	53.5		
Lmax (dB(A))		82.6	
L90 (dB(A))			48.3
Ldn (dB(A))	58.5		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประเทศไทยมาตรฐานการวัดและประเมินค่าเสียง (พ.ร.บ. 2540) ที่ว่าด้วยการควบคุมการปล่อยเสียงจากโรงงานอุตสาหกรรม
2. ประเทศไทยมาตรฐานการวัดและประเมินค่าเสียง (พ.ร.บ. 2540) ที่ว่าด้วยการควบคุมการปล่อยเสียงจากโรงงานอุตสาหกรรม

Technical Management

Thanitak
Thanitak Kulkarni
Scientist (4)

Approved by

Supot S
Supot Salameh
Section Head

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RIGHT SOLUTIONS PRECISELY MEASURED

3 Vapors/Air Noise rpt (8/30/48)



Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217942
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2270978-1

Page 1 of 1

Sample Number : 2217942-2
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณศูนย์รวมพลังงานไฟฟ้าโครงการ (GPS 47P 0727956, 1405409)
Measurement Date : Mar 16 - Mar 17, 2022
Measurement by : Nontachai Uppathamp
Sound Level meter : Serial No. 233184

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	55.1	75.2	49.6
11:00 AM - 12:00 PM	53.4	71.4	48.7
12:00 PM - 01:00 PM	53.6	75.8	48.5
01:00 PM - 02:00 PM	55.0	78.0	49.4
02:00 PM - 03:00 PM	54.1	74.1	49.9
03:00 PM - 04:00 PM	55.5	74.6	49.2
04:00 PM - 05:00 PM	54.1	74.5	47.4
05:00 PM - 06:00 PM	52.8	83.4	47.1
06:00 PM - 07:00 PM	52.0	74.8	47.0
07:00 PM - 08:00 PM	55.6	81.3	47.5
08:00 PM - 09:00 PM	49.3	66.7	47.8
09:00 PM - 10:00 PM	50.3	64.3	48.7
10:00 PM - 11:00 PM	50.5	65.3	49.0
11:00 PM - 12:00 AM	51.5	70.0	49.0
12:00 AM - 01:00 AM	50.8	67.2	48.9
01:00 AM - 02:00 AM	49.5	64.2	48.5
02:00 AM - 03:00 AM	49.2	65.7	48.1
03:00 AM - 04:00 AM	49.7	55.6	49.0
04:00 AM - 05:00 AM	50.1	75.0	48.0
05:00 AM - 06:00 AM	52.3	76.0	49.2
06:00 AM - 07:00 AM	55.2	75.3	49.6
07:00 AM - 08:00 AM	55.3	76.2	48.7
08:00 AM - 09:00 AM	55.0	73.8	48.5
09:00 AM - 10:00 AM	53.9	74.9	47.6
Leq Average 24 hrs. (dB(A))	53.2		
Lmax (dB(A))		83.4	
L90 (dB(A))			48.7
Ldn (dB(A))	58.3		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประเทศไทยมาตรฐานการวัดและประเมินค่าเสียง (พ.ร.บ. 2540) ที่ว่าด้วยการควบคุมการปล่อยเสียงจากโรงงานอุตสาหกรรม
2. ประเทศไทยมาตรฐานการวัดและประเมินค่าเสียง (พ.ร.บ. 2540) ที่ว่าด้วยการควบคุมการปล่อยเสียงจากโรงงานอุตสาหกรรม

Technical Management

Thanitak
Thanitak Kulkarni
Scientist (4)

Approved by

Supot S
Supot Salameh
Section Head

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RIGHT SOLUTIONS PRECISELY MEASURED

3 Vapors/Air Noise rpt (8/30/48)



Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217942
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2270979-1

Page 1 of 1

Sample Number : 2217942-3
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณศูนย์รวมพลังงานไฟฟ้าโครงการ (GPS 47P 0727956, 1405409)
Measurement Date : Mar 17 - Mar 18, 2022
Measurement by : Nontachai Uppathamp
Sound Level meter : Serial No. 233184

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	53.7	75.2	47.5
11:00 AM - 12:00 PM	53.3	72.5	47.6
12:00 PM - 01:00 PM	54.9	77.9	49.7
01:00 PM - 02:00 PM	54.5	75.9	48.8
02:00 PM - 03:00 PM	52.0	72.4	48.1
03:00 PM - 04:00 PM	54.0	77.3	49.1
04:00 PM - 05:00 PM	54.8	77.0	48.0
05:00 PM - 06:00 PM	52.7	86.2	46.9
06:00 PM - 07:00 PM	52.5	73.0	47.0
07:00 PM - 08:00 PM	55.9	85.0	47.5
08:00 PM - 09:00 PM	50.0	71.5	48.0
09:00 PM - 10:00 PM	50.7	67.3	49.1
10:00 PM - 11:00 PM	50.9	70.1	49.1
11:00 PM - 12:00 AM	51.5	71.3	48.6
12:00 AM - 01:00 AM	50.2	76.7	48.6
01:00 AM - 02:00 AM	52.7	82.5	48.5
02:00 AM - 03:00 AM	49.3	60.2	48.2
03:00 AM - 04:00 AM	49.4	55.3	48.5
04:00 AM - 05:00 AM	51.3	73.9	48.7
05:00 AM - 06:00 AM	53.2	74.4	49.4
06:00 AM - 07:00 AM	56.9	82.5	49.7
07:00 AM - 08:00 AM	55.3	73.7	49.0
08:00 AM - 09:00 AM	55.5	77.5	48.7
09:00 AM - 10:00 AM	55.1	84.5	48.3
Leq Average 24 hrs. (dB(A))	53.4		
Lmax (dB(A))		86.2	
L90 (dB(A))			48.5
Ldn (dB(A))	59.1		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประเทศไทยมาตรฐานการวัดและประเมินค่าเสียง (พ.ร.บ. 2540) ที่ว่าด้วยการควบคุมการปล่อยเสียงจากโรงงานอุตสาหกรรม
2. ประเทศไทยมาตรฐานการวัดและประเมินค่าเสียง (พ.ร.บ. 2540) ที่ว่าด้วยการควบคุมการปล่อยเสียงจากโรงงานอุตสาหกรรม

Technical Management

Thanitak
Thanitak Kulkarni
Scientist (4)

Approved by

Supot S
Supot Salameh
Section Head

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Life Sciences

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RIGHT SOLUTIONS PRECISELY MEASURED

3 Vapors/Air Noise rpt (8/30/48)



Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217942
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2270980-1

Page 1 of 1

Sample Number : 2217942-4
Parameter : Noise (Leq 24 hrs.)
Location : บริเวณศูนย์รวมพลังงานไฟฟ้าโครงการ (GPS 47P 0727956, 1405409)
Measurement Date : Mar 18 - Mar 19, 2022
Measurement by : Nontachai Uppathamp
Sound Level meter : Serial No. 233184

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	55.0	85.1	49.1
11:00 AM - 12:00 PM	61.0	78.8	52.9
12:00 PM - 01:00 PM	63.0	90.9	57.4
01:00 PM - 02:00 PM	57.7	79.4	53.3
02:00 PM - 03:00 PM	53.5	76.0	49.1
03:00 PM - 04:00 PM	56.1	78.3	48.5
04:00 PM - 05:00 PM	54.6	75.1	48.0
05:00 PM - 06:00 PM	52.9	77.4	47.1
06:00 PM - 07:00 PM	57.3	91.0	48.0
07:00 PM - 08:00 PM	55.2	79.1	48.0
08:00 PM - 09:00 PM	51.5	69.8	49.0
09:00 PM - 10:00 PM	52.4	74.9	49.8
10:00 PM - 11:00 PM	52.0	61.9	50.8
11:00 PM - 12:00 AM	53.1	73.4	50.9
12:00 AM - 01:00 AM	52.0	64.1	50.7
01:00 AM - 02:00 AM	51.6	65.7	50.5
02:00 AM - 03:00 AM	51.0	55.2	49.9
03:00 AM - 04:00 AM	51.8	67.2	50.6
04:00 AM - 05:00 AM	52.5	72.5	51.4
05:00 AM - 06:00 AM	54.6	74.5	51.8
06:00 AM - 07:00 AM	57.5	84.8	51.0
07:00 AM - 08:00 AM	57.0	82.2	48.3
08:00 AM - 09:00 AM	55.1	77.9	47.8
09:00 AM - 10:00 AM	51.5	71.8	46.9
Leq Average 24 hrs. (dB(A))	55.9		
Lmax (dB(A))		91.0	
L90 (dB(A))			49.8
Ldn (dB(A))	60.5		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ประเทศไทยมาตรฐานการวัดและประเมินค่าเสียง (พ.ร.บ. 2540) ที่ว่าด้วยการควบคุมการปล่อยเสียงจากโรงงานอุตสาหกรรม
2. ประเทศไทยมาตรฐานการวัดและประเมินค่าเสียง (พ.ร.บ. 2540) ที่ว่าด้วยการควบคุมการปล่อยเสียงจากโรงงานอุตสาหกรรม

Technical Management

Thanitak
Thanitak Kulkarni
Scientist (4)

Approved by

Supot S
Supot Salameh
Section Head

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Life Sciences

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RIGHT SOLUTIONS PRECISELY MEASURED

3 Vapors/Air Noise rpt (8/30/48)



Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217942
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2270981-1

Page 1 of 1

Sample Number	2217942-5		
Parameter	Noise (Leq 24 hrs.)		
Location	พื้นที่บริเวณโรงไฟฟ้าพลังงานแสงอาทิตย์ (GPS 47P 0272956, 1405409)		
Measurement Date	Mar 19 - Mar 20, 2022		
Measurement by	Nontachai Uppathamp		
Sound Level meter	Serial No. 233184		
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	54.4	73.2	47.1
11:00 AM - 12:00 PM	54.1	79.7	46.6
12:00 PM - 01:00 PM	52.6	75.9	46.6
01:00 PM - 02:00 PM	54.1	72.9	47.7
02:00 PM - 03:00 PM	51.9	73.5	47.5
03:00 PM - 04:00 PM	52.5	74.3	47.6
04:00 PM - 05:00 PM	53.6	76.8	47.9
05:00 PM - 06:00 PM	53.4	76.9	48.8
06:00 PM - 07:00 PM	54.0	72.9	49.2
07:00 PM - 08:00 PM	54.7	77.3	49.0
08:00 PM - 09:00 PM	51.1	72.3	49.2
09:00 PM - 10:00 PM	51.4	67.4	49.8
10:00 PM - 11:00 PM	52.1	70.2	50.2
11:00 PM - 12:00 AM	52.2	67.3	50.2
12:00 AM - 01:00 AM	51.0	65.5	49.6
01:00 AM - 02:00 AM	50.2	61.5	48.9
02:00 AM - 03:00 AM	49.5	58.1	48.5
03:00 AM - 04:00 AM	50.3	68.2	49.0
04:00 AM - 05:00 AM	49.8	72.0	48.3
05:00 AM - 06:00 AM	50.8	77.5	53.0
06:00 AM - 07:00 AM	55.5	79.0	49.9
07:00 AM - 08:00 AM	54.5	76.4	49.3
08:00 AM - 09:00 AM	50.5	68.2	47.7
09:00 AM - 10:00 AM	49.5	69.2	47.1
Leq Average 24 hrs. (dB(A))	53.4		
Lmax (dB(A))		79.7	
L90 (dB(A))			48.8
Ldn (dB(A))	60.1		
Standard (dB(A))	70	115	
Reference Method	ISO1996-1 and 1996-2		
Standard	1. วัตถุประสงค์การตรวจวัดค่าเสียงตามข้อกำหนด มาตรฐาน 15 (พ.ร.บ. 2540) เพื่อการควบคุมผลกระทบจากเสียงรบกวน 2. วัตถุประสงค์การตรวจวัดค่าเสียงตามข้อกำหนดการควบคุมผลกระทบจากเสียงรบกวนตามมาตรฐาน และ/หรือตามข้อกำหนดอื่นๆที่เกี่ยวข้อง ที่ ม.ร.ท. 2548		

Technical Management

Thanita Kulsurwong
Scientist (4)

Approved by

Supt S
Supt Salanth
Section Head

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LIFE SOLUTIONS

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NIGHT SOLUTIONS PICTURE PHOTOGRAPHY

5 (Vapor/Air Noise) (p. 3/31AM)



Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217942
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2270982-1

Page 1 of 1

Sample Number	2217942-6		
Parameter	Noise (Leq 24 hrs.)		
Location	บริเวณโรงโม่หินพื้นที่นาข้าวไร่นาทอง (GPS 47P 0277596, 1405409)		
Measurement Date	Mar 20 - Mar 21, 2022		
Measurement by	Nontachai Uppathamp		
Sound Level meter	Serial No. 233184		
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	50.8	73.9	47.3
11:00 AM - 12:00 PM	51.6	71.9	47.8
12:00 PM - 01:00 PM	50.5	70.5	47.7
01:00 PM - 02:00 PM	50.6	70.3	48.4
02:00 PM - 03:00 PM	50.7	75.7	50.6
03:00 PM - 04:00 PM	52.1	78.3	48.4
04:00 PM - 05:00 PM	51.4	71.0	48.7
05:00 PM - 06:00 PM	52.8	74.8	48.5
06:00 PM - 07:00 PM	53.6	73.0	49.1
07:00 PM - 08:00 PM	52.4	77.0	49.3
08:00 PM - 09:00 PM	52.4	74.8	49.5
09:00 PM - 10:00 PM	50.7	70.4	49.2
10:00 PM - 11:00 PM	50.8	67.3	49.3
11:00 PM - 12:00 AM	57.5	72.8	51.4
12:00 AM - 01:00 AM	52.5	72.3	50.4
01:00 AM - 02:00 AM	55.7	74.1	51.2
02:00 AM - 03:00 AM	59.3	71.1	55.7
03:00 AM - 04:00 AM	55.0	75.1	51.1
04:00 AM - 05:00 AM	51.9	65.6	50.6
05:00 AM - 06:00 AM	51.4	74.7	50.8
06:00 AM - 07:00 AM	55.8	75.8	51.0
07:00 AM - 08:00 AM	58.6	89.0	50.0
08:00 AM - 09:00 AM	55.4	83.2	49.3
09:00 AM - 10:00 AM	56.5	79.3	48.9
Leq Average 24 hrs. (dB(A))	54.5		
Lmax (dB(A))		89.0	
L90 (dB(A))			49.3
Ldn (dB(A))	61.7		
Standard (dB(A))	70	115	
Reference Method	ISO1996-1 and 1996-2		
Standard	1. วัตถุประสงค์การตรวจวัดค่าเสียงตามข้อกำหนด มาตรฐาน 15 (พ.ร.บ. 2540) เพื่อการควบคุมผลกระทบจากเสียงรบกวน 2. วัตถุประสงค์การตรวจวัดค่าเสียงตามข้อกำหนดการควบคุมผลกระทบจากเสียงรบกวนตามมาตรฐาน และ/หรือตามข้อกำหนดอื่นๆที่เกี่ยวข้อง ตามที่ ม.ร.ท. 2548		

Technical Management

Thanita Kulsurwong
Scientist (4)

Approved by

Supt S
Supt Salanth
Section Head

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5 (Vapor/Air Noise) (p. 3/31AM)



Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217942
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2270983-1

Page 1 of 1

Sample Number	2217942-7		
Parameter	Noise (Leq 24 hrs.)		
Location	พื้นที่บริเวณโรงไฟฟ้าพลังงานแสงอาทิตย์ (GPS 47P 0277596, 1405409)		
Measurement Date	Mar 21 - Mar 22, 2022		
Measurement by	Nontachai Uppathamp		
Sound Level meter	Serial No. 233184		
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:00 AM - 11:00 AM	55.2	79.9	49.4
11:00 AM - 12:00 PM	55.1	74.7	48.3
12:00 PM - 01:00 PM	54.6	79.7	48.2
01:00 PM - 02:00 PM	54.8	79.9	48.3
02:00 PM - 03:00 PM	56.4	76.8	48.2
03:00 PM - 04:00 PM	54.5	79.3	47.9
04:00 PM - 05:00 PM	54.8	83.6	48.3
05:00 PM - 06:00 PM	53.5	82.5	48.5
06:00 PM - 07:00 PM	54.2	74.4	48.9
07:00 PM - 08:00 PM	55.0	82.3	48.8
08:00 PM - 09:00 PM	49.8	69.0	48.6
09:00 PM - 10:00 PM	50.8	68.4	49.5
10:00 PM - 11:00 PM	51.6	69.3	50.0
11:00 PM - 12:00 AM	52.7	71.9	50.0
12:00 AM - 01:00 AM	51.0	68.5	49.8
01:00 AM - 02:00 AM	51.1	71.8	50.1
02:00 AM - 03:00 AM	51.1	61.8	50.3
03:00 AM - 04:00 AM	56.6	60.7	49.8
04:00 AM - 05:00 AM	51.4	73.3	49.9
05:00 AM - 06:00 AM	53.5	76.0	50.3
06:00 AM - 07:00 AM	58.1	87.4	50.3
07:00 AM - 08:00 AM	56.5	76.1	49.8
08:00 AM - 09:00 AM	55.9	77.5	50.3
09:00 AM - 10:00 AM	58.2	72.8	48.1
Leq Average 24 hrs. (dB(A))	54.4		
Lmax (dB(A))		87.4	
L90 (dB(A))			49.4
Ldn (dB(A))	59.8		
Standard (dB(A))	70	115	
Reference Method	ISO1996-1 and 1996-2		
Standard	1. วัตถุประสงค์การตรวจวัดค่าเสียงตามข้อกำหนด มาตรฐาน 15 (พ.ร.บ. 2540) เพื่อการควบคุมผลกระทบจากเสียงรบกวน 2. วัตถุประสงค์การตรวจวัดค่าเสียงตามข้อกำหนดการควบคุมผลกระทบจากเสียงรบกวนตามมาตรฐาน และ/หรือตามข้อกำหนดอื่นๆที่เกี่ยวข้อง ตามที่ ม.ร.ท. 2548		

Technical Management

Thanita Kulsurwong
Scientist (4)

Approved by

Supt S
Supt Salanth
Section Head

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5 (Vapor/Air Noise) (p. 3/31AM)



Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217942
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2270984-1

Page 1 of 1

Sample Number	2217942-8		
Parameter	Noise (Leq 24 hrs.)		
Location	พื้นที่บริเวณโรงไฟฟ้าพลังงานแสงอาทิตย์ (GPS 47P 0278246, 1403366)		
Measurement Date	Mar 15 - Mar 16, 2022		
Measurement by	Nontachai Uppathamp		
Sound Level meter	Serial No. 734223		
Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	51.8	79.5	44.8
10:00 AM - 11:00 AM	50.3	77.6	45.1
11:00 AM - 12:00 PM	51.6	77.1	44.5
12:00 PM - 01:00 PM	50.3	77.1	43.1
01:00 PM - 02:00 PM	50.4	77.8	46.4
02:00 PM - 03:00 PM	53.3	76.9	45.4
03:00 PM - 04:00 PM	51.9	81.3	45.1
04:00 PM - 05:00 PM	49.5	69.5	46.1
05:00 PM - 06:00 PM	51.4	71.0	46.8
06:00 PM - 07:00 PM	50.8	80.7	45.8
07:00 PM - 08:00 PM	49.5	69.4	47.3
08:00 PM - 09:00 PM	50.5	71.0	49.7
09:00 PM - 10:00 PM	48.7	70.3	47.6
10:00 PM - 11:00 PM	44.8	64.3	43.7
11:00 PM - 12:00 AM	44.2	65.2	43.3
12:00 AM - 01:00 AM	47.3	72.3	45.2
01:00 AM - 02:00 AM	48.1	69.9	47.4
02:00 AM - 03:00 AM	46.8	66.1	45.9
03:00 AM - 04:00 AM	46.4	57.1	45.4
04:00 AM - 05:00 AM	46.4	62.0	44.5
05:00 AM - 06:00 AM	51.7	70.8	48.3
06:00 AM - 07:00 AM	55.5	73.9	49.7
07:00 AM - 08:00 AM	52.1	74.0	46.0
08:00 AM - 09:00 AM	49.8	73.1	44.3
Leq Average 24 hrs. (dB(A))	50.6		
Lmax (dB(A))		81.3	
L90 (dB(A))			45.4
Ldn (dB(A))	56.2		
Standard (dB(A))	70	115	
Reference Method	ISO1996-1 and 1996-2		
Standard	1. วัตถุประสงค์การตรวจวัดค่าเสียงตามข้อกำหนด มาตรฐาน 15 (พ.ร.บ. 2540) เพื่อการควบคุมผลกระทบจากเสียงรบกวน 2. วัตถุประสงค์การตรวจวัดค่าเสียงตามข้อกำหนดการควบคุมผลกระทบจากเสียงรบกวนตามมาตรฐาน และ/หรือตามข้อกำหนด ที่เกี่ยวข้อง ม.ร.ท. 2548		

Technical Management

Thanita Kulsurwong
Scientist (4)

Approved by

Supt S
Supt Salanth
Section Head

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5 (Vapor/Air Noise) (p. 3/31AM)





Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217942
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2270989-1

Page 1 of 1

Sample Number : 2217942-12
Parameter : Noise (Leq 24 hrs.)
Location : หน่วยควบคุม (GPS 47P 0728246, 1403366)
Measurement Date : Mar 20 - Mar 21, 2022
Measurement by : Nontachai Uppathamp
Sound Level meter : Serial No. 734223

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	51.8	81.0	45.5
10:00 AM - 11:00 AM	49.1	69.9	44.6
11:00 AM - 12:00 PM	52.9	76.8	41.1
12:00 PM - 01:00 PM	52.7	79.8	45.4
01:00 PM - 02:00 PM	53.4	78.7	46.5
02:00 PM - 03:00 PM	58.7	76.5	48.4
03:00 PM - 04:00 PM	52.0	76.3	47.4
04:00 PM - 05:00 PM	49.7	68.3	46.9
05:00 PM - 06:00 PM	51.9	77.3	46.6
06:00 PM - 07:00 PM	50.4	71.7	48.5
07:00 PM - 08:00 PM	54.5	80.0	53.2
08:00 PM - 09:00 PM	50.5	60.8	49.6
09:00 PM - 10:00 PM	47.7	71.8	46.4
10:00 PM - 11:00 PM	47.3	58.4	45.9
11:00 PM - 12:00 AM	50.8	78.4	47.8
12:00 AM - 01:00 AM	47.5	64.7	46.1
01:00 AM - 02:00 AM	55.7	72.9	48.5
02:00 AM - 03:00 AM	58.3	75.7	52.1
03:00 AM - 04:00 AM	50.0	62.1	48.5
04:00 AM - 05:00 AM	50.5	60.9	48.6
05:00 AM - 06:00 AM	54.8	78.7	50.1
06:00 AM - 07:00 AM	53.3	78.5	49.9
07:00 AM - 08:00 AM	53.1	79.0	49.4
08:00 AM - 09:00 AM	52.0	79.8	46.4

Leq Average 24 hrs. (dB(A)) : 53.8
Lmax (dB(A)) : 81.0
L90 (dB(A)) : 47.4
Ldn (dB(A)) : 61.2
Standard (dB(A)) : 70

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ใช้มาตรฐานการวัดและประเมินค่าเสียงตามข้อกำหนด 15 (พ.ร.บ. 2540) สำหรับการควบคุมการปนเปื้อนเสียงในชุมชน
2. ใช้มาตรฐานการวัดและประเมินค่าเสียงตามข้อกำหนด 15 (พ.ร.บ. 2540) สำหรับการควบคุมการปนเปื้อนเสียงในชุมชน
ทั้งนี้ ม.ร. 2548

Technical Management

Thanitak
Thanita Kulrurivong
Scientist (4)

Approved by

Supt S
Supot Salamech
Section Head

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6402-74/ EMAIL

S:\Reports\LA\Noise\pt (9.36AM)



Analysis / Test Report



TESTING
No.0042

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

Lot ID: 2217942
Date Received : Mar 23, 2022
Date Reported : Mar 28, 2022
Report Number: 2270990-1

Page 1 of 1

Sample Number : 2217942-14
Parameter : Noise (Leq 24 hrs.)
Location : หน่วยควบคุม (GPS 47P 0728246, 1403366)
Measurement Date : Mar 21 - Mar 22, 2022
Measurement by : Nontachai Uppathamp
Sound Level meter : Serial No. 734223

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	51.4	74.2	46.6
10:00 AM - 11:00 AM	52.1	70.5	47.2
11:00 AM - 12:00 PM	53.4	74.5	47.1
12:00 PM - 01:00 PM	51.1	75.4	45.3
01:00 PM - 02:00 PM	51.8	75.4	46.4
02:00 PM - 03:00 PM	48.7	68.6	45.6
03:00 PM - 04:00 PM	50.4	74.5	46.3
04:00 PM - 05:00 PM	51.5	70.4	46.9
05:00 PM - 06:00 PM	52.4	85.3	47.7
06:00 PM - 07:00 PM	52.3	73.3	50.8
07:00 PM - 08:00 PM	52.4	70.7	51.4
08:00 PM - 09:00 PM	52.8	74.4	51.8
09:00 PM - 10:00 PM	50.3	65.2	49.5
10:00 PM - 11:00 PM	49.8	61.4	48.8
11:00 PM - 12:00 AM	50.7	74.6	48.1
12:00 AM - 01:00 AM	63.3	80.7	47.4
01:00 AM - 02:00 AM	47.5	56.3	46.3
02:00 AM - 03:00 AM	47.8	59.3	46.5
03:00 AM - 04:00 AM	47.5	57.7	46.4
04:00 AM - 05:00 AM	48.3	66.3	46.1
05:00 AM - 06:00 AM	54.0	82.6	48.5
06:00 AM - 07:00 AM	52.4	74.7	47.8
07:00 AM - 08:00 AM	51.1	79.7	45.9
08:00 AM - 09:00 AM	52.6	75.1	46.6

Leq Average 24 hrs. (dB(A)) : 53.4
Lmax (dB(A)) : 90.7
L90 (dB(A)) : 46.9
Ldn (dB(A)) : 61.3
Standard (dB(A)) : 70

Reference Method : ISO1996-1 and 1996-2

Standard : 1. ใช้มาตรฐานการวัดและประเมินค่าเสียงตามข้อกำหนด 15 (พ.ร.บ. 2540) สำหรับการควบคุมการปนเปื้อนเสียงในชุมชน
2. ใช้มาตรฐานการวัดและประเมินค่าเสียงตามข้อกำหนด 15 (พ.ร.บ. 2540) สำหรับการควบคุมการปนเปื้อนเสียงในชุมชน
ทั้งนี้ ม.ร. 2548

Technical Management

Thanitak
Thanita Kulrurivong
Scientist (4)

Approved by

Supt S
Supot Salamech
Section Head

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6402-74/ EMAIL

S:\Reports\LA\Noise\pt (9.37AM)



Analysis / Test Report

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

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

Lot ID: 2210297
Date Received : Jan 24, 2022
Date Reported : Jan 31, 2022
Report Number : 2213246-2

Page 1 of 1

Sample Number : 2210297-1
Sample Date : Jan 24, 2022 2:25 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : Jan 24, 2022
Condition of Sample : Contained in one amber glass bottle, one BOD bottle and two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOQ)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Dissolved Oxygen	mg/L	-	0.1	7.3	No Standard	Based on APHA (2017), 4500-O(C)	Rayong
Flow rate	m3/s	-	-	-	No Standard	Flow meter	Rayong

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

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

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Approved by

N. Banthong

Narumon Banthongkit
Supervisor

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Phukdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556
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Analysis / Test Report

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

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

TESTING
No.0042
Lot ID: 224432
Date Received : Feb 08, 2022
Date Reported : Feb 17, 2022
Report Number : 2236675-1

Page 1 of 1

Sample Number : 224432-1
Sample Date : Feb 08, 2022 2:45 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : Feb 08, 2022
Condition of Sample : Contained in one amber glass bottle, two plastic bottles and one BOD bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOQ)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2	3	≤500	APHA (2017), 5210 B	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C	-	-	-	8.6	5.5-9.0	Based on APHA (2017), 4500-H (R)	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Based on APHA (2017), 4500-Cl(F)	Rayong
Temperature *	Degree C	-	-	31.2	≤45	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	208	≤3000	APHA (2017), 2540 C	Rayong

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

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

Technical Management

N. Banthong

Narumon Banthongkit
Supervisor
โทรศัพท์ 323-9945

Approved by

D. Chongchon

Dej Chongchon
Senior Manager
โทรศัพท์ 323-9942

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Analysis / Test Report

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

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

Lot ID: 224432
Date Received : Feb 08, 2022
Date Reported : Feb 17, 2022
Report Number : 2236675-2

Page 1 of 1

Sample Number : 224432-1
Sample Date : Feb 08, 2022 2:45 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : Feb 08, 2022
Condition of Sample : Contained in one amber glass bottle, two plastic bottles and one BOD bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOQ)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Dissolved Oxygen	mg/L	-	0.1	10.6	No Standard	Based on APHA (2017), 4500-O(C)	Rayong
Flow rate	m3/s	-	-	-	No Standard	Flow meter	Rayong

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

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

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Approved by

N. Banthong

Narumon Banthongkit
Supervisor

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Phukdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556
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Analysis / Test Report

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

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

TESTING
No.0042
Lot ID: 2217142
Date Received : Mar 08, 2022
Date Reported : Mar 16, 2022
Report Number : 2261976-1

Page 1 of 1

Sample Number : 2217142-1
Sample Date : Mar 08, 2022 2:30 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : Mar 08, 2022
Condition of Sample : Contained in one amber glass bottle, two plastic bottles and one BOD bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOQ)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2	<2	≤500	APHA (2017), 5210 B	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C	-	-	-	9.0	5.5-9.0	Based on APHA (2017), 4500-H (R)	Rayong
Residual Free Chlorine *	mg/L	-	0.1	0.6	≤1	Based on APHA (2017), 4500-Cl(F)	Rayong
Temperature *	Degree C	-	-	30.1	≤45	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	440	≤3000	APHA (2017), 2540 C	Rayong

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

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

Technical Management

N. Banthong

Narumon Banthongkit
Supervisor
โทรศัพท์ 323-9945

Approved by

D. Chongchon

Dej Chongchon
Senior Manager
โทรศัพท์ 323-9942

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Analysis / Test Report

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

Lot ID: 2217142
Date Received : Mar 08, 2022
Date Reported : Mar 16, 2022
Report Number : 2261976-2

Page 1 of 1

Sample Number	2217142-1						
Sampled Date	Mar 08, 2022 2:30 PM						
Sample Description	Wastewater						
Location	Holding pond 320 m3						
Date Analysis Commenced	Mar 08, 2022						
Condition of Sample	Contained in one amber glass bottle, two plastic bottles and one BOD bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Dissolved Oxygen	mg/L	-	0.1	7.5	No Standard	Based on APHA (2017), 4500-O(C)	Rayong
Flow rate	m3/s	-	-	-	No Standard	Flow meter	Rayong

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

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

Approved by

N. Banphit

Narumon Banchohkit
Supervisor

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Phukdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556
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Analysis / Test Report

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

TESTING
No.0042
Lot ID: 2245967
Date Received : Apr 18, 2022
Date Reported : Apr 25, 2022
Report Number : 2287350-1

Page 1 of 1

Sample Number	2245967-1						
Sample Date	Apr 18, 2022 2:40 PM						
Sample Description	Wastewater						
Location	Holding pond 320 m3						
Date Analysis Commenced	Apr 18, 2022						
Condition of Sample	Contained in one amber glass bottle, one BOD bottle and two 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	4	≤500	APHA (2017), 5210 B	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C	-	-	-	6.6	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Residual Free Chlorine *	mg/L	-	0.1	0.2	≤1	Based on APHA (2017), 4500-Cl(F)	Rayong
Temperature *	Degree C	-	-	30.4	≤45	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	37	≤3000	APHA (2017), 2540 C	Rayong

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

Remark :
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Technical Management

N. Banphit

Narumon Banchohkit
Supervisor
โทรศัพท์ 3-323-9-9445

Approved by

D. Changchon

Daj Changchon
Senior Manager
โทรศัพท์ 3-323-9-9442

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Analysis / Test Report

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

Lot ID: 2245967
Date Received : Apr 18, 2022
Date Reported : Apr 25, 2022
Report Number : 2287350-2

Page 1 of 1

Sample Number	2245967-1						
Sample Date	Apr 18, 2022 2:40 PM						
Sample Description	Wastewater						
Location	Holding pond 320 m3						
Date Analysis Commenced	Apr 18, 2022						
Condition of Sample	Contained in one amber glass bottle, one BOD bottle and two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						
Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Dissolved Oxygen	mg/L	-	0.1	7.0	No Standard	Based on APHA (2017), 4500-O(C)	Rayong
Flow rate	m3/s	-	-	-	No Standard	Flow meter	Rayong

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

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

Approved by

N. Banphit

Narumon Banchohkit
Supervisor

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Phukdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556
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Analysis / Test Report

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

TESTING
No.0042
Lot ID: 2243149
Date Received : May 10, 2022
Date Reported : May 18, 2022
Report Number : 2316066-1

Page 1 of 1

Sample Number	2243149-1						
Sample Date	May 10, 2022 2:30 PM						
Sample Description	Wastewater						
Location	Holding pond 320 m3						
Date Analysis Commenced	May 10, 2022						
Condition of Sample	Contained in one amber glass bottle, two plastic bottles and one BOD 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	<2	≤500	APHA (2017), 5210 B	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C	-	-	-	8.0	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Residual Free Chlorine *	mg/L	-	0.1	<0.1	≤1	Based on APHA (2017), 4500-Cl(F)	Rayong
Temperature *	Degree C	-	-	31.0	≤45	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	288	≤3000	APHA (2017), 2540 C	Rayong

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

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

Technical Management

N. Banphit

Narumon Banchohkit
Supervisor
โทรศัพท์ 3-323-9-9445

Approved by

D. Changchon

Daj Changchon
Senior Manager
โทรศัพท์ 3-323-9-9442

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Analysis / Test Report

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

Lot ID: 2243149
Date Received : May 10, 2022
Date Reported : May 18, 2022
Report Number : 2316066-2

Page 1 of 1

Sample Number : 2243149-1
Sample Date : May 10, 2022 2:30 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : May 10, 2022
Condition of Sample : Contained in one amber glass bottle, two plastic bottles and one BOD bottle, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Dissolved Oxygen	mg/L	-	0.1	7.7	No Standard	Based on APHA (2017), 4500-OC(C)	Rayong
Flow rate	m3/s	-	-	0.000	No Standard	Flow meter	Rayong

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

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

Approved by :
Nanum Banchoangkit
Supervisor

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Phukdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556
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4421 (N) BML



Analysis / Test Report

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

TESTING
No.0042
Lot ID: 2267390
Date Received : Jun 14, 2022
Date Reported : Jun 22, 2022
Report Number : 2332936-1

Page 1 of 1

Sample Number : 2267390-1
Sample Date : Jun 14, 2022 2:30 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : Jun 14, 2022
Condition of Sample : Contained in one amber glass bottle, one BOD bottle and two 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	6	≤500	APHA (2017), 5210 B	Rayong
Oil & Grease	mg/L	-	3	<3	≤10	Based on APHA (2017), 5520 B	Rayong
pH at 25 degree C		-	-	9.0	5.5-9.0	Based on APHA (2017), 4500-H (B)	Rayong
Residual Free Chlorine *	mg/L	-	0.1	0.1	≤1	Based on APHA (2017), 4500-ClF	Rayong
Temperature *	Degree C	-	-	34.1	≤45	Based on APHA (2017), 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	164	≤3000	APHA (2017), 2540 C	Rayong

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

Remark :
- LOD : Limit of Detection
- "c" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * as/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 :
Nanum Banchoangkit
Supervisor
มือถือ 09-0945-9445

Approved by :
Dej Changchon
Senior Manager
มือถือ 09-0945-9442

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Phukdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556
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5 (Years), All GL (1:1000)

4421 (N) BML



Analysis / Test Report

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

Lot ID: 2267390
Date Received : Jun 14, 2022
Date Reported : Jun 22, 2022
Report Number : 2332936-2

Page 1 of 1

Sample Number : 2267390-1
Sample Date : Jun 14, 2022 2:30 PM
Sample Description : Wastewater
Location : Holding pond 320 m3
Date Analysis Commenced : Jun 14, 2022
Condition of Sample : Contained in one amber glass bottle, one BOD bottle and two plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Dissolved Oxygen	mg/L	-	0.1	8.6	No Standard	Based on APHA (2017), 4500-OC(C)	Rayong
Flow rate	m3/s	-	-	0.000	No Standard	Flow meter	Rayong

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

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

Approved by :
Nanum Banchoangkit
Supervisor

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Phukdaeng Rayong 21140 Thailand PHONE +66 0 3304 8555 FAX +66 0 3304 8556
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4421 (N) BML



Analysis / Test Report

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

Lot ID: 21153280
Date Received : Jan 11, 2022
Date Reported : Feb 10, 2022
Report Number : 2230100-1

Page 1 of 1

Sample Number : 21153280-2
Sample Date : Jan 11, 2022 2:10 PM
Sample Description : Wastewater
Location : Holding pond 1800 m3
Date Analysis Commenced : Jan 14, 2022
Condition of Sample : Contained in two glass vials, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Bromodichloromethane	ug/L	0.2	0.5	2.5	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Bromoform	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Chloroform	ug/L	0.2	0.5	2.8	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Dibromochloromethane	ug/L	0.2	0.5	2.1	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Trihalomethanes	ug/L	0.2	1	7.4	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok

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
Note : This Analysis test report is reissued to supersede report No.2213177-1, Date Reported : Jan 24, 2022 due to revise analytical information.

Sampled By : Pathompong Kornsawat, Panupong Manit

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

Approved by :
Siriluk Puengsang
Supervisor

ADDRESS 104 Phatthanakan 40 Phatthanakan Rd. Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand PHONE +66 0 2760 3200 FAX +66 0 2760 3197
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Analysis / Test Report

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

Lot ID: 224432
Date Received : Feb 08, 2022
Date Reported : Feb 17, 2022
Report Number : 2236676-1

Page 1 of 1

Sample Number : 224432-2
Sample Date : Feb 08, 2022 2:30 PM
Sample Description : Wastewater
Location : Holding pond 1800 m3
Date Analysis Commenced : Feb 09, 2022
Condition of Sample : Contained in two glass vials, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Bromochloromethane	ug/L	0.2	0.5	8.6	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Bromoform	ug/L	0.2	0.5	1.1	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Chloroform	ug/L	0.2	0.5	12.9	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Dibromochloromethane	ug/L	0.2	0.5	5.1	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Trihalomethanes	ug/L	0.2	1	27.2	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok

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

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

Approved by

Siriluk P.
Siriluk Puangpang
Supervisor

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand. PHONE +66 0 2760 3000 FAX +66 0 2760 3197
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Analysis / Test Report

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

Lot ID: 2217142
Date Received : Mar 08, 2022
Date Reported : Mar 16, 2022
Report Number : 2261977-1

Page 1 of 1

Sample Number : 2217142-2
Sample Date : Mar 08, 2022 2:10 PM
Sample Description : Wastewater
Location : Holding pond 1800 m3
Date Analysis Commenced : Mar 09, 2022
Condition of Sample : Contained in two glass vials, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Bromochloromethane	ug/L	0.2	0.5	9.8	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Bromoform	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Chloroform	ug/L	0.2	0.5	15.8	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Dibromochloromethane	ug/L	0.2	0.5	7.1	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Trihalomethanes	ug/L	0.2	1	32.6	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok

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

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

Approved by

Siriluk P.
Siriluk Puangpang
Supervisor

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand. PHONE +66 0 2760 3000 FAX +66 0 2760 3197
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Analysis / Test Report

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

Lot ID: 2227375
Date Received : Apr 12, 2022
Date Reported : Apr 22, 2022
Report Number : 2246269-1

Page 1 of 1

Sample Number : 2227375-2
Sample Date : Apr 12, 2022 2:30 PM
Sample Description : Wastewater
Location : Holding pond 1800 m3
Date Analysis Commenced : Apr 18, 2022
Condition of Sample : Contained in two glass vials, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Bromochloromethane	ug/L	0.2	0.5	6.5	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Bromoform	ug/L	0.2	0.5	0.7	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Chloroform	ug/L	0.2	0.5	13.0	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Dibromochloromethane	ug/L	0.2	0.5	3.7	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Trihalomethanes	ug/L	0.2	1	23.9	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok

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

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

Approved by

Narin Saseang
Narin Saseang
Supervisor

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand. PHONE +66 0 2760 3000 FAX +66 0 2760 3197
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Analysis / Test Report

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

Lot ID: 2243149
Date Received : May 10, 2022
Date Reported : May 19, 2022
Report Number : 2216067-1

Page 1 of 1

Sample Number : 2243149-2
Sample Date : May 10, 2022 2:10 PM
Sample Description : Wastewater
Location : Holding pond 1800 m3
Date Analysis Commenced : May 11, 2022
Condition of Sample : Contained in two glass vials, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Bromochloromethane	ug/L	0.2	0.5	2.4	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Bromoform	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Chloroform	ug/L	0.2	0.5	4.4	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Dibromochloromethane	ug/L	0.2	0.5	1.4	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Trihalomethanes	ug/L	0.2	1	8.2	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok

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

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

Approved by

Siriluk P.
Siriluk Puangpang
Supervisor

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand. PHONE +66 0 2760 3000 FAX +66 0 2760 3197
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Analysis / Test Report

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

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

Lot ID: 2267390
Date Received : Jun 14, 2022
Date Reported : Jun 22, 2022
Report Number : 2352937-1

Page 1 of 1

Sample Number : 2267390-2
Sample Date : Jun 14, 2022 2:10 PM
Sample Description : Wastewater
Location : Holding pond 1600 m³
Date Analysis Commenced : Jun 15, 2022
Condition of Sample : Contained in two glass vials, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOQ)	Result	Guideline / Specification	Method	Testing Location
Volatile Organics Compounds							
Bromodichloromethane	ug/L	0.2	0.5	1.2	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Bromoform	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Chloroform	ug/L	0.2	0.5	1.7	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Dibromochloromethane	ug/L	0.2	0.5	Not Detected	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok
Total Trihalomethanes	ug/L	0.2	1	2.9	No Standard	Based on US EPA, Method 5030B and 8260D	Bangkok

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

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

Approved by

Siriluk P.
Siriluk Puttongpang
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 :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 2217973

Date Received : Mar 29, 2022
Date Reported : Mar 31, 2022
Report Number: 2227934-1

Page 1 of 2

Sample Number 2217973-1
Parameter Heat Stress (Sampling Time : 01:00 PM - 03:00 PM)
Measurement Date Mar 28, 2022
Measurement by Ronnachai Moungma
Location มัธยมศึกษา 1 ชั้น (ห้องเรียน) : - แทน :-

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
ภายใน GTG	120	30.2	27.5	36.8	35.5
Average (WBGT)		30.2			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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

Technical Management

Supot Salameh
Section Head

Approved by

Wichan Choonharat
Assistant Manager

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S. Veepon, Air Heat (pt) (4.27PM)



Analysis / Test Report

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

Lot ID: 2217973

Date Received : Mar 29, 2022
Date Reported : Mar 31, 2022
Report Number: 2227934-1

Page 2 of 2

Sample Number 2217973-2
Parameter Heat Stress (Sampling Time : 01:00 PM - 03:00 PM)
Measurement Date Mar 28, 2022
Measurement by Ronnachai Moungma
Location มัธยมศึกษา 1 ชั้น (ห้องเรียน) : - แทน :-

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
ภายใน HRSG	120	28.8	27.4	32.3	32.0
Average (WBGT)		28.8			
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 in relation to Heat, Light and Noise, B.E. 2559

Technical Management

Supot Salameh
Section Head

Approved by

Wichan Choonharat
Assistant Manager

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S. Veepon, Air Heat (pt) (4.27PM)



Analysis / Test Report

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

Lot ID: 2217989
Date Received : Mar 29, 2022
Date Reported : Mar 31, 2022
Report Number : 2227963-1

Page 1 of 6

Sample Number : 2217989-1
Sampled Date : Mar 28, 2022
Sample Description : Noise Dose
Location : CO (นิคมฯ)
Personal Sampling : วิศวกรสุวิมล อรุณ
Date Analysis Commenced : Mar 31, 2022

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	07:30 AM - 07:30 PM	%	-	-	<1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 AM - 07:30 PM	%	-	I	<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)	-	-	57.1	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 AM - 07:30 PM	dB(A)	-	-	58.9	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :

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

Sampled By : Natthapon Jengwaeewong

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

Approved by
Wichan Choonharat
Assistant Manager

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand. PHONE +66 0 2760 3000 FAX +66 0 2760 3197
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Analysis / Test Report

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

Lot ID: 2217989
Date Received : Mar 29, 2022
Date Reported : Mar 31, 2022
Report Number : 2227963-1

Page 2 of 6

Sample Number : 2217989-2
Sampled Date : Mar 28, 2022
Sample Description : Noise Dose
Location : CO (นิคมฯ)
Personal Sampling : วิศวกรสุวิมล อรุณ
Date Analysis Commenced : Mar 31, 2022

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	07:30 PM - 07:30 AM	%	-	-	<1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 PM - 07:30 AM	%	-	I	<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)	-	-	60.3	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 PM - 07:30 AM	dB(A)	-	-	61.9	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :

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

Sampled By : Natthapon Jengwaeewong

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

Approved by
Wichan Choonharat
Assistant Manager

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand. PHONE +66 0 2760 3000 FAX +66 0 2760 3197
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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
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P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 2217989
Date Received : Mar 29, 2022
Date Reported : Mar 31, 2022
Report Number : 2227963-1

Page 3 of 6

Sample Number : 2217989-3
Sampled Date : Mar 28, 2022
Sample Description : Noise Dose
Location : FO (1) (นิคมฯ)
Personal Sampling : วิศวกรสุวิมล อรุณ
Date Analysis Commenced : Mar 31, 2022

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	07:30 AM - 07:30 PM	%	-	-	66.1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 AM - 07:30 PM	%	-	I	61.7	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)	-	-	81.2	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 AM - 07:30 PM	dB(A)	-	-	82.9	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :

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

Sampled By : Natthapon Jengwaeewong

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

Approved by
Wichan Choonharat
Assistant Manager

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand. PHONE +66 0 2760 3000 FAX +66 0 2760 3197
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Analysis / Test Report

Client : Global Power Synergy Public Company Limited
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P/O :
Project Name : Monitoring
Project Location : CUP 4

Lot ID: 2217989
Date Received : Mar 29, 2022
Date Reported : Mar 31, 2022
Report Number : 2227963-1

Page 4 of 6

Sample Number : 2217989-4
Sampled Date : Mar 28, 2022
Sample Description : Noise Dose
Location : FO (1) (นิคมฯ)
Personal Sampling : วิศวกรสุวิมล อรุณ
Date Analysis Commenced : Mar 31, 2022

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	07:30 PM - 07:30 AM	%	-	-	1.9	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 PM - 07:30 AM	%	-	I	1.7	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	07:30 PM - 07:30 AM	dB(A)	-	-	65.8	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 PM - 07:30 AM	dB(A)	-	-	67.4	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :

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

Sampled By : Natthapon Jengwaeewong

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

Approved by
Wichan Choonharat
Assistant Manager

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand. PHONE +66 0 2760 3000 FAX +66 0 2760 3197
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Analysis / Test Report

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

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

Lot ID: 2217989
Date Received : Mar 29, 2022
Date Reported : Mar 31, 2022
Report Number : 2227963-1

Page 5 of 6

Sample Number : 2217989-5
Sample Date : Mar 28, 2022
Sample Description : Noise Dose
Location : FO (2) (อาคาร)
Personal Sampling : นายณัฐพล ชัยพัฒน์
Date Analysis Commenced : Mar 31, 2022

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	07:30 AM - 07:30 PM	%	-	-	7.9	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 AM - 07:30 PM	%	-	1	5.8	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)	-	-	72.0	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 AM - 07:30 PM	dB(A)	-	-	72.6	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :

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

Sampled By : Natthapon Jengwareevong

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

Approved by

Wichan Choonharat
Assistant Manager

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ALS-TH-002



Analysis / Test Report

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

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

Lot ID: 2242907
Date Received : Apr 08, 2022
Date Reported : Apr 19, 2022
Report Number : 2280456-1 Rev. No.1

Page 1 of 1

Sample Number : 2242907-1
Sample Date : Apr 07, 2022
Sample Description : Noise Dose
Location : FO (2) (อาคาร)
Personal Sampling : นายณัฐพล ชัยพัฒน์
Date Analysis Commenced : Apr 12, 2022

Analyte	Sampled Date/Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	07:30 PM - 07:30 AM	%	-	-	2.5	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	07:30 PM - 07:30 AM	%	-	1	2.3	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)	-	-	67.0	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	07:30 PM - 07:30 AM	dB(A)	-	-	68.7	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)

Note : This Analysis test report is reissued to supersede report No. 2280456-1, Date Reported : Apr 12, 2022 due to revise sample information.

Sampled By : Natthapon Jengwareevong

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

Approved by

Wichan Choonharat
Assistant Manager

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ใบรับรองการสอบเทียบเครื่องมือ



ALS Laboratory Group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd.,
Khwaeng Phatthanakan, Khet Suan Luang,
Bangkok 10250 Thailand
T +66 2 760 3000 F +66 2 760 3197

รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Stack (CEMs)	Oxides of Nitrogen	Analyzer , System calibration, Stand	-	-	-	-
Stack (CEMs)	Sulfur Dioxide	Analyzer , System calibration, Stand	-	-	-	-
Stack	Total Suspended Particulate	Console Control Unit	BKK_FS0468	12-Jan-22	12-Jul-22	6
Stack	Total Suspended Particulate	Analytical Balance 4 D.	RYG_EN0003	31-Mar-21	31-Mar-22	12
Ambient	Total Suspended Particulate	High Volume	RYG_FS0396	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0173	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0181	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0174	-	-	On site Calibration
Ambient	Total Suspended Particulate	Analytical Balance 5 D.	RYG_EN0001	6-May-21	6-May-22	12
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0295	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0186	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0189	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	High Volume	RYG_FS0190	-	-	On site Calibration
Ambient	Particulate Matter (PM-10)	Analytical Balance 5 D.	RYG_EN0001	6-May-21	6-May-22	12
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0459	4-Jan-22	4-Jul-22	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0261	4-Jan-22	4-Jul-22	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0453	4-Jan-22	4-Jul-22	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0255	4-Jan-22	4-Jul-22	6
Ambient	Sulfur Dioxide	SO ₂ Analyzer	RYG_FS0458	4-Jan-22	4-Jul-22	6
Ambient	Sulfur Dioxide	SO ₂ Analyzer	RYG_FS0260	4-Jan-22	4-Jul-22	6
Ambient	Sulfur Dioxide	SO ₂ Analyzer	RYG_FS0452	4-Jan-22	4-Jul-22	6
Ambient	Sulfur Dioxide	SO ₂ Analyzer	RYG_FS0254	4-Jan-22	4-Jul-22	6
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0530	14-Jul-21	12-Jan-23	18
Workplace	Ammonia	Dry Gas	BKK_FS0465	12-Jan-22	12-Jul-22	6
Workplace	Ammonia	SPECTROPHOTOMETER	RYG_EN0037	1-Apr-21	1-Oct-22	18
Noise	Leq 24 hrs	Sound Calibrator	RYG_FS0496	10-Jan-22	10-Jan-23	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0025	21-Jan-22	21-Jan-23	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0029	21-Apr-21	21-Apr-22	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0228	9-Jul-21	9-Jul-22	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0230	12-Jul-21	12-Jul-22	12
Noise	Noise Dose, TWA	Dose Badge Reader	RYG_FS0440	7-Sep-21	7-Sep-22	12
Noise	Noise Dose, TWA	Dose Badge Reader	RYG_FS0440	7-Sep-21	7-Sep-22	12
Rayong Lab	pH at 25 °C	pH meter	RYG_EN0183	17-Mar-22	17-Mar-23	12
Rayong Lab	BOD (5 days at 20°C)	DO meter with Sensor	RYG_EN0140	2-Feb-21	3-Aug-22	18
Rayong Lab	BOD (5 days at 20°C)	Incubator	RYG_EN0154	22-Apr-22	21-Oct-23	18
Rayong Lab	Dissolved Oxygen	Chamber (Cold Room)	RYG_EN0184	22-Feb-22	22-Feb-23	12
Rayong Lab	Total Dissolved Solids 180°C	Electronic Balance	RYG_EN0002	23-Mar-22	23-Mar-23	12
Rayong Lab	Total Dissolved Solids 180°C	Chamber Oven	RYG_EN0010	5-May-21	3-Nov-22	18
Rayong Lab	Oil & Grease	Electronic Balance	RYG_EN0002	23-Mar-22	23-Mar-23	12
Rayong Lab	Oil & Grease	Chamber Oven	RYG_EN0006	5-May-21	3-Nov-22	18
Rayong Lab	Oil & Grease	Water Bath	RYG_EN0061	5-May-21	3-Nov-22	18
Rayong Lab	Temperature	Digital Thermometer	RYG_FS0467	7-Jul-21	7-Jul-22	18
Water Lab	Chloroform	Gas Chromatography (MSD)	BKK_EN0059	24-Dec-20	24-Jun-22	18
Water Lab	Bromoform	Gas Chromatography (MSD)	BKK_EN0059	24-Dec-20	24-Jun-22	18
Water Lab	Dibromochloromethane	Gas Chromatography (MSD)	BKK_EN0059	24-Dec-20	24-Jun-22	18
Water Lab	Total Trihalomethanes	Gas Chromatography (MSD)	BKK_EN0059	24-Dec-20	24-Jun-22	18
Water Lab	Bromodichloromethane	Gas Chromatography (MSD)	BKK_EN0059	24-Dec-20	24-Jun-22	18



Lot No. 2217853-1

ANALYZER CALIBRATION DATA

Client : Global Power Synergy PCL. Location : HRSGs 1
Date : 15 Mar 22 Test Operator : Sakat P.
O₂ ANALYZER :
Model : TELEDYNE API 200EH Serial No. : 549
Span (%) : 25

	Cylinder Value (%)	Initial Analyzers Calibration Response (%)	Final Analyzers Calibration Response (%)	Difference (Percent of Span)
Zero Gas	0.00	0.07	0.01	0.24
Low-Level Gas	7.93	8.00	7.94	0.24
Span Gas	16.00	16.07	16.01	0.24

NO_x ANALYZER :
Model : TELEDYNE API 200EH Serial No. : 549
Span (ppm) : 100

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	-0.06	-0.02	0.04
Low-Level Gas	50.41	50.35	50.43	0.08
Span Gas	80.27	80.21	80.23	0.02

SO₂ ANALYZER :
Model : TELEDYNE API 100EH Serial No. : 282
Span (ppm) : 100

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.01	0.00	0.01
Low-Level Gas	51.61	51.62	51.61	0.01
Span Gas	79.00	79.01	79.00	0.01

Calibrated by

(Mr. Sakat Phalanphat)

Environmental Field Scientist (4)

FORM NO. F 06-002 REVISION NO. 2 ISSUE DATE 30/5/18

ALS Laboratory Group



Lot No. 2217853-1

SYSTEM CALIBRATION BIAS AND DRIFT DATA

Client : Global Power Synergy PCL. Location : HRSGs 1
Date : 15 Mar 22 Test Operator : Sakat P.

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

	O ₂ Analyzer Calibration Response	Initial Values System Calibration Response	System Cal Bias (% of Span)	Final Values System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	0.07	0.07	0.00	0.01	0.24	0.24
Upscale Gas	16.07	16.07	0.00	16.01	0.24	0.24

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

	NO _x Analyzer Calibration Response	Initial Values System Calibration Response	System Cal Bias (% of Span)	Final Values System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	-0.06	-0.06	0.00	-0.02	0.04	0.04
Upscale Gas	80.21	80.21	0.00	80.23	0.02	0.02

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

	SO ₂ Analyzer Calibration Response	Initial Values System Calibration Response	System Cal Bias (% of Span)	Final Values System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	0.01	0.01	0.00	0.00	0.01	0.01
Upscale Gas	79.01	79.01	0.00	79.00	0.01	0.01

Calibrated by

(Mr. Sakat Phalanphat)

Environmental Field Scientist (4)

FORM NO. F 06-002 REVISION NO. 2 ISSUE DATE 30/5/18

ALS Laboratory Group



EMISSION TEST RESULT

Client : Global Power Synergy PCL. Run # : 1
Date : 15 Mar 22 Location : HRSGs 1
Start Time : 11:00 Test Operator : Sakat P.
Finish Time : 11:20
SO₂ Analyzer Model : TELEDYNE API 100EH Serial No. : 282
NO_x/O₂ Analyzer Model : TELEDYNE API 200EH Serial No. : 549
CO/CO₂ Analyzer Model : TELEDYNE API 300EM Serial No. : 300

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
11:00	13.95	3.82	8.85	0.01	-	
11:01	13.97	3.82	8.86	0.01	-	
11:02	13.97	3.90	8.77	0.01	-	
11:03	13.97	3.90	8.62	0.01	-	
11:04	13.95	3.82	8.49	0.01	-	
11:05	13.97	3.97	8.47	0.01	-	
11:06	13.96	3.82	8.44	0.01	-	
11:07	13.96	3.96	8.58	0.01	-	
11:08	13.95	3.90	8.67	0.01	-	
11:09	13.97	3.93	8.57	0.01	-	
11:10	13.95	3.96	8.51	0.01	-	
11:11	13.97	3.90	8.48	0.01	-	
11:12	13.97	3.92	8.40	0.01	-	
11:13	13.98	3.92	8.39	0.01	-	
11:14	13.98	3.93	8.43	0.01	-	
11:15	14.00	3.87	8.47	0.01	-	
11:16	14.01	3.95	8.44	0.01	-	
11:17	14.00	3.94	8.45	0.02	-	
11:18	14.01	3.93	8.47	0.02	-	
11:19	14.00	3.94	8.47	0.02	-	
11:20	13.99	3.95	8.46	0.02	-	
Average	13.98	3.82	8.84	0.01	-	

(Mr. Sakat Phalanphat)

Environmental Field Scientist (4)

FORM NO. F 06-002 REVISION NO. 2 ISSUE DATE 30/5/18

ALS Laboratory Group



EMISSION TEST RESULT

Client : Global Power Synergy PCL. Run # : 2
Date : 15 Mar 22 Location : HRSGs 1
Start Time : 11:21 Test Operator : Sakat P.
Finish Time : 11:41
SO₂ Analyzer Model : TELEDYNE API 100EH Serial No. : 282
NO_x/O₂ Analyzer Model : TELEDYNE API 200EH Serial No. : 549
CO/CO₂ Analyzer Model : TELEDYNE API 300EM Serial No. : 300

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
11:21	14.01	3.87	8.40	0.02	-	
11:22	14.01	3.94	8.50	0.02	-	
11:23	14.01	3.99	8.45	0.02	-	
11:24	14.02	3.86	8.49	0.02	-	
11:25	14.01	3.96	8.49	0.02	-	
11:26	14.00	3.99	8.60	0.02	-	
11:27	14.01	3.86	8.61	0.02	-	
11:28	14.01	3.96	8.54	0.02	-	
11:29	14.01	3.96	8.46	0.02	-	
11:30	14.01	3.91	8.46	0.02	-	
11:31	14.00	3.95	8.56	0.02	-	
11:32	14.01	3.92	8.58	0.02	-	
11:33	14.02	3.89	8.53	0.02	-	
11:34	14.00	3.90	8.42	0.02	-	
11:35	13.99	3.91	8.39	0.02	-	
11:36	13.97	3.93	8.38	0.02	-	
11:37	13.98	3.99	8.42	0.02	-	
11:38	13.98	3.94	8.48	0.02	-	
11:39	13.97	3.94	8.54	0.02	-	
11:40	13.97	3.95	8.51	0.02	-	
11:41	13.97	3.94	8.38	0.02	-	
Average	14.00	3.89	8.48	0.02	-	

(Mr. Sakat Phalanphat)

Environmental Field Scientist (4)

FORM NO. F 06-002 REVISION NO. 2 ISSUE DATE 30/5/18

ALS Laboratory Group



EMISSION TEST RESULT

Client	Global Power Synergy PCL	Run #	3
Date	16 Mar 22	Location	HRSGs 1
Start Time	11:42	Test Operator	Sakalt P.
Finish Time		Serial No.	282
SO ₂ Analyzer Model	TELEDYNE API 100EH	Serial No.	548
NO _x /O ₂ Analyzer Model	TELEDYNE API 200EH	Serial No.	300
CO/CO ₂ Analyzer Model	TELEDYNE API 300EM		

Time (min)	O ₂ (%)	CO ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)	Remark
11:42	13.96	3.91	8.37	0.02	-	
11:43	13.96	3.89	8.40	0.02	-	
11:44	13.96	3.92	8.42	0.02	-	
11:45	13.97	3.91	8.40	0.02	-	
11:46	13.97	3.95	8.35	0.02	-	
11:47	13.96	3.93	8.39	0.02	-	
11:48	13.96	3.90	8.44	0.02	-	
11:49	13.97	3.90	8.43	0.02	-	
11:50	13.99	3.95	8.38	0.02	-	
11:51	13.99	3.97	8.34	0.02	-	
11:52	13.99	3.95	8.35	0.02	-	
11:53	14.01	3.90	8.43	0.02	-	
11:54	14.01	3.95	8.51	0.02	-	
11:55	14.00	3.98	8.55	0.02	-	
11:56	14.01	3.96	8.52	0.02	-	
11:57	14.00	3.91	8.46	0.02	-	
11:58	14.01	3.97	8.44	0.02	-	
11:59	14.01	3.93	8.44	0.02	-	
12:00	14.02	3.90	8.35	0.02	-	
12:01	14.02	3.94	8.25	0.02	-	
12:02	14.00	3.99	8.32	0.02	-	
Average	13.99	3.93	8.41	0.02	-	

Sakalt P.
(Mr. Sakalt Phaisanphut)

Environmental Field Scientist (4)

FORM NO. F-06-002 REVISION NO. 2 ISSUE DATE 3/06/19

ALS Laboratory Group



Lot No. 2217871-1

ANALYZER CALIBRATION DATA

Client	Global Power Synergy PCL	Location	HRSGs 1
Date	16 Mar 22	Test Operator	Sakalt P.
O ₂ ANALYZER Model	TELEDYNE API 200EH	Serial No.	548
Span (%)	25		

Cylinder Value (%)	Initial Analyzers Calibration Response (%)	Final Analyzers Calibration Response (%)	Difference (Percent of Span)
Zero Gas	0.00	0.07	0.01
Low-Level Gas	7.93	8.00	0.04
Span Gas	16.00	16.07	0.04

NO _x ANALYZER Model	TELEDYNE API 200EH	Serial No.	548
Span (ppm)	100		

Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	-0.08	-0.02
Low-Level Gas	50.41	50.35	-0.03
Span Gas	80.27	80.21	-0.02

SO ₂ ANALYZER Model	TELEDYNE API 100EH	Serial No.	282
Span (ppm)	100		

Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.01	0.00
Low-Level Gas	51.61	51.62	0.01
Span Gas	79.00	79.01	0.01

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

Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	-0.02	-0.02
Low-Level Gas	50.31	50.28	-0.01
Span Gas	80.53	80.51	-0.01

Calibrated by

Sakalt P.
(Mr. Sakalt Phaisanphut)

Environmental Field Scientist (4)

FORM NO. F-06-104 REVISION NO. 1 ISSUE DATE 3/06/19

ALS Laboratory Group



Lot No. 2217871-1

SYSTEM CALIBRATION BIAS AND DRIFT DATA

Client	Global Power Synergy PCL	Location	HRSGs 1
Date	16 Mar 22	Test Operator	Sakalt P.

O ₂ ANALYZER Cylinder Conc. (%)	16.00	Span (%)	25
--	-------	----------	----

O ₂ Analyzer Calibration Response	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	0.07	0.07	0.00	0.01	0.24
Upscale Gas	16.07	16.07	0.00	16.01	0.24

NO _x ANALYZER Cylinder Conc. (ppm)	80.27	Span (ppm)	100
---	-------	------------	-----

NO _x Analyzer Calibration Response	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	-0.08	-0.08	-0.02	0.04	0.04
Upscale Gas	80.21	80.21	0.00	80.23	0.02

SO ₂ ANALYZER Cylinder Conc. (ppm)	79.00	Span (ppm)	100
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SO ₂ Analyzer Calibration Response	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	0.01	0.01	0.00	0.00	0.01
Upscale Gas	79.01	79.01	0.00	79.00	0.01

CO ANALYZER Cylinder Conc. (ppm)	80.53	Span (ppm)	100
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CO Analyzer Calibration Response	System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	Drift (% of Span)
Zero Gas	-0.02	-0.02	0.00	0.02	0.02
Upscale Gas	80.51	80.51	0.00	80.53	0.02

Calibrated by

Sakalt P.
(Mr. Sakalt Phaisanphut)

Environmental Field Scientist (4)

FORM NO. F-06-104 REVISION NO. 1 ISSUE DATE 3/06/19

ALS Laboratory Group



CEMs Data

Client Name	Global Power Synergy PCL	Date	16 Mar 22
Plant Name	CUPA	Location	HRSGs 1

Run No. 1	Time Base 21 min	Run No. 2	Time Base 21 min
Date	Time	Date	Time
16 Mar 22	11:00	16 Mar 22	11:01
16 Mar 22	11:01	16 Mar 22	11:02
16 Mar 22	11:02	16 Mar 22	11:03
16 Mar 22	11:03	16 Mar 22	11:04
16 Mar 22	11:04	16 Mar 22	11:05
16 Mar 22	11:05	16 Mar 22	11:06
16 Mar 22	11:06	16 Mar 22	11:07
16 Mar 22	11:07	16 Mar 22	11:08
16 Mar 22	11:08	16 Mar 22	11:09
16 Mar 22	11:09	16 Mar 22	11:10
16 Mar 22	11:10	16 Mar 22	11:11
16 Mar 22	11:11	16 Mar 22	11:12
16 Mar 22	11:12	16 Mar 22	11:13
16 Mar 22	11:13	16 Mar 22	11:14
16 Mar 22	11:14	16 Mar 22	11:15
16 Mar 22	11:15	16 Mar 22	11:16
16 Mar 22	11:16	16 Mar 22	11:17
16 Mar 22	11:17	16 Mar 22	11:18
16 Mar 22	11:18	16 Mar 22	11:19
16 Mar 22	11:19	16 Mar 22	11:20
16 Mar 22	11:20	16 Mar 22	11:21
Max	0.00	0.00	0.00
Avg	0.00	0.00	0.00

Run No. 3	Time Base 21 min	Run No. 4	Time Base 21 min
Date	Time	Date	Time
16 Mar 22	11:21	16 Mar 22	11:22
16 Mar 22	11:22	16 Mar 22	11:23
16 Mar 22	11:23	16 Mar 22	11:24
16 Mar 22	11:24	16 Mar 22	11:25
16 Mar 22	11:25	16 Mar 22	11:26
16 Mar 22	11:26	16 Mar 22	11:27
16 Mar 22	11:27	16 Mar 22	11:28
16 Mar 22	11:28	16 Mar 22	11:29
16 Mar 22	11:29	16 Mar 22	11:30
16 Mar 22	11:30	16 Mar 22	11:31
16 Mar 22	11:31	16 Mar 22	11:32
16 Mar 22	11:32	16 Mar 22	11:33
16 Mar 22	11:33	16 Mar 22	11:34
16 Mar 22	11:34	16 Mar 22	11:35
16 Mar 22	11:35	16 Mar 22	11:36
16 Mar 22	11:36	16 Mar 22	11:37
16 Mar 22	11:37	16 Mar 22	11:38
16 Mar 22	11:38	16 Mar 22	11:39
16 Mar 22	11:39	16 Mar 22	11:40
16 Mar 22	11:40	16 Mar 22	11:41
16 Mar 22	11:41	16 Mar 22	11:42
Max	0.00	0.00	0.00
Avg	0.00	0.00	0.00

Run No. 5	Time Base 21 min	Run No. 6	Time Base 21 min
Date	Time	Date	Time
16 Mar 22	11:43	16 Mar 22	11:44
16 Mar 22	11:44	16 Mar 22	11:45
16 Mar 22	11:45	16 Mar 22	11:46
16 Mar 22	11:46	16 Mar 22	11:47
16 Mar 22	11:47	16 Mar 22	11:48
16 Mar 22	11:48	16 Mar 22	11:49
16 Mar 22	11:49	16 Mar 22	11:50
16 Mar 22	11:50	16 Mar 22	11:51
16 Mar 22	11:51	16 Mar 22	11:52
16 Mar 22	11:52	16 Mar 22	11:53
16 Mar 22	11:53	16 Mar 22	11:54
16 Mar 22	11:54	16 Mar 22	11:55
16 Mar 22	11:55	16 Mar 22	11:56
16 Mar 22	11:56	16 Mar 22	11:57
16 Mar 22	11:57	16 Mar 22	11:58
16 Mar 22	11:58	16 Mar 22	11:59
16 Mar 22	11:59	16 Mar 22	12:00
16 Mar 22	12:00	16 Mar 22	12:01
16 Mar 22	12:01	16 Mar 22	12:02
16 Mar 22	12:02	16 Mar 22	12:03
16 Mar 22	12:03	16 Mar 22	12:04
16 Mar 22	12:04	16 Mar 22	12:05
16 Mar 22	12:05	16 Mar 22	12:06
16 Mar 22	12:06	16 Mar 22	12:07
16 Mar 22	12:07	16 Mar 22	12:08
16 Mar 22	12:08	16 Mar 22	12:09
16 Mar 22	12:09	16 Mar 22	12:10
16 Mar 22	12:10	16 Mar 22	12:11
16 Mar 22	12:11	16 Mar 22	12:12
16 Mar 22	12:12	16 Mar 22	12:13
16 Mar 22	12:13	16 Mar 22	12:14
16 Mar 22	12:14	16 Mar 22	12:15
16 Mar 22	12:15	16 Mar 22	12:16
16 Mar 22	12:16	16 Mar 22	12:17
16 Mar 22	12:17	16 Mar 22	12:18
16 Mar 22	12:18	16 Mar 22	12:19
16 Mar 22	12:19	16 Mar 22	12:20
16 Mar 22	12:20	16 Mar 22	12:21
16 Mar 22	12:21	16 Mar 22	12:22
16 Mar 22	12:22	16 Mar 22	12:23
16 Mar 22	12:23	16 Mar 22	12:24
16 Mar 22	12:24	16 Mar 22	12:25
16 Mar 22	12:25	16 Mar 22	12:26
16 Mar 22	12:26	16 Mar 22	12:27
16 Mar 22	12:27	16 Mar 22	12:28
16 Mar 22	12:28	16 Mar 22	12:29
16 Mar 22	12:29	16 Mar 22	12:30
16 Mar 22	12:30	16 Mar 22	12:31
16 Mar 22	12:31	16 Mar 22	12:32
16 Mar 22	12:32	16 Mar 22	12:33
16 Mar 22	12:33	16 Mar 22	12:34
16 Mar 22	12:34	16 Mar 22	12:35
16 Mar 22	12:35	16 Mar 22	12:36
16 Mar 22	12:36	16 Mar 22	12:37
16 Mar 22	12:37	16 Mar 22	12:38
16 Mar 22	12:38	16 Mar 22	12:39
16 Mar 22	12:39	16 Mar 22	12:40
16 Mar 22	12:40	16 Mar 22	12:41
16 Mar 22	12:41	16 Mar 22	12:42
16 Mar 22	12:42	16 Mar 22	12:43
16 Mar 22	12:43	16 Mar 22	12:44
16 Mar 22	12:44	16 Mar 22	12:45
16 Mar 22	12:45	16 Mar 22	12:46
16 Mar 22	12:46	16 Mar 22	12:47
16 Mar 22	12:47	16 Mar 22	12:48
16 Mar 22	12:48	16 Mar 22	12:49
16 Mar 22	12:49	16 Mar 22	12:50
16 Mar 22	12:50	16 Mar 22	12:51
16 Mar 22	12:51	16 Mar 22	12:52
16 Mar 22	12:52	16 Mar 22	12:53
16 Mar 22	12:53	16 Mar 22	12:54
16 Mar 22	12:54	16 Mar 22	12:55
16 Mar 22	12:55	16 Mar 22	12:56
16 Mar 22	12:56	16 Mar 22	12:57
16 Mar 22	12:57	16 Mar 22	12:58
16 Mar 22	12:58	16 Mar 22	12:59
16 Mar 22	12:59	16 Mar 22	13:00
Max	0.00	0.00	0.00
Avg	0.00	0.00	0.00



Date	15 Mar 2015
Location	HRSQ4

Date	15 Mar 2015
Location	HRSQ4

Run No: 8

Time Save 21

Site	Time	SO ₂ ppm	NO _x ppm	CO ppm	O ₃ ppm	VOCs ppm
18:46:22	18:27	0.00	0.79	0.64	0.88	
18:46:22	18:28	0.00	0.79	0.64	0.88	
18:46:22	18:29	0.00	0.83	0.64	0.88	
18:46:22	18:30	0.00	0.84	0.76	0.88	
18:46:22	18:31	0.00	0.81	0.64	0.88	
18:46:22	18:32	0.00	0.71	0.48	0.88	
18:46:22	18:33	0.00	0.71	0.48	0.88	
18:46:22	18:34	0.00	0.62	0.79	0.88	
18:46:22	18:35	0.00	0.60	0.82	0.88	
18:46:22	18:36	0.00	0.77	0.96	0.88	
18:46:22	18:37	0.00	0.80	0.80	0.88	
18:46:22	18:38	0.00	0.82	0.76	0.88	
18:46:22	18:39	0.00	0.82	0.76	0.88	
18:46:22	18:40	0.00	0.73	0.67	0.88	
18:46:22	18:41	0.00	0.72	0.67	0.88	
18:46:22	18:42	0.00	0.72	0.67	0.88	
18:46:22	18:43	0.00	0.72	0.67	0.88	
18:46:22	18:44	0.00	0.70	0.84	0.88	
18:46:22	18:45	0.00	0.69	0.80	0.88	
18:46:22	18:46	0.00	0.76	0.76	0.88	
18:46:22	18:47	0.00	0.71	0.68	0.88	
Max		0.00	0.80	0.84	0.88	

Run file: 10

[illegible]

Run No: 12

Site	Time	ROI deg	SNR deg	CO deg	CO Var	C ₀ deg
1:34:29	14:51	0.00	0.74	0.64	1.87	
1:34:29	14:52	0.00	0.74	0.64	1.87	
1:34:29	14:53	0.00	0.84	0.76	1.93	
1:34:29	14:54	0.00	0.73	0.70	1.90	
1:34:29	14:55	0.00	0.74	0.64	1.87	
1:34:29	14:56	0.00	0.84	0.76	1.93	
1:34:29	14:57	0.00	0.72	0.61	1.81	
1:34:29	14:58	0.00	0.73	0.70	1.90	
1:34:29	14:59	0.00	0.73	0.70	1.90	
1:34:29	15:00	0.00	0.73	0.70	1.90	
1:34:29	15:01	0.00	0.84	0.76	1.93	
1:34:29	15:02	0.00	0.84	0.76	1.93	
1:34:29	15:03	0.00	0.84	0.76	1.93	
1:34:29	15:04	0.00	0.84	0.76	1.93	
1:34:29	15:05	0.00	0.84	0.76	1.93	
1:34:29	15:06	0.00	0.84	0.76	1.93	
1:34:29	15:07	0.00	0.84	0.76	1.93	
1:34:29	15:08	0.00	0.84	0.76	1.93	
1:34:29	15:09	0.00	0.84	0.76	1.93	
1:34:29	15:10	0.00	0.84	0.76	1.93	
1:34:29	15:11	0.00	0.84	0.76	1.93	
Max.		0.05	0.91	0.87	1.98	



Date _____ 15 M.
Location _____ HRS.

Date _____ 15 M.
Location _____ HRS.

2

[illegible]

Run No. 4

[illegible]

Run No: 6

[illegible]

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Date 15 Mar 2016
Location HRSOs

Date 15 Mar 2016
Location HRSOs

Run No: 8

Time Base 21

Year	Time	SG	H ₂ O	CO	GE	C ₂ H ₂
		ppm	ppm	ppm	ppm	ppm
Mar 22	19:21	0.80	0.74	2.04	14.91	3.88
Mar 22	19:29	0.82	0.74	2.04	14.91	3.88
Mar 22	19:38	0.82	0.60	2.74	14.90	3.88
Mar 22	19:45	0.82	0.74	2.04	14.91	3.88
Mar 22	19:51	0.82	0.74	2.04	14.91	3.88
Mar 22	19:58	0.82	0.74	2.04	14.91	3.88
Mar 22	20:02	0.82	0.62	2.30	14.89	3.83
Mar 22	20:08	0.82	0.74	2.04	14.94	3.81
Mar 22	20:16	0.82	0.74	2.04	14.94	3.81
Mar 22	20:22	0.82	0.74	2.04	14.94	3.81
Mar 22	20:28	0.82	0.74	2.04	14.94	3.81
Mar 22	20:34	0.82	0.68	2.04	14.93	3.84
Mar 22	20:41	0.82	0.67	2.04	14.90	3.82
Mar 22	20:47	0.82	0.67	2.04	14.90	3.82
Mar 22	20:53	0.82	0.68	2.05	14.91	3.83
Mar 22	20:59	0.82	0.68	2.05	14.91	3.83
Mar 22	21:05	0.82	0.68	2.05	14.91	3.83
Mar 22	21:11	0.82	0.68	2.05	14.91	3.83
Mar 22	21:17	0.82	0.68	2.05	14.91	3.83
Mar 22	21:23	0.82	0.68	2.05	14.91	3.83
Mar 22	21:29	0.82	0.68	2.05	14.91	3.83
Mar 22	21:35	0.82	0.68	2.05	14.91	3.83
Mar 22	21:41	0.82	0.68	2.05	14.91	3.83
Mar 22	21:47	0.82	0.68	2.05	14.91	3.83
Mar 22	21:53	0.82	0.68	2.05	14.91	3.83
Mar 22	21:59	0.82	0.68	2.05	14.91	3.83
Mar 22	22:05	0.82	0.68	2.05	14.91	3.83
Mar 22	22:11	0.82	0.68	2.05	14.91	3.83
Mar 22	22:17	0.82	0.68	2.05	14.91	3.83
Mar 22	22:23	0.82	0.68	2.05	14.91	3.83
Mar 22	22:29	0.82	0.68	2.05	14.91	3.83
Mar 22	22:35	0.82	0.68	2.05	14.91	3.83
Mar 22	22:41	0.82	0.68	2.05	14.91	3.83
Mar 22	22:47	0.82	0.68	2.05	14.91	3.83
Mar 22	22:53	0.82	0.68	2.05	14.91	3.83
Mar 22	22:59	0.82	0.68	2.05	14.91	3.83
Mar 22	23:05	0.82	0.68	2.05	14.91	3.83
Mar 22	23:11	0.82	0.68	2.05	14.91	3.83
Mar 22	23:17	0.82	0.68	2.05	14.91	3.83
Mar 22	23:23	0.82	0.68	2.05	14.91	3.83
Mar 22	23:29	0.82	0.68	2.05	14.91	3.83
Mar 22	23:35	0.82	0.68	2.05	14.91	3.83
Mar 22	23:41	0.82	0.68	2.05	14.91	3.83
Mar 22	23:47	0.82	0.68	2.05	14.91	3.83
Mar 22	23:53	0.82	0.68	2.05	14.91	3.83
Mar 22	23:59	0.82	0.68	2.05	14.91	3.83
Mar 23	00:05	0.82	0.68	2.05	14.91	3.83
Mar 23	00:11	0.82	0.68	2.05	14.91	3.83
Mar 23	00:17	0.82	0.68	2.05	14.91	3.83
Mar 23	00:23	0.82	0.68	2.05	14.91	3.83
Mar 23	00:29	0.82	0.68	2.05	14.91	3.83
Mar 23	00:35	0.82	0.68	2.05	14.91	3.83
Mar 23	00:41	0.82	0.68	2.05	14.91	3.83
Mar 23	00:47	0.82	0.68	2.05	14.91	3.83
Mar 23	00:53	0.82	0.68	2.05	14.91	3.83
Mar 23	00:59	0.82	0.68	2.05	14.91	3.83

Run No: 10

Sex	Time	SO2	NOx	CO	O3	COD
		µg/m ³	µg/m ³	ppm	ppm	mg/l
Male	11:00	0.04	0.14	0.04	0.02	0.03
Male	12:00	0.04	0.13	0.03	0.02	0.03
Male	13:00	0.04	0.13	0.03	0.02	0.03
Male	14:00	0.04	0.14	0.04	0.02	0.03
Male	15:00	0.04	0.14	0.04	0.02	0.03
Male	16:00	0.04	0.14	0.04	0.02	0.03
Male	17:00	0.04	0.14	0.04	0.02	0.03
Male	18:00	0.04	0.14	0.04	0.02	0.03
Male	19:00	0.04	0.14	0.04	0.02	0.03
Male	20:00	0.04	0.14	0.04	0.02	0.03
Male	21:00	0.04	0.14	0.04	0.02	0.03
Male	22:00	0.04	0.14	0.04	0.02	0.03
Male	23:00	0.04	0.14	0.04	0.02	0.03
Male	24:00	0.04	0.14	0.04	0.02	0.03
Male	25:00	0.04	0.14	0.04	0.02	0.03
Male	26:00	0.04	0.14	0.04	0.02	0.03
Male	27:00	0.04	0.14	0.04	0.02	0.03
Male	28:00	0.04	0.14	0.04	0.02	0.03
Male	29:00	0.04	0.14	0.04	0.02	0.03
Male	30:00	0.04	0.14	0.04	0.02	0.03
Male	31:00	0.04	0.14	0.04	0.02	0.03
Male	32:00	0.04	0.14	0.04	0.02	0.03
Male	33:00	0.04	0.14	0.04	0.02	0.03
Male	34:00	0.04	0.14	0.04	0.02	0.03
Male	35:00	0.04	0.14	0.04	0.02	0.03
Male	36:00	0.04	0.14	0.04	0.02	0.03
Male	37:00	0.04	0.14	0.04	0.02	0.03
Male	38:00	0.04	0.14	0.04	0.02	0.03
Male	39:00	0.04	0.14	0.04	0.02	0.03
Male	40:00	0.04	0.14	0.04	0.02	0.03
Male	41:00	0.04	0.14	0.04	0.02	0.03
Male	42:00	0.04	0.14	0.04	0.02	0.03
Male	43:00	0.04	0.14	0.04	0.02	0.03
Male	44:00	0.04	0.14	0.04	0.02	0.03
Male	45:00	0.04	0.14	0.04	0.02	0.03
Male	46:00	0.04	0.14	0.04	0.02	0.03
Male	47:00	0.04	0.14	0.04	0.02	0.03
Male	48:00	0.04	0.14	0.04	0.02	0.03
Male	49:00	0.04	0.14	0.04	0.02	0.03
Male	50:00	0.04	0.14	0.04	0.02	0.03
Male	51:00	0.04	0.14	0.04	0.02	0.03
Male	52:00	0.04	0.14	0.04	0.02	0.03
Male	53:00	0.04	0.14	0.04	0.02	0.03
Male	54:00	0.04	0.14	0.04	0.02	0.03
Male	55:00	0.04	0.14	0.04	0.02	0.03
Male	56:00	0.04	0.14	0.04	0.02	0.03
Male	57:00	0.04	0.14	0.04	0.02	0.03
Male	58:00	0.04	0.14	0.04	0.02	0.03
Male	59:00	0.04	0.14	0.04	0.02	0.03
Male	60:00	0.04	0.14	0.04	0.02	0.03
Male	61:00	0.04	0.14	0.04	0.02	0.03
Male	62:00	0.04	0.14	0.04	0.02	0.03
Male	63:00	0.04	0.14	0.04	0.02	0.03
Male	64:00	0.04	0.14	0.04	0.02	0.03
Male	65:00	0.04	0.14	0.04	0.02	0.03
Male	66:00	0.04	0.14	0.04	0.02	0.03
Male	67:00	0.04	0.14	0.04	0.02	0.03
Male	68:00	0.04	0.14	0.04	0.02	0.03
Male	69:00	0.04	0.14	0.04	0.02	0.03
Male	70:00	0.04	0.14	0.04	0.02	0.03

Run No: 12

Site	Time	SSD [mm]	Wd ₅₀ [mm]	CO ₂ [ppm]	W ₅₀ [mm]	CO ₂ [ppm]
15 May 2011	09:31	0.86	0.15	270	14.09	3.93
15 May 2011	10:18	0.78	0.15	270	14.09	3.93
15 May 2011	10:54	0.78	0.15	270	14.09	3.93
15 May 2011	11:41	0.78	0.15	270	14.09	3.93
15 May 2011	12:28	0.78	0.15	270	14.09	3.93
15 May 2011	13:14	0.78	0.15	270	14.09	3.93
15 May 2011	14:01	0.78	0.15	270	14.09	3.93
15 May 2011	14:48	0.78	0.15	270	14.09	3.93
15 May 2011	15:35	0.78	0.15	270	14.09	3.93
15 May 2011	16:22	0.86	0.15	266	14.31	4.02
15 May 2011	17:09	0.86	0.15	266	14.31	4.02
15 May 2011	17:56	0.86	0.15	264	14.31	4.02
15 May 2011	18:43	0.86	0.15	264	14.31	4.02
15 May 2011	19:30	0.86	0.15	264	14.31	4.02
15 May 2011	20:17	0.86	0.15	264	14.31	4.02
15 May 2011	21:04	0.86	0.15	264	14.31	4.02
15 May 2011	21:51	0.86	0.15	264	14.31	4.02
15 May 2011	22:38	0.86	0.15	264	14.31	4.02
15 May 2011	23:25	0.86	0.15	264	14.31	4.02
15 May 2011	00:12	0.86	0.15	264	14.31	4.02
15 May 2011	00:59	0.86	0.15	264	14.31	4.02
15 May 2011	01:46	0.86	0.15	264	14.31	4.02
15 May 2011	02:33	0.86	0.15	264	14.31	4.02
15 May 2011	03:20	0.86	0.15	264	14.31	4.02
15 May 2011	04:07	0.86	0.15	264	14.31	4.02
15 May 2011	04:54	0.86	0.15	264	14.31	4.02
15 May 2011	05:41	0.86	0.15	264	14.31	4.02
15 May 2011	06:28	0.86	0.15	264	14.31	4.02
15 May 2011	07:15	0.86	0.15	264	14.31	4.02
15 May 2011	08:02	0.86	0.15	264	14.31	4.02
15 May 2011	08:49	0.86	0.15	264	14.31	4.02
15 May 2011	09:36	0.86	0.15	264	14.31	4.02
15 May 2011	10:23	0.86	0.15	264	14.31	4.02
15 May 2011	11:10	0.86	0.15	264	14.31	4.02
15 May 2011	11:57	0.86	0.15	264	14.31	4.02
15 May 2011	12:44	0.86	0.15	264	14.31	4.02
15 May 2011	13:31	0.86	0.15	264	14.31	4.02
15 May 2011	14:18	0.86	0.15	264	14.31	4.02
15 May 2011	15:05	0.86	0.15	264	14.31	4.02
15 May 2011	15:52	0.86	0.15	264	14.31	4.02
15 May 2011	16:39	0.86	0.15	264	14.31	4.02
15 May 2011	17:26	0.86	0.15	264	14.31	4.02
15 May 2011	18:13	0.86	0.15	264	14.31	4.02
15 May 2011	19:00	0.86	0.15	264	14.31	4.02
15 May 2011	19:47	0.86	0.15	264	14.31	4.02
15 May 2011	20:34	0.86	0.15	264	14.31	4.02
15 May 2011	21:21	0.86	0.15	264	14.31	4.02
15 May 2011	22:08	0.86	0.15	264	14.31	4.02
15 May 2011	22:55	0.86	0.15	264	14.31	4.02
15 May 2011	23:42	0.86	0.15	264	14.31	4.02
15 May 2011	00:29	0.86	0.15	264	14.31	4.02
15 May 2011	01:16	0.86	0.15	264	14.31	4.02
15 May 2011	02:03	0.86	0.15	264	14.31	4.02
15 May 2011	02:50	0.86	0.15	264	14.31	4.02
15 May 2011	03:37	0.86	0.15	264	14.31	4.02
15 May 2011	04:24	0.86	0.15	264	14.31	4.02
15 May 2011	05:11	0.86	0.15	264	14.31	4.02
15 May 2011	05:58	0.86	0.15	264	14.31	4.02
15 May 2011	06:45	0.86	0.15	264	14.31	4.02
15 May 2011	07:32	0.86	0.15	264	14.31	4.02
15 May 2011	08:19	0.86	0.15	264	14.31	4.02
15 May 2011	09:06	0.86	0.15	264	14.31	4.02
15 May 2011	09:53	0.86	0.15	264	14.31	4.02
15 May 2011	10:40	0.86	0.15	264	14.31	4.02
15 May 2011	11:27	0.86	0.15	264	14.31	4.02
15 May 2011	12:14	0.86	0.15	264	14.31	4.02
15 May 2011	13:01	0.86	0.15	264	14.31	4.02
15 May 2011	13:48	0.86	0.15	264	14.31	4.02
15 May 2011	14:35	0.86	0.15	264	14.31	4.02
15 May 2011	15:22	0.86	0.15	264	14.31	4.02
15 May 2011	16:09	0.86	0.15	264	14.31	4.02
15 May 2011	16:56	0.86	0.15	264	14.31	4.02
15 May 2011	17:43	0.86	0.15	264	14.31	4.02
15 May 2011	18:30	0.86	0.15	264	14.31	4.02
15 May 2011	19:17	0.86	0.15	264	14.31	4.02
15 May 2011	20:04	0.86	0.15	264	14.31	4.02
15 May 2011	20:51	0.86	0.15	264	14.31	4.02
15 May 2011	21:38	0.86	0.15	264	14.31	4.02
15 May 2011	22:25	0.86	0.15	264	14.31	4.02
15 May 2011	23:12	0.86	0.15	264	14.31	4.02
15 May 2011	00:00	0.86	0.15	264	14.31	4.02
15 May 2011	00:47	0.86	0.15	264	14.31	4.02
15 May 2011	01:34	0.86	0.15	264	14.31	4.02
15 May 2011	02:21	0.86	0.15	264	14.31	4.02
15 May 2011	03:08	0.86	0.15	264	14.31	4.02
15 May 2011	03:55	0.86	0.15	264	14.31	4.02
15 May 2011	04:42	0.86	0.15	264	14.31	4.02
15 May 2011	05:29	0.86	0.15	264	14.31	4.02
15 May 2011	06:16	0.86	0.15	264	14.31	4.02
15 May 2011	07:03	0.86	0.15	264	14.31	4.02
15 May 2011	07:50	0.86	0.15	264	14.31	4.02
15 May 2011	08:37	0.86	0.15	264	14.31	4.02
15 May 2011	09:24	0.86	0.15	264	14.31	4.02
15 May 2011	10:11	0.86	0.15	264	14.31	4.02
15 May 2011	10:58	0.86	0.15	264	14.31	4.02
15 May 2011	11:45	0.86	0.15	264	14.31	4.02
15 May 2011	12:32	0.86	0.15	264	14.31	4.02
15 May 2011	13:19	0.86	0.15	264	14.31	4.02
15 May 2011	14:06	0.86	0.15	264	14.31	4.02
15 May 2011	14:53	0.86	0.15	264	14.31	4.02
15 May 2011	15:40	0.86	0.15	264	14.31	4.02
15 May 2011	16:27	0.86	0.15	264	14.31	4.02
15 May 2011	17:14	0.86	0.15	264	14.31	4.02
15 May 2011	18:01	0.86	0.15	264	14.31	4.02
15 May 2011	18:48	0.86	0.15	264	14.31	4.02
15 May 2011	19:35	0.86	0.15	264	14.31	4.02
15 May 2011	20:22	0.86	0.15	264	14.31	4.02
15 May 2011	21:09	0.86	0.15	264	14.31	4.02
15 May 2011	21:56	0.86	0.15	264	14.31	4.02
15 May 2011	22:43	0.86	0.15	264	14.31	4.02
15 May 2011	23:30	0.86	0.15	264	14.31	4.02
15 May 2011	00:17	0.86	0.15	264	14.31	4.02
15 May 2011	01:04	0.86	0.15	264	14.31	4.02
15 May 2011	01:51	0.86	0.15	264	14.31	4.02
15 May 2011	02:38	0.86	0.15	264	14.31	4.02
15 May 2011	03:25	0.86	0.15	264	14.31	4.02
15 May 2011	04:12	0.86	0.15	264	14.31	4.02
15 May 2011	04:59	0.86	0.15	264	14.31	4.02
15 May 2011	05:46	0.86	0.15	264	14.31	4.02
15 May 2011	06:33	0.86	0.15	264	14.31	4.02
15 May 2011	07:20	0.86	0.15	264	14.31	4.02
15 May 2011	08:07	0.86	0.15	264	14.31	4.02
15 May 2011	08:54	0.86	0.15	264	14.31	4.02
15 May 2011	09:41	0.86	0.15	264	14.31	4.02
15 May 2011	10:28	0.86	0.15	264	14.31	4.02
15 May 2011	11:15	0.86	0.15	264	14.31	4.02
15 May 2011	12:02	0.86	0.15	264	14.31	4.02
15 May 2011	12:49	0.86	0.15	264	14.31	4.02
15 May 2011	13:36	0.86	0.15	264	14.31	4.02
15 May 2011	14:23	0.86	0.15	264	14.31	4.02
15 May 2011	15:10	0.86	0.15	264	14.31	4.02
15 May 2011	15:57	0.86	0.15	264	14.31	4.02
15 May 2011	16:44	0.86	0.15	264	14.31	4.02
15 May 2011	17:31	0.86	0.15	264	14.31	4.02
15 May 2011	18:18	0.86	0.15	264	14.31	4.02
15 May 2011	19:05	0.86	0.15	264	14.31	4.02
15 May 2011	19:52	0.86	0.15	264	14.31	4.02
15 May 2011	20:39	0.86	0.15	264	14.31	4.02
15 May 2011	21:26	0.86	0.15	264	14.31	4.02
15 May 2011	22:13	0.86	0.15	264	14.31	4.02
15 May 2011	23:00	0.86	0.15	264	14.31	4.02
15 May 2011	23:47	0.86	0.15	264	14.31	4.02
15 May 2011	00:34	0.86	0.15	264	14.31	4.02
15 May 2011	01:21	0.86	0.15	264	14.31	4.02
15 May 2011	02:08	0.86	0.15	264	14.31	4.02
15 May 2011	02:55	0.86	0.15	264	14.31	4.02
15 May 2011	03:42	0.86	0.15	264	14.31	4.02
15 May 2011	04:29	0.86	0.15	264	14.31	4.02
15 May 2011	05:16	0.86	0.15	264	14.31	4.02
15 May 2011	06:03	0.86	0.15	264	14.31	4.02
15 May 2011	06:50	0.86	0.15	264	14.31	4.02
15 May 2011	07:37	0.86	0.15	264	14.31	4.02
15 May 2011	08:24	0.86	0.15	264	14.31	4.02
15 May 2011	09:11	0.86	0.15	264	14.31	4.02
15 May 2011	09:58	0.86	0.15	264	14.31	4.02
15 May 2011	10:45	0.86	0.15	264	14.31	4.02
15 May 2011	11:32	0.86	0.15	264	14.31	4.02
15 May 2011	12:19	0.86	0.15	264	14.31	4.02
15 May 2011	13:06	0.86	0.15	264	14.31	4.02
15 May 2011	13:53	0.86	0.15	264	14.31	4.02
15 May 2011	14:40	0.86	0.15	264	14.31	4.02
15 May 2011	15:27	0.86	0.15	264	14.31	4.02
15 May 2011	16:14	0.86	0.15	264	14.31	4.02
15 May 2011	17:01	0.86	0.15	264	14.31	4.02
15 May 2011	17:48	0.86	0.15	264	14.31	4.02
15 May 2011	18:35	0.86	0.15	264	14.31	4.02
15 May 2011	19:22	0.86	0.15	264	14.31	4.02
15 May 2011	20:09	0.86	0.15	264	14.31	4.02
15 May 2011	20:56	0.86	0.15	264	14.31	4.02
15 May 2011	21:43	0.86	0.15	264	14.31	4.02
15 May 2011	22:30	0.86	0.15			



Date _____

Date _____

CL

Location

Run No.3	Run No.4		Run No.5	
	Opacity (%)	Time	Opacity (%)	Time
3.06	14.00	2.80	15.00	2.80
3.01	14.01	2.89	15.01	2.89
3.03	14.02	2.89	15.02	2.89
3.02	14.03	2.89	15.03	2.89
3.02	14.04	2.90	15.04	2.89
3.03	14.05	2.91	15.05	2.89
3.03	14.06	2.89	15.06	2.89
3.04	14.07	2.85	15.07	2.89
3.05	14.08	2.89	15.08	2.89
3.04	14.09	2.90	15.09	2.89
3.03	14.10	2.89	15.10	2.89
2.98	14.11	2.90	15.11	2.89
2.95	14.12	2.88	15.12	2.89
2.97	14.13	2.87	15.13	2.89
2.96	14.14	2.86	15.14	2.89
2.94	14.15	2.87	15.15	2.89
2.95	14.16	2.89	15.16	2.89
2.96	14.17	2.87	15.17	2.89
2.92	14.18	2.90	15.18	2.89
2.94	14.19	2.91	15.19	2.89
2.94	14.20	2.90	15.20	2.89
2.91	14.21	2.92	15.21	2.89
2.88	14.22	2.92	15.22	2.89
2.88	14.23	2.91	15.23	2.89
2.91	14.24	2.91	15.24	2.89
2.91	14.25	2.89	15.25	2.89
2.87	14.26	2.90	15.26	2.89
2.87	14.27	2.89	15.27	2.89
2.88	14.28	2.92	15.28	2.89
2.87	14.29	2.93	15.29	2.89
2.84	14.31	2.88	15.31	2.89
2.89	14.32	2.85	15.32	2.89
2.90	14.33	2.85	15.33	2.89
2.89	14.34	2.85	15.34	2.89
2.89	14.35	2.83	15.35	2.89
2.92	14.36	2.86	15.36	2.89
2.90	14.37	2.87	15.37	2.89
2.88	14.38	2.85	15.38	2.89
2.91	14.39	2.88	15.39	2.89
2.92	14.40	2.90	15.40	2.89
2.88	14.41	2.90	15.41	2.89
2.89	14.42	2.94	15.42	2.89
2.83	14.43	2.92	15.43	2.89
2.86	14.44	2.93	15.44	2.89
2.87	14.45	2.88	15.45	2.89
2.87	14.46	2.88	15.46	2.89
2.84	14.47	2.92	15.47	2.89
2.86	14.48	2.95	15.48	2.89

2.93



CEMs Opacity Data

Client Name **GPSC** Date **16-Mar-22**
 Plant Name **CUP4** Location **HR6Gs**

Run No.6		Run No.7		Run No.8		Run No.9		Run No.10	
Time	Opacity (%)	Time	Opacity (%)	Time	Opacity (%)	Time	Opacity (%)	Time	Opacity (%)
10:00	3.00	11:00	3.03	12:00	3.10	13:00	3.09	14:00	53.82
10:01	3.03	11:01	3.00	12:01	3.10	13:01	3.09	14:01	65.34
10:02	3.06	11:02	3.06	12:02	3.15	13:02	3.06	14:02	57.71
10:03	3.06	11:03	3.07	12:03	3.11	13:03	3.08	14:03	41.97
10:04	3.06	11:04	3.03	12:04	3.11	13:04	3.07	14:04	32.91
10:05	3.07	11:05	3.06	12:05	3.10	13:05	3.06	14:05	22.87
10:06	3.05	11:06	3.08	12:06	3.10	13:06	3.04	14:06	3.94
10:07	3.04	11:07	3.07	12:07	3.06	13:07	3.06	14:07	3.06
10:08	3.06	11:08	3.12	12:08	3.09	13:08	3.11	14:08	3.07
10:09	3.04	11:09	3.08	12:09	3.13	13:09	3.11	14:09	3.07
10:10	3.03	11:10	3.10	12:10	3.14	13:10	3.12	14:10	3.06
10:11	3.04	11:11	3.08	12:11	3.16	13:11	3.12	14:11	3.09
10:12	3.06	11:12	3.03	12:12	3.14	13:12	3.12	14:12	3.08
10:13	3.02	11:13	3.04	12:13	3.10	13:13	3.17	14:13	3.07
10:14	2.99	11:14	3.08	12:14	3.16	13:14	3.12	14:14	3.04
10:15	3.03	11:15	3.08	12:15	3.18	13:15	3.12	14:15	3.04
10:16	3.07	11:16	3.04	12:16	3.20	13:16	3.08	14:16	3.04
10:17	3.03	11:17	3.06	12:17	3.18	13:17	3.14	14:17	3.04
10:18	3.06	11:18	3.04	12:18	3.14	13:18	3.08	14:18	2.98
10:19	3.05	11:19	3.06	12:19	3.14	13:19	3.07	14:19	3.02
10:20	3.08	11:20	3.02	12:20	3.13	13:20	3.09	14:20	3.04
10:21	3.07	11:21	3.03	12:21	3.15	13:21	3.05	14:21	3.02
10:22	3.06	11:22	3.06	12:22	3.09	13:22	3.05	14:22	3.05
10:23	3.06	11:23	3.09	12:23	3.11	13:23	3.04	14:23	3.04
10:24	3.02	11:24	3.07	12:24	3.18	13:24	3.06	14:24	3.02
10:25	3.03	11:25	3.06	12:25	3.12	13:25	3.11	14:25	3.06
10:26	3.06	11:26	3.02	12:26	3.08	13:26	3.23	14:26	3.03
10:27	3.06	11:27	3.03	12:27	3.10	13:27	3.19	14:27	3.02
10:28	3.05	11:28	3.04	12:28	3.10	13:28	18.70	14:28	3.01
10:29	3.07	11:29	3.04	12:29	3.10	13:29	15.80	14:29	2.97
10:30	3.04	11:30	3.05	12:30	3.13	13:30	5.66	14:30	3.01
10:31	3.06	11:31	3.09	12:31	3.08	13:31	10.80	14:31	3.00
10:32	3.07	11:32	3.06	12:32	3.07	13:32	10.20	14:32	3.04
10:33	3.07	11:33	3.07	12:33	3.10	13:33	9.62	14:33	3.01
10:34	3.09	11:34	3.04	12:34	3.08	13:34	7.69	14:34	3.01
10:35	3.10	11:35	3.05	12:35	3.10	13:35	18.20	14:35	3.02
10:36	3.06	11:36	3.04	12:36	3.10	13:36	27.00	14:36	3.01
10:37	3.09	11:37	3.08	12:37	3.09	13:37	17.49	14:37	3.01
10:38	3.10	11:38	3.08	12:38	3.11	13:38	33.58	14:38	3.03
10:39	3.10	11:39	3.09	12:39	3.14	13:39	62.76	14:39	3.03
10:40	3.12	11:40	3.08	12:40	3.09	13:40	48.66	14:40	3.01
10:41	3.12	11:41	3.07	12:41	3.08	13:41	52.13	14:41	2.99
10:42	3.16	11:42	3.05	12:42	3.12	13:42	67.63	14:42	2.96
10:43	3.16	11:43	3.11	12:43	3.15	13:43	67.15	14:43	2.95
10:44	3.12	11:44	3.10	12:44	3.12	13:44	60.97	14:44	3.01
10:45	3.09	11:45	3.07	12:45	3.13	13:45	41.95	14:45	3.02
10:46	3.08	11:46	3.07	12:46	3.07	13:46	38.08	14:46	3.05
10:47	3.03	11:47	3.10	12:47	3.09	13:47	46.78	14:47	3.01
10:48	3.04	11:48	3.08	12:48	3.09	13:48	36.57	14:48	3.03
Avg.	3.06	Avg.	3.06	Avg.	3.12	Avg.	16.47	Avg.	8.28



CEMs Opacity Data

Client Name **GPSC** Date **17-Mar-22**
 Plant Name **CUP4** Location **HR6Gs**

Run No.11		Run No.12		Run No.13		Run No.14		Run No.15	
Time	Opacity (%)	Time	Opacity (%)	Time	Opacity (%)	Time	Opacity (%)	Time	Opacity (%)
9:50	3.10	10:45	3.13	11:40	3.03	12:40	3.02	13:40	2.87
9:51	3.09	10:46	3.16	11:41	3.02	12:41	3.02	13:41	2.89
9:52	3.08	10:47	3.22	11:42	3.03	12:42	3.03	13:42	2.87
9:53	3.06	10:48	3.16	11:43	3.04	12:43	3.04	13:43	2.85
9:54	3.06	10:49	3.10	11:44	3.01	12:44	3.03	13:44	2.87
9:55	3.08	10:50	3.13	11:45	3.04	12:45	3.03	13:45	2.88
9:56	3.07	10:51	3.12	11:46	3.05	12:46	3.05	13:46	2.88
9:57	3.07	10:52	3.15	11:47	3.06	12:47	3.05	13:47	2.87
9:58	3.09	10:53	3.13	11:48	3.05	12:48	3.02	13:48	2.84
9:59	3.08	10:54	3.10	11:49	3.05	12:49	3.06	13:49	2.88
10:00	3.12	10:55	3.11	11:50	3.06	12:50	3.02	13:50	2.85
10:01	3.12	10:56	3.15	11:51	3.05	12:51	2.98	13:51	2.85
10:02	3.15	10:57	3.15	11:52	3.03	12:52	3.01	13:52	2.85
10:03	3.08	10:58	3.16	11:53	2.96	12:53	3.03	13:53	2.83
10:04	3.06	10:59	3.19	11:54	3.01	12:54	3.05	13:54	2.84
10:05	3.09	11:00	3.16	11:55	2.98	12:55	3.05	13:55	2.84
10:06	3.10	11:01	3.14	11:56	2.98	12:56	3.06	13:56	2.84
10:07	3.09	11:02	3.11	11:57	3.02	12:57	3.04	13:57	2.81
10:08	3.12	11:03	3.17	11:58	3.02	12:58	3.07	13:58	2.83
10:09	3.11	11:04	3.15	11:59	2.98	12:59	3.05	13:59	2.84
10:10	3.07	11:05	3.16	12:00	2.95	13:00	3.05	14:00	2.84
10:11	3.09	11:06	3.15	12:01	2.98	13:01	3.02	14:01	2.80
10:12	3.08	11:07	3.16	12:02	2.96	13:02	3.05	14:02	2.79
10:13	3.06	11:08	3.15	12:03	3.01	13:03	3.06	14:03	2.79
10:14	3.07	11:09	3.16	12:04	3.00	13:04	3.05	14:04	2.79
10:15	3.11	11:10	3.16	12:05	3.00	13:05	3.05	14:05	2.77
10:16	3.13	11:11	3.16	12:06	3.03	13:06	3.04	14:06	2.79
10:17	3.09	11:12	3.17	12:07	3.02	13:07	3.07	14:07	2.76
10:18	3.09	11:13	3.19	12:08	3.03	13:08	3.04	14:08	2.78
10:19	3.08	11:14	3.14	12:09	3.02	13:09	3.05	14:09	2.77
10:20	3.12	11:15	3.12	12:10	2.98	13:10	3.06	14:10	2.79
10:21	3.12	11:16	3.15	12:11	2.95	13:11	3.04	14:11	2.75
10:22	3.09	11:17	3.17	12:12	2.98	13:12	3.04	14:12	2.74
10:23	3.07	11:18	3.17	12:13	2.95	13:13	3.01	14:13	2.77
10:24	3.09	11:19	3.19	12:14	2.97	13:14	2.99	14:14	2.77
10:25	3.08	11:20	3.13	12:15	2.96	13:15	3.01	14:15	2.79
10:26	3.15	11:21	3.14	12:16	2.94	13:16	2.99	14:16	2.80
10:27	3.18	11:22	3.15	12:17	2.93	13:17	2.97	14:17	2.82
10:28	3.15	11:23	3.15	12:18	2.94	13:18	2.94	14:18	2.81
10:29	3.11	11:24	3.10	12:19	2.98	13:19	3.00	14:19	2.81
10:30	3.07	11:25	3.11	12:20	3.00	13:20	3.02	14:20	2.79
10:31	3.07	11:26	3.09	12:21	2.96	13:21	3.01	14:21	2.80
10:32	3.08	11:27	3.08	12:22	2.99	13:22	2.93	14:22	2.80
10:33	3.09	11:28	3.08	12:23	2.93	13:23	2.97	14:23	2.81
10:34	3.12	11:29	3.08	12:24	2.96	13:24	2.95	14:24	2.78
10:35	3.18	11:30	3.14	12:25	2.93	13:25	2.92	14:25	2.79
10:36	3.14	11:31	3.10	12:26	2.95	13:26	2.95	14:26	2.79
10:37	3.14	11:32	3.08	12:27	2.95	13:27	2.92	14:27	2.78
10:38	3.17	11:33	3.11	12:28	3.00	13:28	2.92	14:28	2.81
Avg.	3.10	Avg.	3.14	Avg.	2.99	Avg.	3.02	Avg.	2.82



Airgas Specialty Gases
 Airgas USA, LLC
 601 East Union Street
 Clarks Summit, NJ 08417-0000
 Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04N090E15A0440
 Cylinder Number: EBO137377
 Laboratory: 124 - Plumsteadville - PA
 PGPV Number: A12020
 Gas Code: CO,NO,NOX,SO2,BALN
 Expiration Date: Feb 28, 2028

Reference Number: 82-401123185-1
 Cylinder Volume: 247.2 CF
 Cylinder Pressure: 2215 PSIG
 Valve Outlet: 660
 Certification Date: Feb 28, 2018



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 procedure 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.

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	80.00 PPM	80.41 PPM	G1	+/- 1.0% NIST Traceable	02/28/2018, 02/29/2018
CARBON MONOXIDE	80.00 PPM	80.31 PPM	G1	+/- 0.7% NIST Traceable	02/28/2018, 02/29/2018
NITRIC OXIDE	80.00 PPM	80.39 PPM	G1	+/- 1.0% NIST Traceable	02/28/2018, 02/29/2018
SULFUR DIOXIDE	80.00 PPM	81.61 PPM	G1	+/- 1.2% NIST Traceable	02/28/2018, 02/29/2018
NITROGEN	Balance				

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	1490755	CO243283	49.83 PPM CARBON MONOXIDE/NITROGEN	+/- 0.8%	Feb 22, 2020
PRM	112807	APX1088237	8.63 PPM NITROGEN DIOXIDE/AIR	+/- 2.8%	Jun 02, 2017
NTRM	1880807	CO243284	86.43 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Jun 02, 2020
GMIS	0511020504	CO293238	4.070 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.6%	Mar 16, 2019
NTRM	16011032	CO473218	49.82 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Jun 07, 2022

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multiport Calibration
Nicolet 6700 APW1100291 CO	FTIR	Feb 08, 2018
Nicolet 6700 APW1100291 NO	FTIR	Feb 16, 2018
Nicolet 6700 APW1100291 NO2	FTIR	Feb 16, 2018
Nicolet 6700 APW1100291 SO2	FTIR	Feb 09, 2018

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 <small>The measurement of this reference material is traceable to SI through the effluent standard which is traceable to Swiss National Standard of Vint. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/6-12/531 for the Assay and Certification of Gaseous Calibration Standards using gravimetric G. The results are expressed on a mole/mole basis, unless otherwise specified. The reported uncertainty is based on a standard deviation multiplied by coverage factor k=2, providing a level of confidence of approximately 95%.</small>			
Certificate Number: 4676/15	Analyst:  THITIRAT LOVRAT		
Cylinder Number: 550730	Approve:  SUKANYA KAMTHARAI		
Nominal Cylinder Content: 6.520 M³	To Re-Order Please Quote: 478100-J-44		
Nominal Pressure: 145.0 Bar			
Valve Outlet: CGA 590 BRASS			
Comment:	<ul style="list-style-type: none"> It is recommended that this product be not used below 5% of actual contents or should not be used when its gas pressure is below 150psig. Other impurities that detect by analytical condition of this mixture shall be report if it is more than 10% of minimum minor component. Keep and use in well-ventilated and secure area. 		

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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

Head Office (Bangkok)

15 ถนนสุขุมวิท 2/3 หมู่ 14 แขวงคลองเตย เขต คลองเตย กรุงเทพฯ 10110

เบอร์โทร: 02-276-1000 ต่อ 10545 โทรสาร: (02) 2338-6100 โทรสาร: (02) 2338-6333

โทรสาร: 105 หมู่ 5 แขวงคลองเตย เขต คลองเตย กรุงเทพฯ 10110

เบอร์โทร: (02) 38.570-479-93 โทรสาร: (02) 38.570-323

Linde (Thailand) Public Company Limited

Head Office (Bangkok)

15 ถนนสุขุมวิท 2/3 หมู่ 14 แขวงคลองเตย เขต คลองเตย กรุงเทพฯ 10110

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โทรสาร: 105 หมู่ 5 แขวงคลองเตย เขต คลองเตย กรุงเทพฯ 10110

เบอร์โทร: (02) 38.570-479-93 โทรสาร: (02) 38.570-323

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 Multi-point Calibration			
Servomex 4100 O2 Analyzer	Paramagnetic	23-Dec-2015			
Method of Analysis: 1. Gas Chromatograph 2. Paramagnetic Oxygen Analyzer 3. Electrochemical Oxygen Analyzer 4. Electrochemical Moisture Analyzer 5. Total Hydrocarbon Analyzer 6. Other specified					
Cylinder Number: 550730 Production Order Number: 90132928			Certification Date: 20-Jan-2016 Expiration Date: 20-Jan-2024		

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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

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เบอร์โทร: 02-276-1000 ต่อ 10545 โทรสาร: (02) 2338-6100 โทรสาร: (02) 2338-6333

โทรสาร: 105 หมู่ 5 แขวงคลองเตย เขต คลองเตย กรุงเทพฯ 10110

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Linde (Thailand) Public Company Limited

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
15 ถนนสุขุมวิท 2/3 หมู่ 14 แขวงคลองเตย เขต คลองเตย กรุงเทพฯ 10110

เบอร์โทร: 02-276-1000 ต่อ 10545 โทรสาร: (02) 2338-6100 โทรสาร: (02) 2338-6333

โทรสาร: 105 หมู่ 5 แขวงคลองเตย เขต คลองเตย กรุงเทพฯ 10110

เบอร์โทร: (02) 38.570-479-93 โทรสาร: (02) 38.570-323

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 <small>The measurement of this reference material is traceable to SI through the effluent standard which is traceable to Swiss National Standard of Vint. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/6-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G. The results are expressed on a mole/mole basis, unless otherwise specified. The reported uncertainty is based on a standard deviation multiplied by coverage factor k=2, providing a level of confidence of approximately 95%.</small>			
Certificate Number: 2857/16	Analyst:  THITIRAT LOVRAT		
Cylinder Number: 363075	Approve:  SUKANYA KAMTHARAI		
Nominal Cylinder Content: 6.560 M³	To Re-Order Please Quote: 557200-J-44		
Nominal Pressure: 145.0 Bar			
Valve Outlet: CGA 590 BRASS			
Comment:	<ul style="list-style-type: none"> It is recommended that this product be not used below 5% of actual contents or should not be used when its gas pressure is below 150psig. Other impurities that detect by analytical condition of this mixture shall be report if it is more than 10% of minimum minor component. Keep and use in well-ventilated and secure area. 		

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เบอร์โทร: 02-276-1000 ต่อ 10545 โทรสาร: (02) 2338-6100 โทรสาร: (02) 2338-6333

โทรสาร: 105 หมู่ 5 แขวงคลองเตย เขต คลองเตย กรุงเทพฯ 10110

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เบอร์โทร: (02) 38.570-479-93 โทรสาร: (02) 38.570-323

CERTIFICATE OF ANALYSIS

Analytical Result					
Component	Request Concentration	Certified Concentration	Certified Uncertainty	Method	Assay Date
Oxygen in Nitrogen	16.0 %	16.0 %	± 1% relative	(2) I-PB-354	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 Multi-point Calibration			
Servomex 4100 O2 Analyzer	Paramagnetic	24-Sep-2016			
Method of Analysis: 1. Gas Chromatograph 2. Paramagnetic Oxygen Analyzer 3. Electrochemical Oxygen Analyzer 4. Electrochemical Moisture Analyzer 5. Total Hydrocarbon Analyzer 6. Other specified					
Cylinder Number: 363075 Production Order Number: 90137389			Certification Date: 24-Sep-2016 Expiration Date: 24-Sep-2024		

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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

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เบอร์โทร: 02-276-1000 ต่อ 10545 โทรสาร: (02) 2338-6100 โทรสาร: (02) 2338-6333

โทรสาร: 105 หมู่ 5 แขวงคลองเตย เขต คลองเตย กรุงเทพฯ 10110

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เบอร์โทร: 02-276-1000 ต่อ 10545 โทรสาร: (02) 2338-6100 โทรสาร: (02) 2338-6333

โทรสาร: 105 หมู่ 5 แขวงคลองเตย เขต คลองเตย กรุงเทพฯ 10110

เบอร์โทร: (02) 38.570-479-93 โทรสาร: (02) 38.570-323



CONSOLE CONTROL UNIT CALIBRATION TEST REPORT

Calibration of Date : 12 Jun 22
Next Cal. Date : 12 Jul 22
Calibration No. : C-120122-BKK_F50468
Dry Gas Meter No. : BKK_F50468
Console Serial No. : 1302005
Console Model No. : XC-572-V
Reference Dry Gas Meter Data
Serial No. : 1607009
Model No. : SK25EXR-Q05
Correction Factor (Y) : 1.0050
Next Calibration Date : 8 Apr 22

AH	G	Reference Dry Gas Meter Calibration				Console Control - Dry Gas Meter				Dry Gas Meter Correction Factor (Y)	Orifice Calibration Factor (Y)
		Wt (Lb)	Initial	Final	Tr (°C)	Wt (Lb)	Initial	Final	Tr (°C)		
15	12.38	150.00	0.00	150.00	30.0	2564504.0	2564355.0	149.00	29.0	1.0078	47.9425
25	9.33	150.00	0.00	150.00	31.0	2564651.0	2564510.0	151.00	30.0	0.9935	44.8773
50	8.57	150.00	0.00	150.00	31.0	2564821.0	2564702.0	151.00	31.0	0.9945	44.1625
80	5.14	150.00	0.00	150.00	31.0	2564983.0	2564830.0	153.00	32.0	0.9819	43.1585
120	4.18	150.00	0.00	150.00	32.0	2565149.0	2564995.0	154.00	32.0	0.9685	43.0440
Avg										0.9893	44.4066

Ratio of reading of reference to dry gas meter tolerance for individual values ± 0.02 from average
 ΔH_0 Orifice pressure differential that equates to 21.24 in of air @ 25 °C and 710 mm of mercury, mmH₂O tolerance for individual values ± 5.0 from average
Procedure: 40 CFR 60 APP A METH SEC 5.3 & 7

Calibrated by : Saksit Phaisanphisit
(Mr Saksit Phaisanphisit)
Field Scientist (4)

Approved by : Wichan Choonharat
(Mr Wichan Choonharat)
Manager

Form 281-040 (04/03/2021)



DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date :	12-Jan-22	Ambient Temperature (°C)	28
Calibration sheet No. :	C-120122-BKK_F50469	Relative Humidity (%) :	55
Digital Temperature ID :	BKK_F50469	Reference Temperature ID :	BKK_F50609
Serial No. :	1302005	Serial No. :	7658004
Model :	XC-572-V	Model :	FLUKE 714
		Next Calibrate :	13 Jan 22

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

Calibrated by : Saksit Phaisanphisit
(Mr Saksit Phaisanphisit)
Field Scientist (4)

Approved by : Wichan Choonharat
Mr Wichan Choonharat
Manager

Form 281-040 (02/03/2021)



Pitot Tube Calibration Data

Pitot Tube Identification Number : BKK_F50472
Lab test duct Number : 258-1-13-01
Calibration Sheet No : C-120122-BKK_F50472
Calibration Date : 12 Jan 22
Standard Pitot ID : BKK_F50441
Cp Standard : 0.99

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

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

Calibrated by : Saksit Phaisanphisit
(Mr Saksit Phaisanphisit)
Field Scientist (4)

Approved by : Wichan Choonharat
Mr Wichan Choonharat
Manager

Form 281-040 (04/03/2021)



Pitot Tube Calibration Data

Pitot Tube Identification Number : BKK_F50473
Lab test duct Number : 258-1-13-01
Calibration Sheet No : C-120122-BKK_F50473
Calibration Date : 12 Jan 22
Standard Pitot ID : BKK_F50441
Cp Standard : 0.99

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

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

Calibrated by : Saksit Phaisanphisit
(Mr Saksit Phaisanphisit)
Field Scientist (4)

Approved by : Wichan Choonharat
Mr Wichan Choonharat
Manager

Form 281-040 (04/03/2021)



PROBE NOZZLE DIAMETER CALIBRATION DATA SHEET

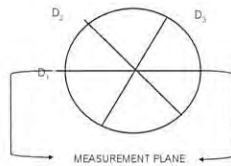
Calibration Date		12 Jan 22		Nozzle Set ID.:		BKK_FS0474			
Calibration Sheet No.:				C-120122-BKK_FS0474		Vernier Caliper ID.:		BKK_FS0626	
Nozzle ID #		Nozzle Diameter (cm)			HI - Lo ΔO		$(D_1 + D_2 + D_3) / 3$ D_{avg}		
		D_1	D_2	D_3					
1		0.300	0.300	0.300	0.000		0.300		
2		0.450	0.450	0.450	0.000		0.450		
3		0.600	0.600	0.600	0.000		0.600		
4		0.780	0.780	0.780	0.000		0.780		
5		0.932	0.932	0.932	0.000		0.932		
6		1.094	1.094	1.094	0.000		1.094		
7		1.264	1.264	1.264	0.000		1.264		

Where:

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

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

D_{avg} = (D₁ + D₂ + D₃) / 3



Calibrated by

Saksit Phaisanphisit

(Mr Saksit Phaisanphisit)
Field Scientist (4)

Approved by

Wichan Choonharat

Mr Wichan Choonharat
Manager

Form No. Q5.291-020 (1.0/01) (03)

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



SARTORIUS

Certificate of Calibration

REVIEW BY: Thamita K.
APPROVED BY: D. K.
NEXT CAL. DATE: 31/03/2022

Model Number: MSU224S-100-DU
Description: Analytical Balance
Serial Number: 31709552
Manufacturer: Sartorius

Certificate No.: 218C0111rev1
Issued Date: Monday, April 26, 2021
Reference No.: 501627
Page No.: 1 of 2

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

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

Calibrated By: Mr Chonchai Inthana
Calibration Date: Wednesday, March 31, 2021

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

Metrological data:

Capacity: 220 g Readability: 0.0001 g

Ambients Conditions:

Temperature: 24.0 °C ± 5.0 °C
Humidity: 60.0 % RH ± 10.0 % RH
Pressure: ±

Reasons for calibration

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

Equipment Condition: ☒ Good Operate ☐ Fair

Measurement Method UKAS Publication Ref: Lab 14

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM). The calibration certificate documents the traceability to National Standards, which is the unit of measurement according to the International 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 - 200g E2.YCS011-522-00	Sartorius	119934 D-K-19398-01-00	10-Sep-2021
MHB-382SD	Humidity/Balometer/Temp. Lutron MHB-382SD	SPC-RT	C19203076	1-Sep-2021

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.

ISO/IEC 17025:RF15 24/03/2020 R2

Mr. Chonchai Inthana (Technical Manager)

S
T
A
M
P



Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8381-6 Fax: +66 2643 8387, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

Model Number: MSU224S-100-DU
Description: Analytical Balance
Serial Number: 31709552
Manufacturer: Sartorius

Certificate No.: 218C0111rev1
Issued Date: Monday, April 26, 2021
Reference No.: 501627
Page No.: 2 of 2

Calibration Results: Without Adjustment

Repeatability			
The repeatability 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 repeatability quantitatively.			
Nominal Value: (Low Load)	20.0000	200.0001	
20 g	20.0000	200.0001	
Tolerance	20.0000	200.0001	
0.0001 g	20.0000	200.0000	
	20.0000	200.0001	
Nominal Value: (High Load)	20.0001	200.0001	
200 g	20.0000	200.0002	
Tolerance	20.0001	200.0001	
0.0001 g	20.0000	200.0001	
	20.0000	200.0001	
Standard Deviation	0.00004	0.00005	
Eccentricity (Off-center loading error)			
The off-center loading error is yielded by the difference between the result of the load, i.e. 1/2 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 R113).			
Nominal value:	50 g		
Tolerance	0.0004 g		
		Difference	
	1	0.0000	
	2	0.0000	
	3	0.0000	
	4	-0.0001	
	5	-0.0001	
	6	0.0000	
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
(g)	(g)	(g)	(g)
0.01	0.0100	0.0100	0.0000
0.1	0.1000	0.1000	0.0000
0.5	0.5000	0.5000	0.0000
1	1.0000	1.0000	0.0000
5	5.0000	5.0001	0.0001
10	10.0000	10.0000	0.0000
20	20.0000	20.0000	0.0000
50	50.0001	50.0001	0.0000
100	100.0001	100.0000	-0.0001
200	200.0001	200.0001	0.0000
Uncertainty			
			(g)
			0.00012
			0.00012
			0.00012
			0.00012
			0.00013
			0.00013
			0.00013
			0.00014
			0.00018
			0.00029
End of Report			

ISO/IEC 17025:RF15 24/03/2020 R2

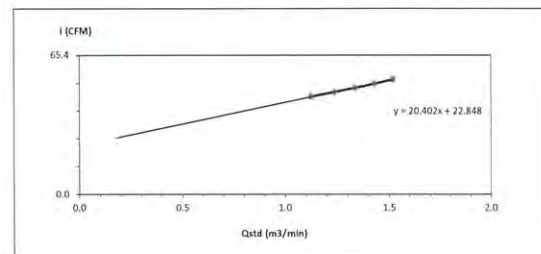
Note: This certificate is replacement with Certificate no.218C0111



High Volume Air Sampler Calibration Worksheet

Project Site:	Global Power Synergy Public Company Limited	Barometric Pressure (mm Hg):	757
Calibrate Location:	ท่าอากาศยานสุวรรณภูมิ	Temperature (°C):	31
Calibrate Date:	15-Mar-22	High Volume ID:	RYG_FS0396
Calibration Sheet No.:	C-150322-RYG_FS0396	High Volume Model:	TE-5170D
Calibrator ID:	RYG_FS0205	High Volume S/N:	5688
Calibrator Model:	TE-5028A	Calibrator Slope:	1.53016
Calibrator S/N:	1166	Calibrator Intercept:	-0.0468

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	1: Chart (CFM)	Linear Regression
1	2.8	1.1274	46	Slope: 20.4019
2	3.4	1.2375	48	Intercept: 22.8475
3	4.0	1.3383	50	Correlation Coefficient: 0.9990
4	4.6	1.4318	52	
5	5.2	1.5194	54	



Calibrated by

Mr Nontachai Uppathamp
Field Scientist(1)

Approved by:

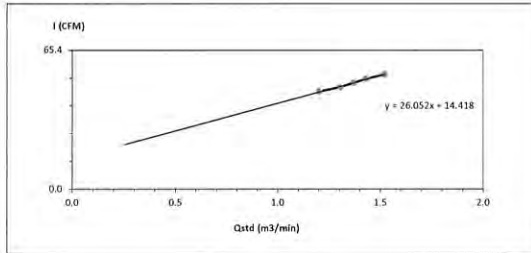
Mr Noppong Jutarupan
Envi Field Coordinator Scientist (3)



High Volume Air Sampler Calibration Worksheet

Project Site: Global Power Synergy Public Company Limited
 Calibrate Location: บ้านนาถนอย
 Calibrate Date: 15-Mar-22
 Calibration Sheet No.: C-150322-RYG-FS0173
 Calibrator ID: RYG_FS0205
 Calibrator Model: TE-5028A
 Calibrator S/N: 1166
 Barometric Pressure (mm Hg): 757
 Temperature (°C): 31
 High Volume ID: RYG_FS0173
 High Volume Model: TE-5170D
 High Volume S/N: 4799
 Calibrator Slope: 1.53016
 Calibrator Intercept: -0.0468

Test No.	Delta H ₂ O (Inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	3.2	1.2020	46	Slope: 26.0522 Intercept: 14.4180 Correlation Coefficient: 0.9956
2	3.8	1.3056	48	
3	4.2	1.3702	50	
4	4.6	1.4318	52	
5	5.2	1.5194	54	



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

Approved by: *N. Noppong*
 (Mr. Noppong Jutarupan)
 Enviro Field Coordinator Scientist (3)

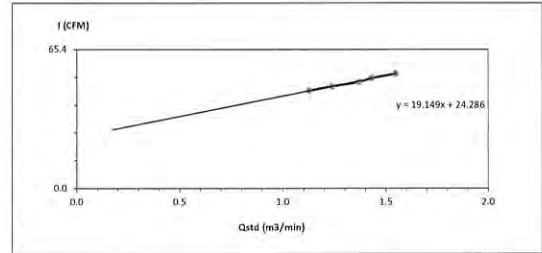
FORM NO. F-06-073 REVISION NO.: ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site: Global Power Synergy Public Company Limited
 Calibrate Location: บ้านนาถนอย
 Calibrate Date: 15-Mar-22
 Calibration Sheet No.: C-150322-RYG-FS0181
 Calibrator ID: RYG_FS0205
 Calibrator Model: TE-5028A
 Calibrator S/N: 1166
 Barometric Pressure (mm Hg): 757
 Temperature (°C): 31
 High Volume ID: RYG_FS0181
 High Volume Model: TE-5170D
 High Volume S/N: 5334
 Calibrator Slope: 1.53016
 Calibrator Intercept: -0.0468

Test No.	Delta H ₂ O (Inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.8	1.1274	46	Slope: 19.1489 Intercept: 24.2856 Correlation Coefficient: 0.9952
2	3.4	1.2375	48	
3	4.2	1.3702	50	
4	4.6	1.4318	52	
5	5.4	1.5474	54	



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

Approved by: *N. Noppong*
 (Mr. Noppong Jutarupan)
 Enviro Field Coordinator Scientist (3)

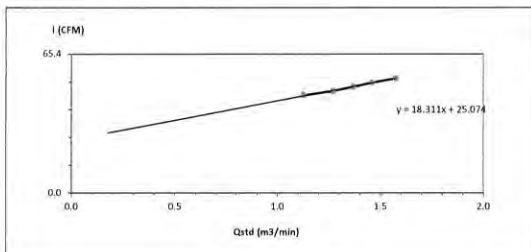
FORM NO. F-06-073 REVISION NO.: ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site: Global Power Synergy Public Company Limited
 Calibrate Location: บ้านนาถนอย
 Calibrate Date: 15-Mar-22
 Calibration Sheet No.: C-150322-RYG-FS0174
 Calibrator ID: RYG_FS0205
 Calibrator Model: TE-5028A
 Calibrator S/N: 1166
 Barometric Pressure (mm Hg): 757
 Temperature (°C): 31
 High Volume ID: RYG_FS0174
 High Volume Model: TE-5170D
 High Volume S/N: 4800
 Calibrator Slope: 1.53016
 Calibrator Intercept: -0.0468

Test No.	Delta H ₂ O (Inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.8	1.1274	46	Slope: 18.3111 Intercept: 25.0743 Correlation Coefficient: 0.9966
2	3.6	1.2720	48	
3	4.2	1.3702	50	
4	4.8	1.4616	52	
5	5.6	1.5750	54	



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

Approved by: *N. Noppong*
 (Mr. Noppong Jutarupan)
 Enviro Field Coordinator Scientist (3)

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

RYG_EN0001

Sartorius (Thailand) Co., Ltd.

129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2642 8361-6, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

REVIEW BY: *Dr. N. Noppong*
 APPROVED BY: *Dr. N. Noppong*
 NEXT CAL DATE: 6/5/22

Model Number: LA130S-F
 Description: Analytical Balance
 Serial Number: 25409664 (RYG_EN0001)
 Manufacturer: Sartorius

Certificate No.: 218C0162
 Issued Date: Monday, May 10, 2021
 Reference No.: 501644
 Page No.: 1 OF 2

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

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

Calibrated By: Mr. Chonchai Inthana
 Calibration Date: Thursday, May 06, 2021

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

Metrological data:
 Capacity: 150 g Readability: 0.0001 g

Ambients Conditions:
 Temperature: 21.9 °C ± 5.0 °C
 Humidity: 48.0 % RH ± 10.0 % RH
 Pressure: ±

Reasons for calibration

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

Equipment Condition: ☒ Good Operate ☐ Fair

Measurement Method UKAS Publication Ref: Lab 14

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

Traceability:

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 200g E2 YCS011-522-00	Sartorius	119934 D-K-19398-01-00	10-Sep-2021
MHB-3825D	Humidity/Barometer/Temp. Lutron MHB-3825D	SPC-RT	C19203076	1-Sep-2021

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.

ISO/IEC 17025:2017/2020 R2

Mr. chonchai Inthana (Technical Manager)



Certificate of Calibration

Model Number: LA130S-F Certificate No.: 218C10162
Description: Analytical Balance Issued Date: Monday, May 10, 2021
Serial Number: 25409664 (RYG_EN0001) Reference No.: 501644
Manufacturer: Sartorius Page No.: 2 of 2

Calibration Results: Without Adjustment

Repeatability			Eccentricity (Off-center loading error)		
The repeatability is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement range is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express repeatability.			The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/2 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 DIN, R16).		
Nominal Value: (Low Load)	10.0000	100.0001	Nominal value:	50	g
10 g	9.9999	100.0002	Tolerance	0.0004	g
Tolerance	9.9998	99.9999			
0.0001 g	10.0000	100.0000			
	10.0000	100.0000			
Nominal Value: (High Load)	10.0000	99.9999			
100 g	10.0001	100.0001			
Tolerance	10.0000	100.0001			
0.0001 g	9.9999	100.0000			
	9.9999	100.0001			
Standard Deviation	0.00010	0.00010			

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	0.00024
0.05	0.0500	0.0500	0.0000	0.00024
0.1	0.1000	0.1000	0.0000	0.00024
0.5	0.5000	0.5000	0.0000	0.00024
1	1.0000	1.0000	0.0000	0.00024
2	2.0000	2.0000	0.0000	0.00024
5	5.0000	5.0000	0.0000	0.00024
10	10.0000	10.0001	0.0001	0.00024
20	20.0000	20.0001	0.0001	0.00024
100	100.0001	100.0003	0.0002	0.00026

End of Report

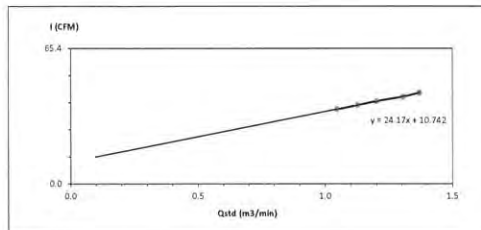
ISO/IEC 17025:2018/2020 R2



High Volume Air Sampler Calibration Worksheet

Project Site: Global Power Synergy Public Company Limited Barometric Pressure (mm Hg): 757
Calibrate Location: กรุงเทพมหานคร Temperature (°C): 31
Calibrate Date: 15-Mar-22 High Volume ID: RYG-FS0295
Calibration Sheet No.: C-150322-RYG-FS0295 High Volume Model: TE-5009X
Calibrator ID: RYG-FS0205 High Volume S/N: 5502
Calibrator Model: TE-5028A Calibrator Slope: 1.53016
Calibrator S/N: 1166 Calibrator Intercept: -0.0468

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.4	1.0472	36	Slope: 24.1702
2	2.8	1.1274	38	Intercept: 10.7425
3	3.2	1.2020	40	Correlation Coefficient: 0.9981
4	3.8	1.3056	42	
5	4.2	1.3702	44	



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

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

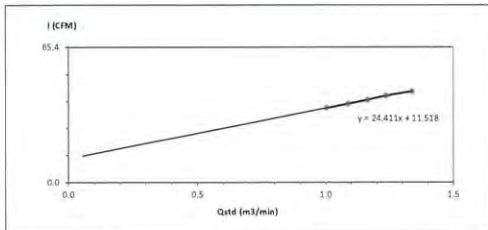
FORM NO. F 06-074 REVISION NO.: ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site: Global Power Synergy Public Company Limited Barometric Pressure (mm Hg): 757
Calibrate Location: กรุงเทพมหานคร Temperature (°C): 31
Calibrate Date: 15-Mar-22 High Volume ID: RYG-FS0186
Calibration Sheet No.: C-150322-RYG-FS0186 High Volume Model: TE-5009X
Calibrator ID: RYG-FS0205 High Volume S/N: 4794
Calibrator Model: TE-5028A Calibrator Slope: 1.53016
Calibrator S/N: 1166 Calibrator Intercept: -0.0468

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.2	1.0046	36	Slope: 24.4108
2	2.6	1.0881	38	Intercept: 11.5184
3	3.0	1.1653	40	Correlation Coefficient: 0.9985
4	3.4	1.2375	42	
5	4.0	1.3383	44	



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

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

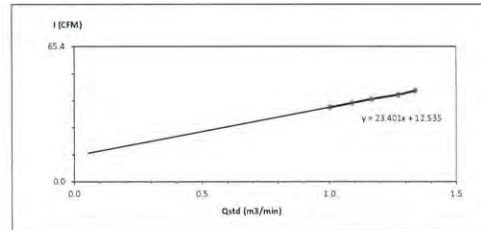
FORM NO. F 06-074 REVISION NO.: ISSUE DATE: 14/03/16



High Volume Air Sampler Calibration Worksheet

Project Site: Global Power Synergy Public Company Limited Barometric Pressure (mm Hg): 757
Calibrate Location: กรุงเทพมหานคร Temperature (°C): 31
Calibrate Date: 15-Mar-22 High Volume ID: RYG-FS0189
Calibration Sheet No.: C-150322-RYG-FS0189 High Volume Model: TE-5009X
Calibrator ID: RYG-FS0205 High Volume S/N: 4797
Calibrator Model: TE-5028A Calibrator Slope: 1.53016
Calibrator S/N: 1166 Calibrator Intercept: -0.0468

Test No.	Delta H ₂ O (inch)	Q _{std} (m ³ /min)	I: Chart (CFM)	Linear Regression
1	2.2	1.0046	36	Slope: 23.4008
2	2.6	1.0881	38	Intercept: 12.5352
3	3.0	1.1653	40	Correlation Coefficient: 0.9981
4	3.6	1.2720	42	
5	4.0	1.3383	44	



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

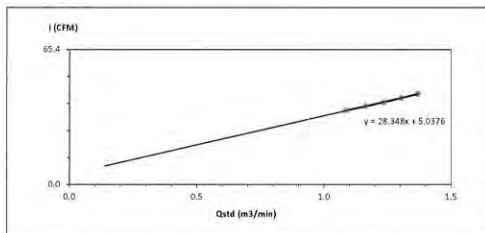
Approved by: hlyst
(Mr. Noppong Juturapan)
Enviro Field Coordinator Scientist (3)

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 :	วัดบางนาสาร	Temperature ("C) :	31
Calibrate Date :	15-Mar-22	High Volume ID :	RYG-FS0190
Calibration Sheet No.:	C-150322-RYG_FS0190	High Volume Model :	G1051
Calibrator ID:	RYG-FS0205	High Volume S/N :	1625
Calibrator Model :	TE-5028A	Calibrator Slope :	1.53016
Calibrator S/N :	1166	Calibrator Intercept :	-0.0468

Test No.	Delta H ₂ O (inch)	Q _{tot} (m ³ /min)	1: Chart (GPM)	Linear Regression
1	2.6	1.0801	36	Slope: 28.3476 Intercept: 5.0376 Correlation Coefficient: 0.9994
2	3.0	1.1653	38	
3	3.4	1.2375	40	
4	3.8	1.3056	42	
5	4.2	1.3702	44	



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

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

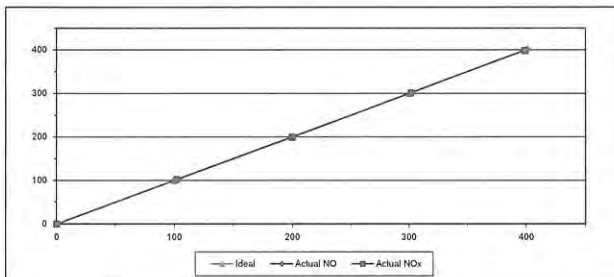
FORM NO.: F 06-074 REVISION NO.: - ISSUE DATE: 14/03/16



MULTIPOINT CALIBRATION REPORT

Calibration Date	4-Jan-22	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	NVOER3YH	Equipment ID	RYG_F80459
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	847		
Std. Gas Concentration (PPM)	51.33	Cylinder No.	LL36633
Cylinder Pressure (psi)	1200	Certified By	Algas Inc.
Certified Date	18-Mar-14	Expired Date	18-Mar-22

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	101.60	1.60	1.60
2	200.00	198.70	-1.30	-0.65	199.70	-0.30	-0.15
3	300.00	301.10	1.10	0.37	301.50	1.50	0.50
4	400.00	401.30	1.30	0.33	398.90	-1.10	-0.28
	AVERAGE (%)			-0.08			0.39



Calibrated By

Approved By _____

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

(Mr.Sarayuth Jittranont)
Assistant General Manager

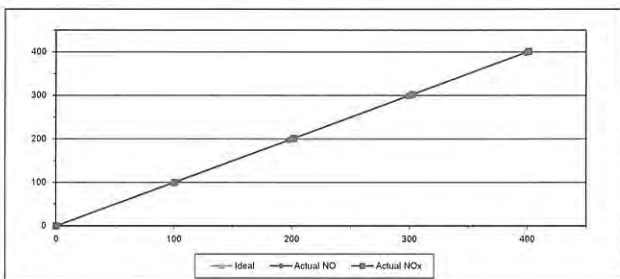
ALS Laboratory Group
FORM NO. F-06-056 REVISION NO. - ISSUE DATE 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	4-Jan-22	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	SEEAW33E	Equipment ID	RYG_F80281
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	51.33	Cylinder No.	LL36633
Cylinder Pressure (psi)	1200	Certified By	Algeas Inc.
Certified Date	18-Mar-14	Expired Date	18-Mar-22

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 (%)				-0.68			0.47



Calibrated By

Approved By

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

(Mr.Sarayuth Jittranont)
Assistant General Manager

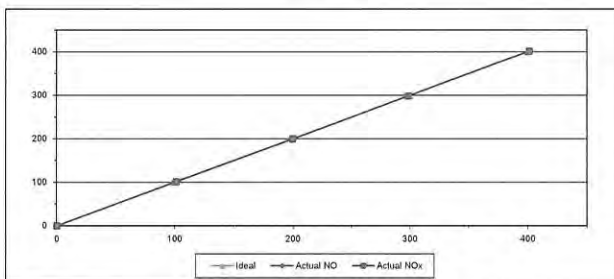
ALS Laboratory Group
FORM NO. F-05-056 REVISION NO. : ISSUE DATE 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	4-Jan-22	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	AWXG87CR	Equipment ID	RYG_F80453
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	51.33	Cylinder No.	LL36633
Cylinder Pressure (psi)	1200	Certified By	Alrgas Inc.
Certified Date	18-Mar-14	Expired Date	18-Mar-22

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	101.40	1.40	1.40
2	200.00	199.60	-1.40	-0.70	199.80	-0.20	-0.10
3	300.00	299.00	-1.00	-0.33	298.50	-1.50	-0.50
4	400.00	402.10	2.10	0.53	401.20	1.20	0.30
AVERAGE (%)				-0.16			0.24



Calibrated By

Approved By _____

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

(Mr.Sarayuth Jittranont)
Assistant General Manager

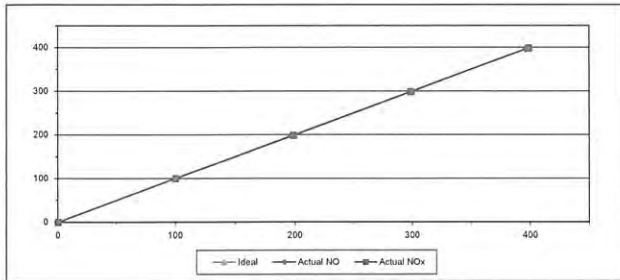
FORM NO. F-06-056 REVISION NO. : ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date 4-Jan-22 Equipment Name NOx Analyzer
 Manufacturer Teledyne API Model T200
 Serial No. 2197 Equipment ID RYG_FS0255
 Calibrator Manufacturer Teledyne API Model 700
 Serial No. 947
 Std. Gas Concentration (PPM) 51.33 Cylinder No. LL38533
 Cylinder Pressure (psi) 1200 Certified By Airgas Inc.
 Certified Date 18-Mar-14 Expired Date 18-Mar-22

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	100.20	0.20	0.20
2	200.00	198.10	-1.90	-0.95	198.50	-1.50	-0.75
3	300.00	297.50	-2.50	-0.83	298.70	-1.30	-0.43
4	400.00	396.50	-3.50	-0.88	398.60	-1.40	-0.35
AVERAGE (%)				-0.59			-0.25



Calibrated By

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

Approved By

(Mr.Sarayuth Jittrantont)
Assistant General Manager

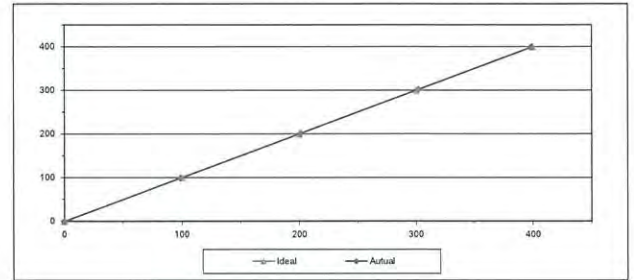
ALS Laboratory Group
FORM NO. F 06-056 REVISION NO. - ISSUE DATE 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date 4-Jan-22 Equipment Name SO2 Analyzer
 Manufacturer HORIBA Model APSA-370
 Serial No. PAUY077A Equipment ID RYG_FS0458
 Calibrator Manufacturer Teledyne API Model 700
 Serial No. 947
 Std. Gas Concentration (PPM) 50.87 Cylinder No. LL38533
 Cylinder Pressure (psi) 1200 Certified By Airgas Inc.
 Certified Date 18-Mar-14 Expired Date 18-Mar-22

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.10	0.10	0.10
1	100.00	98.90	-1.10	-1.10
2	200.00	201.10	1.10	0.55
3	300.00	302.30	2.30	0.77
4	400.00	398.60	-1.40	-0.35
AVERAGE (%)				-0.01



Calibrated By

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

Approved By

(Mr.Sarayuth Jittrantont)
Assistant General Manager

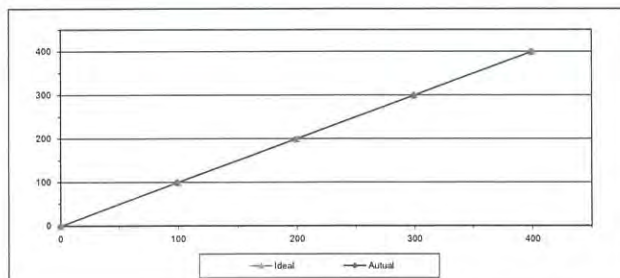
ALS Laboratory Group
FORM NO. F 06-056 REVISION NO. - ISSUE DATE 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date 4-Jan-22 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) 50.87 Cylinder No. LL38533
 Cylinder Pressure (psi) 1200 Certified By Airgas Inc.
 Certified Date 18-Mar-14 Expired Date 18-Mar-22

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.Sarayuth Jittrantont)
Assistant General Manager

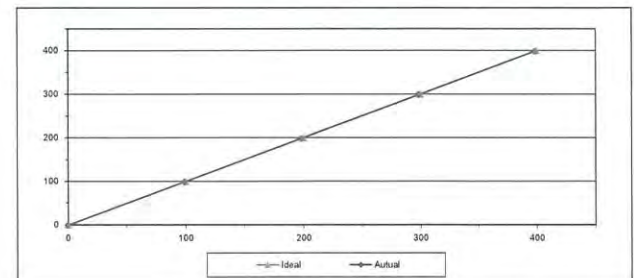
ALS Laboratory Group
FORM NO. F 06-056 REVISION NO. - ISSUE DATE 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date 4-Jan-22 Equipment Name SO2 Analyzer
 Manufacturer HORIBA Model APSA-370
 Serial No. 90U0XJ31 Equipment ID RYG_FS0452
 Calibrator Manufacturer Teledyne API Model 700
 Serial No. 947
 Std. Gas Concentration (PPM) 50.87 Cylinder No. LL38533
 Cylinder Pressure (psi) 1200 Certified By Airgas Inc.
 Certified Date 18-Mar-14 Expired Date 18-Mar-22

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



Calibrated By

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

Approved By

(Mr.Sarayuth Jittrantont)
Assistant General Manager

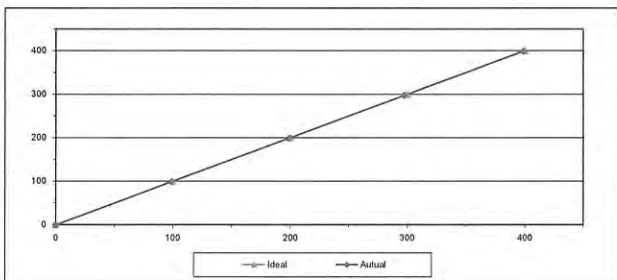
ALS Laboratory Group
FORM NO. F 06-056 REVISION NO. - ISSUE DATE 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date	4-Jan-22	Equipment Name	SO2 Analyzer
Manufacturer	Teledyne API	Model	T100
Serial No.	1772	Equipment ID	RYG_F80254
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	50.87	Cylinder No.	LL36533
Cylinder Pressure (psi)	1200	Certified By	Alrgas Inc.
Certified Date	18-Mar-14	Expired Date	18-Mar-22

Point	Ideal	Actual	Error	%Error
ZERO	0.00	0.05	0.05	0.05
1	100.00	99.10	-0.90	-0.90
2	200.00	199.50	-0.50	-0.25
3	300.00	297.50	-2.50	-0.83
4	400.00	398.80	-1.20	-0.30
AVERAGE (%)				-0.45



Calibrated By

(Mr. Jirawat 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



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

CERTIFICATE OF CALIBRATION

Certificate No: WS-08072021
Page 1 of 2 pages

Measurement Item	Cup anemometer with data logger
Manufacturer	Data logger: Novaynka Cup anemometer: Novaynka
Model/Type	Data logger: 110-WS-25DL-D Cup anemometer: WS-02F
Serial Number	Data logger: A5660 Cup anemometer: WSD-014
ID No	Data logger: - Cup anemometer: -
Customer	ALS Laboratory Group (Thailand) Co., Ltd. 104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.
Test Conditions	Wind tunnel cross test section area: 900 cm ² Anemometer frontal area: 100 cm ² Diameter of mounting pipe: mm Blockage ratio of test object: 0.111 (%)
Test Conditions	Air temperature: 23.4 ±0.5 °C Air pressure: 1000.2 ±0.4 hPa Relative air humidity: 59.5 ±3.5 %RH
Calibration Procedure	Calibration was carried out based on: K.C. 61420-12-1 401: 2025 Power Performance Measurements of Electricity Producing Wind Turbines IEC61420-12-1 401: 2025 Power Performance Measurements of Electricity Producing Wind Turbines IEC61420-12-1 401: 2025 Power Performance Measurements of Electricity Producing Wind Turbines
Traceability	This calibration documents the traceability to national standards which realize the unit of measurement according to the international system of units (SI) through National Institute of Metrology (NMI).
Measurement Date	Jul. 14, 2021
Issued Date	Jul. 15, 2021

Approved Signatory:

Mr. Panyia Booncharoen
Technical Support
and Calibration Manager



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



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

Continuation of Certificate of Calibration Number

Certificate No: WS-08072021
Page 2 of 2 Pages

Result of calibration: ☒ Without adjustment ☐ With adjustment

Calibration is in the range of 1 - 10 m/s at a calibration interval of 1 m/s

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

V _{ref} Reading m/s	V _{app} Reading m/s	Error (m/s)	Uncertainty (%)
2.069	1.9	0.2	2.5
4.122	4.0	0.1	1.2
6.22	6.0	0.2	0.95
7.97	8.3	0.3	0.84
9.96	10.0	0.3	0.69
12.02	12.1	0.1	0.47
13.99	14.2	0.2	0.45
15.98	16.2	0.2	0.55
17.99	18.2	0.2	0.39
19.02	19.1	0.1	0.45
21.02	21.1	0.1	0.53
23.09	23.0	0.0	0.70
25.08	25.0	0.0	0.96
27.112	27.0	0.1	1.2
29.15	29.0	0.0	1.5
31.02	31.0	0.1	0.5

UUC: Unit Under Calibration

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

Appendix 1. Specifications

NO	Sensor	Manufacturer	Model/Type	Calibration Date	Certificate Report Number	Range
1	Wind speed	TECOT INC	64352145	July 14, 2021	MA-0035-20	0 - 30 m/s
2	Pressure Differential Pressure Meter	Zorgas	DPM2502	July 15, 2020	MS-0075-20	0 - 30 m/s
3	Air Velocity Transducer (hot wire)	TSI INC	8455-12	July 20, 2020	MA-003444-20	0 - 5 m/s
4	Temperature	Zorgas	DSR-T10P	March 30, 2021	CL-027-04	30 - 70 °C
5	Relative Humidity	Zorgas	DSR-T10P	March 30, 2021	RE-03032021	0 - 100 %RH
6	Atmospheric pressure	Zorgas	DSR-T10P	March 30, 2021	BP-01032021	600 - 1100 hPa
7	Wind tunnel	CSSEM	MP0350			0 - 50 m/s

End of certificate of calibration



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

CERTIFICATE OF CALIBRATION

Certificate No: WD-08072021
Page 1 of 2 pages

Measurement Item	Wind direction sensor with data logger
Manufacturer	Data logger: Novaynka Wind direction sensor: Novaynka
Model/Type	Data logger: 110-WS-25DL-D Wind direction sensor: WSD-02F
Serial Number	Data logger: A5660 Wind direction sensor: WSD-014
ID No	Data logger: - Wind direction sensor: -
Customer	ALS Laboratory Group (Thailand) Co., Ltd. 104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.

Environmental Condition:

The measurement was carried out in an ambient temperature of (23.4)°C and relative humidity of (40)100%

Measurement Method:

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

Note: The UUC was warned at 1hr 1 hour prior to the calibration being performed.

Traceability:

The measurement results are traceable to the international system of units (SI) through Certificate No. 00553-07-0045, Certificate No. WWS53/0044.

Measurement Date: Jul. 14, 2021
Issued Date: Jul. 15, 2021



Approved Signatory:

Mr. Panyia Booncharoen
Technical Support
and Calibration Manager

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Continuation of Certificate of Calibration Number

Certificate No: WD-06072021
Page 2 of 2 pages

Result of calibration: ☐ Without adjustment ☒ With adjustment.

Calibration in the range of 0 - 360 ° at a calibration interval of 45°.

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

NO	Turning Direction	Nominal Angle (°)	Standard Reading (°)	UUC* Reading (°)	Error (°)	Uncertainty ±(°)
1	Clockwise	0/360	359	359	-1	3.0
2		45	45	42	-3	3.0
3		90	90	87	-3	3.0
4		135	135	134	-1	3.0
5		180	180	182	2	3.0
6		225	225	228	3	3.0
7		270	270	273	3	3.0
8		315	315	316	1	3.0
9	Counter Clockwise	0/360	360	359	-1	3.0
10		45	45	42	-3	3.0
11		90	90	87	-3	3.0
12		135	135	134	-1	3.0
13		180	180	182	2	3.0
14		225	225	228	3	3.0
15		270	270	273	3	3.0
16		315	315	316	1	3.0

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

End of Certificate of Calibration



CERTIFICATE OF CALIBRATION

Certificate No.: CL-050-64
Page 1 of 2

Equipment Name : Data Logger with Temperature Sensor

Manufacturer : Novalyx

Model : 110WS-25

Serial No. : A5660

ID No. :-

Customer

Name : ALS laboratory group (thailand) Co. Ltd.

Address : 104 Phatthanakan 40, Phatthanakan Rd.,Khwaeng Suan Luang, Khet Suan Luang,Bangkok 10250 Thailand.

Received date : 12 JUL 2021

Calibration date : 13 JUL 2021

Issue date : 13 JUL 2021

Reference Used During Calibration

1.Standard Temperature Probe Model : STS-100 A500,

Serial No. : 667682-09, Due date : 25 Mar 2022

2.Digital Temperature Indicator Model : DTI-1000 A MK II, Serial No: 671407-00991 Due date : 04 June 2022

Calibration Condition

Temperature : (23±3) °C

Relative Humidity : (55±15)%

Calibration Procedure

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

Traceability

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

Calibrated by

☐ Mr. Soravit Thachalad

☒ Miss Orathai Wiatwittaya

Approved Signatory:



Mr. Panyia Booncharoen
Technical Support
and Calibration Manager

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Certificate No. : CL-050-64
Page 2 of 2

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C - 40 °C

Function:

This equipment was connected with temperature sensor Model : HMP60 S/N : T0210901

Dimension : Diameter 12mm, Length 60 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
60	20.050	19.7	-0.3	0.080
60	24.875	24.5	-0.4	0.13
60	29.864	29.5	-0.4	0.080
60	34.829	34.3	-0.5	0.080
60	39.831	39.4	-0.5	0.95

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 ★

CALIBRATION REPORT

Calibration No. : RH-02072021
Page 1 of 1 Pages

Measurement Item : Relative humidity with data logger.

Manufacturer :

Data logger, Novalyx.

Relative humidity sensor, Novalyx.

Model/Type :

Data logger, 110-WS-2500, D.

Relative humidity sensor, HMP60.

Serial Number :

Data logger, A5660.

Relative humidity sensor, T0210901.

ID No :

Data logger, -

Relative humidity sensor, -

Customer :

ALS laboratory group (Thailand) co. Ltd.

104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.

Environmental Condition:

The measurement was carried out in an ambient temperature of (25±3)°C and relative humidity of (50±15)%.

Measurement Method:

The Relative humidity with data logger, Unit Under Calibration (UUC) was calibrated by comparison method with the equilibrium of standard salt solution (LiClO4K, Potassium Acetate, MgSO4, Magnesium Nitrate, KCl, Potassium Chloride) to determine the errors.

Measurement Date : 30/14/2021

Issued Date : 31/14/2021

Measurement Results:

The results of calibration are reported in table below.

Standard salt solution,	Standard (RH)	UUC(reading)	Error
CH ₃ COOK: Potassium Acetate	22.61	22.2	-0.3
MgSO ₄ : Magnesium Nitrate	52.89	52.3	-0.6
KCl: Potassium Chloride	84.34	83.8	-0.5

Performed by

☒ Mr. Soravit Thachalad

☐ Miss Orathai Wiatwittaya



Approved Signatory:

Mr. Panyia Booncharoen
Technical Support
and Calibration Manager

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Calibration Results:
Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 2 nm and UUC at 2 nm				
Standard Wavelength	Unit Under Calibration	Correction	Uncertainty	
418.61	418.4	0.21	0.13	
536.66	536.7	-0.04	0.13	
637.98	638.3	-0.32	0.14	
748.48	748.7	-0.22	0.14	
807.03	807.4	-0.37	0.14	
Photometric Accuracy (Absorbance)				
Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.5890	0.590	-0.0010	0.0045
	0.7616	0.762	-0.0004	0.0045
	1.0263	1.027	-0.0007	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.5787	0.579	-0.0003	0.0045
	0.7442	0.744	0.0002	0.0045
	1.0039	1.004	-0.0001	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.5292	0.530	-0.0008	0.0045
	0.6865	0.687	-0.0005	0.0045
	0.9534	0.954	-0.0006	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.5468	0.546	0.0008	0.0045
	0.6957	0.695	0.0007	0.0045
	0.9991	0.998	0.0011	0.0045
590 nm	0.0000	0.000	0.0000	0.0045
	0.5851	0.584	0.0011	0.0045
	0.7238	0.723	0.0008	0.0045
	1.0957	1.094	0.0017	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.5692	0.568	0.0012	0.0045
	0.6914	0.691	0.0004	0.0045
	1.0881	1.087	0.0011	0.0045

SKKI Calibration Center
1014 ซอยวิภาวดีรังสิต 57 แขวงจตุจักร เขตจตุจักร กรุงเทพมหานคร 10200
Tel: 02-2433-8800 Fax: 02-2433-1679 E-mail: cal-center@skki.com http://www.skki.com

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
	0.7307	0.730	0.0007	0.0080
257 nm	0.0000	0.000	0.0000	0.0080
	0.8516	0.850	0.0016	0.0080
313 nm	0.0000	0.000	0.0000	0.0080
	0.2836	0.285	-0.0014	0.0080
350 nm	0.0000	0.000	0.0000	0.0080
	0.6319	0.629	0.0029	0.0080

Stray light *

Standard: cut-off	UUC: Wavelength (nm)	UUC: Transmission (%)	Absorbance (A)
260.57 +/- 0.11 nm	260.6	1.5	1.824
392.03 +/- 0.11 nm	392.0	1.5	1.824

The stray light transmission reference is less than 1.0 T(%) and absorbance is greater than 2.0 (A)

Spectral Resolution *

Nominal Concentration 0.02 % v/v	Peak	Trough	Ratio	SBW
Standard Wavelength (nm)	268.72	266.76	1.39	2.00
UUC: Wavelength (nm)	268.2	266.1		
Std Absorbance (A)	0.4616	0.2797		
Absorbance (A)	0.416	0.300		

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

The End of Certificate

SKKI Calibration Center
1014 ซอยวิภาวดีรังสิต 57 แขวงจตุจักร เขตจตุจักร กรุงเทพมหานคร 10200
Tel: 02-2433-8800 Fax: 02-2433-1679 E-mail: cal-center@skki.com http://www.skki.com

ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: KSPR2104738

ชนิดเครื่องมือ: SPECTROPHOTOMETER

รุ่น: DR6000

หมายเลขเครื่อง: 1627845

ตรวจสอบ (วัน)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
01 Apr 2021			01 Apr 2021		
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 (ซองใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. สวิตช์ เปิด – ปิด เครื่อง (On-Off Switch)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. ปุ่มกด (Keypad)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. หน้าจอ (Display, Screen Contrast)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Spectrophotometer					
<input type="checkbox"/>	<input type="checkbox"/>	6. แรงดันไฟฟ้า (Battery Backup) ≥ 2.5 VDC	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	<input type="checkbox"/>	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	<input type="checkbox"/>	<input type="checkbox"/>	656.1=656.1 nm
<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"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. แหล่งกำเนิดแสง (Visible $< 5,000$ hour)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	11. ข้องวัดหลายตัวอย่าง (Carousel Module)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
pH Meter and Conductivity Meter					
<input type="checkbox"/>	<input type="checkbox"/>	12. ขั้วอิเล็กโทรด (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. ระดับการกรองสว่างของแสง (≥ 2.5 ไมโคร 3.0)	<input type="checkbox"/>	<input type="checkbox"/>	
Automatic titrator					
<input type="checkbox"/>	<input type="checkbox"/>	18. สภาว 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"/>	

เห็นด้วยหรือไม่:

Mr. Chathuporn Folthong
Service Engineer

SKKI Calibration Center
1014 ซอยวิภาวดีรังสิต 57 แขวงจตุจักร เขตจตุจักร กรุงเทพมหานคร 10200
Tel: 02-2433-8800 Fax: 02-2433-1679 E-mail: cal-center@skki.com http://www.skki.com

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

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



Cert. No.: ACC22001
Pages: 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-75
Serial No.: 35002736
ID No.: - 5-22-071

Condition As Found : GOOD

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

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

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

Calibrated by : Nathakorn Pinutpaisan

Approved by :
(Thanakul Peichurai)



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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACC22001
Job No. : VC65AC0040
Pages : 2 of 3

Calibration Procedure : CP-AC-03

Calibration Method :

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

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33511B	MY52302742	EF-0011-21	10-Feb-22
Digital Multimeter	33461A	MY53220104	EEL-BP. 05/0264	10-Feb-22
Digital Multimeter	33461A	MY53220076	EEL-BP. 03/0264	08-Feb-22
Digital Multimeter	33461A	MY60024273	1-15180725251-1	15-Sep-22
Programmable Attenuator	MAT-1070	62100114	1500-07774E	08-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KAI	34560495	AA-3003-21	16-Feb-22
Audio Analyzer	AVR-3360A	V744B6069	EF-0010-21	10-Feb-22

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

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

3.1 National Institute of Metrology (Thailand).

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

QF-TS12-04-04-020664

T. Petchur

Continuation of Calibration Certificate

Cert. No. : ACC22001
Job No. : VC65AC0040
Pages : 3 of 3

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit (dB)
94	93.99	-0.01	0.14	0.40

2. Frequency

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

3. Total distortion

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
0.28	0.10	3.0

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

End of Calibration Certificate

QF-TS12-04-04-020664

T. Petchur

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY451-451/1 Sirinthorn Rd, Bangbunru, Bangplud Bangkok 10700 THAILAND.
Tel:0-2435-8800 Fax:0-2433-1679 e-mail:cal-center@sithiporn.com http://www.sithiporn.comCert. No. : ACL22054
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Pre-amplifier NH-24
Serial No. : 00233184 / 144837 / 23232
ID No. : RYG_FS0025

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 : 14 JANUARY 2022
Calibration Date : 21-24 JANUARY 2022
Date of Issue : 25 JANUARY 2022



Calibrated by : Nathakorn Pisutpaisan

Approved by :

T. Petchur
(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. : ACL22054
Job No. : VC65AC0043
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

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

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

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0012-21	10-Feb-22
Waveform Generator	33511B	MY52302742	EF-0011-21	10-Feb-22
Digital Multimeter	33461A	MY53220104	EEL-BP. 05/0264	10-Feb-22
Digital Multimeter	33461A	MY53220076	EEL-BP. 03/0264	08-Feb-22
Digital Multimeter	34461A	MY60024273	1-15180725251-1	15-Sep-22
Programmable Attenuator	MAT-1070	62100114	1500-07774E	08-Mar-22
Condenser Microphone	4180	2977900	AA-1008-21	05-Feb-22
Measuring Amplifier	NA-42KAI	34560495	AA-3003-21	16-Feb-22

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

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

3.1 National Institute of Metrology (Thailand).

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

QF-TS12-04-04-020664

T. Petchur

Continuation of Calibration Certificate

Cert. No. : ACL22054
Job No. : VC65AC0043
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	✓	-	0.4	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QF-TS12-04-04-020664

T. P. A. L.

Continuation of Calibration Certificate

Cert. No. : ACL22054
Job No. : VC65AC0043
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.2

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

Frequency Weighting	Measured value (dB)
A - weight	10.8
C - weight	17.0
Flat	22.8

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-0.9	-0.8	-0.8	±5.0

QF-TS12-04-04-020664

T. P. A. L.

Continuation of Calibration Certificate

Cert. No. : ACL22054
Job No. : VC65AC0043
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

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

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

QF-TS12-04-04-020664

T. P. A. L.

Continuation of Calibration Certificate

Cert. No. : ACL22054
Job No. : VC65AC0043
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	131.9	-0.1	± 1.1
131.0	130.9	-0.1	± 1.1
129.0	129.0	0.0	± 1.1
124.0	124.0	0.0	± 1.1
119.0	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.0	0.0	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.1	0.1	± 1.1
25.0	25.1	0.1	± 1.1

QF-TS12-04-04-020664

T. P. A. L.

Continuation of Calibration Certificate

Cert. No. : ACL22054
Job No. : VC65AC0043
Pages : 7 of 8

8. Level linearity including the level range control

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

9. Tone burst response

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

10. Peak C' sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (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	135.2	-0.2	±2.0

QI-TS12-04-04-020664

T. Bt.

Continuation of Calibration Certificate

Cert. No. : ACL22054
Job No. : VC65AC0043
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	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Weighting			0.0	±0.3
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

QI-TS12-04-04-020664

T. Bt.

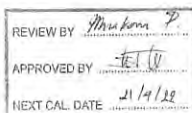


ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT
975 Moo 4, Bangpoo Industrial Estate, Soi 8, Sukhumvit Road km 37,
Phraek Sa, Mueang Samut Prakan, Samut Prakan 10280
Tel: +66 2709 4860-8 Fax: +66 2324 0917-8

Certificate No.: 01685V21
Operation No.: CP2021040004

Certificate of Calibration

Equipment: Sound Level Meter
Manufacturer: RION
Model/Type: NL-42 (Meter), UC-52 (Microphone), NH-24 (Preamplifier)
Serial No.: 00734223 (Meter), 157777 (Microphone), 22653 (Preamplifier)
ID No.: RYG_FS0029
Customer: ALS Laboratory Group (Thailand) Co.,Ltd.
Address: 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan
Khet Suan Luang, Bangkok 10250 Thailand
Received Date: 7 April 2021
Calibrated Date: 21 - 27 April 2021
Issued Date: 28 April 2021
Calibrated by: Ms. Juntaporn Kunhakom



Approved by: (Mr. Sittichai Swaksuriyawong)
Group Manager

The reported uncertainty of measurement was based on standard uncertainty multiplied by a coverage factor $k = 2.00$, providing a level of confidence of approximately 95%. This certificate may not be reproduced other than in full except with the prior written approval of the Electrical and Electronics Institute, Foundation for Industrial Development.



ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: 01685V21

Calibration Report

Equipment: Sound Level Meter
Manufacturer: RION
Model/Type: NL-42 (Meter), UC-52 (Microphone), NH-24 (Preamplifier)
Serial No.: 00734223 (Meter), 157777 (Microphone), 22653 (Preamplifier)
ID No.: RYG_FS0029
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 15) %
Pressure: (101.3 ± 1.5) kPa
Method of Calibration :- IEC61672-3:2013.

Condition of this result of calibration

1. Reference standards instrument :-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Standard microphone	4180	2661000	AA-1013-20	12 May 2021
2) Sine generator	1051	1501442	0151RF20	21 September 2021
3) Arbitrary Function Generator	AFG2021	C010063	0099RF20	17 June 2021
4) Programmable Attenuator	PA5	2755	EF-0034-20	10 November 2021
5) 6.5 Digit precision multimeter	8846A	9609027	0498EL20	10 August 2021
6) 6.5 Digit precision multimeter	8846A	9610014	0669EL20	27 October 2021
7) Pressure humidity and Temperature Transmitter	PTU301	F0640002	CL1-P200051	31 May 2021
8) Pressure humidity and Temperature Transmitter	PTU301	F0640003	CL1-P200052	1 June 2021
			0305TE20	28 June 2021
			0306TE20	28 June 2021

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

3. This certification is traceable to the international system of unit maintained at :-
Reference standards instrument for Acoustic function
- National Institute of Metrology (Thailand)
Reference standards instrument for Electrical function
- National Institute of Metrology (Thailand)
- Electrical and Electronics Institute, ONSC Accredited Calibration No.0119

Result of Calibration:

Function : 1. Indication at the calibration check frequency

Reference Acoustic Signal (dB)	Measured value (dB)	Deviation (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.0

Note : Absolute sensitivity was established by the use of the Sound Calibrator RION Type NC-74 S/N : 34615278.



Certificate No.: 0168SV21

Calibration Report

Function : 2. Self-generated Noise

2.1 Microphone Installed

Measured value (dB)
19.1

2.2 Microphone replaced by the electrical input signal device

Frequency Weighting	Measured value (dB)
A-weighting	12.0
C-weighting	18.5
Z-weighting	23.8

Function : 3. Acoustical signal tests of frequency weightings (Without Windscreen)

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

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
125	0.6	0.7	0.6	±1.5
1000	0.0	0.0	0.0	±1.0
8000	-2.4	-2.4	-2.4	±5.0

Function : 4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various Frequency Weighting Response Curve			
	C-Weighting (dB)	A-Weighting (dB)	Z-Weighting (dB)	Acceptance limits (dB)
63	-0.1	-0.1	0.0	±2.0
125	0.0	-0.1	0.0	±1.5
250	0.0	-0.1	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.1	0.1	0.0	±2.0
4000	0.1	0.0	0.0	±3.0
8000	0.1	0.1	0.0	±5.0

Function : 5. Frequency and time weighting at 1 kHz

5.1 Frequency weighting at 1 kHz

Frequency Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
C-weighting	94.0	0.0	±0.2
A-weighting	94.0	0.0	±0.2
Z-weighting	94.0	0.0	±0.2



Certificate No.: 0168SV21

Calibration Report

5.2 Time weighting at 1 kHz

Time Weighting	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	94.0	0.0	±0.1
Slow	94.0	0.0	±0.1
LAeq	94.0	0.0	±0.1

Function : 6. Long-Term Stability

Long-term stability over 30 minutes, with steady 1 kHz signal at reference level.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
30	94.0	94.0	0.0	±0.3

Function : 7. Level Linearity on the reference level range

7.1 Level Linearity on the reference level range, Upper

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
94.0	94.0	0.0	±1.1
99.0	99.0	0.0	±1.1
104.0	104.0	0.0	±1.1
109.0	109.0	0.0	±1.1
114.0	114.0	0.0	±1.1
119.0	119.0	0.0	±1.1
124.0	124.0	0.0	±1.1
129.0	129.0	0.0	±1.1
130.0	130.0	0.0	±1.1
131.0	131.0	0.0	±1.1
132.0	132.0	0.0	±1.1
133.0	133.0	0.0	±1.1
134.0	134.0	0.0	±1.1
135.0	135.0	0.0	±1.1
136.0	136.0	0.0	±1.1
137.0	137.0	0.0	±1.1

7.2 Level Linearity on the reference level range, Lower

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
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



Certificate No.: 0168SV21

Calibration Report

7.2 Level Linearity on the reference level range, Lower (Cont.)

Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
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
29.0	29.0	0.0	±1.1
24.0	24.0	0.0	±1.1

Function : 8. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Fast	200	126.0	0.0	±1.0
	2	109.0	0.0	+1.0 ; -2.5
	0.25	99.9	-0.1	+1.5 ; -5.0
Slow	200	119.6	0.0	±1.0
	2	100.0	0.0	+1.0 ; -5.0
	200	120.0	0.0	±1.0
LAeq	2	100.0	0.0	+1.0 ; -2.5
	0.25	90.9	-0.1	+1.5 ; -5.0

Function : 9. Peak C sound level

Number of cycles in test signal	Anticipated Value (dB)	Measured value (dB)	Deviated value (dB)	Acceptance limits (dB)
Complete cycle	125.4	125.2	-0.2	±3.0
Positive half cycle	124.4	124.1	-0.3	±2.0
Negative half cycle	124.4	124.1	-0.3	±2.0

Function : 10. Overload indication

Measured value (dB)		Deviated value (dB)	Acceptance limits (dB)
Positive one-half cycle	Negative one-half cycle		
139.5	139.4	-0.1	±1.5



Certificate No.: 0168SV21

Calibration Report

Function : 11. High-Level Stability

High-level stability over 5 minutes, with steady 1 kHz signal, 1 dB below upper boundary.

Time Period to Apply Signal (min)	Reference SPL (dB)	Record SPL at Conclusion of Time Period (dB)	Deviated value (dB)	Acceptance limits (dB)
5	129.0	129.0	0.0	±0.3

Uncertainty of measurement

Function	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1) Indication at the calibration check frequency	0.30	Not applicable
2) Self-generated Noise	0.10	Not applicable
3) Acoustical signal tests of frequency weightings - Free-field sound pressure response level	0.30	0.60 (10Hz to 4kHz) 0.70 (>4kHz to 10kHz)
4) Electrical signal tests of frequency weightings	0.20	0.20
5) Frequency and time weighting at 1 kHz	0.20	0.20
6) Long-Term Stability	0.10	0.10
7) Level Linearity on the reference level range	0.30	0.30
8) Tone burst response	0.20	0.30
9) Peak C sound level	0.20	0.35
10) Overload indication	0.20	0.25
11) High-Level Stability	0.10	0.10

Remarks: 1. The acceptance limit is for the deviated value.
2. Acceptance limits was IEC61672-3:2013 Class 2

-- End of Report --



63/14-15,67/35-36, Soi Petchkasem 7/71, Petchkasem Rd,
Walthapra, Bangkok, Bangkok 10600 Thailand.
Tel: (66) 02-8680812#13 Fax: (66) 02-8680860 www.jiranatee.com



CERTIFICATE OF CALIBRATION

Certificate No.: CL-045-64
Page 1 of 2

Equipment Name: Heat Stress Monitor with Sensor
Manufacturer: DeltaOHM
Model: HD32.2
Serial No: 15020724
ID No: RYG_F50228

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

Received date: 05 JUL 2021
Calibration date: 09 JUL 2021
Issue date: 13 JUL 2021

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

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

REVIEW BY
APPROVED BY
EXT CAL DATE

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-0036-21, Certificate number: ER-0032-
21

Calibrated by
☐ Mr. Sorawit Thachalad
☒ Miss Orathai Wivattwittaya



Approved Signatory:
Mr. Parinya Booncharoen
Technical Support
And Calibration Manager

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



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Walthapra, Bangkok, Bangkok 10600 Thailand.
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Certificate No.: CL-045-64
Page 2 of 2

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C - 40 °C

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2 S/N: 15031956.
Dimension: Diameter 14 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
30	20.055	20.4	0.3	0.16
30	25.046	25.3	0.3	0.099
30	30.040	30.4	0.3	0.16
30	35.036	35.3	0.2	0.14
30	40.029	40.3	0.3	0.30

Table 2: This equipment was connected with temperature probe Model: TP3207.2 S/N: 15031951.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.054	20.3	0.2	0.099
70	24.878	25.0	0.1	0.099
70	29.825	29.9	0.1	0.099
70	34.778	34.8	0.0	0.099
70	39.731	39.7	0.0	0.099

Table 3: This equipment was connected with Globe thermometer probe Model: TP3276.2 S/N: 15028490.
Dimension: Diameter 8 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.055	20.1	0.0	0.099
110	25.046	25.1	0.1	0.099
110	30.040	30.1	0.1	0.099
110	35.035	35.1	0.1	0.099
110	40.029	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 ★



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CERTIFICATE OF CALIBRATION

Certificate No.: CL-047-64
Page 1 of 2

Equipment Name: Heat Stress Monitor with Sensor
Manufacturer: DeltaOHM
Model: HD32.2
Serial No: 15020734
ID No: RYG_F50230

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

Received date: 05 JUL 2021
Calibration date: 12 JUL 2021
Issue date: 13 JUL 2021

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

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

REVIEW BY
APPROVED BY
EXT CAL DATE

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-0036-21, Certificate number: ER-0032-
21

Calibrated by
☐ Mr. Sorawit Thachalad
☒ Miss Orathai Wivattwittaya



Approved Signatory:
Mr. Parinya Booncharoen
Technical Support
And Calibration Manager

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Certificate No.: CL-047-64
Page 2 of 2

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment

Calibration Range: 20 °C - 40 °C

Function:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2 S/N: 15028544.
Dimension: Diameter 14 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
30	20.042	20.0	0.0	0.099
30	25.046	24.9	-0.1	0.099
30	30.040	29.9	-0.1	0.099
30	35.032	34.9	-0.1	0.099
30	40.026	39.9	-0.1	0.099

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

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.040	20.3	0.1	0.099
70	24.921	24.9	0.0	0.099
70	29.830	29.7	-0.1	0.099
70	34.783	34.6	-0.2	0.099
70	39.730	39.5	-0.2	0.099

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

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.041	20.1	0.1	0.099
110	25.046	25.1	0.1	0.099
110	30.040	30.1	0.1	0.099
110	35.033	35.1	0.1	0.099
110	40.026	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 ★

CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc
DATE OF ISSUE 07/09/21 CERTIFICATE NUMBER 162335

REVIEW BY *Timothy P.*
APPROVED BY *W. D. Smith*
NEXT CAL. DATE 7/9/22

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

Page 1 of 1

Test engineer:
Nigel Smith
Electronically signed:

W. D. Smith

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: 07 September 2021

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)
Initial	113.90	1000.2	0.20
Adjusted	114.00	1000.2	0.20
Uncertainty	± 0.11	± 0.14	± 0.10
Tolerances	± 0.60	± 2.00	± 4.00

Environmental Conditions

Pressure: 101.40 kPa
Temperature: 22.4 °C
Humidity: 60.2 %

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%.



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL: 0-2717-3000-27 FAX: 0-2719-5484



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

Certificate of Calibration

Equipment: pH Meter
Manufacturer: Mettler Toledo
Model: Seven Compact S22Q
Serial No.: C104059460
ID No.: RYG_EN0183
Condition As-Received: Used Item
Received Date: 16 March 2022
Calibration Date: 17 March 2022
Reference: 2203-0611DSC-4
Submitted by: ALS Laboratory Group (Thailand) Co., Ltd.
Rayong Branch
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

Calibrated by: Warakorn Lernagatrakul

Approved by: *W. D. Smith*
Approved Signatory

(/) Malee Bulkrusa
() Sathip Meangmai
() Warakorn Lernagatrakul

Issue Date: 22 March 2022

The Uncertainties are for a confidence probability of approximately 95%

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A 0037307



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

Condition of this calibration result

1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	21E2682	25 Aug 2022
2) Ref. Standard Thermometer	4982054	110RC044	21I1201	28 Oct 2022

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

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

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

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

Calibration Results

Function: mV Measurement

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

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



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

Calibration Results

Function: pH Measurement

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

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH measurement (±)	Coverage factor k
pH Electrode S/N.: 1453404	4.008	4.010	177.7	0.0046	2.00
	6.982	6.988	3.6	0.0064	2.00
	10.015	10.010	-172.9	0.0073	2.05

Function: Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model: InLab Expert Pro-ISM
- Serial No.: 1453404

Dimension of probe:
- Length: 120 mm.
- Diameter: 12 mm.
- Immersion Depth: 100 mm.

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

Remark: - UUC* = Unit Under Calibration

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

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1100955

1100954



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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Certificate of Calibration

Certificate No.: 22E866
Page: 1 of 2

Equipment: pH Meter
Manufacturer: Mettler Toledo
Model: SevenCompact S220
Serial No.: C104059460
ID No.: RYG_EN0183
Condition As-Received: Used Item
Received Date: 16 March 2022
Calibration Date: 21 March 2022
Reference: 2203-0511DSC
Ambient Temperature: (23 ± 2) °C
Relative Humidity: (50 ± 10) %

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Corporate Services 3: Equipment Calibration and Testing Services.

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

616/10 Moo 5 T.Menam 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:

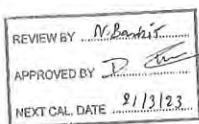
Instrument	Model	Serial No.	Certificate No.	Due Date
1) Multi-Product Calibrator	5500A	6440007	21E1444	07 May 2022

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

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

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

-National Institute of Metrology Thailand (NIMT)



Calibrated by: Pongsamorn Boonyaporn
Issue Date: 22 March 2022

Approved Signatory:

() Phalinee Prabpai
() Nuntawat Khamchai
() Ponthippa Tameyakul

B 0284414



Cert. No.: 22E866
Page: 2 of 2

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

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

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

*UUC= Unit Under Calibration.

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Cert.No.: 21TW20
Page: 1 of 2

Certificate of Testing

Equipment: DO Meter
Manufacturer: YSI
Model: 5100
Serial No.: 15L102139
ID No.: RYG_EN0140
Received Date: 29 January 2021
Test Date: 02 February 2021
Reference: 2101-0817DSC-1

Submitted by: ALS Laboratory Group (Thailand) Co., Ltd.
Rayong Branch
Eastern Seaboard Industrial Estate (Rayong)
64/77 Moo 4, Building No.B1, Highway 331,
Km91.5, T.Pluakdaeng, 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

Calibrated by: Walalak Sirthean

Approved by:
Approved Signatory

(/) Malee Butkruea
() Saithip Meangmai
() Warakorn Lemgagtrakul

Issue Date: 3 February 2021

B 0252485



Cert.No.: 21TW20
Page: 2 of 2

Result: Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: 16C100847

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.02	8.02	0.0055

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

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Cert. No.: 21TM271
Page.: 1 of 2

Certificate of Calibration

Equipment : DO Meter with Sensor
Manufacturer : YSI
Model : 5100
Serial No. : 15L102139
ID No. : RYG_EN0140
Submitted by : ALS Laboratory Group (Thailand) Co.,Ltd. Rayong Branch
Eastern Seaboard Industrial Estate (Rayong)
64/77 Moo 4 Building No.B1, Highway 331 km. 91.5,
T. Pluakdaeng, A. Pluakdaeng, Rayong 21140 Thailand
Location : TPA On Site Calibration Laboratory
Received Order : 29 January 2021
Calibrated Date : 3 February 2021
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
AC Line Voltage : (220 ± 22) V

Calibrated by : Malee Butkrues

Approved by :
Approved Signatory

() Pornthippa Tameyakul
(✓) Suwit Imjai

Issue Date : 4 February 2021

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 0024028



Equipment : DO Meter with Sensor
Condition As-Received : Used Item
Reference : 2101-0817DSC-2
Procedure Used :-

Cert. No.: 21TM271
Page.: 2 of 2

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

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Digital Thermometer	1523	2188060	2011369	20 Nov 2021

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 maintained at:-
- National Institute of Metrology Thailand (NIMT)

Result of Calibration :- (*) Without Adjustment

Function : Temperature measurement.

This instrument was connected with temperature sensor, S/N.: 16C100647

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor k
20.00	60	20.008	19.96	-0.048	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 %.

-000-

a 1038626



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert. No.: 22TM317
Page.: 1 of 3

Certificate of Calibration

Equipment : Low Temp. Incubator
Manufacturer : Memmert
Model : IPP750
Serial No. : VB18.0094
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 : 22 April 2022
Calibration Date : 22 April 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %
Calibrated by : Man Pattanapongpalboon

Approved by :
Approved Signatory

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

Issue Date : 3 May 2022

The Uncertainties are for a confidence probability of approximately 95%

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

A 0040735



Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2204-01460C-1
Procedure Used :-

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

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

Condition of this result of calibration

1. Reference standard instrument:-

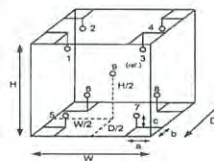
Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY44031769	21LM12	02 Sep 2022

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 = 10 cm D = 0.80 m
b = 10 cm W = 1.0 m
c = 10 cm H = 1.2 m
Capacity = 0.75 m³

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

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

a 1106485



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

Cert. No.: 22TM317
 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
20.0	20.0	20.0	0.022	0.20	0.22	0.30	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
20.0	20.209	20.174	20.199	20.110	20.075	20.062	20.027	20.069	20.030

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%.

-00-

a 1106484



Metrological Center

SCI ECO Services Company Limited

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

Saraburi Tel : +66 3627 3096 Fax : +66 3627 3100

Bangkok Tel : +668 9205 6851 , +669 8247 2360

Website : www.scieco.co.th E-Mail : calibrate@scg.co.th



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

Certificate of Calibration

Equipment : Chamber (Cold Room)

Manufacturer : MODULAR

Model : IREVCOHCOO

Serial No. : C00351459

Customer Code : RYG_EN0184

ID No. : T1939A5

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


616/10 Moo 5 T.Maenam Khu,

A.Pluakdaeng, Rayong 21140

Customer Location : Laboratory

Date of Receipt : 18 February 2022

Calibrated By : Boonchai Suriyawong (Site Calibration Manager)

Approved By :  / Sujjar Naknakred (Site Calibration Manager)

Date of Issue : 18 MAR 2022

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

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

FM-L14 117/01-02-64



Metrological Center

SCI ECO Services Company Limited

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



Certificate No. T220384101

Page 2 of 4

Calibration Report

Equipment : Chamber (Cold Room)
 Date of Calibration : 22 February 2022
 Environment : Temperature : 23.2-24.3 °C
 Line Voltage : 221.8-227.2 V
 Relative Humidity : 55 - 65 %RH

Condition of this results of calibration :

1. This equipment was calibrated by insert 16 standard thermocouples type T into its chamber , the other one standard thermocouples type T use for ambient temperature measurement . The calibration was done in according to WI-T20 (based on ASTM E145-94 (Reapproved 2001) and AS2853-1986). All data show below were final values and the initial data from customer request . The temperature scale used was based on ITS - 90 .

2. Reference Standard Instrument :

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

3. This certificate is traceable to :

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

4. Condition of calibrated item : good

Equipment Description :

Time Constant : - Hour 40 Minute At 3 °C
 Fresh Air Damper : ☐ Open ☐ Min ☐ Medium ☐ Max
☐ Close
☒ Not Available

5. Adjustment :

(X) without adjustment () after adjustment

Approved By 

FM-L15 117/15-05-63



Metrological Center

SCI ECO Services Company Limited

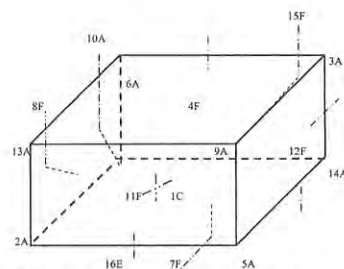
33/2 Moo 3, T.Banpa, A.Kaengkhoh, Saraburi 18110, Thailand.



Certificate No. T220384101


Page 3 of 4

Calibration Report



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

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

Approved By 

FM-L15 117/15-05-63



Metrological Center

SCI ECO Services Company Limited

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



NSC-T158-T15 17025
CALIBRATION 0244

Certificate No. T220384101

Page 4 of 4

Calibration Report

Measurement Results

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

Chamber (Cold Room)			Temperature Distribution				
Setting (°C)	Reading (°C)		Average (°C)	Stability (± °C)	Uniformity (°C)	Uncertainty (± °C)	Coverage
	Min , Max	Average					Factor k
3.0	2.7, 4.1	3.5	3.11	1.30	1.30	2.00	2.05

* The Accused uncertainty exclude "uniformity"

The calibration result apply only the above calibrated item.

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

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

Approved By: _____

FM-L15 (17/15-05-63)

RYG_EN0002



PENTA
CALIBRATION

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

Certificate of Calibration

Represent to Certificate of Calibration ,PTC/07/22103

Certificate No.: PTC/07/22103 Page: 1 of 2
Equipment: Digital Balance Condition: Normal
Manufacturer: Sartorius Serial No: 26207038
Model: MSE224S-100-DU ID No: RYG_EN0002
Type of Balance: Single interval

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

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

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

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

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

Date Received: March 23, 2022

Calibration Date: March 23, 2022

Issued Date: March 25, 2022

Calibration By: Mr. Rungroje Metakul

REVIEW BY: Thantail
APPROVED BY: D. Kerdto
NEXT CAL. DATE: 03/03/23



Approved By: _____
(Mr. Keattisak Kerdto)
Laboratory Manager

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

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

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

PTC-FMC-01-02 2 Feb 2020



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

Represent to Certificate of Calibration ,PTC/07/22103

Certificate No.: PTC/07/22103

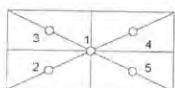
Page: 2 of 2

Measurement Results:

Without Adjustment :

Function Calibration: Non Adjustment

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



Eccentricity test 100 (g)				
Position (g)				
1	2	3	4	5
0.0000	0.0000	-0.0002	0.0002	0.0002
Maximum deviation: 0.0002				

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

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

Nominal test value (g)	Standard Deviation
200	0.00003

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

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

Note Weight of adjust (g)

The End of Certificate

PTC-FMC-01-02 2 Feb 2020

RYG_EN0010



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
55/14 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL: 0-2717-3000-21 FAX: 0-2719-9384



Cert. No.: 21TM827
Page: 1 of 3

Certificate of Calibration

Equipment: Hot Air Oven

Manufacturer: Memmert

Model: UFE 500

Serial No.: G511.1572

ID No.: RYG_EN0010

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

Location: Oven Room

Received Order: 5 May 2021

Calibration Date: 5 May 2021

Ambient Temperature: (26 ± 10) °C

Relative Humidity: (50 ± 30) %

Calibrated by: Khit Rutanaprapachai

Approved by: _____
Approved Signatory

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

Issue Date: 14 May 2021

REVIEW BY: Thantail
APPROVED BY: D. Kerdto
NEXT CAL DATE: 03/03/23

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 & Equipment Calibration and Testing Services.

A 0028099



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2105-0005OC-4

Cert. No.: 21TM827
Page.: 2 of 3

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

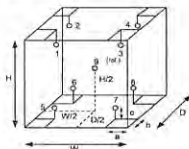
Instrument Model Serial No. Cert. No. Due Date
1) Data Acquisition 34972A MY57013823 21LM3 26 Feb 2022

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 = 0.40 m
b = 5.0 cm W = 0.56 m
c = 5.0 cm H = 0.48 m
Capacity = 0.11 m³

Environment during calibration		
	Beginning	Finished
Temp. (°C)	28	29
REL.Humid. (%)	59	56
AC Supply (Volt)	220	221

Ref. Std. ID No.: @ Calibration Point		
Position :	(104) °C	(180) °C
1	21-17RTD-01	19-17TC-01
2	21-17RTD-02	19-17TC-02
3	17RTD-03	19-17TC-03
4	17RTD-04	19-17TC-04
5	17RTD-05	19-17TC-05
6	17RTD-06	19-17TC-06
7	17RTD-07	19-17TC-07
8	17RTD-08	19-17TC-08
9 (ref.)	17RTD-09	19-17TC-09

a 1054287



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2105-0005OC-4

Cert. No.: 21TM827
Page.: 3 of 3

Result of Calibration :-

(*) Without Adjustment

Function of UUC* : Temperature Source

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	0.063	0.54	0.70	0.42	2
180.0	180.0	180.0	0.15	0.89	1.3	1.1	2

Measured Temperature (°C)									
Calibration Point (°C)	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
104.0	104.243	103.732	103.760	103.742	103.863	103.743	104.311	103.689	103.815
180.0	180.101	180.481	179.401	179.692	179.980	179.943	180.127	179.915	179.709

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 %.

-000-

a 1054286

RYG_END0006



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
53/2 PATTANAKARN ROAD SOI 18, SUKHUMVIT, SUKHUMVIT 10250
TEL: 0-2717-3000-27 FAX: 0-2719-9484



Cert. No.: 21TM828
Page.: 1 of 3

Certificate of Calibration

Equipment : Hot Air Oven

Manufacturer : Memmert

Model : UM 400

Serial No. : b495.0899

ID No. : RYG_END0006

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 : 5 May 2021

Calibration Date : 5 - 6 May 2021

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Khit Rutianapreapachai

Approved by :

() Pornthippa Tameyakul
() Maee Butkruea
() Suwit Imjai

Issue Date : 14 May 2021

The Uncertainties are for a confidence probability of approximately 95%

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Approval of the local of Corporate Services & Equipment Calibration and Testing Services

A 0028096



Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2105-0005OC-1

Cert. No.: 21TM829
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 MY57013823 21LM3 26 Feb 2022

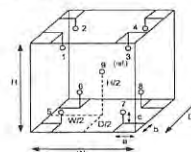
2. This certificate is valid only to the item calibrated on date and place of calibration.

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)	29	30
REL.Humid. (%)	56	58
AC Supply (Volt)	221	222

Position :	Ref. Std. ID No.:
1	21-17RTD-01
2	21-17RTD-02
3	17RTD-03
4	17RTD-04
5	17RTD-05
6	17RTD-06
7	17RTD-07
8	17RTD-08
9 (ref.)	17RTD-09

a 1054310



Equipment : Hot Air Oven
 Condition As-Received : Used Item
 Reference : 2105-0005OC-1
 Result of Calibration :- (*) Without Adjustment
 Function of UUC* : Temperature Source

Cert. No.: 21TM829
 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	0.21	1.8	2.0	0.55	2

Calibration Point (°C)	Measured Temperature (°C)								
	Position								
	1	2	3	4	5	6	7	8	9 (ref.)
70.0	70.404	70.277	70.607	70.307	68.789	69.257	68.846	69.331	70.495

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 %.

-00o-

a 1054309



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
 CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
 5344 PATTANAKARN ROAD SOI 15, SUANLUANG, SUANLUANG HANGKRO 10259
 TEL. 0 2717-3000-21 FAX. 0 2719 9184



Cert. No.: 21TM673
 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
 Wet Chemistry Lab

Location :

Received Order : 5 May 2021

Calibration Date : 5 May 2021

Ambient Temperature : (26 ± 10) °C

Relative Humidity : (50 ± 30) %

Calibrated by : Tawatchai Pama

Approved by :
 Approved Signatory

() Pongthipha Tameyaskul
 (/) Malee Bulkruea
 () Suwit Imjai

Issue Date : 14 May 2021

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 0028098



Equipment : Water Bath
 Condition As-Received : Used Item
 Reference : 2105-0005OC-3
 Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Data Acquisition	34970A	MY44060450	21LM4	06 Mar 2022

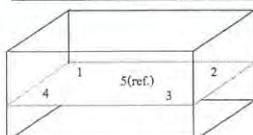
2. This certificate is valid only to the item calibrated on date and place of calibration.

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	22	68	230
Finished of Calibration	20	64	231



Front

Position :	Ref. Std. S.N.:
1	4803988-001
2	4803988-002
3	4803988-003
4	4803988-004
5(ref.)	4803988-005

a 1054289



Equipment : Water Bath
 Condition As-Received : Used Item
 Reference : 2105-0005OC-3
 Result of Calibration :- (*) Without Adjustment
 Function of UUC* : Temperature Source

Cert. No.: 21TM673
 Page.: 3 of 3

Calibration point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Average* Standard Reading (°C)				
			1	2	3	4	5 (ref.)
85.0	85.0	85.0	84.891	84.893	84.880	84.892	84.917

Calibration point (°C)	Uniformity (°C)	Stability (± °C)	Uncertainty (± °C)	Coverage Factor k
85.0	0.089	0.052	0.22	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 %.

-00o-

a 1054288



Certificate of Calibration

Certificate No.: 2111200
Page: 1 of 2

Equipment: Digital Thermometer With Sensor

Manufacturer: Testo

Model: 106

Serial No.: 31281494/504

ID No.: RYG_FS0467

Condition As-Received: Used Item

Received Date: 02 July 2021

Calibration Date: 07 July 2021

Reference: 2107-0068DSC

Ambient Temperature: (25 ± 3) °C

Relative Humidity: (50 ± 20) %

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.

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-T01 according to comparison with
Platinum Resistance Thermometer (PRT) into liquid bath temperature controller.
The temperature scale used was based on ITS-90.

Condition of this result of calibration

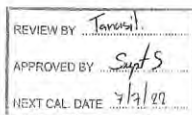
1. Reference standards Instruments:

Instrument	Model	Serial No.	Certificate No.	Due Date
1) Digital Thermometer	1529-R	B19520	211680	26 Jun 2022
2) Platinum Resistance Thermometer	935-14-95	261589/1	211680	26 Jun 2022

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

3. This Calibration is traceable to the International System of Unit maintained at:-

-National Institute of Metrology Thailand (NIMT)



Calibrated by: Yossapon Poljorn
Issue Date: 09 July 2021

Approved Signatory:

[] Phalinee Prabpaijal
[] Chatchawan Khunpluek
[x] Wanlop Larprum

B 0265214



Cert. No.: 2111200
Page: 2 of 2

Result of Calibration:

Without Adjustment

Function: Temperature measurement

Dimension of probe: Diameter 3 mm., Length 55 mm. Sheath material: Stainless Steel

Immersion Depth (mm.)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of Measurement (± °C)
50	25.0029	24.9	-0.1029	0.12
50	30.0018	29.9	-0.1018	0.12
50	40.0035	40.0	-0.0035	0.12

UUC*: Unit Under Calibration

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

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a 1063351

Certificate of System Qualification

GC-OQ + GCMS-OQ

System ID: GM-7

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

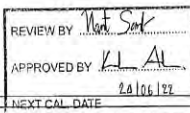
Organization Location: 104 Pathanakarn 40, Pathanakarn rd., Khwang Suan Luang, Khet Suan Luang, Bangkok 10250

Date: December 24, 2020 2:51:10 PM

EQP Name: AgilentRecommended, AgilentRecommended

EQP Revision: GC.02.50, GCMS.02.50

Overall Qualification Status: Pass



System Inspection and Basic Safety and Operation

Name: 7890

Setpoint Status: Pass

Overall System Inspection and Basic Safety and Operation Test Status

Pass

Inlet Pressure Accuracy

Name: 7890

Front: SSL

Setpoint Status: Pass

Setpoint: 25.0 psi Actual: 25.3 psi

Accuracy: 0.3 psi

Agilent Recommended: <= 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 7890

Date: December 24, 2020 2:51:10 PM

System ID: GM-7

Setpoint Status:

Zone:

Temperature:

Accuracy:

Agilent Recommended:

Pass
Oven
Setpoint/Actual
230.0 230.6 °C
0.6 °C
>= -1.0 % setpoint in K (-5.0 °C)
<= 1.0 % setpoint in K (5.0 °C)

Data for this setpoint was entered manually.

Reason: Data logging currently not available.

Setpoint Status:

Zone:

Temperature:

Accuracy:

Agilent Recommended:

Pass
Oven
Setpoint/Actual
100.0 100.9 °C
0.9 °C
>= -1.0 % setpoint in K (-3.7 °C)
<= 1.0 % setpoint in K (3.7 °C)

Data for this setpoint was entered manually.

Reason: Data logging solution currently not available.

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: 7890

Setpoint Status: Pass

Temperature:

Stability:

Agilent Recommended:

Setpoint/Average
100.0 100.9 °C
0.0 °C
<= 0.5

Data for this setpoint was entered manually.

Reason: Data logging solution currently not available.

Date: December 24, 2020 2:51:10 PM

System ID: GM-7

Overall GC Oven Temperature Stability Test Status

Pass

Log Amp

Tested Combination1 Front SSL / External SQ
Name: 5977A
Setpoint Status: Pass

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: RFPA Voltage:
15 mV 518 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

Date: December 24, 2020 2:51:10 PM
System ID: GM-7

Signal to Noise EI

Tested Combination1 Front SSL / External SQ
Name: 5977A
Source: EI - Extractor Filament: 1
Setpoint Status: Pass
Signal to Noise: 1472
Agilent Recommended: >= 1200
Source: EI - Extractor Filament: 2
Setpoint Status: Pass
Signal to Noise: 3400
Agilent Recommended: >= 1200

Overall Signal to Noise EI Test Status

Pass

Date: December 24, 2020 2:51:10 PM
System ID: GM-7

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: December 24, 2020 2:51:10 PM
System ID: GM-7

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 6.00.21
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: December 24, 2020 2:51:10 PM
System ID: GM-7

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:	December 24, 2020
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:	December 24, 2020 2:51:10 PM
System ID:	GM-7

ภาคผนวก จ

สำเนาหนังสืออนุญาตขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน



ที่ อก ๐๓๓๐(๑)/ ๓๐๖๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๔๐๐

๒๘ มกราคม ๒๕๖๕

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และนิติสารณณ์ของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๓๐ กรกฎาคม ๒๕๖๓

สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น

๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ แผ่น

๓. ขอบข่ายสารณณ์ที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุ
หนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๕
ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร
ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย)
จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ตามสิ่งที่ส่งมาด้วย ๑

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖๒ ราย ตามสิ่งที่ส่งมาด้วย ๒

ค. ขอบข่ายสารณณ์ที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๕๔ รายการ น้ำได้ดิน
จำนวน ๑๒๖ รายการ อากาศเสีย ๑๖ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๓๔ รายการ และดิน
จำนวน ๑๒๕ รายการ รวมทั้งสิ้นจำนวน ๓๖๒ รายการ ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กันยายน ๒๕๖๖ หากประสงค์จะต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอ
ต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์
เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายศิระ จันทน์นิล)

ผู้อำนวยการสำนักงานการฝึกฝน วิชาการช่างเทคนิค
ผู้อำนวยการกองวิจัยและพัฒนาเครื่องวัดและเครื่องมือวัด
ปฏิบัติการทางเคมีและชีวเคมี กรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๒๐๒ ๔๑๔๖ ๐ ๒๒๐๒ ๔๐๐๒

โทรสาร ๐ ๒๒๕๔ ๓๒๐๘ ๐ ๒๒๕๔ ๓๔๑๕

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ๖-๒๐๔

ที่ อก ๐๓๓๐(๑)/

ลงวันที่ ๒๘ มกราคม ๒๕๖๕

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

๑) นางสาวอุฬาร จันทน์นิล

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๐๐

๒) นางสาวจันทน์ นิมากร ณ นคร

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๐๑

๓) นายศุภพร จิตราภรณ์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๐๒

๔) นางสาวกนกกร เอนก

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๑๑

๕) นายสุริยา สอนแก้ว

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๑๒

๖) นายวิชัย พุฒพริต

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๑๓

(นายศิระ จันทน์นิล)

ผู้อำนวยการสำนักงานการฝึกฝน วิชาการช่างเทคนิค
ผู้อำนวยการกองวิจัยและพัฒนาเครื่องวัดและเครื่องมือวัด
ปฏิบัติการทางเคมีและชีวเคมี กรมโรงงานอุตสาหกรรม

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ๖-๒๐๔

ที่ อก ๐๓๓๐(๑)/ ๓๐๖๕

ลงวันที่ ๒๘ มกราคม ๒๕๖๕

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖๒ ราย

๑) นางสาวจิราภา จุลธรรม

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๐๔

๒) นางสาววิภา น้อยเจริญ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๐๕

๓) นางสาวณิชากร อิ่มนง

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๐

๔) นางสาวนันทิ์ สายแสง

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๕

๕) นางสาวนันทิ์ สมบูรณ์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๖

๖) นางสาวศรัณยา เอลิมังการ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๗

๗) นางสาวสุวิมล มงคลจิราภรณ์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๘

๘) นางสาวศิริลักษณ์ หึงแสง

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๒๐

๙) นายพชร จันทน์นิล

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๙

๑๐) นายนครเศรษฐ์ โภคภักดิ์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๓

๑๑) นายชินวรา จริยา

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๔

๑๒) นางสาวเกศรินทร์ แก้วมณี

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๖

๑๓) นางสาวสุวิมล ชัยเรืองวุฒิ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๗

๑๔) นางสาวสุชาดา ธรรมการ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๘

๑๕) นางสาวเมธิกา ชัยเดชมงคล

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๙

๑๖) นางสาวศศิธร หนูสวัสดิ์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๔

๑๗) นางสาวเสาวลักษณ์ ภูมิกษาอำพร

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๕

๑๘) นายอภิสิทธิ์ สิงหา

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๖

๑๙) นายศักดิ์สิทธิ์ โพธิ์ทาสี

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๗

๒๐) ว่าที่ร้อยตรีหญิง พรหมนิภา ชำเจริญ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๘

๒๑) นางจิตตา คำภูแก้ว

ทะเบียนเลขที่ ๖-๒๐๔-๔-๔๗๑๙

๒๒) นางสาวอรรณพ รักษ์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๑๑

๒๓) นางสาวนันทิ์ แยมกรานต์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๑๒

๒๔) นายจุลเดช วรินทร์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๑๓

๒๕) นางสาวสุวิมล รุ่งคำ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๑๔

๒๖) นายนคร สุระเจริญ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๑๕

๒๗) นายปัญชา นามเขตต์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๑๖

๒๘) นายพรมมี ศรีปิตนตร

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๑๗

๒๙) นายอุทิศ อุณิธิ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๑๘

๓๐) ว่าที่ร้อยตรี เอลิมังการ ธรรมศิริธรรม

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๑๙

๓๑) นางสาววิภา ศรีวงษา

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๒๐

๓๒) นายอนุพงษ์ รัตนศิริประเสริฐ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๒๑

๓๓) นางสาวจุฑาพรรณ โอนสันเฒะ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๒๒

๓๔) นางสาวจรรวณ พันธ์อัครกิตติยา

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๒๓

(นายศิระ จันทน์นิล)

๓๕) นางสาวปรางค์ทิพย์...

ผู้อำนวยการสำนักงานการฝึกฝน วิชาการช่างเทคนิค
ผู้อำนวยการกองวิจัยและพัฒนาเครื่องวัดและเครื่องมือวัด
ปฏิบัติการทางเคมีและชีวเคมี กรมโรงงานอุตสาหกรรม

- ๒ -

๓๕) นางสาวปรางค์ทิพย์ กิจไพศาลศักดิ์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๒๔

๓๖) นางสาวเดือนใจ หากกลาง

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๒๕

๓๗) นางสาวจิราพร ศิริเวช

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๒๖

๓๘) นายวรากร ยุทธิรักษ์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๒๗

๓๙) นายทรง วิเศษศักดิ์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๒๘

๔๐) นายอนันต์ เจนจบ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๒๙

๔๑) นายศศิธร ข้าเพชร

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๓๐

๔๒) นายอรรคพล นิยมวิทยาพันธ์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๓๑

๔๓) นายอุทัย พรหมเสนา

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๓๒

๔๔) นายอเนก โภคพิพัฒน์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๓๓

๔๕) นายชวฤทธิ์ วงษ์จันทร์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๓๔

๔๖) นายอาทิตย์ ศรีเสน

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๓๕

๔๗) นายเจตน์ดิเรก คงศักดิ์ไทย

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๓๖

๔๘) นายจุฬิน บุญธิ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๓๗

๔๙) นายสนธิ์ เอก

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๓๘

๕๐) นายอภิวัฒน์ ทุมหนู

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๓๙

๕๑) นางสาวสุภาวีย์ มาก

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๔๐

๕๒) นางสาวศิริพร ขวาลสมบุญ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๔๑

๕๓) นางสาววิมล บุญเพ็ญ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๔๒

๕๔) นางสาวกนกกร เข้มเพชร

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๔๓

๕๕) นางสาวพัชรีา หงษ์สนธิ์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๔๔

๕๖) นางสาวภาณุตา สุวงศ์ตระกูล

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๔๕

๕๗) นางสาวภาณุมาศ นามวัฒน์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๔๖

๕๘) นางสาวอุไรรัตน์ หึงแสงแป้น

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๔๗

๕๙) นายธีรวัฒน์ ปวงสุข

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๔๘

๖๐) นายอิทธิพล ยะโส

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๔๙

๖๑) นายประจักษ์ วรรณสุข

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๕๐

๖๒) นายชยธร พงษ์ทิพย์

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๕๑

๖๓) นางสาวกนกวรรณ จันทนาศ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๕๒

๖๔) นางสาวนภาพร หล้าบุญ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๕๓

๖๕) นายสิทธิโชค ธงเงิน

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๕๔

๖๖) นางสาววรรณใจ บุญ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๕๕

๖๗) นางสาวพรหมนิศา พุ่มคง

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๕๖

๖๘) นางสาวศรัณย์ ยิ่ง

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๕๗

๖๙) นายเนาว์พัชร ศรีวิชัย

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๕๘

๗๐) นายสุวิภา ห่ออ่อน

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๕๙

๗๑) นายวิบูลย์ บุญชนะ

ทะเบียนเลขที่ ๖-๒๐๔-๔-๖๑๖๐

(นายศิระ จันทน์นิล)

๗๒) นายสมบุญ...

ผู้อำนวยการสำนักงานการฝึกฝน วิชาการช่างเทคนิค
ผู้อำนวยการกองวิจัยและพัฒนาเครื่องวัดและเครื่องมือวัด
ปฏิบัติการทางเคมีและชีวเคมี กรมโรงงานอุตสาหกรรม

[illegible]

๓๐๙) นายพนทชัย...

- ๓๐๖) นายนาหนะชัย สุขนิรัตน์
- ๓๐๗) นายเนติพล ฤกษ์ฤทธิ์
- ๓๐๘) นายเนติพนธ์ สาริน
- ๓๐๙) นายปิยะธิดา พนมศรี
- ๓๑๐) นายพรชัย โสธะชัย
- ๓๑๑) นายพรพิพัฒน์ กัคำ
- ๓๑๒) นายภาณุพงศ์ มานิตย์
- ๓๑๓) นายประทีป สภาทิพย์
- ๓๑๔) นายประทีป พูลศรี
- ๓๑๕) นายสิริพันธ์ ทองอิน
- ๓๑๖) นายสมชาย ทัพะนิล
- ๓๑๗) นายศักดิ์ ฟูนิ
- ๓๑๘) นายสันติชัย วิเศษ
- ๓๑๙) นายสุวิมล เตชะทอง
- ๓๒๐) นายวรวิทย์ สักดิ์
- ๓๒๑) นายแสงระวี นตะสิทธิ์
- ๓๒๒) นายสุพจน์ ฟ้าทะ
- ๓๒๓) นายชัยฉัตร นิลเอื้อ
- ๓๒๔) นายวิฑูรย์ ธรรมะนาถ
- ๓๒๕) นายเนนทพ เตชะทอง
- ๓๒๖) นายกัณย สุตะ
- ๓๒๗) นายสุวิมลรัตน์ วัชรเกษม
- ๓๒๘) นางสาวประภาภรณ์ นิล
- ๓๒๙) นางสาววิภาวดี นิล
- ๓๓๐) นางสาวพริ้งกรรย์ นิล
- ๓๓๑) นายพัชริศ เบญจนิล
- ๓๓๒) นางสาวกรรณภา ทองงาม
- ๓๓๓) นางสาวกัญญา ธีรสาริน
- ๓๓๔) นางสาวอัมพร เทือกอุ
- ๓๓๕) นางสาวสุภาวดีพร คุ้ม
- ๓๓๖) นางสาวสุภาวดีพร คุ้ม
- ๓๓๗) นางสาวสุภาวดีพร คุ้ม
- ๓๓๘) นางสาวสุภาวดีพร คุ้ม
- ๓๓๙) นางสาวสุภาวดีพร คุ้ม
- ๓๔๐) นางสาวสุภาวดีพร คุ้ม
- ๓๔๑) นางสาวสุภาวดีพร คุ้ม
- ๓๔๒) นางสาวสุภาวดีพร คุ้ม
- ๓๔๓) นางสาวสุภาวดีพร คุ้ม
- ๓๔๔) นางสาวสุภาวดีพร คุ้ม
- ๓๔๕) นางสาวสุภาวดีพร คุ้ม
- ๓๔๖) นางสาวสุภาวดีพร คุ้ม
- ๓๔๗) นางสาวสุภาวดีพร คุ้ม
- ๓๔๘) นางสาวสุภาวดีพร คุ้ม
- ๓๔๙) นางสาวสุภาวดีพร คุ้ม
- ๓๕๐) นางสาวสุภาวดีพร คุ้ม

[illegible]

(นายศิระ จันทรเจ็ด)


๓๔๖) นางสาวชุตาภรณ์...

[illegible]

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาการอำนวยการ
ผู้อำนวยการกองวิจัยและเกิดนกับมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

น้ำเสีย จำนวน 59 รายการ

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


 (นางจิราญจน์ จิตฺตกุลวิไล)
 ผู้อำนวยการศูนย์มาตรฐานวิชาการ สำนักงานเขตหนองแขม
 และทะเบียนห้องปฏิบัติการ

19 Copper...

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

วิมล
(นางสาวกัญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการศูนย์มาตรฐานวิธีการทางห้องปฏิบัติการ
.....ศูนย์พิษวิทยา.....

44 Methomyl...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
44	Methomyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
45	Nickel	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ⁽⁴⁾ 2) Soxhlet Extraction Method ⁽⁴⁾
47	Oxamyl	High-Performance Liquid Chromatographic Method ⁽⁴⁾
48	Propoxur	High-Performance Liquid Chromatographic Method ⁽⁴⁾
49	pH	Electrometric Method ⁽⁴⁾
50	Phenols	1) Distillation, Chloroform Extraction Method ⁽⁴⁾ 2) Distillation, Direct Photometric Method ⁽⁴⁾
51	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
52	Sulfide	Iodometric Method ⁽⁴⁾
53	Temperature	Laboratory and Field Methods ⁽³⁾
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⁾

น้ำดื่ม จำนวน 126 รายการ

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

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.....ศูนย์พิษวิทยา.....

3 Aldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
8	Barium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
10	Benzen	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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.....ศูนย์พิษวิทยา.....


18 Bis(2-ethylhexyl)phthalate...

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

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.....ศูนย์พิษวิทยา.....


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⁾


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
51 cis-1,2-Dichloroethylene...

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


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
68 Fluorene...

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


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84 Methanol...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾ 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB 1242 - PCB 1248 - PCB 1254 - PCB 1260	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾


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97 Pentachlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
98	pH	Electrometric Method ⁽⁴⁾
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
100	Phenol	1) Distillation, Direct Photometric Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
102	Selenium	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
103	Silver	1) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ⁽⁴⁾
104	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
105	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
106	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
107	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
109	TPH (C ₈ -C ₉)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(1,2,4)
110	TPH (C ₈ -C ₁₀)	Solvent Extraction, Gas Chromatographic Method ^(9,21)
111	TPH (C ₁₀ -C ₃₀)	Solvent Extraction, Gas Chromatographic Method ^(9,21)
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾

114 1,1,2-Trichloroethane...

(นางริกาญจน์ อัครสกุลโต)
ผู้อำนวยการศูนย์มาตรฐานวิชาการ กรมส่งเสริมการค้าระหว่างประเทศ
และเขตการค้าเสรี

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

จากเคมี (ป่องระบวบ) จำนวน 16 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic, Digestion, Inductively Coupled Plasma Method ⁽³⁾
2	Arsenic	Isokinetic, Digestion, Inductively Coupled Plasma Method ⁽⁴⁾

3 Carbon Monoxide...

(นางริกาญจน์ อัครสกุลโต)
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และเขตการค้าเสรี

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

สิ่งปฏิกูล...

(นางริกาญจน์ อัครสกุลโต)
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และเขตการค้าเสรี

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช่แล้ว จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,9,23) 2) Soxhlet Extraction, Gas Chromatographic Method ^(6,22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22,31)
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,13) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,14)
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14) 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 ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14) 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 ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,14)

6 Cadmium...

(นางริกาญจน์ อัครสกุลโต)
ผู้อำนวยการศูนย์มาตรฐานวิชาการ กรมส่งเสริมการค้าระหว่างประเทศ
และเขตการค้าเสรี

ลำดับที่	สารเคมี	วิธีวิเคราะห์
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.14) 3) Digestion, Inductively Coupled Plasma Method ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.14)
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.14) 3) Digestion, Inductively Coupled Plasma Method ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.14)
9	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1.6.15.17) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method ^(1.6.16.17) 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7.15.17) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7.16.16.17)
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method ^(1.6.17) 2) Alkaline Digestion, Colorimetric Method ^(16.17)

วิมล
(นางวิภาณูญ อัครสกุลวิไล)
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กรมส่งเสริมการค้าระหว่างประเทศ
กระทรวงพาณิชย์

11 Cobalt...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.14) 3) Digestion, Inductively Coupled Plasma Method ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.14)
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.14) 3) Digestion, Inductively Coupled Plasma Method ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.14)
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25)

วิมล
(นางวิภาณูญ อัครสกุลวิไล)
ผู้อำนวยการศูนย์มาตรฐานวิธีการวิเคราะห์ทดสอบเคมี
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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) 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)
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.14) 3) Digestion, Inductively Coupled Plasma Method ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.14)
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(1.6.18)

วิมล
(นางวิภาณูญ อัครสกุลวิไล)
ผู้อำนวยการศูนย์มาตรฐานวิธีการวิเคราะห์ทดสอบเคมี
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กระทรวงพาณิชย์


2) Waste Extraction...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
23	Methoxychlor	2) Waste Extraction, Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ^(1.6.19) 3) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^(1.6.20) 4) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^(1.18) 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ^(1.19) 6) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^(1.20)
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1.9.25) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10.22) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(22.31)
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.14) 3) Digestion, Inductively Coupled Plasma Method ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.14)
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1.6.15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1.6.14) 3) Digestion, Inductively Coupled Plasma Method ^(7.15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7.14)


วิมล
(นางวิภาณูญ อัครสกุลวิไล)
ผู้อำนวยการศูนย์มาตรฐานวิธีการวิเคราะห์ทดสอบเคมี
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กระทรวงพาณิชย์

27 Polychlorinated...

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


 (นางกัญญา ชิตกรกุลวิไล)
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
ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,2,23) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,23) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(2,23) Electrometric Method ^(2,23)
29	pH	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15)
30	Selenium	2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,14)
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14)
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,14)
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^(1,2,23) 2) Soxhlet Extraction, Gas Chromatographic Method ^(10,23) 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^(2,23)
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,15)


 (นางกัญญา ชิตกรกุลวิไล)
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
ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
35	Zinc	4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14) 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^(1,6,15) 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(1,6,14) 3) Digestion, Inductively Coupled Plasma Method ^(7,15) 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,14)

สืบ 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 ^(7,14)
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^(7,14)
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 ^(7,14)


 (นางกัญญา ชิตกรกุลวิไล)
 ผู้อำนวยการศูนย์มาตรฐานวิธีการวิเคราะห์ทดสอบผลิตภัณฑ์

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	Benzog(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 ^(7,14)
17	Bis(2-chloroethyl)ether	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
18	Bis(2-ethylhexyl)phthalate	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)
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 ^(7,14)
24	Carbazole	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(25,31)
25	Carbon Disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(14,24)


 (นางกัญญา ชิตกรกุลวิไล)
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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
28	p-Chloroaniline	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
32	2-Chlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,14)
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,15,17) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^(7,8,16,17)
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^(8,17)
36	Chrysene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
37	Cyanide	Extraction, Distillation, Colorimetric Method ^(26,27,28)
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
39	DDD	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)

Signature
(นางวิภาดา ชัยมงคลกิจ)
ผู้อำนวยการศูนย์มาตรฐานวิธีการทางห้องปฏิบัติการ

40 DDE...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
40	DDE	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
41	DDT	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
42	Dibenz(a,h)anthracene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
43	Di-n-Butyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
47	3,3-Dichlorobenzidine	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
53	2,4-Dichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)

Signature
(นางวิภาดา ชัยมงคลกิจ)
ผู้อำนวยการศูนย์มาตรฐานวิธีการทางห้องปฏิบัติการ

57 Dieldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
57	Dieldrin	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
58	Diethyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
59	2,4-Dimethylphenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
60	2,4-Dinitrophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
61	2,4-Dinitrotoluene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
62	2,6-Dinitrotoluene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
63	Di-n-Octyl Phthalate	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
64	Endosulfan	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
65	Endrin	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
67	Fluoranthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
68	Fluorene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
69	Heptachlor	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
70	Heptachlor Epoxide	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)

Signature
(นางวิภาดา ชัยมงคลกิจ)
ผู้อำนวยการศูนย์มาตรฐานวิธีการทางห้องปฏิบัติการ

71 Hexachlorobenzene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
74	α-HCH	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
75	β-HCH	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
76	γ-HCH	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
77	Hexachlorocyclopentadiene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
78	Hexachloroethane	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
79	Indeno(1,2,3-cd)pyrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
80	Isophorone	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(25,31)
81	Lead	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,14)
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,14)
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ⁽¹⁸⁾

Signature
(นางวิภาดา ชัยมงคลกิจ)
ผู้อำนวยการศูนย์มาตรฐานวิธีการทางห้องปฏิบัติการ

2) Thermal...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
84	Methanol	2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry ⁽¹⁹⁾ 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ⁽²⁰⁾ Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^(12,24)
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,22) 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(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 ^(7,14)
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 ^(10,23) 2) Automated Soxhlet Extraction, Gas Chromatographic Method ^(23,31)

วิธี
(นางรักอุยณ์ ชัยรสกุลวิไล)
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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 - Pentachlorophenol	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)
97	Phenanthrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(23,31)
98	Phenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(23,31)
99	Pyrene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^(23,31)

วิธี
(นางรักอุยณ์ ชัยรสกุลวิไล)
ผู้อำนวยการศูนย์มาตรฐานวิธีการวิเคราะห์ของกรม

101 Selenium...

ลำดับที่	สารเคมี	วิธีวิเคราะห์
101	Selenium	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,14)
102	Silver	1) Digestion, Inductively Coupled Plasma Method ^(7,15) 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^(7,14)
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 ₉ -C ₁₀)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^(14,24)
109	TPH (C ₉ -C ₁₀)	1) Solvent Extraction, Gas Chromatographic Method ^(11,21) 2) Automated Soxhlet Extraction, Gas Chromatographic Method ^(23,31)
110	TPH (C ₁₀ -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)

วิธี
(นางรักอุยณ์ ชัยรสกุลวิไล)
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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 ^(7,14)
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 ^(7,14)

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วิธี
(นางรักอุยณ์ ชัยรสกุลวิไล)
ผู้อำนวยการศูนย์มาตรฐานวิธีการวิเคราะห์ของกรม

7. United States...

- วิภาณี
(นางวิภาณีย์ จักรสกุลใจ)
ผู้อำนวยการศูนย์บริหารงานวิชาการและพัฒนาระบบ
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 (นางจิราภา จิตกร)
 ผู้อำนวยการศูนย์มาตรฐานวิชาการกระทรวงมหาดไทย
 และทะเบียนท้องถิ่น

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบผลิตภัณฑ์และทะเบียนห้องปฏิบัติการ กองวิจัยและเตือนภัยผลิตภัณฑ์โรงงาน กรมโรงงานอุตสาหกรรม โทร. ๐ ๒๒๐๒ ๕๐๐๒, ๕๐๑๐



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

២៤ មិថុនា ២៥៦៩

เรื่อง จันทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กริป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๙ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท เอแอลเอส แลบบอราทอรี กรุป (ประเทศไทย) จำกัด จำนวน ๒

ตามคำลั่นที่ยังถึง บริษัท เอเอเอส แลบริเอท กรุ๊ป (ประเทศไทย) จำกัด ซึ่ขณะนั้น
 ห้างบริษัทการค้าหรือหอประชุม หรือรวมอยู่กันบุคคลและทั้งปฏิบัติการค้าระหว่าง เจ้าหน้าที่จะประจำ
 ห้างบริษัทการค้าหรือหอประชุม และรายการตามหนังสือที่จะทำการค้าระหว่าง ต่อมาจึงรวมอุตสาหกรรม
 กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอเอเอส แลบริเอท กรุ๊ป
 (ประเทศไทย) จำกัด ขึ้นทะเบียนเป็นผู้ประกอบการระหว่างหอประชุม ๖-๗๓๓ สถานที่ตั้งเลขที่
 ๒๒๒/๑๐ หมู่ ๕ ตำบลเนินสี อำเภอเมือง จังหวัดขอนแก่น โดยมีทะเบียนประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

- ๓) นายเดช ข้างชน
- ๔) นางวิลาวัณย์ บริรักษ์
- ๕) นายสุพจน์ สุลามเต๊ะ

ทะเบียนเลขที่ 7-๓๒๓-ก-๕๔๔๒
ทะเบียนเลขที่ 7-๓๒๓-ก-๕๔๔๓
ทะเบียนเลขที่ 7-๓๒๓-ก-๕๔๔๔

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

- ๑) นางสาวณัฐกร บรรจงกิจ
- ๒) นางพจนนา สีตา
- ๓) นางสาวอนิศา กุศลวิวัฒน์
- ๔) นายพิทยา ทองแดง
- ๕) นายเชษฐาธิ์ ลูกกอง
- ๖) ว่าที่ ร.ต.รณชัย พ่วงมา
- ๗) นายราวุธ ทัพพา
- ๘) นายศักดิ์นิรวัตร จรัสกาย
- ๙) นายสุรศักดิ์ ลาชิน
- ๑๐) นางสาวเพ็ญกานต์ ภาวภูตานนท์
- ๑๑) นายสราวุธ ภาแก้ว

ทะเบียนเลขที่	7-๒๒๒๒-จ-๑๙๙๕
ทะเบียนเลขที่	7-๒๒๒๒-จ-๑๙๙๖
ทะเบียนเลขที่	7-๒๒๒๒-จ-๑๙๙๗
ทะเบียนเลขที่	7-๒๒๒๒-จ-๑๙๙๘
ทะเบียนเลขที่	7-๒๒๒๒-จ-๑๙๙๙
ทะเบียนเลขที่	7-๒๒๒๒-จ-๑๙๙๐
ทะเบียนเลขที่	7-๒๒๒๒-จ-๑๙๙๑
ทะเบียนเลขที่	7-๒๒๒๒-จ-๑๙๙๒
ทะเบียนเลขที่	7-๒๒๒๒-จ-๑๙๙๓
ทะเบียนเลขที่	7-๒๒๒๒-จ-๑๙๙๔
ทะเบียนเลขที่	7-๒๒๒๒-จ-๑๙๙๕
ทะเบียนเลขที่	7-๒๒๒๒-จ-๑๙๙๖

๑๓) นายวิมล...

5

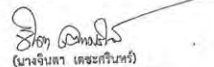
- ๓๓) นายฉลอม ไชยชนะ
- ๓๔) นางสาววันนา เหมนิลบุตรกุล
- ๓๕) นางสาววันภา ผลุดิษฐ์
- ๓๖) นางสาวเสาวีย์ วงศ์ไชย
- ๓๗) นายชัยสุนทร เลิศนิลทูกชัย
- ๓๘) นายสังจา เสงี่ยมหลวง
- ๓๙) นายภักดณ มณีสัมพันธ์
- ๔๐) นางสาวชัยพันธ์ โกมนชนะ
- ๔๑) นายสุรินทร์ อธิจันดา
- ๔๒) นายศุภณัฐ พิทักษ์พันธ์
- ๔๓) นายศุภชัย วงศ์สุธิตาย
- ๔๔) นายปฐมพร กลสวัสดิ์
- ๔๕) นายโศภิต คำพันธ์
- ๔๖) นางสาวภาศิตยา สัมภูภาธรวิจารณ์
- ๔๗) นางสาวเชษฐาพร ทรัพย์เรือง
- ๔๘) นางสาวมณีพร ลิ้มหา
- ๔๙) นางสาวธิดารัตน์ ศิริมงคล
- ๕๐) นายพัฒน์ นันทิวงศ์เศรษฐี
- ๕๑) นายศรัทธีพร เรืองแสง
- ๕๒) นายปรานณ กสิ์สุภณ
- ๕๓) นายอนุฬา ธรรมะโร
- ๕๔) นางสาวศุภรัตน์ โสจันทร์
- ๕๕) นายเพชร กิจนันทนา
- ๕๖) นายพิฑารก เข็มจาก
- ๕๗) นายอนุวัชร หอมแจ้จรงค์
- ๕๘) นายอภิชาติ วิชา
- ๕๙) นายจักรินทร์ ศรีวิภา
- ๖๐) นางสาวสณามิธร เขื่อนเพชร
- ๖๑) นายภาณุวัฒน์ วัง
- ๖๒) นายสิทธิ์ ชัยชนะ
- ๖๓) นายสิทธิชัย นันทกุล
- ๖๔) นายพนิตกร กลชาติ

[illegible]

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๓๔ รายการ
อากาศเสีย (ปล่องระบาย) จำนวน ๗ รายการ และน้ำใต้ดิน จำนวน ๓ รายการ รวมทั้งสิ้นจำนวน ๔๔ รายการ
ตามสิ่งที่ยังคงด้วย

หนังสือฉบับนี้มีอายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์จะต่ออายุหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นสุดของหนังสือขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

 (นางจุฬาลักษณ์ เศษะเกรรินทร์)
 ผู้อำนวยการกองขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
 ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม
 ๒๘ มิ.ย. ๒๕๖๕

กองวิจัยและพัฒนาผลิตภัณฑ์โรงงาน
 ศูนย์วิจัยและพัฒนาผลิตภัณฑ์โรงงานภาคตะวันออก
 โทร. ๐ ๙๘๐๙ ๗๖๒๓-๓
 ไปรษณีย์อิเล็กทรอนิกส์ enw@dlw.mail.go.th

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
 บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ๗-๓๒๓๓
 ที่ อก ๐๓๑๐(๓)/ ๖๔ ๗๐ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ
 น้ำเสีย จำนวน 14 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method ⁽²⁾
2	Chemical Oxygen Demand	2) 5-Day BOD Test, Azide Modification Method ⁽²⁾ 1) Open Reflux, Titrimetric Method ⁽²⁾ 2) Closed Reflux, Colorimetric Method ⁽²⁾ 3) Closed Reflux, Titrimetric Method ⁽²⁾
3	Color	ADMI Weighted - Ordinate Spectrophotometric Method ⁽²⁾
4	Cyanide	Distillation, Colorimetric Method ⁽²⁾
5	Formaldehyde	Distillation, Colorimetric Method ⁽¹⁾
6	Free Chlorine	DPD-Ferrous Titrimetric Method ⁽²⁾
7	Oil and Grease	Liquid-Liquid Partition-Gravimetric Method ⁽²⁾
8	pH	Electrometric Method ⁽²⁾
9	Phenols	1) Distillation, Chloroform Extraction Method ⁽²⁾ 2) Distillation, Direct Photometric Method ⁽²⁾
10	Sulfide	ZnS Precipitation, Iodometric Method ⁽²⁾
11	Temperature	Laboratory and Field Method ⁽²⁾
12	Total Dissolved Solids	Dried at 180 °C ⁽²⁾
13	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ⁽²⁾
14	Total Suspended Solids	Dried at 103-105 °C ⁽²⁾

อากาศเสีย (ปล่อยระบาย) จำนวน 7 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Carbon Monoxide	1) Sampling Bag, Non-Dispersive Infrared Method ⁽⁵⁾ 2) Instrumental Analyzer Method ⁽⁶⁾
2	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ⁽⁵⁾
3	Opacity	Ringelmann's Method ^(3,4)
4	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ⁽⁴⁾ 2) Instrumental Analyzer Method ⁽⁶⁾
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ⁽⁵⁾ 2) Instrumental Analyzer Method ⁽⁶⁾

วิฑูรย์ สิมสุทนต์
 (นางสาววิฑูรย์ สิมสุทนต์)
 ผู้อำนวยการ
 ศูนย์วิจัยและพัฒนาผลิตภัณฑ์โรงงานภาคตะวันออก Sulfuric Acid...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Sulfuric Acid	Isokinetic Sampling, Barium - Thorin Titrimetric Method ⁽⁶⁾
7	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method ⁽⁷⁾

น้ำได้ดิบ จำนวน 3 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Cyanide	Distillation, Colorimetric Method ⁽²⁾
2	pH	Electrometric Method ⁽²⁾
3	Phenols	Distillation, Direct Photometric Method ⁽²⁾

เอกสารอ้างอิง

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วิฑูรย์ สิมสุทนต์
 (นางสาววิฑูรย์ สิมสุทนต์)
 ผู้อำนวยการ

ศูนย์วิจัยและพัฒนาผลิตภัณฑ์โรงงานภาคตะวันออก

ศูนย์วิจัยและพัฒนาผลิตภัณฑ์โรงงานภาคตะวันออก กองวิจัยและพัฒนาผลิตภัณฑ์โรงงาน กรมโรงงานอุตสาหกรรม โทร ๐ ๙๘๐๙ ๗๖๒๓-๓



บริษัท เอแอลเอส แลборาทอรี กรุ๊ป (ประเทศไทย) จำกัด

104 ซอยพัฒนาการ 40 ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพฯ 10250

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