

ภาคผนวก ค

ใบรับรองผลการวิเคราะห์



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317302

Date Received : Mar 07, 2023
Date Reported : Mar 13, 2023
Report Number: 2592195-1

Page 1 of 1

Sample Description Air Quality
Location วัดมาบชลด (GPS 47P 0730831, 1407365)
Parameter Nitrogen dioxide (ppm)
Measurement Date Feb 27, 2023 - Mar 06, 2023
Measurement by Mongkon Phalathip

	2317302-8 Feb 27, 2023	2317302-9 Feb 28, 2023	2317302-10 Mar 01, 2023	2317302-11 Mar 02, 2023	2317302-12 Mar 03, 2023	2317302-13 Mar 04, 2023	2317302-14 Mar 05, 2023
Time							
12:00 PM - 01:00 PM	0.005	0.006	0.005	0.005	0.005	0.004	0.006
01:00 PM - 02:00 PM	0.004	0.005	0.004	0.004	0.004	0.004	0.009
02:00 PM - 03:00 PM	0.008	0.004	0.004	0.004	0.004	0.004	0.009
03:00 PM - 04:00 PM	0.005	0.005	0.006	0.004	0.003	0.004	0.006
04:00 PM - 05:00 PM	0.004	0.008	0.006	0.005	0.003	0.004	0.006
05:00 PM - 06:00 PM	0.004	0.009	0.005	0.007	0.003	0.004	0.005
06:00 PM - 07:00 PM	0.005	0.009	0.006	0.007	0.004	0.006	0.005
07:00 PM - 08:00 PM	0.005	0.012	0.006	0.007	0.006	0.008	0.006
08:00 PM - 09:00 PM	0.005	0.011	0.011	0.012	0.006	0.007	0.010
09:00 PM - 10:00 PM	0.011	0.010	0.012	0.014	0.014	0.009	0.015
10:00 PM - 11:00 PM	0.016	0.009	0.014	0.013	0.013	0.012	0.012
11:00 PM - 12:00 AM	0.005	0.006	0.014	0.011	0.014	0.010	0.012
12:00 AM - 01:00 AM	0.006	0.009	0.010	0.006	0.009	0.009	0.014
01:00 AM - 02:00 AM	0.010	0.009	0.004	0.009	0.006	0.007	0.011
02:00 AM - 03:00 AM	0.012	0.007	0.004	0.010	0.005	0.006	0.012
03:00 AM - 04:00 AM	0.015	0.005	0.005	0.009	0.007	0.010	0.010
04:00 AM - 05:00 AM	0.013	0.005	0.004	0.011	0.007	0.010	0.005
05:00 AM - 06:00 AM	0.011	0.004	0.004	0.008	0.006	0.009	0.004
06:00 AM - 07:00 AM	0.011	0.004	0.005	0.008	0.005	0.009	0.004
07:00 AM - 08:00 AM	0.011	0.006	0.005	0.007	0.007	0.009	0.004
08:00 AM - 09:00 AM	0.010	0.005	0.006	0.007	0.011	0.010	0.007
09:00 AM - 10:00 AM	0.012	0.006	0.010	0.008	0.012	0.010	0.012
10:00 AM - 11:00 AM	0.012	0.009	0.010	0.010	0.011	0.010	0.011
11:00 AM - 12:00 PM	0.007	0.007	0.008	0.008	0.006	0.006	0.008
Average	0.009	0.007	0.007	0.008	0.007	0.008	0.009
1hr - Maximum	0.016	0.012	0.014	0.014	0.014	0.012	0.015
Standard 1hr - Average	0.170	0.170	0.170	0.170	0.170	0.170	0.170

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

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

Approved by

Suchada T.

Suchada Thammathaworn
Scientist (2)

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317305

Date Received : Mar 07, 2023
Date Reported : Mar 11, 2023
Report Number: 2569405-1

Page 1 of 1

Sample Description Air Quality
Location วัดหนองแฟบ (GPS 47P 0729830, 1403321)
Date Analysis Commenced Mar 09, 2023
Condition of Sample Drawn into one glass filter paper (8x10 inch) placed in plastic bag

Sample Number	Sampled Date	Total Suspended Particulate (mg/m3)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2317305-1	Feb 27 - Feb 28, 2023	0.124	760	31
2317305-2	Feb 28 - Mar 01, 2023	0.126	760	31
2317305-3	Mar 01 - Mar 02, 2023	0.138	760	31
2317305-4	Mar 02 - Mar 03, 2023	0.106	760	30
2317305-5	Mar 03 - Mar 04, 2023	0.115	760	30
2317305-6	Mar 04 - Mar 05, 2023	0.132	760	31
2317305-7	Mar 05 - Mar 06, 2023	0.113	760	31
Guideline		0.33	-	-

Reference Method

Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B

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

Sampled By : Mongkon Phalathip

Remark :

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

Approved by

Thanita K.

Thanita Kulsuriwong
Scientist (4)

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317305

Date Received : Mar 07, 2023
Date Reported : Mar 11, 2023
Report Number: 2569405-2

Page 1 of 1

Sample Description Air Quality
Location วัดนาบขลุ่ย (GPS 47P 0730831, 1407365)
Date Analysis Commenced Mar 09, 2023
Condition of Sample Drawn into one glass filter paper (8x10 inch) placed in plastic bag

Sample Number	Sampled Date	Total Suspended Particulate (mg/m ³)	Barometric Pressure (mm Hg)	Atmospheric Temperature (°C)
2317305-8	Feb 27 - Feb 28, 2023	0.096	760	31
2317305-9	Feb 28 - Mar 01, 2023	0.114	760	31
2317305-10	Mar 01 - Mar 02, 2023	0.117	760	31
2317305-11	Mar 02 - Mar 03, 2023	0.094	760	30
2317305-12	Mar 03 - Mar 04, 2023	0.129	760	30
2317305-13	Mar 04 - Mar 05, 2023	0.128	760	31
2317305-14	Mar 05 - Mar 06, 2023	0.103	760	31
Guideline		0.33	-	-

Reference Method

Total Suspended Particulate : US EPA 40 CFR Part 50 Appendix B

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

Sampled By : Mongkon Phalathip

Remark :

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

Approved by

Thanita K.

Thanita Kulsuriwong
Scientist (4)

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



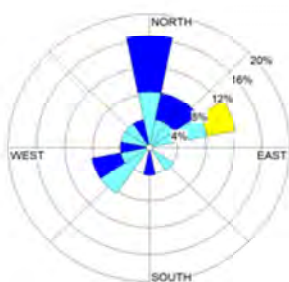
Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

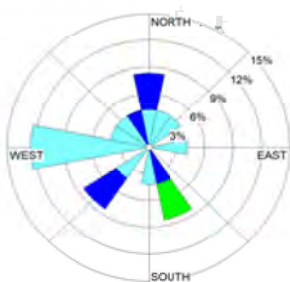
Lot ID : 2317307
Date Received : Mar 07, 2023
Date Reported : Mar 15, 2023
Report Number : 2569408-1

Page 2 of 2

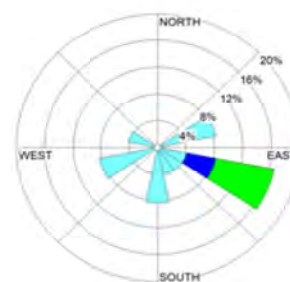
Wind Rose



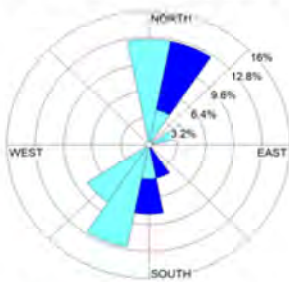
Date : Feb 27-28, 2023



Date : Feb 28-Mar 01, 2023



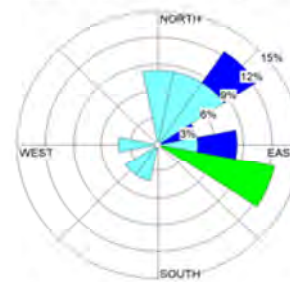
Date : Mar 01-02, 2023



Date : Mar 02-03, 2023



Date : Mar 03-04, 2023



Date : Mar 04-05, 2023



Date : Mar 05-06, 2023



Date : Feb 27-Mar 06, 2023

	WS(m/s)	%
	≥ 10.0	0.00
	8.0-10.0	0.00
	5.5-8.0	0.60
	3.3-5.5	5.95
	1.7-3.3	14.88
	0.3-1.7	43.45
	Calms	35.12

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

Approved by

Sarayuth Jitranont
Assistant General Manager



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317259
Date Received : Mar 09, 2023
Date Reported : Mar 14, 2023
Report Number : 2569348-1

Page 1 of 1

Sample Number : 2317259-1
Sample Description : Emission from Stationary Source
Location : Auxiliary Boiler
Measurement Date : Mar 09, 2023

Stack Description

Ambient Temperature	30 °C	Diameter	1.80 m	Oxygen	14.61 %
Ambient Pressure	757 mmHg	Shape	Circle	Carbon dioxide	12.00 %
Type of Process	Combustion	Stack Temperature	193 °C	Gas Velocity	6.88 m/s
Type of Fuel	Natural Gas	Moisture	9.09 %	Flow Rate	36465 Nm3/hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)	
				at Actual O ₂	At 7% O ₂
1	10:20 AM - 10:40 AM	14.63	3.60	16.65	36.90
2	10:41 AM - 11:01 AM	14.62	3.61	17.03	37.68
3	11:02 AM - 11:22 AM	14.60	3.62	17.19	37.91
Average (ppm)		14.61	3.61	16.96	37.50
Guideline ^{1/} (ppm)				-	53
Guideline ^{2/} (ppm)				-	120
Guideline ^{3/} (ppm)				-	120
Result (mg/Nm ³)				31.90	70.55
Emission Rate at Actual O ₂ (g/s)				0.3231	
Guideline ^{1/} (g/s)				2.10	
Method				US EPA Method 7E	

Sampled By : Saksit Phaisanphisut

Guideline : ^{1/} Environmental Impact Assessment Report of Global Power Synergy Public Company Limited (CUP 1)

^{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
ทะเบียนเลขที่ ว-204-ค-6113

Approved by

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

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

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakarn, Khet Suan Luang, Bangkok 10250, THAILAND | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2317253

Date Received : Mar 09, 2023

Date Reported : Mar 17, 2023

Report Number: 2569341-1

Page 1 of 2

Sample Number 2317253-1
Sampled Date Mar 09, 2023
Sample Description Emission from Stationary Source
Location Auxiliary Boiler
Date Analysis Commenced Mar 10, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	757	mmHg	Diameter	1.80	m	Oxygen	14.6	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	3.6	%
Type of Process	Combustion		Stack Temperature	193	°C	Gas Velocity	7.0	m/s
Type of Fuel	Natural Gas		Moisture	9.11	%	Flow Rate (Actual O2)	37195	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O ₂	Result at 14.6 % O ₂	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing										
Total Suspended Particulate	10:30 AM - 11:12 AM	mg/m3	-	0.5	<0.5	<0.5	60	1.20	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline :

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

Guideline (2) : Environmental Impact Assessment Report of Global Power Synergy Public Company Limited. (CUP 1)

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2317253

Date Received : Mar 09, 2023

Date Reported : Mar 17, 2023

Report Number: 2569341-1

Page 2 of 2

Sample Number 2317253-1
Sampled Date Mar 09, 2023
Sample Description Emission from Stationary Source
Location Auxiliary Boiler
Date Analysis Commenced Mar 10, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	757	mmHg	Diameter	1.80	m	Oxygen	14.6	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	3.6	%
Type of Process	Combustion		Stack Temperature	193	°C	Gas Velocity	7.0	m/s
Type of Fuel	Natural Gas		Moisture	9.11	%	Flow Rate (Actual O2)	37195	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate *	10:30 AM - 11:12 AM	g/s	-	-	<0.005	-	0.019	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 1)

Sampled By : Saknarin Jaraskay , Prasanmit Kueanpet

Remark :

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2312498
Date Received : Mar 02, 2023
Date Reported : Mar 08, 2023
Report Number : 2569350-1

Page 1 of 1

Sample Number : 2312498-1
Sample Description : Emission from Stationary Source
Location : HRSG #1
Measurement Date : Feb 28, 2023

Stack Description

Ambient Temperature	30 °C	Diameter	3.30 m	Oxygen	14.79 %
Ambient Pressure	759 mmHg	Shape	Circle	Carbon dioxide	12.00 %
Type of Process	Combustion	Stack Temperature	163 °C	Gas Velocity	18.43 m/s
Type of Fuel	Natural Gas	Moisture	9.18 %	Flow Rate	351506 Nm3/hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)	
				at Actual O ₂	At 7% O ₂
1	01:15 PM - 01:35 PM	14.78	3.47	7.80	17.71
2	01:36 PM - 01:56 PM	14.80	3.48	7.78	17.72
3	01:57 PM - 02:17 PM	14.80	3.48	7.52	17.12
Average (ppm)		14.79	3.48	7.70	17.52
Guideline ^{1/} (ppm)				-	35
Guideline ^{2/} (ppm)				-	120
Guideline ^{3/} (ppm)				-	120
Result (mg/Nm ³)				14.48	32.95
Emission Rate at Actual O ₂ (g/s)				1.4139	
Guideline ^{1/} (g/s)				3.55	
Method				US EPA Method 7E	

Sampled By : Saksit Phaisanphisut

Guideline : ^{1/} Environmental Impact Assessment Report of Global Power Synergy Public Company Limited (CUP 1)

^{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
ทะเบียนเลขที่ ว-204-ค-6113

Approved by

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

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



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2317251

Date Received : Mar 02, 2023

Date Reported : Mar 11, 2023

Report Number: 2569343-1

Page 1 of 2

Sample Number 2317251-1
Sampled Date Feb 28, 2023
Sample Description Emission from Stationary Source
Location HRSG #1
Date Analysis Commenced Mar 03, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	759	mmHg	Diameter	3.30	m	Oxygen	14.8	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	3.5	%
Type of Process	Combustion		Stack Temperature	163	°C	Gas Velocity	18.8	m/s
Type of Fuel	Natural Gas		Moisture	9.27	%	Flow Rate (Actual O2)	358438	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O ₂	Result at 14.8 % O ₂	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing										
Total Suspended Particulate	01:15 PM - 02:03 PM	mg/m3	-	0.5	<0.5	<0.5	60	3.20	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline :

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

Guideline (2) : Environmental Impact Assessment Report of Global Power Synergy Public Company Limited. (CUP 1)

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2317251

Date Received : Mar 02, 2023

Date Reported : Mar 11, 2023

Report Number: 2569343-1

Page 2 of 2

Sample Number 2317251-1
Sampled Date Feb 28, 2023
Sample Description Emission from Stationary Source
Location HRSG #1
Date Analysis Commenced Mar 03, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	759	mmHg	Diameter	3.30	m	Oxygen	14.8	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	3.5	%
Type of Process	Combustion		Stack Temperature	163	°C	Gas Velocity	18.8	m/s
Type of Fuel	Natural Gas		Moisture	9.27	%	Flow Rate (Actual O2)	358438	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate *	01:15 PM - 02:03 PM	g/s	-	-	<0.050	-	0.40	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 1)

Sampled By : Jaradrawee Sriuksa , Siriwit Ruangsom

Remark :

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317258
Date Received : Mar 02, 2023
Date Reported : Mar 08, 2023
Report Number : 2569349-1

Page 1 of 1

Sample Number : 2317258-1
Sample Description : Emission from Stationary Source
Location : HRSG #2
Measurement Date : Feb 28, 2023

Stack Description

Ambient Temperature	30 °C	Diameter	3.30 m	Oxygen	14.73 %
Ambient Pressure	759 mmHg	Shape	Circle	Carbon dioxide	3.41 %
Type of Process	Combustion	Stack Temperature	160 °C	Gas Velocity	20.47 m/s
Type of Fuel	Natural Gas	Moisture	8.39 %	Flow Rate	396577 Nm ³ /hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)	
				at Actual O ₂	At 7% O ₂
1	10:50 AM - 11:10 AM	14.77	3.38	11.23	25.44
2	11:11 AM - 11:31 AM	14.71	3.42	11.24	25.26
3	11:32 AM - 11:52 AM	14.71	3.42	11.26	25.29
Average (ppm)		14.73	3.41	11.24	25.33
Guideline ^{1/} (ppm)				-	35
Guideline ^{2/} (ppm)				-	120
Guideline ^{3/} (ppm)				-	120
Result (mg/Nm ³)				21.15	47.66
Emission Rate at Actual O ₂ (g/s)				2.3303	
Guideline ^{1/} (g/s)				3.55	
Method				US EPA Method 7E	

Sampled By : Kantaphon Maneesampan

Guideline : ^{1/} Environmental Impact Assessment Report of Global Power Synergy Public Company Limited (CUP 1)

^{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
ทะเบียนเลขที่ ว-204-ค-6113

Approved by

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

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

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakarn, Khet Suan Luang, Bangkok 10250, THAILAND | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2317252

Date Received : Mar 02, 2023

Date Reported : Mar 14, 2023

Report Number: 2569342-1

Page 1 of 2

Sample Number 2317252-1
Sampled Date Feb 28, 2023
Sample Description Emission from Stationary Source
Location HRSG #2
Date Analysis Commenced Mar 03, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	759	mmHg	Diameter	3.30	m	Oxygen	14.7	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	3.4	%
Type of Process	Combustion		Stack Temperature	160	°C	Gas Velocity	20.4	m/s
Type of Fuel	Natural Gas		Moisture	8.43	%	Flow Rate (Actual O2)	395431	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O ₂	Result at 14.7 % O ₂	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing										
Total Suspended Particulate	11:00 AM - 11:48 AM	mg/m3	-	0.5	<0.5	<0.5	60	3.20	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline :

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

Guideline (2) : Environmental Impact Assessment Report of Global Power Synergy Public Company Limited. (CUP 1)

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2317252

Date Received : Mar 02, 2023

Date Reported : Mar 14, 2023

Report Number: 2569342-1

Page 2 of 2

Sample Number 2317252-1
Sampled Date Feb 28, 2023
Sample Description Emission from Stationary Source
Location HRSG #2
Date Analysis Commenced Mar 03, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	759	mmHg	Diameter	3.30	m	Oxygen	14.7	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	3.4	%
Type of Process	Combustion		Stack Temperature	160	°C	Gas Velocity	20.4	m/s
Type of Fuel	Natural Gas		Moisture	8.43	%	Flow Rate (Actual O2)	395431	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate *	11:00 AM - 11:48 AM	g/s	-	-	<0.055	-	0.40	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 1)

Sampled By : Kantaphon Maneesampan , Jaradrawee Sriruksa

Remark :

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317269
Date Received : Mar 02, 2023
Date Reported : Mar 08, 2023
Report Number : 2569383-1

Page 1 of 1

Sample Number : 2317269-1
Sample Description : Emission from Stationary Source
Location : HRSG #3
Measurement Date : Mar 01, 2023

Stack Description

Ambient Temperature	30 °C	Diameter	3.30 m	Oxygen	14.27 %
Ambient Pressure	759 mmHg	Shape	Circle	Carbon dioxide	12.00 %
Type of Process	Combustion	Stack Temperature	136 °C	Gas Velocity	17.80 m/s
Type of Fuel	Natural Gas	Moisture	7.80 %	Flow Rate	367495 Nm3/hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)	
				at Actual O ₂	At 7% O ₂
1	12:30 PM - 12:50 PM	14.33	3.74	14.87	31.47
2	12:51 PM - 01:11 PM	14.29	3.77	13.90	29.21
3	01:12 PM - 01:32 PM	14.20	3.82	12.31	25.53
Average (ppm)		14.27	3.78	13.69	28.74
Guideline ^{1/} (ppm)				-	48
Guideline ^{2/} (ppm)				-	120
Guideline ^{3/} (ppm)				-	120
Result (mg/Nm ³)				25.76	54.07
Emission Rate at Actual O ₂ (g/s)				2.6295	
Guideline ^{1/} (g/s)				5.07	
Method				US EPA Method 7E	

Sampled By : Saksit Phaisanphisut

^{1/} Environmental Impact Assessment Report of Global Power Synergy Public Company Limited (CUP 1)

^{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
ทะเบียนเลขที่ ว-204-ค-6113

Approved by

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

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

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakarn, Khet Suan Luang, Bangkok 10250, THAILAND | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2317271

Date Received : Mar 02, 2023

Date Reported : Mar 11, 2023

Report Number: 2569397-1

Page 1 of 2

Sample Number	2317271-1
Sampled Date	Mar 01, 2023
Sample Description	Emission from Stationary Source
Location	HRSG #3
Date Analysis Commenced	Mar 03, 2023
Condition of Sample	Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one plastic bottle, refrigerated

Stack Description

Ambient Pressure	759	mmHg	Diameter	3.30	m	Oxygen	14.3	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	3.8	%
Type of Process	Combustion		Stack Temperature	136	°C	Gas Velocity	18.2	m/s
Type of Fuel	Natural Gas		Moisture	7.85	%	Flow Rate (Actual O2)	374686	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result		Guideline (1)	Guideline (2)	Method	Testing Location
					at 7 %O ₂	at 14.3 % O ₂				
Air Testing										
Total Suspended Particulate	12:30 PM - 01:18 PM	mg/m3	-	0.5	<0.5	<0.5	60	3.00	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline :

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

Guideline (2) : Environmental Impact Assessment Report of Global Power Synergy Public Company Limited. (CUP 1)

Technical Management

Thanita K.

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

Approved by

D. Changchon

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

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2317271

Date Received : Mar 02, 2023

Date Reported : Mar 11, 2023

Report Number: 2569397-1

Page 2 of 2

Sample Number 2317271-1
Sampled Date Mar 01, 2023
Sample Description Emission from Stationary Source
Location HRSG #3
Date Analysis Commenced Mar 03, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one plastic bottle, refrigerated

Stack Description

Ambient Pressure	759	mmHg	Diameter	3.30	m	Oxygen	14.3	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	3.8	%
Type of Process	Combustion		Stack Temperature	136	°C	Gas Velocity	18.2	m/s
Type of Fuel	Natural Gas		Moisture	7.85	%	Flow Rate (Actual O2)	374686	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate *	12:30 PM - 01:18 PM	g/s	-	-	<0.052	-	0.40	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 1)

Sampled By : Jaradrawee Sriuksa , Sutdamrong Chokpitinan

Remark :

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

Technical Management

Thanita K.

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

Approved by

D. Changchon

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

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317284
Date Received : Apr 21, 2023
Date Reported : Apr 25, 2023
Report Number : 2569379-1

Page 1 of 1

Sample Number : 2317284-1
Sample Description : Emission from Stationary Source
Location : HRSG #4 (GPS 47P 0730798, 1404983)
Measurement Date : Apr 21, 2023

Stack Description

Ambient Temperature	32 °C	Diameter	3.30 m	Oxygen	14.20 %
Ambient Pressure	753 mmHg	Shape	Circle	Carbon dioxide	3.83 %
Type of Process	Combustion	Stack Temperature	125 °C	Gas Velocity	20.54 m/s
Type of Fuel	Natural Gas	Moisture	8.07 %	Flow Rate	430916 Nm3/hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)	
				at Actual O ₂	At 7% O ₂
1	11:30 AM - 11:50 AM	14.20	3.84	12.02	24.96
2	11:51 AM - 12:11 PM	14.20	3.84	12.07	25.02
3	12:12 PM - 12:32 PM	14.21	3.83	13.00	27.01
Average (ppm)		14.20	3.83	12.36	25.66
Guideline ^{1/} (ppm)				-	32
Guideline ^{2/} (ppm)				-	120
Guideline ^{3/} (ppm)				-	120
Result (mg/Nm ³)				23.26	48.28
Emission Rate at Actual O ₂ (g/s)				2.7845	
Guideline ^{1/} (g/s)				2.84	
Method				US EPA Method 7E	

Sampled By : Sathaporn Thakarn

Guideline : ^{1/} Environmental Impact Assessment Report of Global Power Synergy Public Company Limited (CUP 1)

^{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
ทะเบียนเลขที่ ว-204-ค-6113

Approved by

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

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

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakarn, Khet Suan Luang, Bangkok 10250, THAILAND | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2317278

Date Received : Apr 21, 2023

Date Reported : Apr 28, 2023

Report Number: 2569391-1

Page 1 of 2

Sample Number 2317278-1
Sampled Date Apr 21, 2023
Sample Description Emission from Stationary Source
Location HRSG #4
Date Analysis Commenced Apr 24, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one amber plastic bottle, refrigerated

Stack Description

Ambient Pressure	753	mmHg	Diameter	3.30	m	Oxygen	14.2	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	3.8	%
Type of Process	Combustion		Stack Temperature	125	°C	Gas Velocity	20.5	m/s
Type of Fuel	Natural Gas		Moisture	8.04	%	Flow Rate (Actual O2)	430503	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O ₂	Result at 14.2 % O ₂	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing										
Total Suspended Particulate	11:30 AM - 12:18 PM	mg/m3	-	0.5	<0.5	<0.5	60	3.60	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline :

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

Guideline (2) : Environmental Impact Assessment Report of Global Power Synergy Public Company Limited. (CUP 1)

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2317278

Date Received : Apr 21, 2023

Date Reported : Apr 28, 2023

Report Number: 2569391-1

Page 2 of 2

Sample Number 2317278-1
Sampled Date Apr 21, 2023
Sample Description Emission from Stationary Source
Location HRSG #4
Date Analysis Commenced Apr 24, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one amber plastic bottle, refrigerated

Stack Description

Ambient Pressure	753	mmHg	Diameter	3.30	m	Oxygen	14.2	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	3.8	%
Type of Process	Combustion		Stack Temperature	125	°C	Gas Velocity	20.5	m/s
Type of Fuel	Natural Gas		Moisture	8.04	%	Flow Rate (Actual O2)	430503	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate *	11:30 AM - 12:18 PM	g/s	-	-	<0.059	-	0.40	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 1)

Sampled By : Tinnakorn Kulchart , Sathapron Thakarw

Remark :

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317285
Date Received : Apr 24, 2023
Date Reported : Apr 26, 2023
Report Number : 2569378-1

Page 1 of 1

Sample Number : 2317285-1
Sample Description : Emission from Stationary Source
Location : HRSG #5 (GPS 47P 0730892, 1405132)
Measurement Date : Apr 21, 2023

Stack Description

Ambient Temperature	32 °C	Diameter	3.30 m	Oxygen	13.83 %
Ambient Pressure	753 mmHg	Shape	Circle	Carbon dioxide	4.02 %
Type of Process	Combustion	Stack Temperature	177 °C	Gas Velocity	23.44 m/s
Type of Fuel	Natural Gas	Moisture	7.66 %	Flow Rate	436710 Nm3/hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)	
				at Actual O ₂	At 7% O ₂
1	10:45 AM - 11:05 AM	13.88	3.99	2.47	4.88
2	11:06 AM - 11:26 AM	13.85	4.00	2.41	4.75
3	11:27 AM - 11:47 AM	13.75	4.07	2.34	4.55
Average (ppm)		13.83	4.02	2.40	4.73
Guideline ^{1/} (ppm)				-	20
Guideline ^{2/} (ppm)				-	120
Guideline ^{3/} (ppm)				-	120
Result (mg/Nm ³)				4.52	8.89
Emission Rate at Actual O ₂ (g/s)				0.5489	
Guideline ^{1/} (g/s)				2.82	
Method				US EPA Method 7E	

Sampled By : Saksit Phaisanphisut

Guideline : ^{1/} Environmental Impact Assessment Report of Global Power Synergy Public Company Limited (CUP 1)

^{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
ทะเบียนเลขที่ ว-204-ค-6113

Approved by

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

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

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakarn, Khet Suan Luang, Bangkok 10250, THAILAND | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2317279

Date Received : Apr 21, 2023

Date Reported : Apr 28, 2023

Report Number: 2569390-1

Page 1 of 2

Sample Number 2317279-1
Sampled Date Apr 21, 2023
Sample Description Emission from Stationary Source
Location HRSG #5 (GPS 47P 0730892, 1405132)
Date Analysis Commenced Apr 24, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one amber plastic bottle, refrigerated

Stack Description

Ambient Pressure	753	mmHg	Diameter	3.30	m	Oxygen	13.8	%
Ambient Temperature	33.0	°C	Shape	Circle		Carbon Dioxide	4.0	%
Type of Process	Combustion		Stack Temperature	177	°C	Gas Velocity	23.4	m/s
Type of Fuel	Natural Gas		Moisture	7.63	%	Flow Rate (Actual O2)	436270	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O ₂	Result at 13.8 % O ₂	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing										
Total Suspended Particulate	10:45 AM - 11:33 AM	mg/m3	-	0.5	<0.5	<0.5	60	2.30	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline :

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

Guideline (2) : Environmental Impact Assessment Report of Global Power Synergy Public Company Limited. (CUP 1)

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317279

Date Received : Apr 21, 2023
Date Reported : Apr 28, 2023
Report Number: 2569390-1

Page 2 of 2

Sample Number 2317279-1
Sampled Date Apr 21, 2023
Sample Description Emission from Stationary Source
Location HRSG #5 (GPS 47P 0730892, 1405132)
Date Analysis Commenced Apr 24, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one amber plastic bottle, refrigerated

Stack Description

Ambient Pressure	753	mmHg	Diameter	3.30	m	Oxygen	13.8	%
Ambient Temperature	33.0	°C	Shape	Circle		Carbon Dioxide	4.0	%
Type of Process	Combustion		Stack Temperature	177	°C	Gas Velocity	23.4	m/s
Type of Fuel	Natural Gas		Moisture	7.63	%	Flow Rate (Actual O2)	436270	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate *	10:45 AM - 11:33 AM	g/s	-	-	<0.06	-	0.40	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 1)

Sampled By : Warawut Pubpa , Tinnakorn Kulchart

Remark :

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

Technical Management

Thanita K.

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

Approved by

D. Changchon

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

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317286
Date Received : Mar 02, 2023
Date Reported : Mar 08, 2023
Report Number : 2569376-1

Page 1 of 1

Sample Number : 2317286-1
Sample Description : Emission from Stationary Source
Location : HRSG #6
Measurement Date : Mar 01, 2023

Stack Description

Ambient Temperature	30 °C	Diameter	3.30 m	Oxygen	14.67 %
Ambient Pressure	759 mmHg	Shape	Circle	Carbon dioxide	3.49 %
Type of Process	Combustion	Stack Temperature	181 °C	Gas Velocity	24.04 m/s
Type of Fuel	Natural Gas	Moisture	7.27 %	Flow Rate	449857 Nm3/hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)	
				at Actual O ₂	At 7% O ₂
1	10:30 AM - 10:50 AM	14.69	3.49	5.32	11.90
2	10:51 AM - 11:11 AM	14.67	3.50	5.17	11.54
3	11:12 AM - 11:32 AM	14.66	3.49	4.85	10.81
Average (ppm)		14.67	3.49	5.12	11.42
Guideline ^{1/} (ppm)				-	20
Guideline ^{2/} (ppm)				-	120
Guideline ^{3/} (ppm)				-	120
Result (mg/Nm ³)				9.63	21.48
Emission Rate at Actual O ₂ (g/s)				1.2029	
Guideline ^{1/} (g/s)				2.82	
Method				US EPA Method 7E	

Sampled By : Kantaphon Maneesampan

Guideline : ^{1/} Environmental Impact Assessment Report of Global Power Synergy Public Company Limited (CUP 1)

^{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

ทะเบียนเลขที่ ว-204-ค-6113

Approved by

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

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

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakarn, Khet Suan Luang, Bangkok 10250, THAILAND | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2317280

Date Received : Mar 02, 2023

Date Reported : Mar 11, 2023

Report Number: 2569388-1

Page 1 of 2

Sample Number 2317280-1
Sampled Date Mar 01, 2023
Sample Description Emission from Stationary Source
Location HRSG #6
Date Analysis Commenced Mar 03, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one plastic bottle, refrigerated

Stack Description

Ambient Pressure	759	mmHg	Diameter	3.30	m	Oxygen	14.7	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	3.5	%
Type of Process	Combustion		Stack Temperature	180	°C	Gas Velocity	24.0	m/s
Type of Fuel	Natural Gas		Moisture	7.36	%	Flow Rate (Actual O2)	449325	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O ₂	Result at 14.7 % O ₂	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing										
Total Suspended Particulate	10:30 AM - 11:18 AM	mg/m3	-	0.5	<0.5	<0.5	60	2.30	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline :

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

Guideline (2) : Environmental Impact Assessment Report of Global Power Synergy Public Company Limited. (CUP 1)

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ทะเบียนเลขที่ ว-323-จ-9447

Approved by

D. Changchon

Dej Changchon
Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2317280

Date Received : Mar 02, 2023

Date Reported : Mar 11, 2023

Report Number: 2569388-1

Page 2 of 2

Sample Number 2317280-1
Sampled Date Mar 01, 2023
Sample Description Emission from Stationary Source
Location HRSG #6
Date Analysis Commenced Mar 03, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one plastic bottle, refrigerated

Stack Description

Ambient Pressure	759	mmHg	Diameter	3.30	m	Oxygen	14.7	%
Ambient Temperature	30.0	°C	Shape	Circle		Carbon Dioxide	3.5	%
Type of Process	Combustion		Stack Temperature	180	°C	Gas Velocity	24.0	m/s
Type of Fuel	Natural Gas		Moisture	7.36	%	Flow Rate (Actual O2)	449325	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate *	10:30 AM - 11:18 AM	g/s	-	-	<0.062	-	0.40	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 1)

Sampled By : Kantaphon Maneesampan , Jaradrawee Sriruksa

Remark :

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

Technical Management

Thanita K.

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

Approved by

D. Changchon

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

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324974

Date Received : Mar 09, 2023

Date Reported : Mar 22, 2023

Report Number : 2584409-1

Page 1 of 8

Sample Number 2324974-1
Sampled Date Mar 08, 2023
Sample Description Air Quality
Location บริเวณ HRSG #3
Date Analysis Commenced Mar 11, 2023
Condition of Sample Drawn into one amber plastic bottle, refrigerated
Barometric Pressure 759 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Ammonia	08:30 AM - 10:30 AM	ppm	-	0.10	<0.10	50	Based on Method of Air Sampling and Analysis, 401	MOL	Rayong

Guideline :

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

Sampled By : Norranon Tathongkham

Remark :

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

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

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2335193

Date Received : Mar 30, 2023

Date Reported : Apr 05, 2023

Report Number : 2606932-1

Page 1 of 2

Sample Number 2335193-1
Sampled Date Mar 29, 2023
Sample Description Air Quality
Location บังเกอร์ HRSG #4
Date Analysis Commenced Apr 01, 2023
Condition of Sample Drawn into one amber plastic bottle, refrigerated
Barometric Pressure 750 mmHg
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Ammonia	09:00 AM - 11:00 AM	ppm	-	0.10	<0.10	50	Based on Method of Air Sampling and Analysis, 401	MOL	Rayong

Guideline :

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

Sampled By : Mongkon Phalathip

Remark :

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

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

Approved by

Thanita K.

Thanita Kulsuriwong
Scientist (4)

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2335193

Date Received : Mar 30, 2023

Date Reported : Apr 05, 2023

Report Number : 2606932-1

Page 2 of 2

Sample Number 2335193-2
Sampled Date Mar 29, 2023
Sample Description Air Quality
Location บังเกอร์ HRS #5
Date Analysis Commenced Apr 01, 2023
Condition of Sample Drawn into one amber plastic bottle, refrigerated
Barometric Pressure 750 mmHg
Atmospheric Temperature 31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Ammonia	09:00 AM - 11:00 AM	ppm	-	0.10	<0.10	50	Based on Method of Air Sampling and Analysis, 401	MOL	Rayong

Guideline :

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

Sampled By : Mongkon Phalathip

Remark :

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

Approved by

Thanita K.

Thanita Kulsuriwong
Scientist (4)

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324974

Date Received : Mar 09, 2023

Date Reported : Mar 22, 2023

Report Number : 2584409-1

Page 2 of 8

Sample Number 2324974-4
Sampled Date Mar 08, 2023
Sample Description Air Quality
Location บริเวณ HRSG #6
Date Analysis Commenced Mar 11, 2023
Condition of Sample Drawn into one amber plastic bottle, refrigerated
Barometric Pressure 759 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Ammonia	08:30 AM - 10:30 AM	ppm	-	0.10	<0.10	50	Based on Method of Air Sampling and Analysis, 401	MOL	Rayong

Guideline :

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

Sampled By : Norranon Tathongkham

Remark :

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

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

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324974

Date Received : Mar 09, 2023

Date Reported : Mar 22, 2023

Report Number : 2584409-1

Page 3 of 8

Sample Number 2324974-5
Sampled Date Mar 08, 2023
Sample Description Air Quality
Location NH4OH Tank
Date Analysis Commenced Mar 11, 2023
Condition of Sample Drawn into one amber plastic bottle, refrigerated
Barometric Pressure 759 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Ammonia	08:30 AM - 10:30 AM	ppm	-	0.10	<0.10	50	Based on Method of Air Sampling and Analysis, 401	MOL	Rayong

Guideline :

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

Sampled By : Norranon Tathongkham

Remark :

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

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

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324974

Date Received : Mar 09, 2023

Date Reported : Mar 22, 2023

Report Number : 2584409-1

Page 4 of 8

Sample Number 2324974-6
Sampled Date Mar 08, 2023
Sample Description Air Quality
Location Cooling Tower#1
Date Analysis Commenced Mar 15, 2023
Condition of Sample Drawn into one amber plastic bottle, refrigerated
Barometric Pressure 759 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Chlorine	08:30 AM - 10:30 AM	ppm	-	0.10	<0.10	1(C)	Based on OSHA, ID 101	MOL	Bangkok

Guideline :

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

Sampled By : Norranon Tathongkham

Remark :

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

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324974

Date Received : Mar 09, 2023

Date Reported : Mar 22, 2023

Report Number : 2584409-1

Page 5 of 8

Sample Number 2324974-7
Sampled Date Mar 08, 2023
Sample Description Air Quality
Location Cooling Tower#2
Date Analysis Commenced Mar 15, 2023
Condition of Sample Drawn into one amber plastic bottle, refrigerated
Barometric Pressure 759 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Chlorine	08:30 AM - 10:30 AM	ppm	-	0.10	<0.10	1(C)	Based on OSHA, ID 101	MOL	Bangkok

Guideline :

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

Sampled By : Norranon Tathongkham

Remark :

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

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324974

Date Received : Mar 09, 2023

Date Reported : Mar 22, 2023

Report Number : 2584409-1

Page 6 of 8

Sample Number 2324974-8
Sampled Date Mar 08, 2023
Sample Description Air Quality
Location Cooling Tower#3
Date Analysis Commenced Mar 15, 2023
Condition of Sample Drawn into one amber plastic bottle, refrigerated
Barometric Pressure 759 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Chlorine	08:30 AM - 10:30 AM	ppm	-	0.10	<0.10	1(C)	Based on OSHA, ID 101	MOL	Bangkok

Guideline :

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

Sampled By : Norranon Tathongkham

Remark :

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

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

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324974

Date Received : Mar 09, 2023

Date Reported : Mar 22, 2023

Report Number : 2584409-1

Page 7 of 8

Sample Number 2324974-9
Sampled Date Mar 08, 2023
Sample Description Air Quality
Location Demin Plant#1
Date Analysis Commenced Mar 11, 2023
Condition of Sample Drawn into one filter paper placed in plastic cassette and one sorbent tube, refrigerated
Barometric Pressure 759 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Hydrochloric Acid (HCl)	08:30 AM - 10:30 AM	ppm	-	0.05	<0.05	5(C)	Based on OSHA, ID-174-SG	MOL	Bangkok
Sodium hydroxide as NaOH	08:30 AM - 10:30 AM	mg/m3	-	0.05	<0.05	2	NIOSH (1994), 7401	MOL	Rayong

Guideline :

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

Sampled By : Norranon Tathongkham

Remark :

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

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

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324974

Date Received : Mar 09, 2023

Date Reported : Mar 22, 2023

Report Number : 2584409-1

Page 8 of 8

Sample Number 2324974-10
Sampled Date Mar 08, 2023
Sample Description Air Quality
Location Demin Plant#2
Date Analysis Commenced Mar 11, 2023
Condition of Sample Drawn into one filter paper placed in plastic cassette and one sorbent tube, refrigerated
Barometric Pressure 759 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Hydrochloric Acid (HCl)	08:30 AM - 10:30 AM	ppm	-	0.05	<0.05	5(C)	Based on OSHA, ID-174-SG	MOL	Bangkok
Sodium hydroxide as NaOH	08:30 AM - 10:30 AM	mg/m3	-	0.05	<0.05	2	NIOSH (1994), 7401	MOL	Rayong

Guideline :

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

Sampled By : Norranon Tathongkham

Remark :

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

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

Approved by

Orawan R.

Orawan Rakyong
Scientist (3)

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317290
Date Received : Mar 07, 2023
Date Reported : Mar 11, 2023
Report Number: 2591218-1

Page 1 of 1

Sample Number 2317290-1
Parameter Noise (Leq 24 hrs.)
Location ริมรั้วด้านทางเข้าโรงงาน (GPS 47P 0730817, 1405162)
Measurement Date Feb 27 - Feb 28, 2023
Measurement by Mongkon Phalathip
Sound Level meter Serial No. 734221

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	67.8	91.9	63.1
10:00 AM - 11:00 AM	67.2	88.6	62.5
11:00 AM - 12:00 PM	67.4	89.8	62.4
12:00 PM - 01:00 PM	66.4	84.7	62.0
01:00 PM - 02:00 PM	67.2	87.0	62.5
02:00 PM - 03:00 PM	66.9	83.8	62.7
03:00 PM - 04:00 PM	67.6	86.6	62.4
04:00 PM - 05:00 PM	66.9	87.7	62.5
05:00 PM - 06:00 PM	67.6	90.1	62.6
06:00 PM - 07:00 PM	68.0	86.9	62.7
07:00 PM - 08:00 PM	67.3	82.8	63.2
08:00 PM - 09:00 PM	65.9	85.1	62.8
09:00 PM - 10:00 PM	65.0	80.4	62.4
10:00 PM - 11:00 PM	64.7	83.6	62.4
11:00 PM - 12:00 AM	64.4	81.8	62.1
12:00 AM - 01:00 AM	63.1	77.7	62.0
01:00 AM - 02:00 AM	63.2	79.2	62.0
02:00 AM - 03:00 AM	63.3	81.0	62.0
03:00 AM - 04:00 AM	63.8	82.1	62.0
04:00 AM - 05:00 AM	63.7	81.0	62.0
05:00 AM - 06:00 AM	64.2	80.8	62.1
06:00 AM - 07:00 AM	67.6	88.3	62.1
07:00 AM - 08:00 AM	69.3	85.1	62.1
08:00 AM - 09:00 AM	68.4	85.9	62.1

Leq Average 24 hrs. (dB(A)) 66.5
Lmax (dB(A)) 91.9
L90 (dB(A)) 62.4
Ldn (dB(A)) 71.4
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317290
Date Received : Mar 07, 2023
Date Reported : Mar 11, 2023
Report Number: 2591219-1

Page 1 of 1

Sample Number 2317290-2
Parameter Noise (Leq 24 hrs.)
Location ริมรั้วด้านทางเข้าโรงงาน (GPS 47P 0730817, 1405162)
Measurement Date Feb 28 - Mar 01, 2023
Measurement by Mongkon Phalathip
Sound Level meter Serial No. 734221

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	66.9	83.4	62.4
10:00 AM - 11:00 AM	67.8	92.7	62.7
11:00 AM - 12:00 PM	66.9	84.1	62.1
12:00 PM - 01:00 PM	66.5	86.0	61.8
01:00 PM - 02:00 PM	67.0	84.1	62.7
02:00 PM - 03:00 PM	68.2	88.3	63.0
03:00 PM - 04:00 PM	67.0	86.5	62.5
04:00 PM - 05:00 PM	67.8	93.4	63.2
05:00 PM - 06:00 PM	67.3	85.2	62.5
06:00 PM - 07:00 PM	66.6	85.8	62.4
07:00 PM - 08:00 PM	67.6	86.4	62.7
08:00 PM - 09:00 PM	65.8	86.0	62.3
09:00 PM - 10:00 PM	64.5	81.9	62.3
10:00 PM - 11:00 PM	64.8	79.7	62.4
11:00 PM - 12:00 AM	64.1	81.2	62.4
12:00 AM - 01:00 AM	63.8	81.7	62.4
01:00 AM - 02:00 AM	63.4	77.8	62.4
02:00 AM - 03:00 AM	63.5	80.2	62.4
03:00 AM - 04:00 AM	64.0	79.5	62.4
04:00 AM - 05:00 AM	64.1	80.7	62.4
05:00 AM - 06:00 AM	64.7	80.4	62.5
06:00 AM - 07:00 AM	67.7	89.0	62.8
07:00 AM - 08:00 AM	68.8	86.8	62.2
08:00 AM - 09:00 AM	68.0	86.5	62.2

Leq Average 24 hrs. (dB(A)) 66.4
Lmax (dB(A)) 93.4
L90 (dB(A)) 62.4
Ldn (dB(A)) 71.5
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317290

Date Received : Mar 07, 2023

Date Reported : Mar 11, 2023

Report Number: 2591220-1

Page 1 of 1

Sample Number 2317290-3
Parameter Noise (Leq 24 hrs.)
Location ริมรั้วด้านทางเข้าโรงงาน (GPS 47P 0730817, 1405162)
Measurement Date Mar 01 - Mar 02, 2023
Measurement by Mongkon Phalathip
Sound Level meter Serial No. 734221

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	67.4	86.3	62.2
10:00 AM - 11:00 AM	66.9	83.2	62.0
11:00 AM - 12:00 PM	66.6	84.9	61.5
12:00 PM - 01:00 PM	65.6	85.1	61.2
01:00 PM - 02:00 PM	66.5	87.7	62.0
02:00 PM - 03:00 PM	66.8	89.3	62.1
03:00 PM - 04:00 PM	66.2	84.8	62.1
04:00 PM - 05:00 PM	66.7	83.4	62.3
05:00 PM - 06:00 PM	67.4	82.4	62.6
06:00 PM - 07:00 PM	67.5	87.2	62.2
07:00 PM - 08:00 PM	67.1	84.8	62.7
08:00 PM - 09:00 PM	65.1	80.4	62.1
09:00 PM - 10:00 PM	64.7	85.5	61.9
10:00 PM - 11:00 PM	64.5	82.0	61.9
11:00 PM - 12:00 AM	63.7	79.0	61.8
12:00 AM - 01:00 AM	63.7	82.1	61.9
01:00 AM - 02:00 AM	63.2	79.6	62.0
02:00 AM - 03:00 AM	63.3	82.5	62.0
03:00 AM - 04:00 AM	63.7	78.8	61.9
04:00 AM - 05:00 AM	64.0	79.2	62.0
05:00 AM - 06:00 AM	64.2	79.0	62.1
06:00 AM - 07:00 AM	67.9	84.3	62.6
07:00 AM - 08:00 AM	68.5	86.5	61.4
08:00 AM - 09:00 AM	68.5	87.6	62.2

Leq Average 24 hrs. (dB(A)) 66.1
Lmax (dB(A)) 89.3
L90 (dB(A)) 62.0
Ldn (dB(A)) 71.3

Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317290
Date Received : Mar 07, 2023
Date Reported : Mar 11, 2023
Report Number: 2591221-1

Page 1 of 1

Sample Number 2317290-4
Parameter Noise (Leq 24 hrs.)
Location ริมรั้วด้านทางเข้าโรงงาน (GPS 47P 0730817, 1405162)
Measurement Date Mar 02 - Mar 03, 2023
Measurement by Mongkon Phalathip
Sound Level meter Serial No. 734221

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	67.8	86.8	61.8
10:00 AM - 11:00 AM	67.0	92.2	61.9
11:00 AM - 12:00 PM	66.7	84.4	62.0
12:00 PM - 01:00 PM	66.6	83.9	62.0
01:00 PM - 02:00 PM	67.0	86.4	62.3
02:00 PM - 03:00 PM	67.6	86.6	62.3
03:00 PM - 04:00 PM	67.1	87.9	62.1
04:00 PM - 05:00 PM	66.5	83.7	62.3
05:00 PM - 06:00 PM	68.0	89.1	62.8
06:00 PM - 07:00 PM	67.8	87.1	62.4
07:00 PM - 08:00 PM	67.7	85.8	63.3
08:00 PM - 09:00 PM	65.9	81.8	62.3
09:00 PM - 10:00 PM	64.9	83.2	62.0
10:00 PM - 11:00 PM	65.0	83.8	62.0
11:00 PM - 12:00 AM	64.5	83.4	62.0
12:00 AM - 01:00 AM	64.5	80.6	62.3
01:00 AM - 02:00 AM	64.9	80.9	62.1
02:00 AM - 03:00 AM	65.1	82.5	62.0
03:00 AM - 04:00 AM	65.4	82.9	61.9
04:00 AM - 05:00 AM	65.2	81.4	61.9
05:00 AM - 06:00 AM	65.2	80.7	61.8
06:00 AM - 07:00 AM	68.3	83.3	62.3
07:00 AM - 08:00 AM	69.0	85.7	61.9
08:00 AM - 09:00 AM	68.5	86.6	61.9

Leq Average 24 hrs. (dB(A)) 66.7
Lmax (dB(A)) 92.2
L90 (dB(A)) 62.0
Ldn (dB(A)) 72.2
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317290

Date Received : Mar 07, 2023
Date Reported : Mar 11, 2023
Report Number: 2591223-1

Page 1 of 1

Sample Number 2317290-6
Parameter Noise (Leq 24 hrs.)
Location ริมรั้วด้านทางเข้าโรงงาน (GPS 47P 0730817, 1405162)
Measurement Date Mar 04 - Mar 05, 2023
Measurement by Mongkon Phalathip
Sound Level meter Serial No. 734221

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	67.1	82.9	62.2
10:00 AM - 11:00 AM	66.7	83.8	61.7
11:00 AM - 12:00 PM	66.4	84.8	61.6
12:00 PM - 01:00 PM	65.7	88.0	61.2
01:00 PM - 02:00 PM	65.9	82.6	61.6
02:00 PM - 03:00 PM	66.0	81.4	61.5
03:00 PM - 04:00 PM	66.1	83.7	62.7
04:00 PM - 05:00 PM	66.9	90.0	63.3
05:00 PM - 06:00 PM	66.8	84.5	62.1
06:00 PM - 07:00 PM	66.6	82.7	62.5
07:00 PM - 08:00 PM	67.7	90.4	62.8
08:00 PM - 09:00 PM	66.0	84.0	62.5
09:00 PM - 10:00 PM	65.4	81.4	62.3
10:00 PM - 11:00 PM	65.5	85.9	62.2
11:00 PM - 12:00 AM	64.8	80.6	61.9
12:00 AM - 01:00 AM	63.8	81.6	62.0
01:00 AM - 02:00 AM	63.8	79.5	62.1
02:00 AM - 03:00 AM	63.6	79.9	62.0
03:00 AM - 04:00 AM	63.3	81.2	61.8
04:00 AM - 05:00 AM	62.5	79.7	61.8
05:00 AM - 06:00 AM	62.6	78.8	61.8
06:00 AM - 07:00 AM	66.1	85.4	62.0
07:00 AM - 08:00 AM	68.1	84.4	62.4
08:00 AM - 09:00 AM	66.9	87.1	61.9

Leq Average 24 hrs. (dB(A)) 65.8
Lmax (dB(A)) 90.4
L90 (dB(A)) 62.0
Ldn (dB(A)) 71.0
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2317290
Date Received : Mar 07, 2023
Date Reported : Mar 11, 2023
Report Number: 2591224-1

Page 1 of 1

Sample Number 2317290-7
Parameter Noise (Leq 24 hrs.)
Location ริมรั้วด้านทางเข้าโรงงาน (GPS 47P 0730817, 1405162)
Measurement Date Mar 05 - Mar 06, 2023
Measurement by Mongkon Phalathip
Sound Level meter Serial No. 734221

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:00 AM - 10:00 AM	65.7	85.5	61.9
10:00 AM - 11:00 AM	65.8	84.7	62.4
11:00 AM - 12:00 PM	66.1	83.3	63.0
12:00 PM - 01:00 PM	66.2	85.2	64.2
01:00 PM - 02:00 PM	67.8	86.2	66.0
02:00 PM - 03:00 PM	66.5	85.2	63.2
03:00 PM - 04:00 PM	63.9	79.3	61.1
04:00 PM - 05:00 PM	65.4	86.3	61.5
05:00 PM - 06:00 PM	65.4	85.0	61.9
06:00 PM - 07:00 PM	66.1	83.7	62.3
07:00 PM - 08:00 PM	66.8	89.8	62.9
08:00 PM - 09:00 PM	65.6	84.0	62.5
09:00 PM - 10:00 PM	64.3	84.2	62.2
10:00 PM - 11:00 PM	64.2	82.2	62.0
11:00 PM - 12:00 AM	63.8	84.4	61.9
12:00 AM - 01:00 AM	63.1	79.8	61.7
01:00 AM - 02:00 AM	63.0	80.7	62.0
02:00 AM - 03:00 AM	63.4	82.9	62.2
03:00 AM - 04:00 AM	63.0	78.9	62.0
04:00 AM - 05:00 AM	64.5	81.3	62.2
05:00 AM - 06:00 AM	64.0	88.5	62.0
06:00 AM - 07:00 AM	66.6	84.6	62.2
07:00 AM - 08:00 AM	68.5	84.7	62.7
08:00 AM - 09:00 AM	67.1	87.3	62.1

Leq Average 24 hrs. (dB(A)) 65.6
Lmax (dB(A)) 89.8
L90 (dB(A)) 62.2
Ldn (dB(A)) 70.9
Standard (dB(A)) 70 115

Reference Method : ISO1996-1 and 1996-2

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

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

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324977

Date Received : Mar 09, 2023

Date Reported : Mar 14, 2023

Report Number: 2592603-1

Page 1 of 1

Sample Number 2324977-1
Parameter Noise (Leq 8 hrs.)
Location เครื่องอัดอากาศ
Measurement Date Mar 07, 2023
Measurement by Norranon Tathongkham

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:56 AM - 09:56 AM	80.0	88.7	62.2
09:56 AM - 10:56 AM	81.2	86.4	79.9
10:56 AM - 11:56 AM	80.9	85.6	79.9
11:56 AM - 12:56 PM	80.6	89.2	79.4
12:56 PM - 01:56 PM	81.0	88.6	79.6
01:56 PM - 02:56 PM	81.5	86.1	79.9
02:56 PM - 03:56 PM	81.5	86.7	80.1
03:56 PM - 04:56 PM	80.8	85.3	79.4

Leq Average 8 hrs. (dB(A))

81.0

Lmax (dB(A))

89.2

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324977

Date Received : Mar 09, 2023

Date Reported : Mar 14, 2023

Report Number: 2592604-1

Page 1 of 1

Sample Number 2324977-2
Parameter Noise (Leq 8 hrs.)
Location ทอหล่อเย็น
Measurement Date Mar 07, 2023
Measurement by Norranon Tathongkham

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:01 AM - 10:01 AM	69.6	92.2	63.7
10:01 AM - 11:01 AM	69.4	93.5	68.0
11:01 AM - 12:01 PM	68.9	76.2	68.0
12:01 PM - 01:01 PM	68.8	76.4	68.0
01:01 PM - 02:01 PM	68.8	74.3	67.9
02:01 PM - 03:01 PM	68.9	76.8	68.0
03:01 PM - 04:01 PM	69.1	76.3	68.1
04:01 PM - 05:01 PM	69.0	79.9	68.1

Leq Average 8 hrs. (dB(A))

69.1

Lmax (dB(A))

93.5

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324977

Date Received : Mar 09, 2023

Date Reported : Mar 14, 2023

Report Number: 2592605-1

Page 1 of 1

Sample Number 2324977-3
Parameter Noise (Leq 8 hrs.)
Location เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #1
Measurement Date Mar 07, 2023
Measurement by Norranon Tathongkham

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:56 AM - 09:56 AM	75.0	91.2	62.9
09:56 AM - 10:56 AM	75.5	81.0	75.3
10:56 AM - 11:56 AM	75.5	78.6	75.3
11:56 AM - 12:56 PM	75.9	80.9	75.6
12:56 PM - 01:56 PM	75.6	82.8	75.4
01:56 PM - 02:56 PM	75.7	81.3	75.5
02:56 PM - 03:56 PM	75.7	83.5	75.6
03:56 PM - 04:56 PM	76.4	81.1	75.7

Leq Average 8 hrs. (dB(A))

75.7

Lmax (dB(A))

91.2

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324977

Date Received : Mar 09, 2023

Date Reported : Mar 14, 2023

Report Number: 2592606-1

Page 1 of 1

Sample Number 2324977-4
Parameter Noise (Leq 8 hrs.)
Location เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #2
Measurement Date Mar 07, 2023
Measurement by Norranon Tathongkham

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:07 PM - 09:07 PM	79.6	80.6	79.5
09:07 PM - 10:07 PM	79.6	92.4	79.5
10:07 PM - 11:07 PM	79.8	94.9	79.5
11:07 PM - 12:07 AM	79.7	80.3	79.5
12:07 AM - 01:07 AM	79.7	83.4	79.6
01:07 AM - 02:07 AM	79.8	80.4	79.6
02:07 AM - 03:07 AM	79.9	81.3	79.7
03:07 AM - 04:07 AM	80.5	81.3	80.3

Leq Average 8 hrs. (dB(A))

79.8

Lmax (dB(A))

94.9

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324977

Date Received : Mar 09, 2023

Date Reported : Mar 14, 2023

Report Number: 2592607-1

Page 1 of 1

Sample Number 2324977-5
Parameter Noise (Leq 8 hrs.)
Location เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #3
Measurement Date Mar 07, 2023
Measurement by Norranon Tathongkham

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:34 AM - 09:34 AM	78.3	91.0	62.5
09:34 AM - 10:34 AM	80.4	82.5	80.2
10:34 AM - 11:34 AM	80.1	82.5	79.7
11:34 AM - 12:34 PM	79.8	81.1	79.4
12:34 PM - 01:34 PM	79.3	83.3	79.1
01:34 PM - 02:34 PM	79.3	83.9	79.1
02:34 PM - 03:34 PM	79.4	89.8	79.2
03:34 PM - 04:34 PM	79.7	83.1	79.4

Leq Average 8 hrs. (dB(A))

79.6

Lmax (dB(A))

91.0

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2335199

Date Received : Mar 30, 2023

Date Reported : Apr 05, 2023

Report Number: 2613724-1

Page 1 of 1

Sample Number 2335199-1
Parameter Noise (Leq 8 hrs.)
Location เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #4
Measurement Date Mar 29, 2023
Measurement by Jaradrawee Siruksa

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:38 AM - 09:38 AM	82.9	93.0	82.6
09:38 AM - 10:38 AM	82.8	90.1	82.5
10:38 AM - 11:38 AM	82.5	87.3	82.1
11:38 AM - 12:38 PM	82.6	87.5	82.2
12:38 PM - 01:38 PM	82.6	88.8	82.2
01:38 PM - 02:38 PM	82.6	91.5	82.3
02:38 PM - 03:38 PM	82.6	87.6	82.3
03:38 PM - 04:38 PM	82.8	87.7	82.4

Leq Average 8 hrs. (dB(A))

82.7

Lmax (dB(A))

93.0

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2335199

Date Received : Mar 30, 2023

Date Reported : Apr 05, 2023

Report Number: 2613725-1

Page 1 of 1

Sample Number 2335199-2
Parameter Noise (Leq 8 hrs.)
Location เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #5
Measurement Date Mar 29, 2023
Measurement by Jaradrawee Siruksa

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:17 AM - 09:17 AM	82.4	89.7	81.9
09:17 AM - 10:17 AM	82.2	83.8	81.8
10:17 AM - 11:17 AM	82.2	83.7	81.8
11:17 AM - 12:17 PM	82.2	83.9	81.8
12:17 PM - 01:17 PM	82.7	85.3	82.1
01:17 PM - 02:17 PM	83.2	85.2	82.9
02:17 PM - 03:17 PM	83.2	85.2	82.8
03:17 PM - 04:17 PM	83.5	85.1	83.1

Leq Average 8 hrs. (dB(A))

82.7

Lmax (dB(A))

89.7

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324977

Date Received : Mar 09, 2023

Date Reported : Mar 14, 2023

Report Number: 2592610-1

Page 1 of 1

Sample Number 2324977-8
Parameter Noise (Leq 8 hrs.)
Location เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #6
Measurement Date Mar 07, 2023
Measurement by Norranon Tathongkham

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:12 PM - 09:12 PM	79.1	81.8	78.9
09:12 PM - 10:12 PM	79.0	80.7	78.9
10:12 PM - 11:12 PM	79.0	81.5	78.8
11:12 PM - 12:12 AM	78.8	79.9	78.7
12:12 AM - 01:12 AM	78.9	89.6	78.7
01:12 AM - 02:12 AM	78.9	80.3	78.8
02:12 AM - 03:12 AM	79.2	80.8	78.8
03:12 AM - 04:12 AM	80.0	81.2	79.4

Leq Average 8 hrs. (dB(A))

79.1

Lmax (dB(A))

89.6

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324977

Date Received : Mar 09, 2023

Date Reported : Mar 14, 2023

Report Number: 2592611-1

Page 1 of 1

Sample Number 2324977-9
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำหลัก HRSG #1
Measurement Date Mar 07, 2023
Measurement by Norranon Tathongkham

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:33 AM - 09:33 AM	78.3	90.8	62.5
09:33 AM - 10:33 AM	79.7	82.4	79.2
10:33 AM - 11:33 AM	79.6	82.3	78.9
11:33 AM - 12:33 PM	79.9	82.5	79.2
12:33 PM - 01:33 PM	79.7	82.7	79.0
01:33 PM - 02:33 PM	79.7	82.3	79.0
02:33 PM - 03:33 PM	80.0	82.6	79.2
03:33 PM - 04:33 PM	80.2	82.6	79.4

Leq Average 8 hrs. (dB(A))

79.7

Lmax (dB(A))

90.8

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324977

Date Received : Mar 09, 2023

Date Reported : Mar 14, 2023

Report Number: 2592612-1

Page 1 of 1

Sample Number 2324977-10
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำหลัก HRSG #2
Measurement Date Mar 07, 2023
Measurement by Norranon Tathongkham

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:33 PM - 09:33 PM	79.6	81.2	79.4
09:33 PM - 10:33 PM	79.5	82.8	79.3
10:33 PM - 11:33 PM	79.7	84.3	79.4
11:33 PM - 12:33 AM	79.8	80.8	79.6
12:33 AM - 01:33 AM	79.9	82.2	79.5
01:33 AM - 02:33 AM	79.7	81.0	79.3
02:33 AM - 03:33 AM	79.7	81.4	79.4
03:33 AM - 04:33 AM	80.0	81.6	79.7

Leq Average 8 hrs. (dB(A))

79.7

Lmax (dB(A))

84.3

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324977

Date Received : Mar 09, 2023

Date Reported : Mar 14, 2023

Report Number: 2592613-1

Page 1 of 1

Sample Number 2324977-11
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำหลัก HRSG #3
Measurement Date Mar 07, 2023
Measurement by Norranon Tathongkham

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:59 AM - 09:59 AM	78.4	89.3	63.0
09:59 AM - 10:59 AM	79.9	81.4	79.6
10:59 AM - 11:59 AM	79.8	81.9	79.5
11:59 AM - 12:59 PM	79.3	80.2	79.1
12:59 PM - 01:59 PM	79.2	81.4	78.9
01:59 PM - 02:59 PM	79.6	81.8	79.1
02:59 PM - 03:59 PM	79.5	82.6	79.1
03:59 PM - 04:59 PM	79.8	81.7	79.4

Leq Average 8 hrs. (dB(A))

79.5

Lmax (dB(A))

89.3

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2335199

Date Received : Mar 30, 2023

Date Reported : Apr 05, 2023

Report Number: 2613726-1

Page 1 of 1

Sample Number 2335199-3
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำหลัก HRSG #4
Measurement Date Mar 29, 2023
Measurement by Jaradrawee Siruksa

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:33 AM - 09:33 AM	79.6	82.3	79.3
09:33 AM - 10:33 AM	79.4	81.2	79.1
10:33 AM - 11:33 AM	79.0	86.4	78.5
11:33 AM - 12:33 PM	78.9	80.7	78.6
12:33 PM - 01:33 PM	79.1	80.7	78.8
01:33 PM - 02:33 PM	79.2	81.2	78.9
02:33 PM - 03:33 PM	79.3	80.1	79.0
03:33 PM - 04:33 PM	79.4	82.1	79.1

Leq Average 8 hrs. (dB(A))

79.2

Lmax (dB(A))

86.4

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2335199

Date Received : Mar 30, 2023

Date Reported : Apr 05, 2023

Report Number: 2613727-1

Page 1 of 1

Sample Number 2335199-4
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำหลัก HRSG #5
Measurement Date Mar 29, 2023
Measurement by Jaradrawee Siruksa

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:50 AM - 09:50 AM	80.1	82.4	79.4
09:50 AM - 10:50 AM	79.4	82.2	78.6
10:50 AM - 11:50 AM	78.9	79.8	78.5
11:50 AM - 12:50 PM	78.7	80.1	78.4
12:50 PM - 01:50 PM	78.9	80.4	78.5
01:50 PM - 02:50 PM	79.0	80.3	78.7
02:50 PM - 03:50 PM	79.0	80.4	78.6
03:50 PM - 04:50 PM	79.4	80.7	79.1

Leq Average 8 hrs. (dB(A))

79.2

Lmax (dB(A))

82.4

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324977

Date Received : Mar 09, 2023

Date Reported : Mar 14, 2023

Report Number: 2592616-1

Page 1 of 1

Sample Number 2324977-14
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำหลัก HRSG #6
Measurement Date Mar 07, 2023
Measurement by Norranon Tathongkham

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:13 PM - 09:13 PM	77.4	78.1	77.2
09:13 PM - 10:13 PM	77.3	78.0	77.1
10:13 PM - 11:13 PM	77.6	79.1	77.2
11:13 PM - 12:13 AM	77.6	78.8	77.3
12:13 AM - 01:13 AM	77.6	78.5	77.3
01:13 AM - 02:13 AM	77.4	78.6	77.1
02:13 AM - 03:13 AM	77.7	79.8	77.1
03:13 AM - 04:13 AM	78.4	79.8	78.0

Leq Average 8 hrs. (dB(A))

77.6

Lmax (dB(A))

79.8

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O :

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2324977

Date Received : Mar 09, 2023

Date Reported : Mar 14, 2023

Report Number: 2592617-1

Page 1 of 1

Sample Number 2324977-15
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำสำรอง
Measurement Date Mar 07, 2023
Measurement by Norranon Tathongkham

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:37 AM - 09:37 AM	77.1	89.3	63.6
09:37 AM - 10:37 AM	77.9	80.8	77.6
10:37 AM - 11:37 AM	78.1	81.3	77.8
11:37 AM - 12:37 PM	78.8	82.6	77.8
12:37 PM - 01:37 PM	77.8	80.9	77.6
01:37 PM - 02:37 PM	77.9	79.4	77.7
02:37 PM - 03:37 PM	78.1	81.3	77.7
03:37 PM - 04:37 PM	80.0	83.1	78.4

Leq Average 8 hrs. (dB(A))

78.3

Lmax (dB(A))

89.3

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023
Date Reported : Jun 08, 2023
Report Number: 2676073-1

Page 1 of 1

Sample Number 2363198-1
Parameter Noise (Leq 8 hrs.)
Location เครื่องอัดอากาศ
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:28 AM - 10:28 AM	78.4	81.7	77.2
10:28 AM - 11:28 AM	78.3	88.1	77.2
11:28 AM - 12:28 PM	78.5	81.0	77.9
12:28 PM - 01:28 PM	78.5	81.3	78.0
01:28 PM - 02:28 PM	78.1	81.1	77.1
02:28 PM - 03:28 PM	77.5	88.4	76.5
03:28 PM - 04:28 PM	77.8	80.6	77.2
04:28 PM - 05:28 PM	78.1	81.3	77.4

Leq Average 8 hrs. (dB(A))

78.2

Lmax (dB(A))

88.4

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023
Date Reported : Jun 08, 2023
Report Number: 2676074-1

Page 1 of 1

Sample Number 2363198-2
Parameter Noise (Leq 8 hrs.)
Location นอกล่อเย็น
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:23 AM - 10:23 AM	70.3	81.3	69.1
10:23 AM - 11:23 AM	69.4	83.4	68.2
11:23 AM - 12:23 PM	68.9	78.2	68.1
12:23 PM - 01:23 PM	68.6	76.9	67.9
01:23 PM - 02:23 PM	68.6	84.6	67.9
02:23 PM - 03:23 PM	68.6	78.3	67.8
03:23 PM - 04:23 PM	69.1	74.5	68.1
04:23 PM - 05:23 PM	68.8	77.3	68.1

Leq Average 8 hrs. (dB(A))

69.1

Lmax (dB(A))

84.6

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023

Date Reported : Jun 08, 2023

Report Number: 2676075-1

Page 1 of 1

Sample Number 2363198-3
Parameter Noise (Leq 8 hrs.)
Location เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #1
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:36 AM - 10:36 AM	76.6	82.9	75.9
10:36 AM - 11:36 AM	76.6	80.3	76.0
11:36 AM - 12:36 PM	76.6	80.8	75.9
12:36 PM - 01:36 PM	76.6	81.9	75.9
01:36 PM - 02:36 PM	76.4	78.8	75.9
02:36 PM - 03:36 PM	76.5	80.9	76.0
03:36 PM - 04:36 PM	76.9	80.0	76.2
04:36 PM - 05:36 PM	77.0	79.3	76.4

Leq Average 8 hrs. (dB(A))

76.7

Lmax (dB(A))

82.9

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023

Date Reported : Jun 08, 2023

Report Number: 2676076-1

Page 1 of 1

Sample Number 2363198-4
Parameter Noise (Leq 8 hrs.)
Location เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #2
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:40 AM - 10:40 AM	80.7	82.7	80.4
10:40 AM - 11:40 AM	80.6	81.8	80.4
11:40 AM - 12:40 PM	80.6	82.8	80.3
12:40 PM - 01:40 PM	80.6	83.7	80.3
01:40 PM - 02:40 PM	80.7	82.3	80.4
02:40 PM - 03:40 PM	80.6	83.8	80.4
03:40 PM - 04:40 PM	80.8	84.5	80.6
04:40 PM - 05:40 PM	80.9	82.6	80.6

Leq Average 8 hrs. (dB(A))

80.7

Lmax (dB(A))

84.5

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023

Date Reported : Jun 08, 2023

Report Number: 2676077-1

Page 1 of 1

Sample Number 2363198-5
Parameter Noise (Leq 8 hrs.)
Location เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #3
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:40 AM - 10:40 AM	81.1	82.6	80.8
10:40 AM - 11:40 AM	81.0	82.3	80.7
11:40 AM - 12:40 PM	81.0	83.0	80.7
12:40 PM - 01:40 PM	81.0	83.2	80.7
01:40 PM - 02:40 PM	81.1	82.2	80.9
02:40 PM - 03:40 PM	81.2	83.3	80.9
03:40 PM - 04:40 PM	81.2	83.3	81.0
04:40 PM - 05:40 PM	81.2	82.6	80.9

Leq Average 8 hrs. (dB(A))

81.1

Lmax (dB(A))

83.3

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023

Date Reported : Jun 08, 2023

Report Number: 2676078-1

Page 1 of 1

Sample Number 2363198-6
Parameter Noise (Leq 8 hrs.)
Location เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #4
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:53 AM - 10:53 AM	83.0	94.3	82.3
10:53 AM - 11:53 AM	82.9	85.9	82.2
11:53 AM - 12:53 PM	83.0	86.1	82.3
12:53 PM - 01:53 PM	83.1	85.8	82.4
01:53 PM - 02:53 PM	83.2	85.9	82.5
02:53 PM - 03:53 PM	83.1	85.6	82.5
03:53 PM - 04:53 PM	83.3	93.1	82.7
04:53 PM - 05:53 PM	83.1	86.3	82.7

Leq Average 8 hrs. (dB(A))

83.1

Lmax (dB(A))

94.3

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023

Date Reported : Jun 08, 2023

Report Number: 2676079-1

Page 1 of 1

Sample Number 2363198-7
Parameter Noise (Leq 8 hrs.)
Location เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #5
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:52 AM - 10:52 AM	82.0	83.9	81.6
10:52 AM - 11:52 AM	81.9	83.7	81.5
11:52 AM - 12:52 PM	81.9	89.9	81.5
12:52 PM - 01:52 PM	81.9	83.5	81.6
01:52 PM - 02:52 PM	82.0	83.6	81.6
02:52 PM - 03:52 PM	82.2	85.8	81.7
03:52 PM - 04:52 PM	82.0	83.8	81.7
04:52 PM - 05:52 PM	81.9	83.4	81.6

Leq Average 8 hrs. (dB(A))

82.0

Lmax (dB(A))

89.9

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023

Date Reported : Jun 08, 2023

Report Number: 2676080-1

Page 1 of 1

Sample Number 2363198-8
Parameter Noise (Leq 8 hrs.)
Location เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #6
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:06 AM - 11:06 AM	68.9	90.1	66.7
11:06 AM - 12:06 PM	68.2	79.8	66.4
12:06 PM - 01:06 PM	67.6	81.6	66.2
01:06 PM - 02:06 PM	67.9	84.0	66.3
02:06 PM - 03:06 PM	68.2	82.8	66.4
03:06 PM - 04:06 PM	68.3	83.3	66.5
04:06 PM - 05:06 PM	70.4	95.8	66.6
05:06 PM - 06:06 PM	69.6	84.4	66.6

Leq Average 8 hrs. (dB(A))

68.7

Lmax (dB(A))

95.8

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023
Date Reported : Jun 08, 2023
Report Number: 2676081-1

Page 1 of 1

Sample Number 2363198-9
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำหลัก HRSG #1
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:28 AM - 10:28 AM	78.6	80.4	78.2
10:28 AM - 11:28 AM	78.6	80.2	78.2
11:28 AM - 12:28 PM	78.7	80.1	78.3
12:28 PM - 01:28 PM	78.3	79.9	77.9
01:28 PM - 02:28 PM	78.7	84.1	78.0
02:28 PM - 03:28 PM	79.3	81.8	78.6
03:28 PM - 04:28 PM	79.6	82.2	78.9
04:28 PM - 05:28 PM	79.6	82.2	78.9

Leq Average 8 hrs. (dB(A))

79.0

Lmax (dB(A))

84.1

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023

Date Reported : Jun 08, 2023

Report Number: 2676082-1

Page 1 of 1

Sample Number 2363198-10
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำหลัก HRSG #2
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:44 AM - 10:44 AM	79.5	81.1	79.2
10:44 AM - 11:44 AM	79.5	81.4	79.2
11:44 AM - 12:44 PM	79.4	81.1	79.1
12:44 PM - 01:44 PM	79.2	80.1	79.0
01:44 PM - 02:44 PM	79.2	79.9	79.0
02:44 PM - 03:44 PM	79.2	80.2	79.0
03:44 PM - 04:44 PM	79.2	84.8	79.0
04:44 PM - 05:44 PM	79.5	80.4	79.3

Leq Average 8 hrs. (dB(A))

79.3

Lmax (dB(A))

84.8

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023
Date Reported : Jun 08, 2023
Report Number: 2676083-1

Page 1 of 1

Sample Number 2363198-11
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำหลัก HRSG #3
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:44 AM - 10:44 AM	79.9	81.5	79.6
10:44 AM - 11:44 AM	79.8	80.6	79.6
11:44 AM - 12:44 PM	79.8	80.8	79.4
12:44 PM - 01:44 PM	79.5	80.7	79.3
01:44 PM - 02:44 PM	79.5	80.4	79.3
02:44 PM - 03:44 PM	79.6	80.5	79.4
03:44 PM - 04:44 PM	79.8	86.1	79.6
04:44 PM - 05:44 PM	80.0	80.9	79.9

Leq Average 8 hrs. (dB(A))

79.7

Lmax (dB(A))

86.1

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023

Date Reported : Jun 08, 2023

Report Number: 2676084-1

Page 1 of 1

Sample Number 2363198-12
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำหลัก HRSG #4
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:52 AM - 10:52 AM	79.4	80.6	79.1
10:52 AM - 11:52 AM	79.3	80.6	79.1
11:52 AM - 12:52 PM	79.2	80.4	79.0
12:52 PM - 01:52 PM	79.2	80.3	78.9
01:52 PM - 02:52 PM	79.4	81.4	79.0
02:52 PM - 03:52 PM	79.3	80.3	79.0
03:52 PM - 04:52 PM	79.4	80.2	79.1
04:52 PM - 05:52 PM	79.4	80.4	79.1

Leq Average 8 hrs. (dB(A))

79.3

Lmax (dB(A))

81.4

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023
Date Reported : Jun 08, 2023
Report Number: 2676085-1

Page 1 of 1

Sample Number 2363198-13
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำหลัก HRSG #5
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:48 AM - 10:48 AM	80.0	85.0	79.8
10:48 AM - 11:48 AM	79.9	80.6	79.7
11:48 AM - 12:48 PM	79.8	80.5	79.5
12:48 PM - 01:48 PM	79.6	80.2	79.5
01:48 PM - 02:48 PM	79.6	80.1	79.5
02:48 PM - 03:48 PM	79.7	80.2	79.5
03:48 PM - 04:48 PM	79.9	80.4	79.7
04:48 PM - 05:48 PM	80.0	80.5	79.9

Leq Average 8 hrs. (dB(A))

79.8

Lmax (dB(A))

85.0

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023

Date Reported : Jun 08, 2023

Report Number: 2676086-1

Page 1 of 1

Sample Number 2363198-14
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำหลัก HRSG #6
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
10:05 AM - 11:05 AM	65.4	75.4	63.3
11:05 AM - 12:05 PM	64.8	74.7	63.3
12:05 PM - 01:05 PM	65.3	72.4	63.3
01:05 PM - 02:05 PM	65.3	72.7	63.4
02:05 PM - 03:05 PM	65.0	71.1	63.4
03:05 PM - 04:05 PM	65.0	70.3	63.3
04:05 PM - 05:05 PM	65.5	80.0	63.3
05:05 PM - 06:05 PM	67.5	85.9	63.5

Leq Average 8 hrs. (dB(A))

65.6

Lmax (dB(A))

85.9

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2363198

Date Received : Jun 02, 2023

Date Reported : Jun 08, 2023

Report Number: 2676087-1

Page 1 of 1

Sample Number 2363198-15
Parameter Noise (Leq 8 hrs.)
Location หน่วยผลิตไอน้ำสำรอง
Measurement Date Jun 01, 2023
Measurement by Tarin Octjinda

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:29 AM - 10:29 AM	78.8	82.0	77.9
10:29 AM - 11:29 AM	78.6	82.4	77.8
11:29 AM - 12:29 PM	78.7	81.9	77.8
12:29 PM - 01:29 PM	78.7	81.9	77.9
01:29 PM - 02:29 PM	78.8	81.8	77.9
02:29 PM - 03:29 PM	78.9	81.9	78.0
03:29 PM - 04:29 PM	79.0	83.0	78.0
04:29 PM - 05:29 PM	78.7	81.8	77.9

Leq Average 8 hrs. (dB(A))

78.8

Lmax (dB(A))

83.0

Standard (dB(A))

90

140

Reference Method : ISO1996-1 and 1996-2

Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย
ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management

Thanita K.

Thanita Kulsuriwong
Scientist (4)

Approved by

Supot S.

Supot Salamteh
Section Head

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 232837

Date Received : Feb 14, 2023

Date Reported : Feb 21, 2023

Report Number : 2545781-1

Page 1 of 1

Sample Number	232837-1
Sampled Date	Feb 14, 2023 10:50 AM
Sample Description	Wastewater
Location	บ่อตรวจวัดคุณภาพน้ำทิ้งของโครงการ
Date Analysis Commenced	Feb 14, 2023
Condition of Sample	Contained in one amber glass 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	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B	Rayong
Oil & Grease *	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C *		-	-	7.4	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	30.6	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	480	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	10	≤200	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

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

Sampling By : Tanasit Wongsachai ทะเบียนเลขที่ ว-323-จ-9460

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING

No.0042

Lot ID: 2330437

Date Received : Apr 11, 2023

Date Reported : Apr 20, 2023

Report Number : 2597725-1

Client : Global Power Synergy Public Company Limited

92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location: CUP 1

Page 1 of 1

Sample Number	2330437-1
Sampled Date	Apr 11, 2023 11:05 AM
Sample Description	Wastewater
Location	บ่อตรวจวัดคุณภาพน้ำทิ้งของโครงการ
Date Analysis Commenced	Apr 11, 2023
Condition of Sample	Contained in one amber glass 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	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B	Rayong
Oil & Grease *	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C *		-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	32.9	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	290	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	12	≤200	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

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

Sampling By : Tanasit Wongsachai ทะเบียนเลขที่ ว-323-จ-9460

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

TESTING
No.0042

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand 21150

P/O : DA41002956

Project Name : Monitoring

Project Location : CUP 1

Lot ID: 2363199

Date Received : Jun 13, 2023

Date Reported : Jun 20, 2023

Report Number : 2668798-1

Page 1 of 1

Sample Number	2363199-1
Sampled Date	Jun 13, 2023 11:50 AM
Sample Description	Wastewater
Location	บ่อดักน้ำเสียจากน้ำทิ้งของโครงการ
Date Analysis Commenced	Jun 13, 2023
Condition of Sample	Contained in one amber glass 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	-	2.0	<2.0	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
Oil & Grease *	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH at 25 degree C *		-	-	7.8	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	32.3	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Dissolved Solids Dried at 180 degree C	mg/L	-	5	304	≤3000	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 C	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	9	≤200	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2540 D	Rayong

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

Sampling By : Chainusorn Lertnanthakunchai ทะเบียนเลขที่ ว-323-จ-9461

Remark :

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

Technical Management

N. Banchongkit

Narumon Banchongkit

Supervisor

ทะเบียนเลขที่ ว-323-จ-9445

Approved by

D. Changchon

Dej Changchon

Senior Manager

ทะเบียนเลขที่ ว-323-ค-9442

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

ADDRESS 616/10 Moo 5 T. Maenam Khu A. Pluakdaeng Rayong 21140 Thailand | PHONE +66 0 3304 8555 | FAX +66 0 3304 8556
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand
21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2324972
Date Received : Mar 09, 2023
Date Reported : Mar 13, 2023
Report Number: 2584428-1

Page 1 of 9

Sample Number 2324972-1
Parameter Heat Stress (Sampling Time : 09.00 AM -11.00 AM)
Measurement Date Mar 08, 2023
Measurement by Norranon Tathongkham
Location ปฏิบัติงาน 1 พื้นที่ (ชื่อ-นามสกุล ผู้ปฏิบัติงาน : - แผนก : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #1	120	27.9	25.7	33.0	32.0
Average (WBGT)		27.9			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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. 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 Salamteh
Section Head

Approved by

Wichan Choonharat
Assistant Manager

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



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand
21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2324972
Date Received : Mar 09, 2023
Date Reported : Mar 13, 2023
Report Number: 2584428-1

Page 2 of 9

Sample Number 2324972-2
Parameter Heat Stress (Sampling Time : 09.00 AM -11.00 AM)
Measurement Date Mar 08, 2023
Measurement by Norranon Tathongkham
Location ปฏิบัติงาน 1 พื้นที่ (ชื่อ-นามสกุล ผู้ปฏิบัติงาน : - แผนก : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #2	120	28.1	26.0	33.1	31.9
Average (WBGT)		28.1			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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. 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 Salamteh
Section Head

Approved by

Wichan Choonharat
Assistant Manager

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



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand
21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2324972
Date Received : Mar 09, 2023
Date Reported : Mar 13, 2023
Report Number: 2584428-1

Page 3 of 9

Sample Number 2324972-3
Parameter Heat Stress (Sampling Time : 09.00 AM -11.00 AM)
Measurement Date Mar 08, 2023
Measurement by Norranon Tathongkham
Location ปฏิบัติงาน 1 พื้นที่ (ชื่อ-นามสกุล ผู้ปฏิบัติงาน : - แผนก : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #3	120	28.8	26.3	34.6	34.5
Average (WBGT)		28.8			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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. 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 Salamteh
Section Head

Approved by

Wichan Choonharat
Assistant Manager

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



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand
21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2324972
Date Received : Mar 09, 2023
Date Reported : Mar 13, 2023
Report Number: 2584428-1

Page 4 of 9

Sample Number 2324972-6
Parameter Heat Stress (Sampling Time : 11.00 AM - 01.00 PM)
Measurement Date Mar 08, 2023
Measurement by Norranon Tathongkham
Location ปฏิบัติงาน 1 พื้นที่ (ชื่อ-นามสกุล ผู้ปฏิบัติงาน : - แผนก : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
เครื่องกำเนิดไฟฟ้ากังหันก๊าซ #6	120	27.9	25.2	34.3	33.7
Average (WBGT)		27.9			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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. 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 Salamteh
Section Head

Approved by

Wichan Choonharat
Assistant Manager

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



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand
21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2324972
Date Received : Mar 09, 2023
Date Reported : Mar 13, 2023
Report Number: 2584428-1

Page 5 of 9

Sample Number 2324972-7
Parameter Heat Stress (Sampling Time : 09.00 AM - 11.00 AM)
Measurement Date Mar 08, 2023
Measurement by Norranon Tathongkham
Location ปฏิบัติงาน 1 พื้นที่ (ชื่อ-นามสกุล ผู้ปฏิบัติงาน : - แผนก : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
หน่วยผลิตไอน้ำหลัก HRSG #1	120	29.1	25.8	37.0	35.9
Average (WBGT)		29.1			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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. 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 Salamteh
Section Head

Approved by

Wichan Choonharat
Assistant Manager

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



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand
21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2324972
Date Received : Mar 09, 2023
Date Reported : Mar 13, 2023
Report Number: 2584428-1

Page 6 of 9

Sample Number 2324972-8
Parameter Heat Stress (Sampling Time : 09.00 AM - 11.00 AM)
Measurement Date Mar 08, 2023
Measurement by Norranon Tathongkham
Location ปฏิบัติงาน 1 พื้นที่ (ชื่อ-นามสกุล ผู้ปฏิบัติงาน : - แผนก : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
หน่วยผลิตไอน้ำหลัก HRSG #2	120	27.9	25.4	34.3	32.9
Average (WBGT)		27.9			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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. 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 Salamteh
Section Head

Approved by

Wichan Choonharat
Assistant Manager

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



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand
21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2324972
Date Received : Mar 09, 2023
Date Reported : Mar 13, 2023
Report Number: 2584428-1

Page 7 of 9

Sample Number 2324972-9
Parameter Heat Stress (Sampling Time : 09.00 AM - 11.00 AM)
Measurement Date Mar 08, 2023
Measurement by Norranon Tathongkham
Location ปฏิบัติงาน 1 พื้นที่ (ชื่อ-นามสกุล ผู้ปฏิบัติงาน : - แผนก : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
หน่วยผลิตไอน้ำหลัก HRSG #3	120	28.3	25.9	34.2	32.9
Average (WBGT)		28.3			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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. 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 Salamteh
Section Head

Approved by

Wichan Choonharat
Assistant Manager

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



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand
21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2324972
Date Received : Mar 09, 2023
Date Reported : Mar 13, 2023
Report Number: 2584428-1

Page 8 of 9

Sample Number 2324972-12
Parameter Heat Stress (Sampling Time : 11.00 AM - 01.00 PM)
Measurement Date Mar 08, 2023
Measurement by Norranon Tathongkham
Location ปฏิบัติงาน 1 พื้นที่ (ชื่อ-นามสกุล ผู้ปฏิบัติงาน : - แผนก : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
หน่วยผลิตไอน้ำหลัก HRSG #6	120	28.7	25.3	37.2	35.6
Average (WBGT)		28.7			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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. 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 Salamteh
Section Head

Approved by

Wichan Choonharat
Assistant Manager

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



Analysis / Test Report

Client : Global Power Synergy Public Company Limited
92/9, Rayong Highway Road 3191, Map Ta Phut, Mueang, Rayong Thailand
21150
P/O : DA41002956
Project Name : Monitoring
Project Location : CUP 1

Lot ID: 2324972
Date Received : Mar 09, 2023
Date Reported : Mar 13, 2023
Report Number: 2584428-1

Page 9 of 9

Sample Number 2324972-13
Parameter Heat Stress (Sampling Time : 09.00 AM - 11.00 AM)
Measurement Date Mar 08, 2023
Measurement by Norranon Tathongkham
Location ปฏิบัติงาน 1 พื้นที่ (ชื่อ-นามสกุล ผู้ปฏิบัติงาน : - แผนก : -)

Location	Duration (min)	WBGT (°C)	NWB (°C)	GT (°C)	DB (°C)
หน่วยผลิตไอน้ำสำรอง	120	30.1	26.8	38.0	37.6
Average (WBGT)		30.1			
Guideline WBGT (°C)		34.0			

Reference Method : Wet Bulb Globe Temperature

Guideline:

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. 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 Salamteh
Section Head

Approved by

Wichan Choonharat
Assistant Manager

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

ภาคผนวก ง

ใบรับรองการสอบเทียบเครื่องมือ



right solutions.
right partner.

รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Stack (CEMs)	Carbon Monoxide	Analyzer , System calibration, Standard gas	-	-	-	-
Stack (CEMs)	Oxides of Nitrogen	Analyzer , System calibration, Standard gas	-	-	-	-
Stack	Total Suspended Particulate	Console Control Unit	BKK_FS0468	13-Jan-23	13-Jul-23	6
Stack	Total Suspended Particulate	Console Control Unit	RYG_FS0315	13-Jan-23	13-Jul-23	6
Stack	Total Suspended Particulate	Console Control Unit	BKK_FS0556	13-Jan-23	13-Jul-23	6
Stack	Total Suspended Particulate	Flue gas Analyzer	RYG_FS0465	23-Jan-23	23-Jan-24	12
Stack	Total Suspended Particulate	Flue gas Analyzer	RYG_FS0564	20-Jan-23	20-Jan-24	12
Stack	Total Suspended Particulate	Digital Balance	RYG_EN0003	1-Mar-23	1-Mar-24	12
Ambient	Total Suspended Particulate	High Volume	RYG_FS0173	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0291	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0173	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0291	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0393	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0291	-	-	On site Calibration
Ambient	Total Suspended Particulate	Digital Balance	RYG_EN0001	1-Mar-23	1-Mar-24	12
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0453	5-Jan-23	5-Jul-23	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0457	5-Jan-23	5-Jul-23	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0453	5-Jan-23	5-Jul-23	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0457	5-Jan-23	5-Jul-23	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	BKK_FS1064	5-Jan-23	5-Jul-23	6
Ambient	Nitrogen Dioxide	NO ₂ Analyzer	RYG_FS0461	5-Jan-23	5-Jul-23	6
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0412	10-Feb-23	10-Aug-24	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0412	10-Feb-23	10-Aug-24	18
Ambient	Wind Speed / Wind Direction	Wind Speed / Wind Direction	RYG_FS0329	31-Jan-22	29-Jul-23	18
Workplace	Ammonia	Field Rotameter	BKK_FS1040	3-Jan-23	3-Apr-23	3
Workplace	Ammonia	SPECTROPHOTOMETER	RYG_EN0037	27-Sep-22	27-Mar-24	18
Workplace	Sodium hydroxide	Field Rotameter	BKK_FS1040	3-Jan-23	3-Apr-23	3
Workplace	Chlorine	Field Rotameter	BKK_FS1040	3-Jan-23	3-Apr-23	3
Workplace	Hydrogen Chloride	Field Rotameter	BKK_FS1004	3-Jan-23	3-Apr-23	3
Workplace	Hydrogen Chloride	Ion Chromatography	BKK_EN0069	12-Jan-23	12-Jan-24	12
Noise	Leq 24 hrs	Sound Calibrator	RYG_FS0496	17-Jan-23	17-Jan-24	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0027	13-Jan-23	13-Jan-24	12
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0215	31-Aug-22	31-Aug-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0617	20-Oct-22	20-Oct-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0619	20-Oct-22	20-Oct-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0027	13-Jan-23	13-Jan-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0620	20-Oct-22	20-Oct-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0621	20-Oct-22	20-Oct-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0618	20-Oct-22	20-Oct-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0029	24-May-22	24-May-23	12
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0215	31-Aug-22	31-Aug-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0018	3-Jan-23	3-Jan-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0019	13-Jan-23	13-Jan-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0020	13-Jan-23	13-Jan-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0022	25-Jan-23	25-Jan-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0023	13-Jan-23	13-Jan-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0434	25-Jan-23	25-Jan-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0614	12-Oct-22	12-Oct-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0615	12-Oct-22	12-Oct-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0616	12-Oct-22	12-Oct-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0617	20-Oct-22	20-Oct-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0620	20-Oct-22	20-Oct-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0621	20-Oct-22	20-Oct-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0386	26-Aug-22	26-Aug-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0431	25-Jan-23	25-Jan-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0433	25-Jan-23	25-Jan-24	12
Noise	Leq 8 hrs	Sound Calibrator	RYG_FS0215	31-Aug-22	31-Aug-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0620	20-Oct-22	20-Oct-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0020	13-Jan-23	13-Jan-24	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0619	20-Oct-22	20-Oct-23	12
Noise	Leq 8 hrs	Sound Level Meter	RYG_FS0019	13-Jan-23	13-Jan-24	12



right solutions.
right partner.

รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0218	14-Feb-23	14-Feb-24	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0219	14-Feb-23	14-Feb-24	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0220	3-Feb-23	3-Feb-24	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0223	3-Feb-23	3-Feb-24	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0224	14-Feb-23	14-Feb-24	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0228	25-Aug-22	25-Aug-23	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0230	25-Aug-22	25-Aug-23	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0224	14-Feb-23	14-Feb-24	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0226	27-Feb-23	27-Feb-24	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0358	02-Feb-23	2-Feb-24	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0359	02-Feb-23	2-Feb-24	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0228	25-Aug-22	25-Aug-23	12
Heat	Heat Stress	Heat Stress Monitor	RYG_FS0230	25-Aug-22	25-Aug-23	12
Rayong Lab	BOD	DO meter with Sensor	RYG_EN0032	14-Feb-22	15-Aug-23	18
Rayong Lab	BOD	Incubator	RYG_EN0154	22-Apr-22	21-Oct-23	18
Rayong Lab	Oil & Grease	Electronic Balance	RYG_EN0002	1-Mar-23	1-Mar-24	12
Rayong Lab	Oil & Grease	Hot Air Oven	RYG_EN0006	20-Oct-22	20-Apr-24	18
Rayong Lab	Oil & Grease	Water Bath	RYG_EN0061	20-Oct-22	20-Apr-24	18
Rayong Lab	pH at 25 °C	pH meter	RYG_EN0183	27-Feb-23	27-Feb-24	12
Rayong Lab	Temperature	Digital Thermometer With Sensor	RYG_FS0469	31-Aug-22	31-Aug-23	12
Rayong Lab	Total Dissolved Solids 180°C	Electronic Balance	RYG_EN0002	1-Mar-23	1-Mar-24	12
Rayong Lab	Total Dissolved Solids 180°C	Hot Air Oven	RYG_EN0010	20-Oct-22	20-Apr-24	18
Rayong Lab	Total Suspended Solids	Electronic Balance	RYG_EN0002	1-Mar-23	1-Mar-24	12
Rayong Lab	Total Suspended Solids	Hot Air Oven	RYG_EN0010	20-Oct-22	20-Apr-24	18



Time (min)	CO ₂ (g)	DO ₂ (g)	NO ₂ (g)	SO ₂ (g)	CO (g)	Report
11:12	14.03	2.46	9.81		1.22	
11:13	14.83	2.56	9.81		1.14	
11:14	15.44	2.52	9.74		1.28	
11:16	16.03	2.51	9.68		1.28	
11:18	16.63	2.52	9.71		1.18	
11:17	16.62	2.47	9.84		1.23	
11:18	16.84	2.52	9.80		1.18	
11:19	16.84	2.52	9.88		1.24	
11:20	16.92	2.51	9.87		1.20	
11:21	16.94	2.50	9.85		1.17	
11:22	16.83	2.51	9.89		1.10	
11:23	16.48	2.49	9.85		1.10	
11:24	16.87	2.49	9.80		1.05	
11:25	16.87	2.48	9.77		0.90	
11:26	16.89	2.49	9.80		1.04	
11:27	16.68	2.47	9.83		0.97	
11:28	16.69	2.48	9.80		0.93	
11:29	16.72	2.44	9.84		0.92	
11:30	16.74	2.47	9.86		0.93	
11:31	16.83	2.47	9.88		0.95	
11:32	16.88	2.48	9.78		0.88	
11:33	16.88	2.48	9.80		0.88	

FORM NO. 1 (05-08) REVISED 2-00 (SEE INSTRUCTIONS)



	Cylinder Value (%)	Initial Analyzers Calibration Response (%)	Final Analyzers Calibration Response (%)	Difference (Percent of Span)
Zero Gas	0.00	-0.05	-0.01	0.04
Low-Level Gas	0.04	7.99	8.03	0.04

NO _x ANALYZER			
Model	TELEDYNE API 300EH	Serial No.	125
Span (ppm)	100		
	Cylinder Value	Initial Analyzer	Final Analyzer
			Difference

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	-0.06	-0.01	0.05
Low-Level Gas	54.98	54.90	54.90	0.05
High-Level Gas	70.47	70.40	70.47	-0.04

CO ANALYZER		Serial No.	
Model	TELEVIEW API 3000M		425
Span (ppm)	2500		
	Cylinder Value	Initial Analyzed	Final Analyzed
			Difference

Collected by
Sakot P
(Mr Sakot Phaisanphit) 206-11
Environmental Field Scientist (4)



	O ₂ Analyzer Calibration Response	Initial Values		Final Values		Diff (% of Span)
		System Calibration Response	System Cell Size (% of Span)	System Calibration Response	System Cell Size (% of Span)	
Zero Gas	-0.05	-0.05	0.00	-0.01	0.18	0.18
Span Gas	15.04	14.90	0.00	14.90	0.00	0.00

NO ₂ ANALYZER		Span (ppm) : 100			
Cylinder Conc. (ppm) : 78.42					
NO ₂ Analyzer Calibration	Initial values		Final values		Diff
	System	System	System	System	

	Response	(% of Span)	Response	(% of Span)
Zero Gas	-0.06	0.00	0.06	0.00
Hydrogen Gas	75.36	0.00	18.41	0.00

CO ANALYZER

Cylinder Conc. (ppm) : 2003.00 Span (ppm) : 2900

	CO Analyzer Calibration Response	Initial values		Final values		Diff (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	-0.04	-0.04	0.00	-0.01	0.00	0.00

Calibrated by
Sekit P
(Mr Sekit Phasomphit)
Environmental Field Scientist (4)
FORM IN-1 F 06-02 REVISION NO: 2 ISSUE DATE: 2007

[illegible]

Sakot P
(Mr Sakot Phasanyouan)
Environmental Field Scientist (II)



Time (min)	Si (%)	SiO ₂ (%)	MS (µg/ml)	SiO ₂ (µg/ml)	COI (µg/ml)	Remarks
00:41	14.51	5.60	16.93	16.93	536.14	
00:42	14.34	5.53	16.93	16.93	587.87	
00:43	14.34	5.53	16.94	16.94	676.78	
00:44	14.34	5.53	16.93	16.93	676.78	
00:45	14.34	5.53	16.93	16.93	676.78	
00:46	14.34	5.53	16.93	16.93	676.78	
00:47	14.34	5.53	16.93	16.93	676.78	
00:48	14.34	5.53	16.93	16.93	676.78	
00:49	14.34	5.53	16.97	16.97	676.78	
00:50	14.34	5.53	16.97	16.97	676.78	
00:51	14.34	5.57	17.02	17.02	688.31	
00:52	14.34	5.57	17.02	17.02	688.31	
00:53	14.34	5.57	17.02	17.02	688.31	
00:54	14.34	5.57	17.02	17.02	688.31	
00:55	14.34	5.57	17.02	17.02	688.31	
00:56	14.34	5.57	17.02	17.02	688.31	
00:57	14.34	5.57	17.02	17.02	688.31	
00:58	14.34	5.57	17.02	17.02	688.31	
00:59	14.34	5.57	17.02	17.02	688.31	
01:00	14.34	5.57	17.02	17.02	688.31	
01:01	14.34	5.57	17.02	17.02	688.31	
01:02	14.34	5.57	17.02	17.02	688.31	
01:03	14.34	5.57	17.02	17.02	688.31	
01:04	14.34	5.57	17.02	17.02	688.31	
01:05	14.34	5.57	17.02	17.02	688.31	
01:06	14.34	5.57	17.02	17.02	688.31	
01:07	14.34	5.57	17.02	17.02	688.31	
01:08	14.34	5.57	17.02	17.02	688.31	
01:09	14.34	5.57	17.02	17.02	688.31	
01:10	14.34	5.57	17.02	17.02	688.31	
01:11	14.34	5.57	17.02	17.02	688.31	
01:12	14.34	5.57	17.02	17.02	688.31	
01:13	14.34	5.57	17.02	17.02	688.31	
01:14	14.34	5.57	17.02	17.02	688.31	
01:15	14.34	5.57	17.02	17.02	688.31	
01:16	14.34	5.57	17.02	17.02	688.31	
01:17	14.34	5.57	17.02	17.02	688.31	
01:18	14.34	5.57	17.02	17.02	688.31	
01:19	14.34	5.57	17.02	17.02	688.31	
01:20	14.34	5.57	17.02	17.02	688.31	
01:21	14.34	5.57	17.02	17.02	688.31	
01:22	14.34	5.57	17.02	17.02	688.31	
01:23	14.34	5.57	17.02	17.02	688.31	
01:24	14.34	5.57	17.02	17.02	688.31	
01:25	14.34	5.57	17.02	17.02	688.31	
01:26	14.34	5.57	17.02	17.02	688.31	
01:27	14.34	5.57	17.02	17.02	688.31	
01:28	14.34	5.57	17.02	17.02	688.31	
01:29	14.34	5.57	17.02	17.02	688.31	
01:30	14.34	5.57	17.02	17.02	688.31	
01:31	14.34	5.57	17.02	17.02	688.31	
01:32	14.34	5.57	17.02	17.02	688.31	
01:33	14.34	5.57	17.02	17.02	688.31	
01:34	14.34	5.57	17.02	17.02	688.31	
01:35	14.34	5.57	17.02	17.02	688.31	
01:36	14.34	5.57	17.02	17.02	688.31	
01:37	14.34	5.57	17.02	17.02	688.31	
01:3						

(Mr. Sakshi Phalgaonkar)



Time point	Q ₁₀ (s)	CO ₂ (%)	Min (g/s)	EO ₂ (g/s)	CO (g/s)	Remarks
1:02	1:39	3.50	17.30	-	47.43	
1:05	1:39	3.50	17.15	-	47.43	
1:10	1:39	3.50	17.15	-	47.43	
1:15	1:47	3.50	17.15	-	50.12	
1:20	1:49	3.50	17.15	-	48.32	
1:27	1:49	3.50	17.27	-	50.19	
1:30	1:49	3.50	17.27	-	47.51	
1:35	1:47	3.50	17.12	-	47.52	
1:40	1:47	3.50	17.15	-	47.51	
1:42	1:49	3.50	17.22	-	47.54	
1:45	1:47	3.50	17.28	-	48.38	
1:49	1:50	3.50	17.28	-	47.76	
1:52	1:50	3.50	17.22	-	48.38	
1:55	1:52	3.50	17.24	-	48.38	
1:57	1:52	3.50	17.22	-	47.52	
1:59	1:50	3.50	17.22	-	47.52	
2:00	1:50	3.50	17.22	-	48.38	
2:01	1:50	3.50	17.22	-	47.52	
2:02	1:50	3.50	17.22	-	47.52	
2:03	1:50	3.50	17.22	-	47.52	
2:04	1:50	3.50	17.22	-	47.52	
2:05	1:50	3.50	17.22	-	47.52	
2:06	1:50	3.50	17.22	-	47.52	
2:07	1:50	3.50	17.22	-	47.52	
2:08	1:50	3.50	17.22	-	47.52	
2:09	1:50	3.50	17.22	-	47.52	
2:10	1:50	3.50	17.22	-	47.52	
2:11	1:50	3.50	17.22	-	47.52	
2:12	1:50	3.50	17.22	-	47.52	
2:13	1:50	3.50	17.22	-	47.52	
2:14	1:50	3.50	17.22	-	47.52	
2:15	1:50	3.50	17.22	-	47.52	
2:16	1:50	3.50	17.22	-	47.52	
2:17	1:50	3.50	17.22	-	47.52	
2:18	1:50	3.50	17.22	-	47.52	
2:19	1:50	3.50	17.22	-	47.52	
2:20	1:50	3.50	17.22	-	47.52	
2:21	1:50	3.50	17.22	-	47.52	
2:22	1:50	3.50	17.22	-	47.52	
2:23	1:50	3.50	17.22	-	47.52	
2:24	1:50	3.50	17.22	-	47.52	
2:25	1:50	3.50	17.22	-	47.52	
2:26	1:50	3.50	17.22	-	47.52	
2:27	1:50	3.50	17.22	-	47.52	
2:28	1:50	3.50	17.22	-	47.52	
2:29	1:50	3.50	17.22	-	47.52	
2:30	1:50	3.50	17.22	-	47.52	
2:31	1:50	3.50	17.22	-	47.52	
2:32	1:50	3.50	17.22	-	47.52	
2:33	1:50	3.50	17.22	-	47.52	
2:34	1:50	3.50	17.22	-	47.52	
2:35	1:50	3.50	17.22	-	47.52	
2:36	1:50	3.50	17.22	-	47.52	
2:37	1:50	3.50	17.22	-	47.52	
2:38	1:50	3.50	17.22	-	47.52	
2:39	1:50	3.50	17.22	-	47.52	
2:40	1:50	3.50	17.22	-	47.52	
2:41	1:50	3.50	17.22	-	47.52	
2:42	1:50	3.50	17.22	-	47.52	
2:43	1:50	3.50	17.22	-	47.52	
2:44	1:50	3.50	17.22	-	47.52	
2:45	1:50	3.50	17.22	-	47.52	
2:46	1:50	3.50	17.22	-	47.52	
2:47	1:50	3.50	17.22	-	47.52	
2:48	1:50	3.50				

Sakot P
(Mr Sakot Phasaphant)
Environmental Field Scientist (4)



Expiration Date: Dec 23, 2028

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No.	Concentration	Uncertainty	Expiration Date
NTRM	11011103	HA104536	97.31 PPM CARBON MONOXIDE/NITROGEN	< 0.8%	09/04/2022
PMMA	12188	088629	9.91 PPM NITROGEN/DIOXIDE	2.0%	Feb 28, 2021
NTRM	12181229	088629 128	146.1 PPM NITRO: CARBON DIOXIDE	< 1.0%	04/23/2021
CALC	12433663	DC131767	4.024 PPM NITROGEN/DIOXIDE/NITROGEN	2.1%	Aug 16, 2021
NTRM	10710053	KAL625087	87.68 PPM SULFUR DIOXIDE/NITROGEN	< 0.8%	Dec 31, 2021

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multi-Element Calibration
Perkin Elmer 7000 ICP-AES	ICP-AES	Dec 10, 2020
Perkin Elmer 7000 ICP-AES	ICP-AES	Mar 18, 2020

Product Code: FTB-AU-0101042-01 Price: \$95.00, \$100.00
 Product Code: FTB-AU-0101043-01 Price: \$95.00, \$100.00

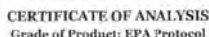
Trusted Data Available Upon Request

NOTES:
 Gross Weight: 27.5 Kg



Fast Viewport: 4.7 Kg

Michael A. Bailey



Expiration Date: Feb 27, 2029

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No.	Concentration	Uncertainty	Expiration Date
118M	14680152	02819885	49.48 PPM CARBON MONOXIDE/NITROGEN	±0.05%	Feb 17, 2008
118M	121360	02860020	0.31 PPM AIR/NITROGEN DILUTE	±0%	Feb 22, 2008
118M	200911-08	02199888	49.82 PPM NITRIC OXIDE/NITROGEN	±0.05%	Feb 22, 2009
0405	12442466	02122897	4.108 PPM HYDROGEN DIOXIDE/NITROGEN	±0%	Aug 15, 2001
0405	2141709	03610790	40.62 PPM SULFUR DIOXIDE/NITROGEN	±0.15%	Jun 22, 2002

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nesotec 650 FTR ALP2010248 C23	FTR	Feb 04, 2021
Nesotec 230 FTR ALP2010248 C23	FTR	Feb 11, 2021
Nesotec 650 FTR ALP2010248 C23	FTR	Feb 22, 2021
Nesotec 650 FTR ALP2010248 C23	FTR	Feb 18, 2021

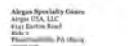
Test Data Available Upon Request

NOTES:
Gross Weight: 25.0 Kg
Net Weight: 8.8 Kg



Approved for Release

Page 1 of 103-40010199



Labatory:	134 - Riverbend (SAP) - NJ	Cylinder Pressure:	2315 PSIG
PG/PP Number:	812018	Valve Outlet:	062
Gas Color:	CO, NO, NOX, SO2, BALN	Certification Date:	Feb 28, 2018
Expiration Date:		Feb 28, 2020	

Type		Lot ID	Cylinder No.	Calibration Standards	Molar Ratio	Expiration Date
HTPA	1428723	05244981	48.43 PPM CARBON DIOXIDE/NITROGEN	+0.4%	Feb 12, 2010	
HTPA	1428723	05244982	48.43 PPM CARBON DIOXIDE/NITROGEN	+0.4%	Feb 12, 2010	
HTPA	1505687	03043584	50.45 PPM NITRIC DIOXIDE/NITROGEN	+0.2%	Jan 27, 2010	
HTPA	1505687	03043585	49.45 PPM NITRIC DIOXIDE/NITROGEN	+0.18%	Mar 18, 2010	
HTPA	1505687	03043586	49.45 PPM NITRIC DIOXIDE/NITROGEN	+0.18%	Mar 18, 2010	
HTPA	1505687	03043587	49.45 PPM NITRIC DIOXIDE/NITROGEN	+0.18%	Mar 18, 2010	

ANALYTICAL EQUIPMENT			
Instrument/Make/Model	Analytical Principle	Last Calibration Certificate	
Model-6105 APV1106281 DQ	FIRMS	Feb 28, 2018	
Model-6105 APV1106281 DQ	FIRMS	Feb 15, 2018	
Model-6105 APV1106281 DQ	FIRMS	Feb 15, 2018	
Model-6105 APV1106281 DQ	FIRMS	Feb 15, 2018	

(Full Data Available Upon Request)

087103

The contractor has been certified in accordance with the May 2012 EPA Transparency Protocol.
Passport ID#069035811. All testing programs and measurements conform to the requirements of
EPA/OSW-11204 and are done by EPA Region 9 staff and state staff as listed below on the certificate.

statement that can be introduced in litigation without approval of the court.

TESTING CERT No. 3083AS


Approved for Release

Page 1 of 33-48932000-1



Pitot

Pilot Tube Identification Number :	B90K_F05060	Calibration Date :	13 Jan 23
Lab test duct Number :	258-1-13-01	Standard Pilot ID :	B90K_F05044
Calibration Sheet No. :	C-130123-B90K_F05060	Cp Standard :	0.99

Type 5 Pilot Value Coefficient Data					
	Type = pilot value Lag A,B	Standard pilot Value $(\Delta V_{\text{pilot}})_{\text{mean}}(Z)$	Type = pilot Value $(\Delta V_{\text{pilot}})_{\text{mean}}(Z)$	Cir (0) Lag A	Cir (0) Lag B
Test 1	A	32.00	37.00	0.040	
	B	32.00	32.00		0.000
Test 2	A	32.00	37.00	0.040	
	B	32.00	37.00		0.040
Test 3	X	32.00	30.00	0.045	
	B	35.00	30.00		0.045
Total			0.042	0.007	

$$Q_{PSD} = C_P = \sqrt{\frac{\Delta P_{PSD}}{\Delta P_{(A)}}}$$

$$|C_{P(A)} - C_{P(B)}|_{\max} \leq 0.01$$

$$\text{Average deviation } A \text{ or } B = \frac{\sum [C_P(n) - Q_{PSD} \text{ or } B]}{J} \quad \max |B| \leq 0.01$$

Approved by: Mathapan Jeyarajasingh
(Mr Mathapan Jeyarajasingh)
Specialist (T)

Downloaded At: 11:53 11 September 2009

© 2004 Blackwell Publishing Ltd *Journal of Internal Medicine* 255: 111–117

PS

Calibration Date: 13-Jan-23	Nozzle Set ID: B9KJ100402		
Calibration Sheet No.: C-130123-B9KJ100062	Vendor Caliper ID: B9KJ111123		
Reactor ID#	Nozzle Diameter (mm)	18.10	$d_1 + d_2 + d_3 / 3$

Nuclei Z, N	Nuclear Diameter (fm.)			Δr	$\Delta \rho$	$(\rho/\rho_0)^{1/2} \times 10^{12} \text{ g/cm}^3$
	D_N	D_Z	D_A			
1	0.330	0.336	0.352	0.008	0.503	
2	0.490	0.475	0.488	0.006	0.478	
3	0.628	0.630	0.630	0.005	0.626	
4	0.755	0.750	0.766	0.015	0.757	
5	0.975	0.980	0.970	0.010	0.975	
6	1.095	1.090	1.090	0.005	1.093	
7	1.275	1.275	1.270	0.005	1.273	
8	1.610	1.610	1.610	0.000	1.610	

Notes:

- D_1, D_2, D_3 → three different nozzle diameters, at 90 degrees to each other, each measured the nearest 0.025 mm.
- h → minimum distance between any two diameters.
- total $h \leq 100$ mm.
- $D_1 + D_2 + D_3 \geq 2$

Accepted by _____
(Mr. Kallappa Jangamanna)

PROBE NOZZLE DIAMETER
CALIBRATION DATA SHEET

Calibration Date:	13 Jan 23	Nozzle Set ID:	BNK_130602
Calibration Sheet No.:	C_130123-BNK_130602	Verier Caliper ID:	BNK_131123
Formula ID: 6	Nozzle Diameter (mm)	FB - Lo	$(D_1 + D_2 + D_3) / 3$

Fig. 2.1	Nucleic Acid (g/L)			pH	A ₂₁₀	A ₂₆₀
	D ₁	D ₂	D ₃			
1	0.300	0.306	0.302	0.999	0.303	
2	0.400	0.475	0.400	0.999	0.478	
3	0.625	0.630	0.600	0.999	0.626	
4	0.750	0.750	0.766	0.015	0.757	
5	0.975	0.980	0.970	0.010	0.975	
6	1.095	1.090	1.090	0.005	1.093	
7	1.275	1.275	1.270	0.005	1.273	
8	1.610	1.610	1.610	0.000	1.610	

Approved by: Mr. Nathapol Jongsawadwong
Specialist (T)

DOI: 10.1002/for

[Home](#)
[About Us](#)
[Contact Us](#)
[Privacy Policy](#)
[Terms of Service](#)



Certificate No.: G 60041

Certificate No: 0 560018
Date of issue: 23 Jan 23

Standard Reference (Table 1)				
Standard	Certificate No.	Vendor	Due date	
Organic (CO) 2-406 % Vol	4374321	Linder	25-Sep-20	
Organic (CO) 1354 % Vol	25-15123-13	West	10-Sep-20	
Organic (CO) 37.52 % Vol	US-0041-22	West	10-Sep-20	
Organic (CO) 100.0 % Vol	25-15123-13	West	10-Sep-20	
Carbon monoxide (CO) 2.985 % Gas	27033-22	Linder	12-Jan-21	
Carbon monoxide (CO) 11803 ppm	27033-22	Linder	18-Jun-20	
Carbon monoxide (CO) 10.00 ppm	25-15123-13	West	10-Sep-20	
Hydro. Oxide (NO) 1500 % Gas	2704373	Linder	27-Jun-21	
Hydro. Oxide (NO) 1300 % Gas	2704373	Linder	27-Jun-21	
Sulfur dioxide (SO ₂) 252 % Gas	3007072	Linder	25-Sep-21	
Sulfur dioxide (SO ₂) 1500 % Gas	3007072	Linder	25-Sep-21	
Sulfur Dioxide (SO ₂) 100.0 % Gas	3188423	Linder	28-Sep-21	

Flameless vapor conditions				
	32.0 °C	Humidity	A/F	Remarks
				0.013 / 0.16

Calibration conditions				
	22 °C	Pre-hold	Min	Max
				0.016 / 0.20

Concentration factors (before adjustment) (Table 2)				
Measurement of Standard	Standard	Mean of UNC	Unc	Uncertainty
CO (Vol%)	2.409 ± 2.06	4.00	-0.070	0.26
CO (ppm)	13.01	9.93	0.11	0.40
CO ₂ (ppm)	31.63	71.18	0.35	0.80
CH ₄ (ppm)	85.14	94	1.86	3.27
HC (ppm)	309.9	310	2.8	5.2
CD (ppm)	3003.3	1368	34	32
HC (ppm)	230.9	230	2.8	5.2
HC (ppm)	12.0	19.9	4.3	8.0
NO (ppm)	126.6	800	11.9	32
NO ₂ (ppm)	63.64	99.9	1.64	6.0
SO ₂ (ppm)	32.8	99	1.3	6.0
SO ₂ (ppm)	62.1	107	-4.1	6.0

Parameter of Standard	Standard Values	Mean of VAC	Error	Uncertainty (1)
IG (1040)	2.40	2.40	0.008	0.20
IG (960)	13.04	9.32	-3.72	8.40
IG (920)	21.61	21.10	-0.51	8.80
IG (880)	30.14	30.14	0.00	3.0
IG (840)	39.93	39.8	-0.13	3.0
IG (800)	49.97	49.97	0.00	1.0
IG (760)	59.93	59.93	0.00	0.8
IG (720)	69.93	69.93	0.00	0.8
IG (680)	79.93	79.93	0.00	0.8
IG (640)	89.93	89.93	0.00	0.8
IG (600)	99.93	99.93	0.00	0.8
IG (560)	109.93	109.93	0.00	0.8
IG (520)	119.93	119.93	0.00	0.8
IG (480)	129.93	129.93	0.00	0.8
IG (440)	139.93	139.93	0.00	0.8
IG (400)	149.93	149.93	0.00	0.8
IG (360)	159.93	159.93	0.00	0.8
IG (320)	169.93	169.93	0.00	0.8
IG (280)	179.93	179.93	0.00	0.8
IG (240)	189.93	189.93	0.00	0.8
IG (200)	199.93	199.93	0.00	0.8
IG (160)	209.93	209.93	0.00	0.8
IG (120)	219.93	219.93	0.00	0.8
IG (80)	229.93	229.93	0.00	0.8
IG (40)	239.93	239.93	0.00	0.8
IG (0)	249.93	249.93	0.00	0.8

Remark 1 \mathcal{L}_1 consists of 1 layer, \mathcal{L}_2 consists of 1 layer.

[illegible]

Date of calibration: 20-Jan-25

Ertach Industrial Solution Co., Ltd.
17/121 Sukhumvit-naiwan 47, Pook 4B, Ekkongkarn, Lakso Bangkok 10210 THAILAND TEL: 0-2779-8888 Callcenter@ertach.com
Fax: +66 (0)2555-00000 www.ertach.com.th



ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

รหัสใบงาน: KSPR2212224

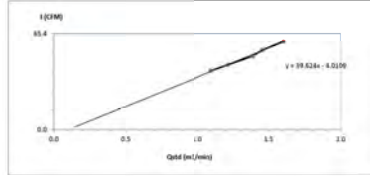
หมายเลข: 1627846



High Volume Air Sampler Calibration Worksheet

Project Site:	Global Power Sengkhong Public Company Limited	Barometric Pressure (mm Hg):	750
Calibrate Location:	Sengkhong	Temperature (°C):	31
Calibrate Date:	27-Feb-23	High Volume ID:	RTS-P50273
Calibration Sheet No.:	C-270223-RTS-P50173	High Volume Model:	TS-51700
Calibrator ID:	RTS-P50206	High Volume S/N:	4799
Calibrator Model:	TS-50206	Calibrator Slope:	1.47433
Calibrator S/N:	1543	Calibrator Intercept:	-0.03352

Test No.	Inlet H ₂ O (mm)	Q _{air} (m³/min)	1-Chart (CFM)	Linear Regression
1	2.6	1.8979	40	Slope: 39.6238
2	3.2	1.2363	44	Intercept: -4.0049
3	4.2	1.2913	50	Correlation Coefficient: 0.9963
4	5.0	1.4023	54	
5	5.6	1.4942	60	



Calibrated by: Hongkhan Ph.
(Mr. Hongkhan Phutapong)
Field Scientist(1)

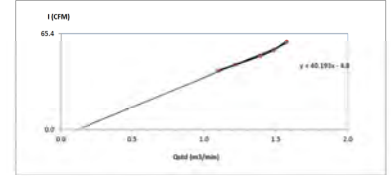
Approved by: [Signature]
(Mr. Wongsing Intarapong)
Senior Field Coordinator Scientist (3)



High Volume Air Sampler Calibration Worksheet

Project Site:	Global Power Sengkhong Public Company Limited	Barometric Pressure (mm Hg):	750
Calibrate Location:	Sengkhong	Temperature (°C):	31
Calibrate Date:	27-Feb-23	High Volume ID:	RTS-P50273
Calibration Sheet No.:	C-270223-RTS-P50291	High Volume Model:	TS-51700
Calibrator ID:	RTS-P50206	High Volume S/N:	5333
Calibrator Model:	TS-50206	Calibrator Slope:	1.47433
Calibrator S/N:	1543	Calibrator Intercept:	-0.03352

Test No.	Inlet H ₂ O (mm)	Q _{air} (m³/min)	1-Chart (CFM)	Linear Regression
1	2.6	1.8979	40	Slope: 39.6238
2	3.2	1.2363	44	Intercept: -4.0049
3	4.2	1.2913	50	Correlation Coefficient: 0.9963
4	5.0	1.4023	54	
5	5.6	1.4942	60	



Calibrated by: Hongkhan Ph.
(Mr. Hongkhan Phutapong)
Field Scientist(1)

Approved by: [Signature]
(Mr. Wongsing Intarapong)
Senior Field Coordinator Scientist (3)

Site Address: 100/100 Moo 5, Tambon Sengkhong, Amphoe Sengkhong, Nakhon Phanom Province, Thailand 49100
Delivering Growth - in Asia and Beyond.

DATE: 16/02/2023

FORM NO. F-04-073 REVISION NO. - ISSUE DATE: 14/05/14

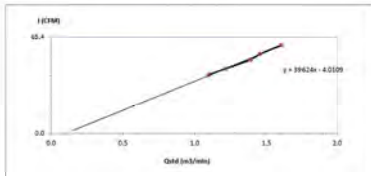
FORM NO. F-04-073 REVISION NO. - ISSUE DATE: 14/05/14



High Volume Air Sampler Calibration Worksheet

Project Site:	Global Power Sengkhong Public Company Limited	Barometric Pressure (mm Hg):	750
Calibrate Location:	Sengkhong	Temperature (°C):	31
Calibrate Date:	6-Mar-23	High Volume ID:	RTS-P50173
Calibration Sheet No.:	C-060323-RTS-P50173	High Volume Model:	TS-51700
Calibrator ID:	RTS-P50206	High Volume S/N:	4799
Calibrator Model:	TS-50206	Calibrator Slope:	1.47433
Calibrator S/N:	1543	Calibrator Intercept:	-0.03352

Test No.	Inlet H ₂ O (mm)	Q _{air} (m³/min)	1-Chart (CFM)	Linear Regression
1	2.6	1.8979	40	Slope: 39.6238
2	3.2	1.2363	44	Intercept: -4.0049
3	4.2	1.2913	50	Correlation Coefficient: 0.9963
4	5.0	1.4023	54	
5	5.6	1.4942	60	



Calibrated by: Hongkhan Ph.
(Mr. Hongkhan Phutapong)
Field Scientist(1)

Approved by: [Signature]
(Mr. Wongsing Intarapong)
Senior Field Coordinator Scientist (3)

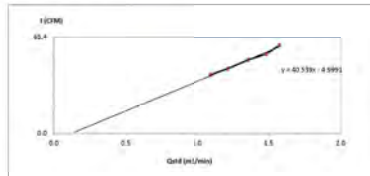
FORM NO. F-04-073 REVISION NO. - ISSUE DATE: 14/05/14



High Volume Air Sampler Calibration Worksheet

Project Site:	Global Power Sengkhong Public Company Limited	Barometric Pressure (mm Hg):	750
Calibrate Location:	Sengkhong	Temperature (°C):	31
Calibrate Date:	6-Mar-23	High Volume ID:	RTS-P50291
Calibration Sheet No.:	C-060323-RTS-P50291	High Volume Model:	TS-51700
Calibrator ID:	RTS-P50206	High Volume S/N:	5333
Calibrator Model:	TS-50206	Calibrator Slope:	1.47433
Calibrator S/N:	1543	Calibrator Intercept:	-0.03352

Test No.	Inlet H ₂ O (mm)	Q _{air} (m³/min)	1-Chart (CFM)	Linear Regression
1	2.6	1.8979	40	Slope: 39.6238
2	3.2	1.2363	44	Intercept: -4.0049
3	4.2	1.2913	50	Correlation Coefficient: 0.9963
4	5.0	1.4023	54	
5	5.6	1.4942	60	



Calibrated by: Hongkhan Ph.
(Mr. Hongkhan Phutapong)
Field Scientist(1)

Approved by: [Signature]
(Mr. Wongsing Intarapong)
Senior Field Coordinator Scientist (3)

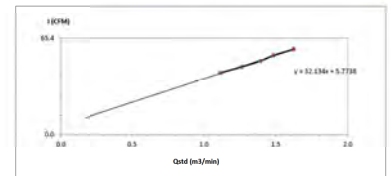
FORM NO. F-04-073 REVISION NO. - ISSUE DATE: 14/05/14



High Volume Air Sampler Calibration Worksheet

Project Site:	Global Power Sengkhong Public Company Limited	Barometric Pressure (mm Hg):	750
Calibrate Location:	Sengkhong	Temperature (°C):	31
Calibrate Date:	19-Apr-23	High Volume ID:	RTS-P50899
Calibration Sheet No.:	C-190423-RTS-P50899	High Volume Model:	TS-51700
Calibrator ID:	RTS-P50206	High Volume S/N:	5333
Calibrator Model:	TS-50206	Calibrator Slope:	1.58765
Calibrator S/N:	1166	Calibrator Intercept:	-0.02943

Test No.	Inlet H ₂ O (mm)	Q _{air} (m³/min)	1-Chart (CFM)	Linear Regression
1	2.6	1.1361	42	Slope: 32.1344
2	3.6	1.2628	46	Intercept: 5.7738
3	4.4	1.3744	50	Correlation Coefficient: 0.9973
4	5.0	1.4045	54	
5	6.0	1.6263	58	



Calibrated by: Karaphon M.
(Mr. Karaphon Manwanpong)
Field Scientist(2)

Approved by: [Signature]
(Mr. Wongsing Intarapong)
Senior Field Coordinator Scientist (3)

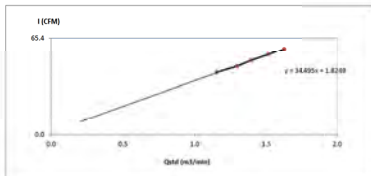
FORM NO. F-04-073 REVISION NO. - ISSUE DATE: 14/05/14



High Volume Air Sampler Calibration Worksheet

Project Site:	Global Power Sengkhong Public Company Limited	Barometric Pressure (mm Hg):	750
Calibrate Location:	Sengkhong	Temperature (°C):	32
Calibrate Date:	10-Apr-23	High Volume ID:	RTS-P50291
Calibration Sheet No.:	C-100423-RTS-P50291	High Volume Model:	TS-51700
Calibrator ID:	RTS-P50206	High Volume S/N:	5333
Calibrator Model:	TS-50206	Calibrator Slope:	1.58765
Calibrator S/N:	1166	Calibrator Intercept:	-0.02943

Test No.	Inlet H ₂ O (mm)	Q _{air} (m³/min)	1-Chart (CFM)	Linear Regression
1	3.0	1.1547	42	Slope: 31.7777
2	3.8	1.2968	46	Intercept: 1.0249
3	4.4	1.3431	50	Correlation Coefficient: 0.9985
4	5.2	1.5437	54	
5	6.0	1.6263	58	



Calibrated by: Karaphon M.
(Mr. Karaphon Manwanpong)
Field Scientist(2)

Approved by: [Signature]
(Mr. Wongsing Intarapong)
Senior Field Coordinator Scientist (3)

FORM NO. F-04-073 REVISION NO. - ISSUE DATE: 14/05/14



RYG EN0001
PENTA CALIBRATION CO., LTD.
100/100 Moo 5, Tambon Sengkhong, Amphoe Sengkhong, Nakhon Phanom Province, Thailand 49100
Tel: +66 (0) 2508-8773
www.pentacal.com

Certificate of Calibration

Referred to Certificate or Calibration:	PTC0202102	Page:	1 of 3
Certificate No.:	PTC0202102	Condition:	Normal
Equipment:	Digital Balance	Serial No.:	35470004
Manufacturer:	Sartorius	ID No.:	RTS-P50001
Model:	LA 1054		
Type of Balance:	Scale (repeal)		

CUSTOMER: ALS Laboratory Group (Thailand) Co. Ltd.
8510/1 Moo 5 T. Maenankong, A. Phukong, Rayong 21140, Thailand

Environment Condition: Temperature: 23.4 °C ± 0.3 °C
Humidity: 58% RH ± 1%
Air density: 1.17 kg/m³

Calibration Place: ALS Laboratory Group (Thailand) Co. Ltd.
8510/1 Moo 5 T. Maenankong, A. Phukong, Rayong 21140, Thailand

The Method Used: In-house method, PTC-WA-07, based on Standard JIS B 7611
Traceability: This certificate is traceable to SI Unit through National Institute of Standards and Technology (NIST) via NIST-9000 Accreditation No. Calibration 0108

Date Received: March 23, 2023
Calibration Date: March 23, 2023
Issued Date: March 25, 2023
Calibration By: (Mr. Rungroj Muek)

Reviewed by: [Signature]
(Mr. Rungroj Muek)

Approved By: [Signature]
(Mr. Rungroj Muek)
Laboratory Manager

This certificate is issued for the purpose of measurement and is not intended to be used as a legal document. It is provided for informational purposes only. The measurement results are based on the current state of the equipment and the calibration process. The measurement results are not intended to be used as a legal document. The measurement results are not intended to be used as a legal document. The measurement results are not intended to be used as a legal document.

FORM NO. F-04-073



PENTA CALIBRATION CO., LTD.
100/100 Moo 5, Tambon Sengkhong, Amphoe Sengkhong, Nakhon Phanom Province, Thailand 49100
Tel: +66 (0) 2508-8773
www.pentacal.com

Certificate of Calibration

Referred to Certificate or Calibration:	PTC0202102	Page:	2 of 3
Certificate No.:	PTC0202102		

Measurement Results: Without Adjustment
Function Calibration: Non Adjustment
Bias/Shift Error: Weight to be 10% ± 2% of Maximum capacity

Repeatability Test	Repeatability (g)	Repeatability (g)
1	0.0001	0.0001
2	0.0001	0.0001
3	0.0001	0.0001
4	0.0001	0.0001
5	0.0001	0.0001

Repeatability Test: Weight to be 10% ± 2% of Maximum capacity
Determination of the standard deviation of weighing results: Repeatability: 0.0001 (g)

Internal test value (g)	Standard Deviation
100	0.00003

Line of Indication: From nominal value, Repeatability: 0.0001 (g)
Normal Value (g) Indication (g) Correction of Balance (g) Uncertainty (g) k

(g)	(g)	(g)	(g)	(g)
0	0.00003	0.00003	0.00003	0.00003
0.1	0.00003	0.00003	0.00003	0.00003
0.2	0.00003	0.00003	0.00003	0.00003
0.3	0.00003	0.00003	0.00003	0.00003
0.4	0.00003	0.00003	0.00003	0.00003
0.5	0.00003	0.00003	0.00003	0.00003
0.6	0.00003	0.00003	0.00003	0.00003
0.7	0.00003	0.00003	0.00003	0.00003
0.8	0.00003	0.00003	0.00003	0.00003
0.9	0.00003	0.00003	0.00003	0.00003
1	0.00003	0.00003	0.00003	0.00003
2	0.00003	0.00003	0.00003	0.00003
3	0.00003	0.00003	0.00003	0.00003
4	0.00003	0.00003	0.00003	0.00003
5	0.00003	0.00003	0.00003	0.00003
6	0.00003	0.00003	0.00003	0.00003
7	0.00003	0.00003	0.00003	0.00003
8	0.00003	0.00003	0.00003	0.00003
9	0.00003	0.00003	0.00003	0.00003
10	0.00003	0.00003	0.00003	0.00003
100	0.00003	0.00003	0.00003	0.00003

Sartorius (Thailand) Co., Ltd.
128 Rama 9 Road, Bangkok, Thailand 10330
Tel: +66 253 8381-6, +66 253 8381-7, +66 253 8381-8



SARTORIUS
REVIEWED
APPROVED
CAL DATE 10/03/24

Model Number: LA1356-F
Description: Analytical Balance
Serial Number: 25409664
ID No.: RYG_EN0001
Manufacturer: Sartorius
Page No.: 1 of 2

Customer Name: ALS Laboratory Group (Thailand) Co., Ltd. (Rajavithi Branch)
616/10 Moo 5 T Maenam Kru A Phak Dang, Rayong 21140, Thailand
Calibrated Place: ALS Laboratory Group (Thailand) Co., Ltd. (Rajavithi Branch)
616/10 Moo 5 T Maenam Kru A Phak Dang, Rayong 21140, Thailand

Calibrated By: Mr. Chonchai Inthana
Calibration Date: Wednesday, March 01, 2023
Calibration Procedure No.: This calibration was conducted by using previous calibration procedure number (W5033)
Based on UKAS LAB 14: 2019

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

Traceability:
Model Number: Description: Traceability: Certificate No.: Exp. Date:
YC3111-A22-00: Sartorius weight set Imp.: 500g E1 YC3111-A22-00: SPC-RT: 0322 (2025): 14-Sep-2023
MH5-35220: Purity/Sensitivity/Temp.: Sartorius MH5-35220: OHS: C1820444: 5-Sep-2023

This certificate states and apply this document 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.

Calibrated By: (Mr. Jirawut Sakam) Field Environmental Scientist (3)
Approved By: (Mr. Saranyut Jittawong) Assistant General Manager

FORM NO. Y 06-004 REVISION NO.: ISSUE DATE: 02/04/12

Sartorius (Thailand) Co., Ltd.
128 Rama 9 Road, Bangkok, Thailand 10330
Tel: +66 253 8381-6, +66 253 8381-7, +66 253 8381-8

SARTORIUS

Certificate of Calibration

Model Number: LA1356-F
Description: Analytical Balance
Serial Number: 25409664
ID No.: RYG_EN0001
Manufacturer: Sartorius
Page No.: 3 of 3

Calibration Results : Without Adjustment

Repeatability	Linearity	Centricity (Off-center loading error)
The repeatability is the ability of a weighing instrument to obtain identical results under constant conditions when the same load is weighed successively. It is expressed as the standard deviation of the results of 10 consecutive weighings of a load.	The linearity is the ability of a weighing instrument to obtain identical results when the load is changed in a series of steps. It is expressed as the standard deviation of the results of 10 consecutive weighings of a load.	The centricity is the ability of a weighing instrument to obtain identical results when the load is placed at different positions on the weighing pan. It is expressed as the standard deviation of the results of 10 consecutive weighings of a load.
Nominal Value (Low Load): 10 g Tolerance: 0.0001 g Nominal Value (High Load): 100 g Tolerance: 0.0001 g Standard Deviation: 0.00009 g, 0.00006 g	Nominal Value: 10 g, 100 g, 1000 g Tolerance: 0.0001 g, 0.0001 g, 0.0001 g Standard Deviation: 0.00009 g, 0.00006 g	Nominal Value: 10 g, 100 g, 1000 g Tolerance: 0.0001 g, 0.0001 g, 0.0001 g Standard Deviation: 0.00009 g, 0.00006 g

Linearity	Linearity	Linearity
The linearity is the ability of a weighing instrument to obtain identical results when the load is changed in a series of steps. It is expressed as the standard deviation of the results of 10 consecutive weighings of a load.	The linearity is the ability of a weighing instrument to obtain identical results when the load is changed in a series of steps. It is expressed as the standard deviation of the results of 10 consecutive weighings of a load.	The linearity is the ability of a weighing instrument to obtain identical results when the load is changed in a series of steps. It is expressed as the standard deviation of the results of 10 consecutive weighings of a load.
Nominal Value: 10 g, 100 g, 1000 g Tolerance: 0.0001 g, 0.0001 g, 0.0001 g Standard Deviation: 0.00009 g, 0.00006 g	Nominal Value: 10 g, 100 g, 1000 g Tolerance: 0.0001 g, 0.0001 g, 0.0001 g Standard Deviation: 0.00009 g, 0.00006 g	Nominal Value: 10 g, 100 g, 1000 g Tolerance: 0.0001 g, 0.0001 g, 0.0001 g Standard Deviation: 0.00009 g, 0.00006 g

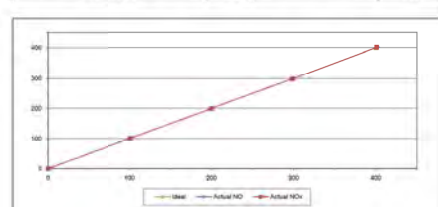
FORM NO. Y 06-004 REVISION NO.: ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 5-Jan-23
Manufacturer: HORIBA
Serial No.: AWXG87CR
Calibrator Manufacturer: Telsys API
Serial No.: 847
Std. Gas Concentration (PPM): 55.88
Cylinder Pressure (psi): 1800
Certified Date: 8-Feb-22

Point	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	101.40	1.40	1.40
2	200.00	199.80	-0.20	-0.10	199.80	-0.20	-0.10
3	300.00	299.50	-0.50	-0.17	299.50	-0.50	-0.17
4	400.00	402.10	2.10	0.53	402.10	2.10	0.53
AVERAGE (%)			-0.18				0.24



Calibrated By: (Mr. Jirawut Sakam) Field Environmental Scientist (3)
Approved By: (Mr. Saranyut Jittawong) Assistant General Manager

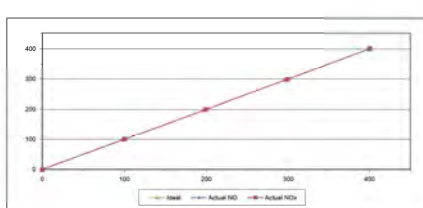
FORM NO. Y 06-004 REVISION NO.: ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 5-Jan-23
Manufacturer: HORIBA
Serial No.: TZTBYRL
Calibrator Manufacturer: Telsys API
Serial No.: 847
Std. Gas Concentration (PPM): 55.88
Cylinder Pressure (psi): 1800
Certified Date: 8-Feb-22

Point	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	100.20	0.20	0.20
2	200.00	199.80	-0.20	-0.10	199.80	-0.20	-0.10
3	300.00	297.10	-2.90	-0.97	297.10	-2.90	-0.97
4	400.00	398.60	-1.40	-0.35	398.60	-1.40	-0.35
AVERAGE (%)			-0.74				-0.05



Calibrated By: (Mr. Jirawut Sakam) Field Environmental Scientist (3)
Approved By: (Mr. Saranyut Jittawong) Assistant General Manager

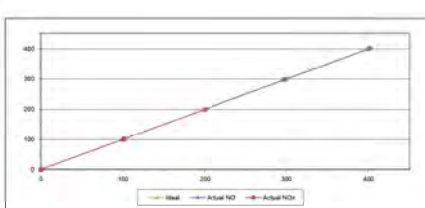
FORM NO. Y 06-004 REVISION NO.: ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 5-Jan-23
Manufacturer: HORIBA
Serial No.: AWXG87CR
Calibrator Manufacturer: Telsys API
Serial No.: 847
Std. Gas Concentration (PPM): 55.88
Cylinder Pressure (psi): 1800
Certified Date: 8-Feb-22

Point	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	101.40	1.40	1.40
2	200.00	199.80	-0.20	-0.10	199.80	-0.20	-0.10
3	300.00	299.50	-0.50	-0.17	299.50	-0.50	-0.17
4	400.00	402.10	2.10	0.53	402.10	2.10	0.53
AVERAGE (%)			-0.18				0.24



Calibrated By: (Mr. Jirawut Sakam) Field Environmental Scientist (3)
Approved By: (Mr. Saranyut Jittawong) Assistant General Manager

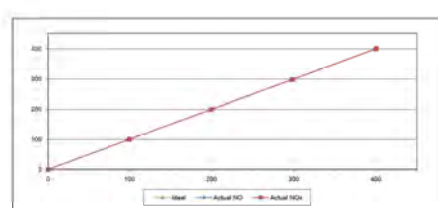
FORM NO. Y 06-004 REVISION NO.: ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 5-Jan-23
Manufacturer: HORIBA
Serial No.: TZTBYRL
Calibrator Manufacturer: Telsys API
Serial No.: 847
Std. Gas Concentration (PPM): 55.88
Cylinder Pressure (psi): 1800
Certified Date: 8-Feb-22

Point	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	100.20	0.20	0.20
2	200.00	199.80	-0.20	-0.10	199.80	-0.20	-0.10
3	300.00	297.10	-2.90	-0.97	297.10	-2.90	-0.97
4	400.00	398.60	-1.40	-0.35	398.60	-1.40	-0.35
AVERAGE (%)			-0.74				-0.05



Calibrated By: (Mr. Jirawut Sakam) Field Environmental Scientist (3)
Approved By: (Mr. Saranyut Jittawong) Assistant General Manager

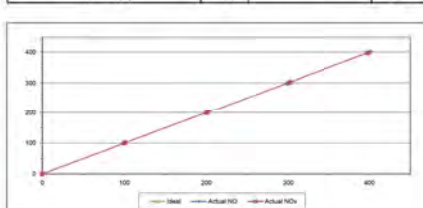
FORM NO. Y 06-004 REVISION NO.: ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 5-Jan-23
Manufacturer: HORIBA
Serial No.: 1454HSD
Calibrator Manufacturer: Telsys API
Serial No.: 847
Std. Gas Concentration (PPM): 55.88
Cylinder Pressure (psi): 1800
Certified Date: 8-Feb-22

Point	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	100.20	0.20	0.20
2	200.00	199.80	-0.20	-0.10	199.80	-0.20	-0.10
3	300.00	299.50	-0.50	-0.17	299.50	-0.50	-0.17
4	400.00	402.10	2.10	0.53	402.10	2.10	0.53
AVERAGE (%)			-0.26				0.36



Calibrated By: (Mr. Jirawut Sakam) Field Environmental Scientist (3)
Approved By: (Mr. Saranyut Jittawong) Assistant General Manager

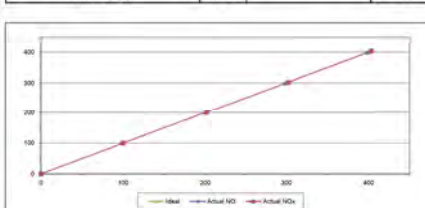
FORM NO. Y 06-004 REVISION NO.: ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 5-Jan-23
Manufacturer: HORIBA
Serial No.: 1954HSD
Calibrator Manufacturer: Telsys API
Serial No.: 847
Std. Gas Concentration (PPM): 55.88
Cylinder Pressure (psi): 1800
Certified Date: 8-Feb-22

Point	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	100.20	0.20	0.20
2	200.00	201.00	1.00	0.50	201.40	1.40	0.70
3	300.00	298.30	-1.70	-0.57	298.30	-1.70	-0.57
4	400.00	398.40	-1.60	-0.40	398.40	-1.60	-0.40
AVERAGE (%)			-0.33				0.50



Calibrated By: (Mr. Jirawut Sakam) Field Environmental Scientist (3)
Approved By: (Mr. Saranyut Jittawong) Assistant General Manager

FORM NO. Y 06-004 REVISION NO.: ISSUE DATE: 02/04/12



MULTIPOINT CALIBRATION REPORT

Calibration Date: 5-Jan-23
Manufacturer: HORIBA
Serial No.: 1454HSD
Calibrator Manufacturer: Telsys API
Serial No.: 847
Std. Gas Concentration (PPM): 55.88
Cylinder Pressure (psi): 1800
Certified Date: 8-Feb-22

Point	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	99.60	-0.40	-0.40	100.20	0.20	0.20
2	200.00	199.80	-0.20	-0.10	199.80	-0.20	-0.10
3	300.00	299.50	-0.50	-0.17	299.50	-0.50	-0.17
4	400.00	402.10	2.10	0.53	402.10	2.10	0.53
AVERAGE (%)			-0.26				0.36



Calibrated By: (Mr. Jirawut Sakam) Field Environmental Scientist (3)
Approved By: (Mr. Saranyut Jittawong) Assistant General Manager

FORM NO. Y 06-004 REVISION NO.: ISSUE DATE: 02/04/12

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

Cert. No. : ACL22041
Job No. : VCSAC0024
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	+1.1
136.0	136.0	0.0	+1.1
135.0	135.0	0.0	+1.1
134.0	134.0	0.0	+1.1
133.0	133.0	0.0	+1.1
132.0	132.0	0.0	+1.1
131.0	131.0	0.0	+1.1
129.0	129.0	0.0	+1.1
124.0	124.0	0.0	+1.1
119.0	119.0	0.0	+1.1
114.0	114.0	0.0	+1.1
109.0	109.0	0.0	+1.1
104.0	104.0	0.0	+1.1
99.0	99.0	0.0	+1.1
94.0	94.0	0.0	+1.1
89.0	89.0	0.0	+1.1
84.0	84.0	0.0	+1.1
79.0	79.0	0.0	+1.1
74.0	74.0	0.0	+1.1
69.0	69.0	0.0	+1.1
64.0	64.0	0.0	+1.1
59.0	59.0	0.0	+1.1
54.0	54.0	0.0	+1.1
49.0	49.0	0.0	+1.1
44.0	44.0	0.0	+1.1
39.0	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
19.0	19.0	0.0	+1.1
14.0	14.0	0.0	+1.1
9.0	9.0	0.0	+1.1

QP-TS12-04-04-020664

T. Petchu

Cert. No. : ACL22041
Job No. : VCSAC0024
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. Time burst response

Time Weighting	Time burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5/-5.0
	2	8	117.0	117.0	0.0	1.0/-2.5
	200	800	134.0	134.1	0.1	+1.0
Slow	2	8	108.0	108.0	0.0	1.5/-5.0
	200	800	127.6	127.6	0.0	+1.0
	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	128.1	0.1	+1.0

10. Peak C residual 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	136.0	-0.4	+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	135.2	-0.2	+2.0
Negative half cycle	135.4	135.2	-0.2	+2.0

QP-TS12-04-04-020664

T. Petchu

Cert. No. : ACL22041
Job No. : VCSAC0024
Pages : 8 of 8

11. Overload indication

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

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	+0.1

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

QP-TS12-04-04-020664

T. Petchu

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

43-45/1 Sienkham Rd, Bangkum, Bangkok 10150 THAILAND
Tel: 0-2435-8800 Fax: 0-2431-1679 E-mail: cal@calibrationlab.com http://www.sithiporn.com



Cert. No. : ACC22023
Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-34
Serial No. : 34178123
ID No. : RYG_F38215

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATHANAKAN 40, PHATHANAKAN ROAD,
KHUANG PHATHANAKAN, KHUANG SUANLUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 22 AUGUST 2022
Calibration Date : 31 AUGUST 2022
Date of Issue : 02 SEPTEMBER 2022

Calibrated by : Nishikom Pichumai

Approved by : T. Petchu
(Thanakul Pichumai)

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.

QP-TS12-04-04-020664

SITHIPORN / SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Cert. No. : ACC22043
Job No. : VCSAC0077
Pages : 2 of 3

Calibration Procedure : CP-AC-04

Calibration Method :

This equipment was calibrated by based on IEC 60942-2003 Standard.
The sound pressure level, frequency and total duration of the sound calibrator was measured using the reference microphones.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33511B	MY52302742	EE-0008-22	04-Feb-23
Digital Multimeter	33461A	MY51220104	EEL-3P-04/02/05	09-Feb-23
Digital Multimeter	33461A	MY51220076	EEL-3P-05/02/05	09-Feb-23
Digital Multimeter	33461A	MY50024273	EEL-3P-05/02/05	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	EE-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KA1	84560495	AA-3005-22	22-Feb-23
Audio Analyzer	AVR-3360A	V744B6069	EE-0010-22	07-Feb-23

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

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

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

QP-TS12-04-04-020664

T. Petchu

SITHIPORN / SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Cert. No. : ACC22023
Job No. : VCSAC0077
Pages : 3 of 3

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit (dB)
94	94.04	0.04	0.14	0.40

2. Frequency

Specified Frequency (Hz)	Measured value (Hz)	Deviated value (%)	Uncertainty (%)	Tolerance limit (%)
1000	1001.5	0.1	0.1	1.0

3. Total duration

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
1.70	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

QP-TS12-04-04-020664

T. Petchu

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

43-45/1 Sienkham Rd, Bangkum, Bangkok 10150 THAILAND
Tel: 0-2435-8800 Fax: 0-2431-1679 E-mail: cal@calibrationlab.com http://www.sithiporn.com



Cert. No. : ACL22108
Pages : 1 of 3

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A Microphone UC-52 / Pre-amplifier NH-20
Serial No. : 06623392 / 198639 / 26420
ID No. : RYG_F38215

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATHANAKAN 40, PHATHANAKAN ROAD,
KHUANG PHATHANAKAN, KHUANG SUANLUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 07 OCTOBER 2022
Calibration Date : 20-21 OCTOBER 2022
Date of Issue : 21 OCTOBER 2022

Calibrated by : Nishikom Pichumai

Approved by : T. Petchu
(Thanakul Pichumai)

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.

QP-TS12-04-04-020664

SITHIPORN / SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Cert. No. : ACC22108
Job No. : VCSAC0089
Pages : 7 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC 61672-2 (2013) Standard for sound level meter (SLM).
The SLM had tests in Acoustical and Electrical signal tests of frequency weighting with Acoustic chamber and Reference Standard Instruments.
For test results of each item were made by observation of each Instruments display and also with SLMs display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	332110	MY-00017076	EE-0007-22	04-Feb-23
Waveform Generator	332110	MY52302742	EE-0008-22	04-Feb-23
Digital Multimeter	33461A	MY51220104	EEL-3P-04/02/05	09-Feb-23
Digital Multimeter	33461A	MY51220076	EEL-3P-05/02/05	09-Feb-23
Digital Multimeter	33461A	MY50024273	EEL-3P-05/02/05	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	EE-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KA1	84560495	AA-3005-22	22-Feb-23

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

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

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

QP-TS12-04-04-020664

T. Petchu

SITHIPORN / SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Cert. No. : ACC22108
Job No. : VCSAC0089
Pages : 8 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	✓	-	0.3	N/A
3. Acoustical signal tests of frequency weightings	✓	-	0.3	N/A
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings	✓	-	0.2	0.6
For 10 Hz to 4 kHz	✓	-	0.3	0.7
For 4 kHz to 10 kHz	✓	-	0.3	0.7
For 10 kHz to 20 kHz	✓	-	0.2	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. Time burst response	✓	-	0.2	0.3
10. Peak C residual level	✓	-	0.2	0.24
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QP-TS12-04-04-020664

T. Petchu

Continuation of Calibration Certificate

Cert. No. : ACL22238
Job No. : YC65AC0009
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.1

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

Frequency Weighting (dB)	Measured value (dB)
A-weight	12.0
C-weight	18.4
Flat	24.4

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.1	0.1	± 1.5
1000	0.0	0.0	0.0	± 1.0
5000	0.5	0.5	0.5	± 5.0

QP-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL22238
Job No. : YC65AC0009
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative ±0.1 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			Acceptance Limits
	Flat	C-weight	A-weight	
63	0.0	0.0	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	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	±5.0
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 (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	0.0	±0.2
C-weight	94.0	0.0	±0.2
Flat	94.0	0.0	±0.2

5.2 Time weightings at 1 kHz

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

6. Long-term stability

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

QP-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL22238
Job No. : YC65AC0009
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	53.9	-0.1	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	38.9	-0.1	±1.1
34.0	33.9	-0.1	±1.1
29.0	28.9	-0.1	±1.1
24.0	23.9	-0.1	±1.1
19.0	18.9	-0.1	±1.1
14.0	13.9	-0.1	±1.1
9.0	8.9	-0.1	±1.1
4.0	3.9	-0.1	±1.1
-1.0	-1.0	0.0	±1.1
-6.0	-6.0	0.0	±1.1
-11.0	-11.0	0.0	±1.1
-16.0	-16.0	0.0	±1.1
-21.0	-21.0	0.0	±1.1
-26.0	-26.0	0.0	±1.1
-31.0	-31.0	0.0	±1.1
-36.0	-36.0	0.0	±1.1
-41.0	-41.0	0.0	±1.1
-46.0	-46.0	0.0	±1.1
-51.0	-51.0	0.0	±1.1
-56.0	-56.0	0.0	±1.1
-61.0	-61.0	0.0	±1.1
-66.0	-66.0	0.0	±1.1
-71.0	-71.0	0.0	±1.1
-76.0	-76.0	0.0	±1.1
-81.0	-81.0	0.0	±1.1
-86.0	-86.0	0.0	±1.1
-91.0	-91.0	0.0	±1.1
-96.0	-96.0	0.0	±1.1
-101.0	-101.0	0.0	±1.1
-106.0	-106.0	0.0	±1.1
-111.0	-111.0	0.0	±1.1
-116.0	-116.0	0.0	±1.1
-121.0	-121.0	0.0	±1.1
-126.0	-126.0	0.0	±1.1
-131.0	-131.0	0.0	±1.1
-136.0	-136.0	0.0	±1.1
-141.0	-141.0	0.0	±1.1
-146.0	-146.0	0.0	±1.1
-151.0	-151.0	0.0	±1.1
-156.0	-156.0	0.0	±1.1
-161.0	-161.0	0.0	±1.1
-166.0	-166.0	0.0	±1.1
-171.0	-171.0	0.0	±1.1
-176.0	-176.0	0.0	±1.1
-181.0	-181.0	0.0	±1.1
-186.0	-186.0	0.0	±1.1
-191.0	-191.0	0.0	±1.1
-196.0	-196.0	0.0	±1.1
-201.0	-201.0	0.0	±1.1
-206.0	-206.0	0.0	±1.1
-211.0	-211.0	0.0	±1.1
-216.0	-216.0	0.0	±1.1
-221.0	-221.0	0.0	±1.1
-226.0	-226.0	0.0	±1.1
-231.0	-231.0	0.0	±1.1
-236.0	-236.0	0.0	±1.1
-241.0	-241.0	0.0	±1.1
-246.0	-246.0	0.0	±1.1
-251.0	-251.0	0.0	±1.1
-256.0	-256.0	0.0	±1.1
-261.0	-261.0	0.0	±1.1
-266.0	-266.0	0.0	±1.1
-271.0	-271.0	0.0	±1.1
-276.0	-276.0	0.0	±1.1
-281.0	-281.0	0.0	±1.1
-286.0	-286.0	0.0	±1.1
-291.0	-291.0	0.0	±1.1
-296.0	-296.0	0.0	±1.1
-301.0	-301.0	0.0	±1.1
-306.0	-306.0	0.0	±1.1
-311.0	-311.0	0.0	±1.1
-316.0	-316.0	0.0	±1.1
-321.0	-321.0	0.0	±1.1
-326.0	-326.0	0.0	±1.1
-331.0	-331.0	0.0	±1.1
-336.0	-336.0	0.0	±1.1
-341.0	-341.0	0.0	±1.1
-346.0	-346.0	0.0	±1.1
-351.0	-351.0	0.0	±1.1
-356.0	-356.0	0.0	±1.1
-361.0	-361.0	0.0	±1.1
-366.0	-366.0	0.0	±1.1
-371.0	-371.0	0.0	±1.1
-376.0	-376.0	0.0	±1.1
-381.0	-381.0	0.0	±1.1
-386.0	-386.0	0.0	±1.1
-391.0	-391.0	0.0	±1.1
-396.0	-396.0	0.0	±1.1
-401.0	-401.0	0.0	±1.1
-406.0	-406.0	0.0	±1.1
-411.0	-411.0	0.0	±1.1
-416.0	-416.0	0.0	±1.1
-421.0	-421.0	0.0	±1.1
-426.0	-426.0	0.0	±1.1
-431.0	-431.0	0.0	±1.1
-436.0	-436.0	0.0	±1.1
-441.0	-441.0	0.0	±1.1
-446.0	-446.0	0.0	±1.1
-451.0	-451.0	0.0	±1.1
-456.0	-456.0	0.0	±1.1
-461.0	-461.0	0.0	±1.1
-466.0	-466.0	0.0	±1.1
-471.0	-471.0	0.0	±1.1
-476.0	-476.0	0.0	±1.1
-481.0	-481.0	0.0	±1.1
-486.0	-486.0	0.0	±1.1
-491.0	-491.0	0.0	±1.1
-496.0	-496.0	0.0	±1.1
-501.0	-501.0	0.0	±1.1
-506.0	-506.0	0.0	±1.1
-511.0	-511.0	0.0	±1.1
-516.0	-516.0	0.0	±1.1
-521.0	-521.0	0.0	±1.1
-526.0	-526.0	0.0	±1.1
-531.0	-531.0	0.0	±1.1
-536.0	-536.0	0.0	±1.1
-541.0	-541.0	0.0	±1.1
-546.0	-546.0	0.0	±1.1
-551.0	-551.0	0.0	±1.1
-556.0	-556.0	0.0	±1.1
-561.0	-561.0	0.0	±1.1
-566.0	-566.0	0.0	±1.1
-571.0	-571.0	0.0	±1.1
-576.0	-576.0	0.0	±1.1
-581.0	-581.0	0.0	±1.1
-586.0	-586.0	0.0	±1.1
-591.0	-591.0	0.0	±1.1
-596.0	-596.0	0.0	±1.1
-601.0	-601.0	0.0	±1.1
-606.0	-606.0	0.0	±1.1
-611.0	-611.0	0.0	±1.1
-616.0	-616.0	0.0	±1.1
-621.0	-621.0	0.0	±1.1
-626.0	-626.0	0.0	±1.1
-631.0	-631.0	0.0	±1.1
-636.0	-636.0	0.0	±1.1
-641.0	-641.0	0.0	±1.1
-646.0	-646.0	0.0	±1.1
-651.0	-651.0	0.0	±1.1
-656.0	-656.0	0.0	±1.1
-661.0	-661.0	0.0	±1.1
-666.0	-666.0	0.0	±1.1
-671.0	-671.0	0.0	±1.1
-676.0	-676.0	0.0	±1.1
-681.0	-681.0	0.0	±1.1
-686.0	-686.0	0.0	±1.1
-691.0	-691.0	0.0	±1.1
-696.0	-696.0	0.0	±1.1
-701.0	-701.0	0.0	±1.1
-706.0	-706.0	0.0	±1.1
-711.0	-711.0	0.0	±1.1
-716.0	-716.0	0.0	±1.1
-721.0	-721.0	0.0	±1.1
-726.0	-726.0	0.0	±1.1
-731.0	-731.0	0.0	±1.1
-736.0	-736.0	0.0	±1.1
-741.0	-741.0	0.0	±1.1
-746.0	-746.0	0.0	±1.1
-751.0	-751.0	0.0	±1.1
-756.0	-756.0	0.0	±1.1
-761.0	-761.0	0.0	±1.1
-766.0	-766.0	0.0	±1.1
-771.0	-771.0	0.0	±1.1
-776.0	-776.0	0.0	±1.1
-781.0	-781.0	0.0	±1.1
-786.0	-786.0	0.0	±1.1
-791.0	-791.0	0.0	±1.1
-796.0	-796.0	0.0	±1.1
-801.0	-801.0	0.0	±1.1
-806.0	-806.0	0.0	±1.1
-811.0	-811.0	0.0	±1.1
-816.0	-816.0	0.0	±1.1
-821.0	-821.0	0.0	±1.1
-826.0	-826.0	0.0	±1.1
-831.0	-831.0	0.0	±1.1
-836.0	-836.0	0.0	±1.1
-841.0	-841.0	0.0	±1.1
-846.0	-846.0	0.0	±1.1
-851.0	-851.0	0.0	±1.1
-856.0	-856.0	0.0	±1.1
-861.0	-861.0	0.0	±1.1
-866.0	-866.0	0.0	±1.1
-871.0	-871.0	0.0	±1.1
-876.0	-876.0	0.0	±1.1
-881.0	-881.0	0.0	±1.1
-886.0	-886.0	0.0	±1.1
-891.0	-891.0	0.0	±1.1
-896.0	-896.0	0.0	±1.1
-901.0	-901.0	0.0	±1.1
-906.0	-906.0	0.0	±1.1
-911.0	-911.0	0.0	±1.1
-916.0	-916.0	0.0	±1.1
-921.0	-921.0	0.0	±1.1
-926.0	-926.0	0.0	±1.1
-931.0	-931.0	0.0	±1.1
-936.0	-936.0	0.0	±1.1
-941.0	-941.0	0.0	±1.1
-946.0	-946.0	0.0	±1.1
-951.0	-951.0	0.0	±1.1
-956.0	-956.0	0.0	±1.1
-961.0	-961.0	0.0	±1.1
-966.0	-966.0	0.0	±1.1
-971.0	-971.0	0.0	±1.1
-976.0	-976.0	0.0	±1.1
-981.0	-981.0	0.0	±1.1
-986.0	-986.0	0.0	±1.1
-991.0	-991.0	0.0	±1.1
-996.0	-996.0	0.0	±1.1
-1001.0	-1001.0	0.0	±1.1
-1006.0	-1006.0	0.0	±1.1
-1011.0	-1011.0	0.0	±1.1
-1016.0	-1016.0	0.0	±1.1
-1021.0	-1021.0	0.0	±1.1

Continuation of Calibration Certificate

Cert. No. : ACL22240
Job No. : VCSAC0089
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	0.1	0.1	0.0	±2.0
125	0.0	0.0	0.1	±2.0
250	0.1	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.1	±2.0
2000	0.0	0.0	0.1	±2.0
4000	0.0	0.0	0.0	±2.0
8000	0.1	0.0	0.1	±2.0

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	±0.2
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	±0.1
Slow	94.0	0.0	±0.1
Log	94.0	0.0	±0.1

6. Long-term stability

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

QP-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL22240
Job No. : VCSAC0089
Pages : 1 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
117.0	117.0	0.0	±1.1
116.0	116.0	0.0	±1.1
115.0	115.1	0.1	±1.1
114.0	114.1	0.1	±1.1
113.0	113.0	0.0	±1.1
112.0	112.0	0.0	±1.1
111.0	111.0	0.0	±1.1
110.0	110.0	0.0	±1.1
109.0	109.0	0.0	±1.1
108.0	108.0	0.0	±1.1
107.0	107.0	0.0	±1.1
106.0	106.0	0.0	±1.1
105.0	105.0	0.0	±1.1
104.0	104.0	0.0	±1.1
103.0	103.0	0.0	±1.1
102.0	102.0	0.0	±1.1
101.0	101.0	0.0	±1.1
100.0	100.0	0.0	±1.1
99.0	99.0	0.0	±1.1
98.0	98.0	0.0	±1.1
97.0	97.0	0.0	±1.1
96.0	96.0	0.0	±1.1
95.0	95.0	0.0	±1.1
94.0	94.0	0.0	±1.1
93.0	93.0	0.0	±1.1
92.0	92.0	0.0	±1.1
91.0	91.0	0.0	±1.1
90.0	90.0	0.0	±1.1
89.0	89.0	0.0	±1.1
88.0	88.0	0.0	±1.1
87.0	87.0	0.0	±1.1
86.0	86.0	0.0	±1.1
85.0	85.0	0.0	±1.1
84.0	84.0	0.0	±1.1
83.0	83.0	0.0	±1.1
82.0	82.0	0.0	±1.1
81.0	81.0	0.0	±1.1
80.0	80.0	0.0	±1.1
79.0	79.0	0.0	±1.1
78.0	78.0	0.0	±1.1
77.0	77.0	0.0	±1.1
76.0	76.0	0.0	±1.1
75.0	75.0	0.0	±1.1
74.0	74.0	0.0	±1.1
73.0	73.0	0.0	±1.1
72.0	72.0	0.0	±1.1
71.0	71.0	0.0	±1.1
70.0	70.0	0.0	±1.1
69.0	69.0	0.0	±1.1
68.0	68.0	0.0	±1.1
67.0	67.0	0.0	±1.1
66.0	66.0	0.0	±1.1
65.0	65.0	0.0	±1.1
64.0	64.0	0.0	±1.1
63.0	63.0	0.0	±1.1
62.0	62.0	0.0	±1.1
61.0	61.0	0.0	±1.1
60.0	60.0	0.0	±1.1
59.0	59.0	0.0	±1.1
58.0	58.0	0.0	±1.1
57.0	57.0	0.0	±1.1
56.0	56.0	0.0	±1.1
55.0	55.0	0.0	±1.1
54.0	54.0	0.0	±1.1
53.0	53.0	0.0	±1.1
52.0	52.0	0.0	±1.1
51.0	51.0	0.0	±1.1
50.0	50.0	0.0	±1.1
49.0	49.0	0.0	±1.1
48.0	48.0	0.0	±1.1
47.0	47.0	0.0	±1.1
46.0	46.0	0.0	±1.1
45.0	45.0	0.0	±1.1
44.0	44.0	0.0	±1.1
43.0	43.0	0.0	±1.1
42.0	42.0	0.0	±1.1
41.0	41.0	0.0	±1.1
40.0	40.0	0.0	±1.1
39.0	39.0	0.0	±1.1
38.0	38.0	0.0	±1.1
37.0	37.0	0.0	±1.1
36.0	36.0	0.0	±1.1
35.0	35.0	0.0	±1.1
34.0	34.0	0.0	±1.1
33.0	33.0	0.0	±1.1
32.0	32.0	0.0	±1.1
31.0	31.0	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	27.0	0.0	±1.1
26.0	26.1	0.1	±1.1
25.0	25.1	0.1	±1.1

QP-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL22240
Job No. : VCSAC0089
Pages : 8 of 8

11. Overall indication

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

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	117.0	117.0	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

QP-TS12-04-04-020664

21-14-1311 Sukhvitai Rd, Bangkok, Bangkok 10110 THAILAND
Tel: 02-615-8801 Fax: 02-615-1679 e-mail: sithiporn@thaisit.com http://www.sithiporn.comCert. No. : ACL22240
Job No. : VCSAC0089
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A Microphone UC-32 / Pre-amplifier M1-24
Serial No. : 06023395 / 198442 / 26423
ID No. : 1-300-11020

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
106 PHATTHANAKAN RD, PHATTHANAKAN ROAD,
KHUANG PHATTHANAKAN, KHEE SUAN LUANG,
BANGKOK, 10250 THAILAND.

Location :
Ambient Temperature : (23.0 ± 3.3) °C
Pressure : (101.3 ± 3.3) kPa
Relative Humidity : (50.0 ± 20.0) %

Received Date : 07 OCTOBER 2022
Calibration Date : 20-21 OCTOBER 2022
Date of Issue : 21 OCTOBER 2022

Calibrated by : Naphon Petchum

Approved by :

T. Petchum
(Thanakul Petchum)

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

Continuation of Calibration Certificate

Cert. No. : ACL22240
Job No. : VCSAC0089
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	✓	-	0.3	0.6
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.6
For 10 Hz to 4 kHz	✓	-	0.3	0.7
For > 4 kHz to 10 kHz	-	-	-	1.0
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	0.3
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. Time burst response	✓	-	0.2	0.3
10. Peak C-weight level	✓	-	0.2	0.3
11. Overall indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QP-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL22240
Job No. : VCSAC0089
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
93.9 (93.95)	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	93.9
C-weight	16.4
Flat	22.1

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits (dB)
125	0.3	0.1	0.3	±1.5
1000	0.0	0.0	0.0	±1.0
8000	0.4	0.1	0.5	±2.0

QP-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL22240
Job No. : VCSAC0089
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. Time burst response

Time Weighting	Time burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; -5.0
	2	8	117.0	116.9	-0.1	1.0; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	107.9	-0.1	1.5; -5.0
	200	800	127.0	127.0	0.0	±1.0
	0.25	1	99.0	98.8	-0.2	1.5; -5.0
SEL	2	8	108.0	108.0	0.0	1.0; -2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C-weight level

Number of cycle in 1st signal	Anticipated Value (dB)	Measured Value, Leq (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±1.0
One	136.4	136.3	-0.1	±2.0

Number of cycle in 1st signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	±1.0
Positive half cycle	135.4	135.1	-0.3	±2.0
Negative half cycle	135.4	135.1	-0.3	±2.0

QP-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL22240
Job No. : VCSAC0089
Pages : 2 of 8

Calibration Procedure : CP-AC-04

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 Acoustic chamber and Reference Standard Instruments.

For test results of each item were made by observation of each instrument 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	MY480317076	IF-0007-22	04-Feb-23
Waveform Generator	33511B	MY32302742	IF-0006-22	04-Feb-23
Digital Multimeter	33461A	MY33291016	EEL-00-040265	09-Feb-23
Digital Multimeter	33461A	MY33291016	EEL-00-040265	09-Feb-23
Digital Multimeter	34461A	MY06024273	EEL-00-050265	09-Feb-23
Programmable Acoustics	MA-107T	62100114	IF-0009-22	07-Feb-23
Condenser Microphone	4180	2077900	AA-0013-22	26-Feb-23
Measuring Amplifier	NA-42KAJ	34560495	AA-0005-22	22-Feb-23

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

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

3.1 National Institute of Metrology (Thailand)

3.2 Thailand Institute of Scientific and Technological Research (TISTR)

QP-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL22240
Job No. : VCSAC0089
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	0.1	0.0	0.0	±2.0
125	0.0	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	0.0	±2.0
8000	0.0	0.1	0.1	±2.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Continuation of Calibration Certificate

Cert. No. : ACL22241
Job No. : VCMAC0889
Pages : 4 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
30.0	30.0	0.0	±1.1
26.0	26.0	0.0	±1.1
22.0	22.0	0.0	±1.1
20.0	20.0	0.0	±1.1
18.0	18.0	0.0	±1.1
16.0	16.0	0.0	±1.1
14.0	14.0	0.0	±1.1
12.0	12.0	0.0	±1.1
10.0	10.0	0.0	±1.1
8.0	8.0	0.0	±1.1
6.0	6.0	0.0	±1.1
4.0	4.0	0.0	±1.1
2.0	2.0	0.0	±1.1
0.0	0.0	0.0	±1.1
-2.0	-2.0	0.0	±1.1
-4.0	-4.0	0.0	±1.1
-6.0	-6.0	0.0	±1.1
-8.0	-8.0	0.0	±1.1
-10.0	-10.0	0.0	±1.1
-12.0	-12.0	0.0	±1.1
-14.0	-14.0	0.0	±1.1
-16.0	-16.0	0.0	±1.1
-18.0	-18.0	0.0	±1.1
-20.0	-20.0	0.0	±1.1
-22.0	-22.0	0.0	±1.1
-24.0	-24.0	0.0	±1.1
-26.0	-26.0	0.0	±1.1
-28.0	-28.0	0.0	±1.1
-30.0	-30.0	0.0	±1.1
-32.0	-32.0	0.0	±1.1
-34.0	-34.0	0.0	±1.1
-36.0	-36.0	0.0	±1.1
-38.0	-38.0	0.0	±1.1
-40.0	-40.0	0.0	±1.1
-42.0	-42.0	0.0	±1.1
-44.0	-44.0	0.0	±1.1
-46.0	-46.0	0.0	±1.1
-48.0	-48.0	0.0	±1.1
-50.0	-50.0	0.0	±1.1
-52.0	-52.0	0.0	±1.1
-54.0	-54.0	0.0	±1.1
-56.0	-56.0	0.0	±1.1
-58.0	-58.0	0.0	±1.1
-60.0	-60.0	0.0	±1.1
-62.0	-62.0	0.0	±1.1
-64.0	-64.0	0.0	±1.1
-66.0	-66.0	0.0	±1.1
-68.0	-68.0	0.0	±1.1
-70.0	-70.0	0.0	±1.1
-72.0	-72.0	0.0	±1.1
-74.0	-74.0	0.0	±1.1
-76.0	-76.0	0.0	±1.1
-78.0	-78.0	0.0	±1.1
-80.0	-80.0	0.0	±1.1
-82.0	-82.0	0.0	±1.1
-84.0	-84.0	0.0	±1.1
-86.0	-86.0	0.0	±1.1
-88.0	-88.0	0.0	±1.1
-90.0	-90.0	0.0	±1.1
-92.0	-92.0	0.0	±1.1
-94.0	-94.0	0.0	±1.1
-96.0	-96.0	0.0	±1.1
-98.0	-98.0	0.0	±1.1
-100.0	-100.0	0.0	±1.1
-102.0	-102.0	0.0	±1.1
-104.0	-104.0	0.0	±1.1
-106.0	-106.0	0.0	±1.1
-108.0	-108.0	0.0	±1.1
-110.0	-110.0	0.0	±1.1
-112.0	-112.0	0.0	±1.1
-114.0	-114.0	0.0	±1.1
-116.0	-116.0	0.0	±1.1
-118.0	-118.0	0.0	±1.1
-120.0	-120.0	0.0	±1.1
-122.0	-122.0	0.0	±1.1
-124.0	-124.0	0.0	±1.1
-126.0	-126.0	0.0	±1.1
-128.0	-128.0	0.0	±1.1
-130.0	-130.0	0.0	±1.1
-132.0	-132.0	0.0	±1.1
-134.0	-134.0	0.0	±1.1
-136.0	-136.0	0.0	±1.1
-138.0	-138.0	0.0	±1.1
-140.0	-140.0	0.0	±1.1
-142.0	-142.0	0.0	±1.1
-144.0	-144.0	0.0	±1.1
-146.0	-146.0	0.0	±1.1
-148.0	-148.0	0.0	±1.1
-150.0	-150.0	0.0	±1.1
-152.0	-152.0	0.0	±1.1
-154.0	-154.0	0.0	±1.1
-156.0	-156.0	0.0	±1.1
-158.0	-158.0	0.0	±1.1
-160.0	-160.0	0.0	±1.1
-162.0	-162.0	0.0	±1.1
-164.0	-164.0	0.0	±1.1
-166.0	-166.0	0.0	±1.1
-168.0	-168.0	0.0	±1.1
-170.0	-170.0	0.0	±1.1
-172.0	-172.0	0.0	±1.1
-174.0	-174.0	0.0	±1.1
-176.0	-176.0	0.0	±1.1
-178.0	-178.0	0.0	±1.1
-180.0	-180.0	0.0	±1.1
-182.0	-182.0	0.0	±1.1
-184.0	-184.0	0.0	±1.1
-186.0	-186.0	0.0	±1.1
-188.0	-188.0	0.0	±1.1
-190.0	-190.0	0.0	±1.1
-192.0	-192.0	0.0	±1.1
-194.0	-194.0	0.0	±1.1
-196.0	-196.0	0.0	±1.1
-198.0	-198.0	0.0	±1.1
-200.0	-200.0	0.0	±1.1
-202.0	-202.0	0.0	±1.1
-204.0	-204.0	0.0	±1.1
-206.0	-206.0	0.0	±1.1
-208.0	-208.0	0.0	±1.1
-210.0	-210.0	0.0	±1.1
-212.0	-212.0	0.0	±1.1
-214.0	-214.0	0.0	±1.1
-216.0	-216.0	0.0	±1.1
-218.0	-218.0	0.0	±1.1
-220.0	-220.0	0.0	±1.1
-222.0	-222.0	0.0	±1.1
-224.0	-224.0	0.0	±1.1
-226.0	-226.0	0.0	±1.1
-228.0	-228.0	0.0	±1.1
-230.0	-230.0	0.0	±1.1
-232.0	-232.0	0.0	±1.1
-234.0	-234.0	0.0	±1.1
-236.0	-236.0	0.0	±1.1
-238.0	-238.0	0.0	±1.1
-240.0	-240.0	0.0	±1.1
-242.0	-242.0	0.0	±1.1
-244.0	-244.0	0.0	±1.1
-246.0	-246.0	0.0	±1.1
-248.0	-248.0	0.0	±1.1
-250.0	-250.0	0.0	±1.1
-252.0	-252.0	0.0	±1.1
-254.0	-254.0	0.0	±1.1
-256.0	-256.0	0.0	±1.1
-258.0	-258.0	0.0	±1.1
-260.0	-260.0	0.0	±1.1
-262.0	-262.0	0.0	±1.1
-264.0	-264.0	0.0	±1.1
-266.0	-266.0	0.0	±1.1
-268.0	-268.0	0.0	±1.1
-270.0	-270.0	0.0	±1.1
-272.0	-272.0	0.0	±1.1
-274.0	-274.0	0.0	±1.1
-276.0	-276.0	0.0	±1.1
-278.0	-278.0	0.0	±1.1
-280.0	-280.0	0.0	±1.1
-282.0	-282.0	0.0	±1.1
-284.0	-284.0	0.0	±1.1
-286.0	-286.0	0.0	±1.1
-288.0	-288.0	0.0	±1.1
-290.0	-290.0	0.0	±1.1
-292.0	-292.0	0.0	±1.1
-294.0	-294.0	0.0	±1.1
-296.0	-296.0	0.0	±1.1
-298.0	-298.0	0.0	±1.1
-300.0	-300.0	0.0	±1.1
-302.0	-302.0	0.0	±1.1
-304.0	-304.0	0.0	±1.1
-306.0	-306.0	0.0	±1.1
-308.0	-308.0	0.0	±1.1
-310.0	-310.0	0.0	±1.1
-312.0	-312.0	0.0	±1.1
-314.0	-314.0	0.0	±1.1
-316.0	-316.0	0.0	±1.1
-318.0	-318.0	0.0	±1.1
-320.0	-320.0	0.0	±1.1
-322.0	-322.0	0.0	±1.1
-324.0	-324.0	0.0	±1.1
-326.0	-326.0	0.0	±1.1
-328.0	-328.0	0.0	±1.1
-330.0	-330.0	0.0	±1.1
-332.0	-332.0	0.0	±1.1
-334.0	-334.0	0.0	±1.1
-336.0	-336.0	0.0	±1.1
-338.0	-338.0	0.0	±1.1
-340.0	-340.0	0.0	±1.1
-342.0	-342.0	0.0	±1.1
-344.0	-344.0	0.0	±1.1
-346.0	-346.0	0.0	±1.1
-348.0	-348.0	0.0	±1.1
-350.0	-350.0	0.0	±1.1
-352.0	-352.0	0.0	±1.1
-354.0	-354.0	0.0	±1.1
-356.0	-356.0	0.0	±1.1
-358.0	-358.0	0.0	±1.1
-360.0	-360.0	0.0	±1.1
-362.0	-362.0	0.0	±1.1
-364.0	-364.0	0.0	±1.1
-366.0	-366.0	0.0	±1.1
-368.0	-368.0	0.0	±1.1
-370.0	-370.0	0.0	±1.1
-372.0	-372.0	0.0	±1.1
-374.0	-374.0	0.0	±1.1
-376.0	-376.0	0.0	±1.1
-378.0	-378.0	0.0	±1.1
-380.0	-380.0	0.0	±1.1
-382.0	-382.0	0.0	±1.1
-384.0	-384.0	0.0	±1.1
-386.0	-386.0	0.0	±1.1
-388.0	-388.0	0.0	±1.1
-390.0	-390.0	0.0	±1.1
-392.0	-392.0	0.0	±1.1
-394.0	-394.0	0.0	±1.1
-396.0	-396.0	0.0	±1.1
-398.0	-398.0	0.0	±1.1
-400.0	-400.0	0.0	±1.1
-402.0	-402.0	0.0	±1.1
-404.0	-404.0	0.0	±1.1
-406.0	-406.0	0.0	±1.1
-408.0	-408.0	0.0	±1.1
-410.0	-410.0	0.0	±1.1
-412.0	-412.0	0.0	±1.1
-414.0	-414.0	0.0	±1.1
-416.0	-416.0	0.0	±1.1
-418.0	-418.0	0.0	±1.1
-420.0	-420.0	0.0	±1.1
-422.0	-422.0	0.0	±1.1
-424.0	-424.0	0.0	±1.1
-426.0	-426.0	0.0	±1.1
-428.0	-428.0	0.0	±1.1
-430.0	-430.0	0.0	±1.1
-432.0	-432.0	0.0	±1.1
-434.0	-434.0	0.0	±1.1
-436.0	-436.0	0.0	±1.1
-438.0	-438.0	0.0	±1.1
-440.0	-440.0	0.0	±1.1
-442.0	-442.0	0.0	±1.1
-444.0	-444.0	0.0	±1.1
-446.0	-446.0	0.0	±1.1
-448.0	-448.0	0.0	±1.1
-450.0	-450.0	0.0	±1.1
-452.0	-452.0	0.0	±1.1
-454.0	-454.0	0.0	±1.1
-456.0	-456.0	0.0	±1.1
-458.0	-458.0	0.0	±1.1
-460.0	-460.0	0.0	±1.1
-462.0	-462.0	0.0	±1.1
-464.0	-464.0	0.0	±1.1
-466.0	-466.0	0.0	±1.1
-468.0	-468.0	0.0	±1.1
-470.0	-470.0	0.0	±1.1
-472.0	-472.0	0.0	±1.1
-474.0	-474.0	0.0	±1.1
-476.0	-476.0	0.0	±1.1
-478.0	-478.0	0.0	±1.1
-480.0	-480.0	0.0	±1.1
-482.0	-482.0	0.0	±1.1
-484.0	-484.0	0.0	±1.1
-486.0	-486.0	0.0	±1.1
-488.0	-488.0	0.0	±1.1
-490.0	-490.0	0.0	±1.1
-492.0	-492.0	0.0	±1.1
-494.0	-494.0	0.0	±1.1
-496.0	-496.0	0.0	±1.1
-498.0	-498.0	0.0	±1.1
-500.0	-500.0	0.0	±1.1
-502.0	-502.0	0.0	±1.1
-504.0	-504.0	0.0	±1.1
-506.0	-506.0	0.0	±1.1
-508.0	-508.0	0.0	±1.1
-510.0	-510.0	0.0	±1.1
-512.0	-512.0	0.0	±1.1
-514.0	-514.0	0.0	±1.1
-516.0	-516.0	0.0	±1.1
-518.0	-518.0	0.0	±1.1

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. Time burst response

Time Weighting	Time burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; -2.5
	2	8	117.0	117.0	0.0	1.0; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	0.25	1	108.0	108.0	0.0	1.5; -5.0
	2	8	127.6	127.6	0.0	±1.0
	200	800	134.0	134.0	0.0	±1.0
SEL	0.25	1	98.0	98.9	+0.9	1.5; -5.0
	2	8	108.0	108.0	0.0	1.0; -2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

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

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

QP-TS12-04-04-020604

T. Petchu.

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	89.5	±1.5

12. High level stability

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

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

End of Calibration Certificate

QP-TS12-04-04-020604

T. Petchu.

Calibration Procedure : CP-AL-01

Calibration Method :

This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM). The SLM had been tested in Acoustical and Electrical signal using of frequency weighting with A-weight, C-weight and Reference Standard Instruments.

For term results of each item were made by observation of each instrument 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	MY49017076	EP-007-22	04-Feb-23
Waveform Generator	33511B	MY52307042	EP-008-22	04-Feb-23
Digital Multimeter	33461A	MY53270104	EELBP-104065	09-Feb-23
Digital Multimeter	33461A	MY53270106	EELBP-105065	09-Feb-23
Digital Multimeter	34461A	MY6004273	EELBP-105065	09-Feb-23
Programmable Attenuator	NAI-1070	62100114	EP-009-22	07-Feb-23
Consumer Microphone	4180	2977900	AA-113-22	24-Feb-23
Measuring Amplifier	NA-425A1	34560696	AY-001-22	22-Feb-23

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

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

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

QP-TS12-04-04-020604

T. Petchu.

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	✓	-	0.2	N/A
125 Hz	✓	-	0.5	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.6
For 10 Hz to 4 kHz	✓	-	0.3	0.7
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	✓	-	1.0	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.1
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. Time burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.3
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QP-TS12-04-04-020604

T. Petchu.

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	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	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.1	±1.0
4000	0.0	0.1	0.1	±1.0
8000	0.1	0.1	0.1	±1.0

5. Frequency and time weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	0.0	±1.0
C-weight	94.0	0.0	±1.0
Flat	94.0	0.0	±1.0

5.2 Time weighting at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	94.0	0.0	±1.0
Slow	94.0	0.0	±1.0
1/2s	94.0	0.0	±1.0

6. Long-term stability

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

QP-TS12-04-04-020604

T. Petchu.

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.1	0.1	±1.1
134.0	134.1	0.1	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.1	0.1	±1.1
114.0	114.1	0.1	±1.1
109.0	109.0	0.0	±1.1
104.0	104.1	0.1	±1.1
99.0	99.0	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
29.0	29.0	0.0	±1.1
24.0	24.0	0.0	±1.1
19.0	19.0	0.0	±1.1
14.0	14.0	0.0	±1.1
9.0	9.0	0.0	±1.1
4.0	4.0	0.0	±1.1

QP-TS12-04-04-020604

T. Petchu.

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
93.9 (93.9)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.1

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

Frequency Weighting	Measured value (dB)
A-weight	12.0
C-weight	26.1
Flat	26.6

3. Acoustical signals tests of frequency weightings

Meter free-field acoustic response at a level of 94 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.1	0.1	±1.5
1000	0.0	0.0	0.0	±1.0
8000	0.1	0.1	0.1	±1.0

QP-TS12-04-04-020604

T. Petchu.

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. Time burst response

Time Weighting	Time burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; -2.5
	2	8	117.0	117.0	0.0	1.0; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	0.25	1	108.0	108.0	0.0	1.5; -5.0
	2	8	127.6	127.6	0.0	±1.0
	200	800	134.0	134.0	0.0	±1.0
SEL	0.25	1	98.0	98.9	+0.9	1.5; -5.0
	2	8	108.0	108.0	0.0	1.0; -2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	136.2	-0.2	±3.0

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

QP-TS12-04-04-020604

T. Petchu.

Continuation of Calibration Certificate

Cert. No. : ACL23046
Job No. : VC66AC0824
Pages : 3 of 8

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle	0.0
89.5	89.5	±1.5

12. High level stability

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

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

End of Calibration Certificate

43-43/19 Sathakorn Rd., Bangkum, Bangkok 10710 Thailand
Tel: 2435-8807 Fax: 2435-1476 E-mail: sithiporn@thai.com http://www.sithiporn.comCert. No. : ACL23046
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-45 Microlog UC-92 / Precision 704-24
Serial No. : 0122007 / 14559 / 34373
ID No. : RYQ JS0019

Condition As Found : GOOD

Customer : AIS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTHANAKAN RD. PHATTHANAKAN ROAD,
KUTWADONG PHATTHANAKAN, KHEE SUAN LIANG,
BANGKOK, 10250 THAILAND.

Location :
Ambient Temperature : 23.0 ± 3.3 °C
Pressure : 101.3 ± 3.3 kPa
Relative Humidity : (50.0 ± 3.0) %

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

Calibrated by : Nuchalin Pitsuphan

Approved by : T. Petchu-

T. Petchu-
(Thakul Petchu)

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

QP-TS12-04-04-020604

T. Petchu-

QP-TS12-04-04-020604

Continuation of Calibration Certificate

Cert. No. : ACL23046
Job No. : VC66AC0824
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 in Acoustical and Electrical signal with frequency weighting with Acoustic chamber and Reference Standard Instruments.

For test results of each item were made by observation of each instrument directly and also with SLM's display.

Condition of this result of calibration :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33218A	MY5202742	IT-0807-22	04-Feb-23
Waveform Generator	33511B	MY5202742	IT-0908-22	04-Feb-23
Digital Multimeter	33441A	MY5220104	EEL-09-04-25	09-Feb-23
Digital Multimeter	33441A	MY5220106	EEL-09-04-25	09-Feb-23
Digital Multimeter	34401A	MY6002473	EEL-09-05-25	09-Feb-23
Programmable Attenuator	NAAP-1079	A2100114	IT-0609-22	07-Feb-23
Condenser Microphone	4189	2977990	AA-1813-22	24-Feb-23
Measuring Amplifier	NA-CRM	3436095	AA-3005-22	22-Feb-23

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

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

3.1 National Institute of Metrology (Thailand).

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

QP-TS12-04-04-020604

T. Petchu-

Continuation of Calibration Certificate

Cert. No. : ACL23046
Job No. : VC66AC0824
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permissible 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	✓	-	0.3	0.6
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings	✓	-	0.2	0.6
For 10 Hz to 4 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. Time 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

QP-TS12-04-04-020604

T. Petchu-

Continuation of Calibration Certificate

Cert. No. : ACL23046
Job No. : VC66AC0824
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
93.9 (93.9)	91.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.7

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

Frequency Weighting	Measured Value (dB)
A-weight	9.9
C-weight	16.3
Flat	22.4

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.6	0.6	0.6	±1.5
1000	0.1	0.1	0.1	±1.0
8000	-2.3	-2.3	-2.3	±0.0

Continuation of Calibration Certificate

Cert. No. : ACL23046
Job No. : VC66AC0824
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±2.0
125	0.0	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±2.0
4000	0.0	0.0	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
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
Fast	94.0	0.0	±0.1
Slow	94.0	0.0	±0.1
1sec	94.0	0.0	±0.1

6. Long-term stability

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

QP-TS12-04-04-020604

T. Petchu-

Continuation of Calibration Certificate

Cert. No. : ACL23046
Job No. : VC66AC0824
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
117.0	117.0	0.0	±1.1
116.0	116.0	0.0	±1.1
115.0	115.0	0.0	±1.1
114.0	114.0	0.0	±1.1
113.0	113.0	0.0	±1.1
112.0	112.0	0.0	±1.1
111.0	111.0	0.0	±1.1
110.0	110.0	0.0	±1.1
109.0	109.0	0.0	±1.1
108.0	108.0	0.0	±1.1
107.0	107.0	0.0	±1.1
106.0	106.0	0.0	±1.1
105.0	105.0	0.0	±1.1
104.0	104.0	0.1	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
90.0	90.0	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
29.0	29.0	-0.1	±1.1
24.0	23.9	-0.1	±1.1
19.0	27.6	8.6	±1.1
14.0	25.5	11.5	±1.1
9.0	24.7	15.7	±1.1

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

43/151 Sukhvithee Rd, Bangna, Bangkok 10700 Thailand
Tel: 02-445 8888 Fax: 02-445 1879 e-mail: cal@www.sithiporn.com http://www.sithiporn.com



Cert. No. : ACL23047
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/Microphone UC-52 / Pre-amplifier NH-24
Serial No. : 01222716 / 143832 / 22763
ID No. : RYO_F50020

Condition As Found : GOOD

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

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

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

Calibrated by : Nattakorn Pitsuphan

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

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.

QP-TS12-04-04-020664

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23047
Job No. : YC6AC0024
Pages : 1 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC 61672-1 (2003) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests & Frequency weighting with Acoustic chamber and Reference Standard Instruments.

For test results of each item were made by observation of each instrument 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	33511A	MY48017076	IF-0007-22	04-Feb-23
Waveform Generator	33511E	MY5230742	IF-0006-22	04-Feb-23
Digital Multimeter	33461A	MY3320104	EEL-BP 04/04/23	09-Feb-23
Digital Multimeter	33461A	MY33207078	EEL-BP 03/05/23	09-Feb-23
Digital Multimeter	33461A	MY6062373	EEL-BP 05/05/23	09-Feb-23
Programmable Acoustics	MA4-100	62100114	IF-0669-22	07-Feb-23
Condenser Microphone	4180	2977091	AA-101-22	24-Feb-23
Measuring Amplifier	NA-42KA1	3456085	AA-3300-22	22-Feb-23

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

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

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

QP-TS12-04-04-020664

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23047
Job No. : YC6AC0024
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.5)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.3

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

Frequency Weighting (dB)	Measured value (dB)
A-weight	11.0
C-weight	17.0
Flat	23.8

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.5	0.5	0.5	±1.5
1000	0.1	0.1	0.1	±1.0
8000	-1.3	-1.2	-1.2	±0.5

QP-TS12-04-04-020664

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23047
Job No. : YC6AC0024
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

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

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long-term stability

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

QP-TS12-04-04-020664

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23047
Job No. : YC6AC0024
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. Time burst response

Time Weighting	Time burst duration, T _B (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; -5.0
	2	8	117.0	116.9	-0.1	1.0; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	107.9	-0.1	1.5; -5.0
	200	800	127.6	127.6	0.0	±1.0
	0.25	1	99.0	98.9	-0.2	1.5; -5.0
SEL	2	8	108.0	108.0	0.0	1.0; -2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
4 Hz	136.4	135.4	-1.0	±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	133.4	135.1	+1.7	±2.0
Negative half cycle	133.4	135.1	+1.7	±2.0

QP-TS12-04-04-020664

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23047
Job No. : YC6AC0024
Pages : 8 of 8

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	89.6	0.1
Negative one-half cycle	89.6	0.1

12. High level stability

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

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

End of Calibration Certificate

QP-TS12-04-04-020664

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23047
Job No. : YC6AC0024
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
5000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long-term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.2
9. Time burst response	✓	-	0.2	0.2
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QP-TS12-04-04-020664

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23047
Job No. : YC6AC0024
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.1	0.1	±1.1
134.0	134.1	0.1	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
128.0	128.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.1	0.1	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.1	0.1	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
29.0	29.0	0.0	±1.1
24.0	24.0	0.0	±1.1
19.0	19.0	0.0	±1.1
14.0	14.0	0.0	±1.1
9.0	9.0	0.0	±1.1

QP-TS12-04-04-020664

SITHIPORN ASSOCIATES CO.,LTD. CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23047
Job No. : YC6AC0024
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/Microphone UC-52 / Pre-amplifier NH-24
Serial No. : 01222723 / 143841 / 22770
ID No. : RYO_F50022

Condition As Found : GOOD

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

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

Received Date : 24 JANUARY 2023
Calibration Date : 25-26 JANUARY 2023
Date of Issue : 27 JANUARY 2023

Calibrated by : Nattakorn Pitsuphan

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

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.

QP-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23086
Job No. : VCMAC0831
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 Acoustic chamber and Reference Standard Instruments.

For test results of each item were made by observation of each instrument 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	IF-0007-22	04-Feb-23
Waveform Generator	33511B	MY52302742	IF-0008-22	04-Feb-23
Digital Multimeter	34461A	MY53204064	EEL-RP-040245	09-Feb-23
Digital Multimeter	34461A	MY53204076	EEL-RP-040245	09-Feb-23
Digital Multimeter	34461A	MY53204077	EEL-RP-040245	09-Feb-23
Programmable Acoustics	MAT-1079	42100114	IF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KM	34560495	AA-3005-22	22-Feb-23

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

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

3.1 National Institute of Metrology (Thailand).

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

QF-TS12-04-04-02064

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL23086
Job No. : VCMAC0831
Pages : 3 of 8

5. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			Acceptance Limits
	Flat	C-weight	A-weight	
63	0.0	0.0	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	±2.0
8000	0.0	0.1	0.1	±2.0

8. Frequency and time weightings at 1 kHz

8.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
A-weight	94.0	0.0	±1.0
C-weight	94.0	0.0	±0.2
Flat	94.0	0.0	±0.2

8.2 Time weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
Fast	94.0	0.0	±1.0
Slow	94.0	0.0	±0.1
Log	94.0	0.0	±0.1

8. Long-term stability

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

QF-TS12-04-04-02064

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL23086
Job No. : VCMAC0831
Pages : 8 of 8

11. Overall indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits
Positive one-half cycle	89.5	±0.1
Negative one-half cycle	89.5	±0.1

12. High level stability

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

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

End of Calibration Certificate

QF-TS12-04-04-02064

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL23086
Job No. : VCMAC0831
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	✓	-	0.3	0.6
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.6
For 10 Hz to 4 kHz	✓	-	0.3	0.7
For > 4 kHz to 10 kHz	✓	-	0.1	0.1
For > 10 kHz to 20 kHz	✓	-	1.0	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-TS12-04-04-02064

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL23086
Job No. : VCMAC0831
Pages : 3 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	53.9	-0.1	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	38.9	-0.1	±1.1
34.0	33.9	-0.1	±1.1
29.0	28.9	-0.1	±1.1
24.0	23.9	-0.1	±1.1
19.0	18.9	-0.1	±1.1
14.0	13.9	-0.1	±1.1
9.0	8.9	-0.1	±1.1

QF-TS12-04-04-02064

T. Petch.

451-45171 Siladon Road, Banglamung, Bangkok, Thailand 10710 THAILAND
Tel: 02-2415-8898 Fax: 02-2415-8899 Email: info@sithiporn.com, info@thai-sithiporn.comCert. No. : ACL23086
Job No. : VCMAC0831
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : KION
Model : NL-42 Microphone UC-52 / Pre-amplifier NH-24
Serial No. : 01222724 / 141841 / 22771
ID No. : RYO, P50023

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN 40, PHATTANAKAN ROAD,
KHUANG PHU THAI, KHUANG PHU THAI, KHUANG PHU THAI,
BANGKOK, 10250 THAILAND.

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

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

Calibrated by : Nattakorn Pongpang

Approved by : T. Petch.
(Thailand)

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-TS12-04-04-02064

Continuation of Calibration Certificate

Cert. No. : ACL23086
Job No. : VCMAC0831
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits
93.0 (0.0/0.0)	93.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.1

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

Frequency Weighting	Measured value (dB)
A-weight	12.0
C-weight	18.3
Flat	24.0

3. Acoustical signal tests of frequency weightings

Mean free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			Acceptance Limits
	Flat	C-weight	A-weight	
125	0.5	0.5	0.6	±1.5
1000	0.0	-0.1	-0.1	±1.0
8000	-0.1	0.0	0.0	±0.0

QF-TS12-04-04-02064

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL23086
Job No. : VCMAC0831
Pages : 1 of 8

8. Level linearity including the level range control

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

9. Tone burst response

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

10. Peak C sound level

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

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits
Continuous	133.0	133.0	0.0	-
Positive half cycle	135.4	135.3	-0.1	±2.0
Negative half cycle	135.4	135.3	-0.1	±2.0

QF-TS12-04-04-02064

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL23086
Job No. : VCMAC0831
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 Acoustic chamber and Reference Standard Instruments.

For test results of each item were made by observation of each instrument 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	IF-0007-22	04-Feb-23
Waveform Generator	33511B	MY52302742	IF-0008-22	04-Feb-23
Digital Multimeter	34461A	MY53204064	EEL-RP-040245	09-Feb-23
Digital Multimeter	34461A	MY53204076	EEL-RP-040245	09-Feb-23
Digital Multimeter	34461A	MY53204077	EEL-RP-040245	09-Feb-23
Programmable Acoustics	MAT-1079	42100114	IF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KM	34560495	AA-3005-22	22-Feb-23

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

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

3.1 National Institute of Metrology (Thailand).

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

QF-TS12-04-04-02064

T. Petch.

Cert. No. : ACL23048
Job No. : VC6AC0024
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
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	0.2
9. Time burst response	✓	-	0.2	0.2
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QP-TS12-04-04-020604

P.T.A.

Cert. No. : ACL23048
Job No. : VC6AC0024
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.4

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

Frequency Weighting	Measured value (dB)
A-weight	11.2
C-weight	17.6
Flat	23.4

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	-0.1	-0.1	-0.1	±1.0
8000	-0.8	-0.8	-0.7	±0.6

QP-TS12-04-04-020604

P.T.A.

Cert. No. : ACL23048
Job No. : VC6AC0024
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	53.9	-0.1	±1.1
49.0	48.9	-0.1	±1.1
44.0	43.9	-0.1	±1.1
39.0	38.9	-0.1	±1.1
34.0	33.9	-0.1	±1.1
29.0	28.9	-0.1	±1.1
24.0	23.9	-0.1	±1.1
19.0	18.9	-0.1	±1.1
14.0	13.9	-0.1	±1.1
9.0	8.9	-0.1	±1.1
4.0	3.9	-0.1	±1.1

QP-TS12-04-04-020604

P.T.A.

Cert. No. : ACL23048
Job No. : VC6AC0024
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. Time burst response

Time Weighting	Time burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; -5.0
	2	8	117.0	117.0	0.0	1.0; -2.5
	200	800	134.0	134.0	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, Leqpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.3	-0.8	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Positive half cycle	135.4	135.2	-0.2	±2.0
Negative half cycle	133.4	133.2	-0.2	±2.0

QP-TS12-04-04-020604

P.T.A.

151-11111 Sithiporn Rd., Banglamung, Bangkok 10710 THAILAND
Tel: 0-2835-6801, Fax: 0-2835-1829, e-mail: csl@csa.sithiporn.com, http://www.sithiporn.comCert. No. : ACL23048
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : ROKO
Model : NL-42 Microphone UC-52 / Pre-amplifier NH-24
Serial No. : 00296517 / 133220 / 83527
ID No. : RYO, P80414

Condition As Found :

GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
604 PHATHANAKARN SRI PHATTHANAKARN ROAD,
KHUWAENG PHATHANAKARN, KHU SI SANLUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 24 JANUARY 2023
Date of Issue : 25-26 JANUARY 2023
Date of Issue : 27 JANUARY 2023

Calibrated by : Nathanon Pitsupai

Approved by : P. Retan
(Thankul 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.

QP-TS12-04-04-020604

Cert. No. : ACL23048
Job No. : VC6AC0011
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

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

For test results of each item were made by observation of each instrument 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	MY440/7076	EP-0007-22	04-Feb-23
Waveform Generator	33511B	MY53202342	EP-0006-22	04-Feb-23
Digital Multimeter	34461A	MY5320104	EEL-EP-04/0265	09-Feb-23
Digital Multimeter	34461A	MY5320076	EEL-EP-03/0165	09-Feb-23
Digital Multimeter	34461A	MY5320073	EEL-EP-05/0265	09-Feb-23
Programmable Amplifier	NAAT-1079	42100114	HS-0000-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-H13-22	24-Feb-23
Measuring Amplifier	NA-42KA	34560495	AA-3005-22	22-Feb-23

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

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

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

QP-TS12-04-04-020604

P. Retan

Cert. No. : ACL23048
Job No. : VC6AC0024
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting correct response with relative to 1 kHz

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

6. Long-term stability

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

QP-TS12-04-04-020604

P.T.A.

Cert. No. : ACL23048
Job No. : VC6AC0024
Pages : 8 of 8

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive	Negative	-
one-half cycle	one-half cycle	0.1
89.6	89.7	±1.5

12. High level stability

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

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

End of Calibration Certificate

QP-TS12-04-04-020604

P. Retan

Continuation of Calibration Certificate

Cert. No. : ACL22080
Job No. : VCSAC0301
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
17.1

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

Frequency Weighting (dB)	Measured Value (dB)
A-weight	14.2
C-weight	19.9
Flat	25.3

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.3	0.3	0.3	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	-1.5	-1.8	-1.4	±5.0

QP-TS12-04-04-02064

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL22080
Job No. : VCSAC0301
Pages : 7 of 8

4. 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

5. Time burst response

Time Weighting	Time burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 / -5.0
	2	8	117.0	117.0	0.0	1.0 / -2.5
	200	800	124.0	124.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 / -5.0
	200	800	127.0	127.6	0.6	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 / -5.0
	2	8	108.0	108.0	0.0	3.0 / -2.5
	200	800	128.0	128.1	0.1	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	136.2	-0.2	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.1	0.1	-
Positive half cycle	135.4	135.3	-0.1	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

QP-TS12-04-04-02064

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL22228
Job No. : VCSAC0306
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC-61673-3 (2013) Standard for sound level meter (SLM).
The SLM had been to Acoustical and Electrical signal tests of frequency weighting with Acoustic chamber and Reference Standard Instruments.
For test results of each item were made by observation of each instrument's display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Exp. Date
Waveform Generator	33210A	MY48817076	IF-0007-22	04-Feb-23
Waveform Generator	33511B	MY53202542	IF-0008-22	04-Feb-23
Digital Multimeter	34461A	MY53201014	EEL-IP-04/02/25	09-Feb-23
Digital Multimeter	34461A	MY53200706	EEL-IP-03/02/25	09-Feb-23
Digital Multimeter	34461A	MY69024773	EEL-IP-05/02/25	09-Feb-23
Programmable Attenuator	MAV-1070	42160114	IF-0009-22	07-Feb-23
Condenser Microphone	4190	2977965	AA-0115-22	24-Feb-23
Measuring Amplifier	NA-42KAJ	34560495	AA-3005-22	22-Feb-23

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

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

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

QP-TS12-04-04-02064

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL22080
Job No. : VCSAC0301
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±2.0
125	0.0	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±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
Log	94.0	0.0	±0.1

6. Long-term stability

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

QP-TS12-04-04-02064

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL22080
Job No. : VCSAC0301
Pages : 8 of 8

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.5	89.5	0.0	±1.5

12. High level stability

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

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

End of Calibration Certificate

QP-TS12-04-04-02064

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL22228
Job No. : VCSAC0306
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	±1.4
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
29.0	29.0	-0.1	±1.1
24.0	24.0	-0.1	±1.1
19.0	19.0	-0.1	±1.1
14.0	14.0	-0.1	±1.1
9.0	9.0	-0.1	±1.1
4.0	4.0	-0.1	±1.1

QP-TS12-04-04-02064

T. Petch

45/45/11 Silestern Rd, Bangkok, Bangkok 10110 THAILAND
Tel: 045-45100 Fax: 045-16579 e-mail: cal-center@sithiporn.com http://www.sithiporn.comCert. No. : ACL22228
Job No. : VCSAC0306
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A Microphone UC-52 / Preamp/Filter NH-24
Serial No. : 0662389 / 198636 / 26417
ID No. : -

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
194 PHATHANAKAN 40, PHATHANAKAN ROAD,
KHAO AEANG PHATHANAKAN, KHAO SUAN LUANG,
BANGKOK, 10250 THAILAND.

Location : -
Ambient Temperature : (25.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %

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

Calibrated by : Nafakorn Pichaiwan

Approved by : T. Petch
(Thanakul Petchaiwan)

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.

QP-TS12-04-04-02064

Continuation of Calibration Certificate

Cert. No. : ACL22228
Job No. : VCSAC0306
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.2

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

Frequency Weighting (dB)	Measured value (dB)
A-weight	9.9
C-weight	16.3
Flat	22.2

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	±1.5
1000	0.0	0.0	0.0	±1.0
8000	1.0	1.1	1.1	±5.0

QP-TS12-04-04-02064

T. Petch

Continuation of Calibration Certificate

Cert. No. : ACL22228
Job No. : YC65AC0086
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)				Acceptance Limits
	Flat	C-weight	A-weight		
63	0.0	-0.1	-0.1		±2.0
125	0.0	0.0	0.0		±4.5
250	0.0	0.0	0.0		±4.5
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		±7.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long-term stability

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

QE-TS12-04-04-020664

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL22229
Job No. : YC65AC0086
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.1	0.1	±1.1
84.0	84.1	0.1	±1.1
79.0	79.0	0.0	±1.1
74.0	74.1	0.1	±1.1
69.0	69.1	0.1	±1.1
64.0	64.0	0.0	±1.1
59.0	59.1	0.1	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
29.0	29.1	0.1	±1.1
24.0	24.0	0.0	±1.1
19.0	19.1	0.1	±1.1
14.0	14.0	0.0	±1.1
9.0	9.1	0.1	±1.1
4.0	4.0	0.0	±1.1

QE-TS12-04-04-020664

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL22229
Job No. : YC65AC0086
Pages : 7 of 8

8. Level linearity including the level range control

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

9. Tone burst response

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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
On	136.4	135.8	-0.6	±3.0

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

QE-TS12-04-04-020664

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL22228
Job No. : YC65AC0086
Pages : 8 of 8

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.5	89.6	0.1	±1.5

12. High level stability

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

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

End of Calibration Certificate

QE-TS12-04-04-020664

T. Petch.

431-4331 Sithiporn Rd, Sampran, Bangkok 10700 THAILAND
Tel: 02-2435-8800 Fax: 02-2435-8877 e-mail: sithiporn@thai.com http://www.sithiporn.comCert. No. : ACL22229
Job No. : YC65AC0086
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A Microphone UC-52 / Pre-amplifier N11-24
Serial No. : 0682390 / 196637 / 264113
ID No. : -

Condition As Found : GOOD

Customer : ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATHANAKAN 40, PHATHANAKAN ROAD,
KHUANG PHATHANAKAN, KHEE SUANLIANG,
BANGKOK, 10251 THAILAND.

Location : -
Ambient Temperature : (23.0 ± 3.3) °C
Pressure : (101.3 ± 3.3) kPa
Relative Humidity : (50.0 ± 20.0) %

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

Calibrated by : Natchanon Pitsuppan

Approved by : T. Petch.
(Thanakul Pitsuppan)

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.

QE-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL22229
Job No. : YC65AC0086
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC-61672-1 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Acoustic chamber and Reference
Standard Instruments.
For test results of each item 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.	Exp. Date
Waveform Generator	33210A	MY48617676	IE-0007-22	04-Feb-23
Waveform Generator	33511B	MY53202742	IE-0009-22	04-Feb-23
Digital Multimeter	34461A	MY53201004	EEL-RP-040625	09-Feb-23
Digital Multimeter	34461A	MY53201006	EEL-RP-03-0408	09-Feb-23
Digital Multimeter	34461A	MY60024773	EEL-RP-05-0525	09-Feb-23
Programmable Acoustics	MAAT-10707	42100114	IE-0009-22	07-Feb-23
Condenser Microphone	4180	2977960	AA-1015-22	24-Feb-23
Measuring Amplifier	NA-42KA	34560495	AA-3005-22	22-Feb-23

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

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

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

QE-TS12-04-04-020664

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL22229
Job No. : YC65AC0086
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum permitted uncertainty (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings	✓	-	0.3	0.6
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.6
For 10 Hz to 4 kHz	✓	-	0.3	0.7
For > 4 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	0.3
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QE-TS12-04-04-020664

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL22229
Job No. : YC65AC0086
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
93.9 (93.9)	93.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.6

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

Frequency Weighting	Measured value (dB)
A-weight	102.8
C-weight	117.3
Flat	123.1

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			Acceptance Limits
	Flat	C-weight	A-weight	
125	0.2	0.2	0.2	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.4	0.6	0.8	±5.0

QE-TS12-04-04-020664

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL22229
Job No. : YC65AC0086
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)				Acceptance Limits
	Flat	C-weight	A-weight		
63	0.0	-0.1	-0.1		±2.0
125	0.0	0.0	0.0		±1.5
250	0.0	0.0	0.0		±1.5
500	0.0	0.0	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	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	94.0	0.0	±0.3

QE-TS12-04-04-020664

T. Petch.

Continuation of Calibration Certificate

Cert. No. : ACL22229
Job No. : YC8AC0086
Page : 6 of 6

7. Level linearity on the reference level range

Assigned Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.1	0.1	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.1	0.1	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
30.0	30.0	0.0	±1.1
29.0	29.1	0.1	±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

QP-TS12-04-04-020664

T. Petchu

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY431-13111 Sathorn Rd, Bangkok, Bangkok 10120 THAILAND
Tel: 02-253-8839 Fax: 02-253-8879 Email: cal@siha.com www.sithiporn.comCert. No. : ACL22230
Page : 1 of 1

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A/ Microphone UC-52 / Pre-amplifier NH-24
Serial No. : 0623391 / 196630 / 26419
ID No. : -

Condition As Found : GOOD

Customer : A.S. LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATHANAKAN 40, PHATHANAKAN ROAD,
KIWAJING PHATHANAKAN, KHUET SUAN LIANG,
BANGKOK, 10250 THAILAND.

Location : -

Ambient Temperature : (23.0 ± 3) °C

Pressure : (101.3 ± 3) kPa

Relative Humidity : (50.0 ± 20) %

Received Date : 28 SEPTEMBER 2022

Calibration Date : 12-17 OCTOBER 2022

Date of Issue : 18 OCTOBER 2022

Calibrated by : Nattakorn Petchu

Approved by : T. Petchu
(Thakul Petchu)

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

QP-TS12-04-04-020664

T. Petchu

SITHIPORN / SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22230
Job No. : YC8AC0086
Page : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.7

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

Frequency Weighting	Measured value (dB)
A-weight	12.8
C-weight	16.6
Flat	24.1

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 94 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.1	0.1	±1.5
1000	0.0	0.0	0.0	±1.0
8000	0.0	0.0	0.0	±5.0

QP-TS12-04-04-020664

T. Petchu

Continuation of Calibration Certificate

Cert. No. : ACL22229
Job No. : YC8AC0086
Page : 7 of 8

8. Level linearity including the level range control

Range	Assigned Value (dB)	Measured Value (dB)	Deviation Value (dB)	Acceptance Limits (dB)
Auto	94.0	94.0	0.0	±1.1

9. Tone burst response

Time Weighting	Tone burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 / -5.0
	2	8	117.0	117.0	0.0	1.0 / -2.5
	200	800	134.0	134.0	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, Leqpk (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	135.2	-0.2	±2.0
Negative half cycle	133.4	133.2	-0.2	±2.0

QP-TS12-04-04-020664

T. Petchu

SITHIPORN / SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22230
Job No. : YC8AC0086
Page : 2 of 8

Calibration Procedure : QP-NC-01

Calibration Method :

This equipment was calibrated by based on IEC-61673-3 (D03) Standard for sound level meter (SLM). The SLM had been to Acoustical and Electrical signal tests of frequency weightings with Acoustic chamber and Reference Standard Instruments.

For tests results of each item were made by observation of each instrument 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	MY4007676	IEF-0007-22	04-Feb-21
Waveform Generator	33511B	MY5320742	IEF-0008-22	04-Feb-21
Digital Multimeter	33461A	MY5322014	EEL-IRP-04/02/05	05-Feb-23
Digital Multimeter	33461A	MY5322016	EEL-IRP-05/02/05	05-Feb-23
Digital Multimeter	33461A	MY6002473	EEL-IRP-05/02/05	05-Feb-23
Programmable Attenuator	MAAT-1070	6100114	IEF-0009-22	07-Feb-23
Condenser Microphone	4189	2977960	AA-IRP-22	23-Feb-21
Measuring Amplifier	NA-42KA	34500035	AA-9005-22	17-Feb-23

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

3. This certificate is traceable to the International system of unit maintained as :

3.1 National Institute of Metrology (Thailand).

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

QP-TS12-04-04-020664

T. Petchu

SITHIPORN / SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22230
Job No. : YC8AC0086
Page : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±2.0
125	0.0	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.1	±2.0
4000	0.1	0.1	0.1	±3.0
8000	0.1	0.1	0.1	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

Frequency Weighting	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	94.0	0.0	-
C-weight	94.0	0.0	±0.9
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
Log	94.0	0.0	±0.1

6. Long-term stability

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

QP-TS12-04-04-020664

T. Petchu

Continuation of Calibration Certificate

Cert. No. : ACL22230
Job No. : YC8AC0086
Page : 6 of 8

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	90.5	-0.1
Negative one-half cycle	90.5	±1.5

12. High level stability

Frequency Weighting	SLM Display at initial (dB)	SLM Display at final (dB)	Deviated Value (dB)	Acceptance Limits (dB)
A-weight	137.0	137.0	0.0	±0.2

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

QP-TS12-04-04-020664

T. Petchu

SITHIPORN / SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22230
Job No. : YC8AC0086
Page : 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	✓	-	0.2	0.6
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.6
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

QP-TS12-04-04-020664

T. Petchu

SITHIPORN / SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22230
Job No. : YC8AC0086
Page : 8 of 8

7. Level linearity on the reference level range

Assigned Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.1	0.1	±1.1
136.0	136.1	0.1	±1.1
135.0	135.1	0.1	±1.1
134.0	134.1	0.1	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.1	0.1	±1.1
114.0	114.1	0.1	±1.1
109.0	109.0	0.0	±1.1
104.0	104.1	0.1	±1.1
99.0	99.1	0.1	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	0.0	±1.1
34.0	34.0	0.0	±1.1
30.0	30.1	0.1	±1.1
29.0	29.1	0.1	±1.1
28.0	28.1	0.1	±1.1
27.0	27.1	0.1	±1.1
26.0	26.1	0.1	±1.1
25.0	25.2	0.2	±1.1

QP-TS12-04-04-020664

T. Petchu

Cert. No. : ACL22100
Job No. : VCSAC0086
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. Time burst response

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

10. Peak C sound level

Number of cycle in test signal (dB)	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.5	-0.9	±3.0

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

QF-TS12-04-04-02064

7. Rth

Cert. No. : ACL22100
Job No. : VCSAC0086
Pages : 8 of 8

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	89.7	-0.1
Negative one-half cycle	89.7	-0.1

12. High level stability

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

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

End of Calibration Certificate

QF-TS12-04-04-02064

7. Rth

45/45/1 Sathorn Rd, Bangumue, Bangkok 10700 THAILAND
Tel: 02-615-8888 Fax: 02-615-1679 e-mail: sithiporn@thiporn.com http://www.thiporn.com

Cert. No. : ACL22100
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 Microphone UC-52 / Preamplifier NF-24
Serial No. : 01973423 / 169512 / 72664
ID No. : RYG-FS0386

Condition As Found : GOOD

Customer : A&S LABORATORY GROUP (THAILAND) CO., LTD.
194 PHATHANAKAN 40, PHATHANAKAN ROAD,
KHUANG PHATHANAKAN, KHUANG SUAN LUANG,
BANGKOK, 10250 THAILAND.

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

Received Date : 22 AUGUST 2022
Calibration Date : 24-31 AUGUST 2022
Date of Issue : 02 SEPTEMBER 2022

Calibrated by : Nathakorn Poompison

Approved by : T. Petchum
(Thanakul Petchum)

This certificate is valid in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced or any part thereof, except with the prior written approval of the head of Calibration Laboratory.

QF-TS12-04-04-02064

Cert. No. : ACL22100
Job No. : VCSAC0077
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.5	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. Time burst response	✓	-	0.2	0.2
10. Peak C sound level	✓	-	0.2	0.25
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QF-TS12-04-04-02064

7. Rth

Cert. No. : ACL22100
Job No. : VCSAC0077
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
93.9 (93.95)	93.9	-0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
15.4

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

Frequency Weighting	Measured value (dB)
A-weight	12.6
C-weight	18.6
Flat	24.5

3. Acoustical signal tests of frequency weightings

Mean free-field acoustic response at a level of 94 dB

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.3	±1.5
1000	0.3	0.1	-0.1	±1.0
8000	1.5	1.5	1.6	±3.0

QF-TS12-04-04-02064

7. Rth

Cert. No. : ACL22100
Job No. : VCSAC0077
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±2.0
125	0.0	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±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
Imp	94.0	0.0	±0.1

6. Long-term stability

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

QF-TS12-04-04-02064

7. Rth

Cert. No. : ACL22100
Job No. : VCSAC0077
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	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
19.0	19.0	0.0	±1.1
14.0	14.0	0.0	±1.1
9.0	9.0	0.0	±1.1
4.0	4.0	0.0	±1.1

QF-TS12-04-04-02064

7. Rth

Cert. No. : ACL22100
Job No. : VCSAC0077
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. Time burst response

Time Weighting	Time burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	108.0	0.0	1.5; -5.0
	2	8	117.0	117.0	0.0	1.0; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5; -5.0
	200	800	127.6	127.6	0.0	±1.0
	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	128.1	0.1	±1.0

10. Peak C sound level

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

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

QF-TS12-04-04-02064

7. Rth

Cert. No. : ACL22100
Job No. : VCSAC0077
Pages : 8 of 8

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	89.7	-0.2
Negative one-half cycle	89.7	-0.2

12. High level stability

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

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

QF-TS12-04-04-02064

7. Rth

Cert. No. : ACL23001
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 / Microphone UC-52 / Preamp/for NH24
Serial No. : 00796516 / 62730 / 1479C
ID No. : RYO JS0431

Condition As Found : GOOD

Customer : A.S. LABORATORY GROUP (THAILAND) CO., LTD.
(4) PHATTANAKAN 40, PHATTANAKAN ROAD,
KHWAENG PHATTANAKAN, KHET SUAN LUANG,
BANGKOK, 10250 THAILAND.

Location :
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 2.0) %

Received Date : 24 JANUARY 2023
Calibration Date : 25-26 JANUARY 2023
Date of Issue : 27 JANUARY 2023

Calibrated by : Nathakorn Pitsuphan

Approved by : *T. Petch*
(Thanakul Petchum)

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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23001
Job No. : YC66AC0031
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

Measured Value (dB)
21.7

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

Frequency Weighting	Measured value (dB)
A-weight	13.1
C-weight	19.0
Flat	24.7

3. Acoustical signal tests of frequency weightings

Meter free field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.0	0.0	±1.5
1000	-0.1	-0.1	-0.1	±1.0
8000	-0.4	-0.3	-0.3	±0.0

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23001
Job No. : YC66AC0031
Pages : 5 of 8

Calibration Procedure : CPAC-01

Calibration Method :

This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests by Acoustical and Electrical signal tests of frequency weighting with Acoustic chamber and Reference
Standard Instruments.
For test results of each item were made by observation of each instrument 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	IEF-0007-22	04-Feb-23
Waveform Generator	33511B	MY52302742	IEF-0008-22	04-Feb-23
Digital Multimeter	33461A	MY53220104	IEE-0010-22	09-Feb-23
Digital Multimeter	33461A	MY53220106	IEE-0010-22	09-Feb-23
Digital Multimeter	34461A	MY60024273	IEE-0010-22	09-Feb-23
Programmable Amplifier	MAT-10V	62100114	IEE-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1015-22	24-Feb-23
Measuring Amplifier	NA-42KAM	3450405	AA-3005-22	22-Feb-23

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

3. This certificate is issued by the institutional system of unit maintained as :

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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23001
Job No. : YC66AC0031
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting naturally 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	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.0	0.0	±1.5
1000	0.0	0.0	0.0	±0.0
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
A-weight	94.0	0.0	±1.5
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
Fast	94.0	0.0	±1.5
Slow	94.0	0.0	±0.1
Long	94.0	0.0	±0.1

6. Long-term stability

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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23001
Job No. : YC66AC0031
Pages : 6 of 8

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits
Positive one-half cycle	Negative one-half cycle	-0.1	±1.5
89.6	89.5	-0.1	±1.5

12. High level stability

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

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

End of Calibration Certificate

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23001
Job No. : YC66AC0031
Pages : 6 of 8

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.3	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings	✓	-	0.3	0.6
100 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.6
For 10 Hz to 4 kHz	✓	-	0.3	0.7
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	0.5
9. Time burst response	✓	-	0.2	0.7
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23001
Job No. : YC66AC0031
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
117.0	117.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±0.3
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	53.9	-0.1	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	38.9	-0.1	±1.1
34.0	33.9	-0.1	±1.1
29.0	29.9	0.1	±1.1
24.0	23.8	-0.1	±1.1
24.0	23.8	-0.2	±1.1
23.0	24.9	0.1	±1.1
24.0	25.9	0.1	±1.1
25.0	24.9	-0.2	±1.1

QF-TS12-04-04-020664

Continuation of Calibration Certificate

Cert. No. : ACL23001
Job No. : YC66AC0031
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. Time burst response

Time Weighting	Time burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -3.0
	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	127.0	127.0	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 (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.8	-0.6	±3.0

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Positive half cycle	135.8	135.2	-0.6	±2.0
Negative half cycle	135.6	135.2	-0.4	±2.0

QF-TS12-04-04-020664

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

QF-TS12-04-04-020664

Continuation of Calibration Certificate

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 Acoustic chamber and Reference Standard Instruments.

For test results of each item were made by observation of each instrument 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	IF-0607-22	04-Feb-23
Waveform Generator	33511B	MY32262742	IF-0608-22	04-Feb-23
Digital Multimeter	33461A	MY33220104	EEL-BP_0510245	09-Feb-23
Digital Multimeter	33461A	MY33220976	EEL-BP_0510245	09-Feb-23
Digital Multimeter	34461A	MY60024273	EEL-BP_0510245	09-Feb-23
Programmable Attenuator	MAF-1070	62100114	IF-0609-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAJ	34560495	AA-3005-22	22-Feb-23

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

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

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

QP-TS12-04-04-020664

T. Petch

Continuation of Calibration Certificate

Calibration Procedure : CP-AC-01

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	✓	-	0.3	0.6
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings	✓	-	0.3	0.6
For 10 Hz to 4 kHz	✓	-	0.3	0.7
For > 4 kHz to 10 kHz	✓	-	0.3	1.0
For > 10 kHz to 20 kHz	✓	-	0.3	1.6
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

QP-TS12-04-04-020664

T. Petch

Continuation of Calibration Certificate

Calibration Procedure : CP-AC-01

Result of calibration :

1. Absolute sensitivity

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

2. Self-generated noise

Measured Value (dB)
14.8

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

Frequency Weighting	Measured value (dB)
A-weight	11.6
C-weight	17.5
Flat	23.3

3. Acoustical signal tests of frequency weightings

Meter free-field acoustic response at a level of 94 dB

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			Acceptance Limits
	Flat	C-weight	A-weight	
125	0.0	0.1	0.1	±1.5
1000	-0.1	-0.1	-0.1	±1.0
8000	0.4	0.3	0.4	±2.0

QP-TS12-04-04-020664

T. Petch

Continuation of Calibration Certificate

Calibration Procedure : CP-AC-01

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

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

5. Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long-term stability

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

QP-TS12-04-04-020664

T. Petch

Continuation of Calibration Certificate

Calibration Procedure : CP-AC-01

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	39.0	-0.1	±1.1
34.0	33.9	-0.1	±1.1
29.0	29.2	+0.2	±1.1
24.0	24.5	+0.5	±1.1
19.0	21.8	+2.8	±1.1
14.0	26.9	+12.9	±1.1
9.0	25.9	+16.9	±1.1
4.0	24.8	+20.8	±1.1

QP-TS12-04-04-020664

T. Petch

Continuation of Calibration Certificate

Calibration Procedure : CP-AC-01

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	Time burst duration, T _b (ms)	Cycle	Anticipated Value (dB)			Acceptance Limits (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	±0.0, ±2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	±0.0, ±5.0
	200	800	134.0	134.1	0.1	±1.0
	2	8	108.0	108.0	0.0	±0.0, ±5.0
SEL	0.25	1	99.0	98.9	-0.1	±1.5, ±5.0
	2	8	108.0	108.0	0.0	±0.0, ±2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C sound level

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

Number of cycle in test signal	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
Positive half cycle	133.4	133.2	-0.2	±2.0
Negative half cycle	133.4	133.2	-0.2	±2.0

QP-TS12-04-04-020664

T. Petch

Continuation of Calibration Certificate

Calibration Procedure : CP-AC-01

11. Overload indication

Measured value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	89.7	0.2
Negative one-half cycle	89.7	0.2

12. High level stability

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

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

End of Calibration Certificate

QP-TS12-04-04-020664

T. Petch

431-451 Sukhumvit Road, Bangkok 10110 THAILAND

Tel: 02-261-8881 Fax: 02-261-1679 E-mail: sithiporn@thai.com http://www.sithiporn.com

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A/ Microphone UC-52 / Transmitter NH-24
Serial No. : 06623391 / 196647 / 26421
ID No. : -

Condition As Found :

GOOD

Customer :

ALS LABORATORY GROUP (THAILAND) CO., LTD.
104 PHATTANAKAN 40, PHATTANAKAN ROAD,
KHUANG PHATTANAKAN, KHUANG SUAN LUANG,
BANGKOK, 10250 THAILAND.

Location :

(23.0 ± 0.3) °C

Pressure :

(101.3 ± 0.3) kPa

Relative Humidity :

(50.0 ± 2.0) %

Received Date :

07 OCTOBER 2022

Calibration Date :

20-21 OCTOBER 2022

Date of Issue :

21 OCTOBER 2022

Calibrated by :

Natthasorn Petchum

Approved by :

T. Petch

(Thaisak Petchum)

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

QP-TS12-04-04-020664

Continuation of Calibration Certificate

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 Acoustic chamber and Reference Standard Instruments.

For test results of each item were made by observation of each instrument 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	IF-0607-22	04-Feb-23
Waveform Generator	33511B	MY32262742	IF-0608-22	04-Feb-23
Digital Multimeter	33461A	MY33220104	EEL-BP_0510245	09-Feb-23
Digital Multimeter	33461A	MY33220976	EEL-BP_0510245	09-Feb-23
Digital Multimeter	34461A	MY60024273	EEL-BP_0510245	09-Feb-23
Programmable Attenuator	MAF-1070	62100114	IF-0609-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAJ	34560495	AA-3005-22	22-Feb-23

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

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

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

QP-TS12-04-04-020664

T. Petch

Cert. No. : ACL22239
Job No. : VCSAC0089
Pages : 3 of 8

Summary of Measurement Result :

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

QP-TS12-04-04-02064

~ 0.1

Cert. No. : ACL22239
Job No. : VCSAC0089
Pages : 4 of 8

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limits (dB)
95.9 (95.95)	95.9	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
14.6

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

Frequency Weighting	Measured value (dB)
A-weight	11.2
C-weight	17.5
Flat	23.3

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	0.3	0.3	0.3	±1.5
1000	0.0	0.0	0.0	±1.0
8000	0.0	0.0	0.0	±0.0

QP-TS12-04-04-02064

~ 0.1

Cert. No. : ACL22239
Job No. : VCSAC0089
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.0	0.0	±2.0
125	0.0	0.1	0.0	±1.5
250	0.0	0.0	0.0	±1.5
500	0.0	0.1	0.0	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	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
Int	94.0	0.0	±0.1

6. Long-term stability

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

QP-TS12-04-04-02064

~ 0.1

Cert. No. : ACL22239
Job No. : VCSAC0089
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	133.0	0.0	±1.1
132.0	132.0	0.0	±1.1
131.0	131.0	0.0	±1.1
129.0	129.0	0.0	±1.1
124.0	124.0	0.0	±1.1
119.0	119.0	0.0	±1.1
114.0	114.0	0.0	±1.1
109.0	109.0	0.0	±1.1
104.0	104.0	0.0	±1.1
99.0	99.0	0.0	±1.1
94.0	94.0	0.0	±1.1
89.0	89.0	0.0	±1.1
84.0	84.0	0.0	±1.1
79.0	79.0	0.0	±1.1
74.0	74.0	0.0	±1.1
69.0	69.0	0.0	±1.1
64.0	64.0	0.0	±1.1
59.0	59.0	0.0	±1.1
54.0	54.0	0.0	±1.1
49.0	49.0	0.0	±1.1
44.0	44.0	0.0	±1.1
39.0	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
19.0	19.0	0.0	±1.1
14.0	14.0	0.0	±1.1
9.0	9.0	0.0	±1.1

QP-TS12-04-04-02064

~ 0.1

Cert. No. : ACL22239
Job No. : VCSAC0089
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. Time burst response

Time Weighting	Time burst duration, TN (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5; ±5.0
	2	8	117.0	117.0	0.0	1.0; ±2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	0.25	1	108.0	108.0	0.0	1.5; ±5.0
	2	8	127.6	127.6	0.0	±1.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5; ±5.0
	2	8	108.0	108.0	0.0	1.0; ±2.5
	200	800	128.0	128.0	0.0	±1.0

10. Peak C-weight 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	135.6	-0.8	±3.0

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

QP-TS12-04-04-02064

~ 0.1

Cert. No. : ACL22239
Job No. : VCSAC0089
Pages : 8 of 8

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

QP-TS12-04-04-02064

~ 0.1

43-14-151 Sathien Rd., Bangna Suburb, Bangkok 10700 THAILAND
Tels: 2425 8802 Fax: 2431-1679 email: cal-center@sitiporn.com http://www.sitiporn.comCert. No. : ACL22113
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42 Microphone UC-52 / Proamplifier N12-24
Serial No. : 00734221 / 15777 / 22653
ID No. : RYO, P50029

Condition As Found : GOOD

Customer : A.S. LABORATORY GROUP (THAILAND) CO., LTD.
(64 PHATTANAKAN 46, PHATTANAKAN ROAD,
KIWIANG PHATTANAKAN, KUBI SUANLUANG,
BANGKOK, 10250 THAILAND.Location :
Ambient Temperature : (23.0 ± 3) °C
Pressure : (101.3 ± 3) kPa
Relative Humidity : (50.0 ± 20) %Received Date : 17 MAY 2022
Calibration Date : 24-27 MAY 2022
Date of Issue : 30 MAY 2022

Calibrated by : Nafakorn Pongpattana

Approved by : T. R. R. (Thakul Pongpattana)

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.

QP-TS12-04-04-02064

Cert. No. : ACL22113
Job No. : VCSAC0089
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 for Acoustical and Electrical signal tests of frequency weighting with Acoustic chamber and Reference Standard Instruments.
For tests results of each item were made by observation of each instrument 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	ET-0067-22	04-Feb-23
Waveform Generator	33511B	MY52302742	ET-0068-22	04-Feb-23
Digital Multimeter	34461A	MY52320976	EEL-300-030245	09-Feb-23
Digital Multimeter	34461A	MY6004273	EEL-300-050245	09-Feb-23
Programmable Attenuator	MAT-1000	62100114	FF-0069-22	07-Feb-23
Condenser Microphone	4180	2977990	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KA	3456695	AA-3005-22	22-Feb-23

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

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

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

Cert. No. : ACL22113
Job No. : VCSAC0089
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				
100 Hz	✓	-	0.3	0.6
2000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long-term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.2
9. Time burst response	✓	-	0.2	0.35
10. Peak C-weight level	✓	-	0.2	0.25
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

QP-TS12-04-04-02064

~ 0.1

Cert. No. : ACL22115
Job No. : VC65AC0068
Pages : 4 of 8

Result of calibration:

1. Absolute sensitivity

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

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
18.0

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

Frequency Weighting (dB)	Measured value (dB)
A-weight	13.8
C-weight	20.3
Flat	23.8

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.7	0.7	0.7	± 1.5
1000	0.1	0.1	0.1	± 1.0
5000	-1.5	-1.5	-1.5	±5.0

QP-TS12-04-04-02664

T. R. R.

Cert. No. : ACL22115
Job No. : VC65AC0068
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz

Frequency (Hz)	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.2	-0.1	±2.0
125	-0.1	0.0	0.0	±1.5
250	0.0	0.0	-0.1	±2.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±3.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.0	0.0	±5.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long-term stability

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

QP-TS12-04-04-02664

T. R. R.

Cert. No. : ACL22115
Job No. : VC65AC0068
Pages : 6 of 8

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.0	0.0	±1.1
136.0	136.0	0.0	±1.1
135.0	135.0	0.0	±1.1
134.0	134.0	0.0	±1.1
133.0	132.9	-0.1	±1.1
132.0	131.9	-0.1	±1.1
131.0	130.9	-0.1	±1.1
129.0	128.9	-0.1	±1.1
124.0	123.9	-0.1	±1.1
119.0	118.9	-0.1	±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
29.0	28.9	-0.1	±1.1
24.0	23.9	-0.1	±1.1
19.0	18.9	-0.1	±1.1
14.0	13.9	-0.1	±1.1
9.0	8.9	-0.1	±1.1

QP-TS12-04-04-02664

T. R. R.

Cert. No. : ACL22115
Job No. : VC65AC0068
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. Time burst response

Time Weighting	Time burst duration, T _b (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	6.25	1	108.0	107.9	-0.1	1.5; -5.0
	200	800	134.0	134.0	0.0	±1.0
Slow	0.25	1	99.0	98.8	-0.2	1.5; -5.0
	200	800	127.4	127.4	0.0	±1.0
SEL	0.25	1	99.0	98.8	-0.2	1.5; -5.0
	200	800	108.0	108.0	0.0	1.0; -2.5

10. Peak C-weight level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, L _{peak} (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.4	-1.0	±3.0

11. Overload indication

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

12. High level stability

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

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

End of Calibration Certificate

QP-TS12-04-04-02664

T. R. R.

QP-TS12-04-04-02664

T. R. R.

63/14-15/27/35-36, Soi Pathumwan 7/1, Pathumwan Rd,
Wattana, Bangkok, Bangkok 10500 Thailand,
Tel: (66) 02-8680812 Pbx: (66) 02-8680860 www.jnac.com

CERTIFICATE OF CALIBRATION

Certificate No. : CL0204-04
Page 1 of 2

Equipment Name: Peak Stress Monitor
Manufacturer: Delta OHM
Model: 1022.2
Serial No: 26006713
ID No: 014, 00218

Customer
Name: AIS laboratory group (Thailand) Co., Ltd.
Address: 104 Pathumwan Rd, Pathumwan Rd,
Klongkum Sub District, Bangkok 10500 Thailand.

Received date: 07 Feb 2023
Calibration date: 14 Feb 2023
Issue date: 14 Feb 2023

Reference Used During Calibration
1. Standard Temperature Probe Model: ITS-190 A500,
Serial No: 167552-00, Exp date: 23 Mar 2023
2. Digital Temperature Indicator Model: IT1-000A-01,
R. Serial No: 871407-00919, Exp date: 22 July 2023

Calibration Condition
Temperature: 23.9 °C
Relative humidity: 65%±10%

Calibration Procedure

The temperature calibration was done by in-house
calibration method as WILO-005, 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 (NIM) Certificate
number: TT-003422, Certificate number: 89-0092,
22

REVIEW BY: *[Signature]*
APPROVED BY: *[Signature]*
NEXT CAL DATE: 14/2/24

Calibrated by: *[Signature]*
Checked by: *[Signature]*
Approved Signature: *[Signature]*
Calibration Department Manager

63/14-15/27/35-36, Soi Pathumwan 7/1, Pathumwan Rd,
Wattana, Bangkok, Bangkok 10500 Thailand,
Tel: (66) 02-8680812 Pbx: (66) 02-8680860 www.jnac.com

CERTIFICATE OF CALIBRATION

Certificate No. : CL0204-04
Page 2 of 2

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment
Calibration Range: 20 - 40 °C

Table 1: This equipment was connected with wet bulb probe Model: IP9201.2.5/N: 22035257.
Dimension: Diameter 14 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
60	20.002	20.4	0.3	0.099
60	20.000	20.4	0.3	0.099
60	20.001	20.4	0.3	0.099
60	20.000	20.4	0.3	0.099
60	20.000	20.4	0.3	0.099

Table 2: This equipment was connected with temperature probe Model: TP3276.2.5/N: 13015493.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.002	20.3	0.4	0.099
70	20.000	20.3	0.3	0.099
70	20.001	20.3	0.3	0.099
70	20.000	20.3	0.3	0.099
70	20.000	20.3	0.3	0.099

Table 3: This equipment was connected with Glue thermometer probe Model: TP3276.2.5/N: 17023217.
Dimension: Diameter 8 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.002	20.3	0.2	0.099
110	20.000	20.3	0.2	0.099
110	20.001	20.3	0.2	0.099
110	20.000	20.3	0.2	0.099
110	20.000	20.3	0.2	0.099

UUC's Link 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

Result of Calibration: ☒ Without Adjustment ☐ With Adjustment
Calibration Range: 20 - 40 °C
Facilities:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2 S/N: 1705112.
Dimension: Diameter 14 mm, Length 170 mm.

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

Table 2: This equipment was connected with temperature probe Model: TP3207.2 S/N: 1503022.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.044	20.2	0.2	0.099
70	25.038	25.0	0.0	0.099
70	30.032	29.8	-0.2	0.099
70	35.025	34.8	-0.2	0.099
70	40.019	39.8	-0.2	0.099

Table 3: This equipment was connected with double thermometer probe Model: TP3276.2 S/N: 1502842.
Dimension: Diameter 8 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.044	20.1	0.1	0.099
110	25.038	25.1	0.1	0.099
110	30.032	29.1	-0.1	0.099
110	35.025	29.1	-0.1	0.099
110	40.019	40.0	0.0	0.099

UNC* (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

Equipment Name: Heat Stress Monitor
Manufacturer: Delta CHM
Model: HSD2.2
Serial No: 15000126
ID No: HYS_150226

Customer:
Name: AJS laboratory group (Thailand) Co., Ltd.
Address: 104 Phrasathanang 40, Phrasathanang Rd.,
Klongkum Sub District, Klongkum District, Bangkok
10250 Thailand.

Reference Used During Calibration:
1. Standard Temperature Probe Model: STS-100 A500.
Serial No: 607850-05 Due date: 23 Mar 2023
2. Digital Temperature Indicator Model: DTI-1000-A MK II, Serial No: 671407-00991 Due date: 22 July 2023

Calibration Procedure

The temperature calibration was done by triple calibration method as per ISO 9001, according to comparison method with standard digital temperature indicator and standard temperature probe. The temperature scale was based on ITS-90.

Received date: 21 Feb 2023
Calibration date: 27 Feb 2023
Issue date: 28 Feb 2023

Calibration Condition

Temperature: (23 ± 0.1) °C
Relative Humidity: (50 ± 15)%

Traceability

The measurement results are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: TT-0054-22, Certificate number: 65-0090-22

Calibrated by:
☒ Mr. Somchai Thairatana
☐ Miss Jiraporn Lertpraporn

Approved Signature:
Mr. Pichai Boonchaisri
Calibration Department Manager

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

Result of Calibration: ☐ Without Adjustment ☒ With Adjustment
Calibration Range: 20 - 40 °C
Facilities:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2 S/N: 18015841.
Dimension: Diameter 14 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
80	20.052	20.0	-0.1	0.099
80	25.058	25.0	-0.1	0.099
80	30.052	30.0	0.0	0.099
80	35.049	35.0	0.0	0.099
80	40.041	40.0	0.0	0.099

Table 2: This equipment was connected with temperature probe Model: TP3207.2 S/N: 1501484.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.052	20.2	0.1	0.099
70	25.058	25.0	-0.1	0.099
70	30.052	29.9	-0.2	0.099
70	35.048	34.8	-0.2	0.099
70	40.041	39.7	-0.3	0.099

Table 3: This equipment was connected with double thermometer probe Model: TP3276.2 S/N: 20009082.
Dimension: Diameter 8 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.052	20.0	-0.1	0.099
110	25.058	25.1	0.1	0.099
110	30.055	30.1	0.1	0.099
110	35.048	35.1	0.1	0.099
110	40.041	40.1	0.1	0.099

UNC* (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

Equipment Name: Heat Stress Monitor
Manufacturer: Delta CHM
Model: HSD2.2
Serial No: 15018314
ID No: HYS_150358

Customer:
Name: AJS laboratory group (Thailand) Co., Ltd.
Address: 104 Phrasathanang 40, Phrasathanang Rd.,
Klongkum Sub District, Klongkum District, Bangkok
10250 Thailand.

Reference Used During Calibration:
1. Standard Temperature Probe Model: STS-100 A500.
Serial No: 607850-05 Due date: 23 Mar 2023
2. Digital Temperature Indicator Model: DTI-1000-A MK II, Serial No: 671407-00991 Due date: 22 July 2023

Calibration Procedure

The temperature calibration was done by triple calibration method as per ISO 9001, according to comparison method with standard digital temperature indicator and standard temperature probe. The temperature scale was based on ITS-90.

Calibration Condition:
Temperature: (23 ± 0.1) °C
Relative Humidity: (50 ± 15)%

Traceability

The measurement results are traceable to the international system of units (SI) through National Institute of Metrology Thailand (NIMT) Certificate number: TT-0054-22, Certificate number: 65-0090-22

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2 S/N: 18021467.
Dimension: Diameter 14 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
60	20.055	20.1	0.1	0.099
60	25.048	25.1	0.1	0.099
60	30.039	30.1	0.1	0.099
60	35.029	35.1	0.1	0.099
60	40.018	40.1	0.1	0.099

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.051	20.2	0.1	0.099
70	25.051	25.1	0.1	0.099
70	30.058	30.0	0.0	0.099
70	35.029	35.0	0.0	0.099
70	40.021	39.9	-0.1	0.099

Table 3: This equipment was connected with double thermometer probe Model: TP3276.2 S/N: 18021467.
Dimension: Diameter 8 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.052	20.4	0.4	0.099
110	25.050	25.1	0.1	0.099
110	30.058	30.1	0.1	0.099
110	35.029	35.1	0.1	0.099
110	40.020	40.1	0.1	0.099

UNC* (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%.

REVIEW BY: *Pichai B.*
APPROVED BY: *Satit M.*
NEXT CAL DATE: 2/1/24

Calibrated by:
☒ Mr. Somchai Thairatana
☐ Miss Jiraporn Lertpraporn

Approved Signature:
Mr. Pichai Boonchaisri
Calibration Department Manager

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

Result of Calibration: ☐ Without Adjustment ☒ With Adjustment
Calibration Range: 20 - 40 °C
Facilities:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2 S/N: 18021465.
Dimension: Diameter 14 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
60	20.051	20.0	-0.1	0.099
60	25.048	25.0	-0.1	0.099
60	30.048	30.0	0.0	0.099
60	35.030	35.0	0.0	0.099
60	40.021	40.0	0.0	0.099

Table 2: This equipment was connected with temperature probe Model: TP3207.2 S/N: 18021465.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.052	20.1	0.1	0.099
70	25.048	24.9	-0.1	0.099
70	30.040	29.9	-0.1	0.099
70	35.032	34.8	-0.2	0.099
70	40.021	39.8	-0.2	0.099

Table 3: This equipment was connected with double thermometer probe Model: TP3276.2 S/N: 20006280.
Dimension: Diameter 8 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.050	20.0	-0.1	0.099
110	25.050	25.1	0.1	0.099
110	30.039	30.1	0.1	0.099
110	35.032	35.1	0.1	0.099
110	40.022	40.1	0.1	0.099

UNC* (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 *



Result of Calibration: ☐ Without Adjustment ☒ With Adjustment
Calibration Range: 20 - 40 °C
Facilities:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2 S/N: 18021467.
Dimension: Diameter 14 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
60	20.055	20.1	0.1	0.099
60	25.048	25.1	0.1	0.099
60	30.039	30.1	0.1	0.099
60	35.029	35.1	0.1	0.099
60	40.018	40.1	0.1	0.099

Table 2: This equipment was connected with temperature probe Model: TP3207.2 S/N: 18021467.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.051	20.2	0.1	0.099
70	25.051	25.1	0.1	0.099
70	30.058	30.0	0.0	0.099
70	35.029	35.0	0.0	0.099
70	40.021	39.9	-0.1	0.099

Table 3: This equipment was connected with double thermometer probe Model: TP3276.2 S/N: 18021467.
Dimension: Diameter 8 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.052	20.4	0.4	0.099
110	25.050	25.1	0.1	0.099
110	30.058	30.1	0.1	0.099
110	35.029	35.1	0.1	0.099
110	40.020	40.1	0.1	0.099

UNC* (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 *

Calibrated by:
☒ Mr. Somchai Thairatana
☐ Miss Jiraporn Lertpraporn

Approved Signature:
Mr. Pichai Boonchaisri
Calibration Department Manager

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

Result of Calibration: ☐ Without Adjustment ☒ With Adjustment
Calibration Range: 20 - 40 °C
Facilities:

Table 1: This equipment was connected with wet bulb probe Model: HP3201.2 S/N: 18021465.
Dimension: Diameter 14 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
60	20.051	20.0	-0.1	0.099
60	25.048	25.0	-0.1	0.099
60	30.048	30.0	0.0	0.099
60	35.030	35.0	0.0	0.099
60	40.021	40.0	0.0	0.099

Table 2: This equipment was connected with temperature probe Model: TP3207.2 S/N: 18021465.
Dimension: Diameter 14 mm, Length 150 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
70	20.052	20.1	0.1	0.099
70	25.048	24.9	-0.1	0.099
70	30.040	29.9	-0.1	0.099
70	35.032	34.8	-0.2	0.099
70	40.021	39.8	-0.2	0.099

Table 3: This equipment was connected with double thermometer probe Model: TP3276.2 S/N: 20006280.
Dimension: Diameter 8 mm, Length 170 mm.

Immersion Depth (mm)	Standard Reading (°C)	Wet Bulb Reading (°C)	Error (°C)	Uncertainty (°C)
110	20.050	20.0	-0.1	0.099
110	25.050	25.1	0.1	0.099
110	30.039	30.1	0.1	0.099
110	35.032	35.1	0.1	0.099
110	40.022	40.1	0.1	0.099

UNC* (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 *

Calibrated by:
☒ Mr. Somchai Thairatana
☐ Miss Jiraporn Lertpraporn

Approved Signature:
Mr. Pichai Boonchaisri
Calibration Department Manager

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

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND) JAPAN
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
1101 PATTANAPONG ROAD 101, SUKHUMVIT 101, BANGKOK 10110
TEL: 02-2751-8867 FAX: 02-2751-8441

Certificate of Calibration

Equipment: DO Meter with Sensor
Manufacturer: YSI
Model: 5000-115V
Serial No.: 15E102796
ID No.: RYG_EN0002

Submitted by: ALS Laboratory Group (Thailand) Co., Ltd. (Raying Branch)
Location: 116/10 Moo 5 T. Maenam Klu, A. Phukdaeng, Rayong 21140, Thailand
TPA On Site Calibration Laboratory

Received Order: 11 February 2022
Calibration Date: 21 February 2022
Ambient Temperature: $(25 \pm 10) ^\circ\text{C}$
Relative Humidity: $(50 \pm 30) \%$
AC Line Voltage: $(220 \pm 22) \text{ V}$

Calibrated by: Kunchit Phongrat
Approved by: Pongthippa Tameyasil
() Pongthippa Tameyasil
() Malee Bulruen
() Suwit Injai

Issue Date: 21 February 2022

The Uncertainty 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 1. Equipment Calibration and Testing Services.

A 0058008

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND) JAPAN
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
1101 PATTANAPONG ROAD 101, SUKHUMVIT 101, BANGKOK 10110
TEL: 02-2751-8867 FAX: 02-2751-8441

Certificate of Calibration

Equipment: DO Meter with Sensor
Condition As-Received: Used Item
Reference: 2002-0004DSC-6
Cert. No.: 22M12
Page: 2 of 2

Procedure Used: Calibration was conducted using in-house calibration procedure CPO-07H 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 218600 211273 22 Nov 2022
2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Result of Calibration: () Without Adjustment
Function: Temperature measurement
This instrument was connected with temperature sensor, SN: 15E100404

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor
20.00	45	20.001	19.88	-0.121	0.15	2.00

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

Approved by: Pongthippa Tameyasil
() Pongthippa Tameyasil
() Malee Bulruen
() Suwit Injai

Issue Date: 21 February 2022

The Uncertainty 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 1. Equipment Calibration and Testing Services.

A 1095114

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND) JAPAN
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
1101 PATTANAPONG ROAD 101, SUKHUMVIT 101, BANGKOK 10110
TEL: 02-2751-8867 FAX: 02-2751-8441

Certificate of Calibration

Equipment: Low Temp. Incubator
Manufacturer: Memmert
Model: IP750
Serial No.: V818.004
ID No.: RYG_EN0154

Submitted by: ALS Laboratory Group (Thailand) Co., Ltd. (Raying Branch)
Location: 116/10 Moo 5 T. Maenam Klu, A. Phukdaeng, Rayong 21140, Thailand
BOO Room

Received Order: 22 April 2022
Calibration Date: 22 April 2022
Ambient Temperature: $(26 \pm 10) ^\circ\text{C}$
Relative Humidity: $(50 \pm 30) \%$

Calibrated by: Man Patsanapongseboon
Approved by: Pongthippa Tameyasil
() Pongthippa Tameyasil
() Malee Bulruen
() Suwit Injai

Issue Date: 3 May 2022

The Uncertainty 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 1. Equipment Calibration and Testing Services.

A 0040735

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND) JAPAN
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
1101 PATTANAPONG ROAD 101, SUKHUMVIT 101, BANGKOK 10110
TEL: 02-2751-8867 FAX: 02-2751-8441

Certificate of Calibration

Equipment: Low Temp. Incubator
Condition As-Received: Used Item
Reference: 2204-01400G-1
Cert. No.: 22M317
Page: 2 of 3

Procedure Used: Calibration was conducted using calibration procedure CPT-02 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 34972A MY44021709 211412 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

Environment during calibration
Temp. (°C) Beginning Finished
Temp. (°C) 25 25
REL.Humid. (%) 54 56
AC Supply (Vol) 220 220

Probe Installation Details: Dimension of Chamber:
a = 10 cm D = 0.60 m
b = 10 cm W = 1.0 m
c = 10 cm H = 1.2 m
Capacity = 0.75 m³

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

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 %.

Approved by: Pongthippa Tameyasil
() Pongthippa Tameyasil
() Malee Bulruen
() Suwit Injai

Issue Date: 21 February 2022

The Uncertainty 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 1. Equipment Calibration and Testing Services.

A 1106495

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND) JAPAN
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
1101 PATTANAPONG ROAD 101, SUKHUMVIT 101, BANGKOK 10110
TEL: 02-2751-8867 FAX: 02-2751-8441

Certificate of Calibration

Equipment: Low Temp. Incubator
Condition As-Received: Used Item
Reference: 2204-01400G-1
Cert. No.: 22M317
Page: 3 of 3

Function of UUC: Temperature Source
Fresh air setting: Close

Calibration Point (°C)	UUC Setting (°C)	UUC Reading (°C)	Temperature stability (± °C)	Temperature uniformity (± °C)	Overall Variation (± °C)	Uncertainty (± °C)	Coverage Factor
20.0	20.0	20.0	0.002	0.20	0.22	0.30	2

Calibration Point Position
Temp. (°C) 1 2 3 4 5 6 7 8 9 (ref.)
20.0 20.09 20.174 20.189 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 an interval as close as 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.
Note: 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 %.

Approved by: Pongthippa Tameyasil
() Pongthippa Tameyasil
() Malee Bulruen
() Suwit Injai

Issue Date: 21 February 2022

The Uncertainty 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 1. Equipment Calibration and Testing Services.

A 1106484

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND) JAPAN
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
1101 PATTANAPONG ROAD 101, SUKHUMVIT 101, BANGKOK 10110
TEL: 02-2751-8867 FAX: 02-2751-8441

Certificate of Calibration

Model Number: MSE224S-105DU
Description: Analytical Balance
Serial Number: 00000709
ID No.: RYG_EN0002
Manufacturer: Sartorius

Customer Name: ALS Laboratory Group (Thailand) Co., Ltd. (Raying Branch)
Location: 116/10 Moo 5 T. Maenam Klu, A. Phukdaeng, Rayong 21140, Thailand

Calibrated Place: ALS Laboratory Group (Thailand) Co., Ltd. (Raying Branch)
Location: 116/10 Moo 5 T. Maenam Klu, A. Phukdaeng, Rayong 21140, Thailand

Calibrated By: Mr. Chonchai Intanna
Calibration Date: Wednesday, March 9, 2023

Calibration Procedure No.: This calibration was conducted by using in-house calibration procedure number (RM 003) Based on UKAS LAB 14: 2015.

Measurement Method: UKAS Publication Ref: Lab 14
This 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 the Expression of Uncertainty in Measurement (GUM). The calibration certificate documents this traceability to National Standards, which realize the unit of measurement according to the International Standard System of Units (SI). Report of Tolerance came from test of Sartorius Manufacturer Specification.

Traceability:
Model Number: Description: Traceability: Certificate No.: Due Date
Y00011-022-00 Sartorius weight set 100g E2 10011-022-00 BPC-RT C0212555 14 Sep 2023
M04B-30250 Humidity/Balometer/Temp. Lutron MH4-30250 DMSH C19220444 3-Sep-2023

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

SOP FM 35 03 February 2022

Sartorius (Thailand) Co., Ltd.
101 PATTANAPONG ROAD 101, SUKHUMVIT 101, BANGKOK 10110
TEL: 02-2751-8867 FAX: 02-2751-8441

Certificate of Calibration

Model Number: MSE224S-105DU
Description: Analytical Balance
Serial Number: 00000709
ID No.: RYG_EN0002
Manufacturer: Sartorius

Certificate No.: 22M0112
Issued Date: Friday, March 03, 2023
Reference No.: 204513
Page No.: 2 of 3

Calibration Results: Without Adjustment

Repeatability
The repeatability is the ability of a weighing instrument to display nearly identical masses when the same mass is weighed under the same conditions. The repeatability is defined as the standard deviation of the results of the weighing performed under the same conditions. The repeatability is defined according to OIML R111.

Normal Value (Low Load)
20 g
0.0001 g

Normal Value (High Load)
200 g
0.0001 g

Linearity
The linearity is the ability of a weighing instrument to display the masses of a series of weights in a straight line.

Eccentricity (Off-center loading error)
The eccentricity is the difference between the results of the weighing performed under the same conditions, when the mass is placed on the weighing pan at different positions. The eccentricity is defined according to OIML R111.

Normal value: 100 g
Tolerance: 0.0004 g

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

Approved by: Pongthippa Tameyasil
() Pongthippa Tameyasil
() Malee Bulruen
() Suwit Injai

Issue Date: 2 November 2022

The Uncertainty 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 1. Equipment Calibration and Testing Services.

SOP FM 35 03 February 2022

A 0046905

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND) JAPAN
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
1101 PATTANAPONG ROAD 101, SUKHUMVIT 101, BANGKOK 10110
TEL: 02-2751-8867 FAX: 02-2751-8441

Certificate of Calibration

Equipment: Hot Air Oven
Condition As-Received: Used Item
Reference: 2210-03780C-1
Cert. No.: 22M1492
Page: 1 of 3

Procedure Used: Calibration was conducted using calibration procedure CPO-07H 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 34972A MY44021709 211412 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

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

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

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

Approved by: Pongthippa Tameyasil
() Pongthippa Tameyasil
() Malee Bulruen
() Suwit Injai

Issue Date: 2 November 2022

The Uncertainty 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 1. Equipment Calibration and Testing Services.

A 0046905

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND) JAPAN
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
1101 PATTANAPONG ROAD 101, SUKHUMVIT 101, BANGKOK 10110
TEL: 02-2751-8867 FAX: 02-2751-8441

Certificate of Calibration

Equipment: Hot Air Oven
Condition As-Received: Used Item
Reference: 2210-03780C-1
Cert. No.: 22M1492
Page: 2 of 3

Procedure Used: Calibration was conducted using calibration procedure CPO-07H 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 34972A MY44021709 211412 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

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

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

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

Approved by: Pongthippa Tameyasil
() Pongthippa Tameyasil
() Malee Bulruen
() Suwit Injai

Issue Date: 2 November 2022

The Uncertainty 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 1. Equipment Calibration and Testing Services.

A 1132473

Equipment: Hot Air Oven
Condition As-Received: Used Item
Reference: 2210-03760C-1
Result of Calibration: (*) Without Adjustment
Function of UUC: Temperature Source
Fresh air setting: Close

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

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

Calibration Point (°C): 1 2 3 4 5 6 7 8 9 (ref.)
70.0 70.282 69.995 70.070 70.177 70.664 70.039 70.688 70.149 70.328

Average: The average of 30 values in each position.
Temperature stability: One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity: The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation: The difference of the maximum and minimum measured temperatures throughout observation.
UUC: Unit Under Calibration
Note: The reported uncertainty of measurement was included stability and excluded uniformity.
The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %.

-00-

a 1132472

RYG_EN0061

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. (Raying Branch)
Location: 816/10 Moo 5, T. Maenam Khu, A. Phukdaeng, Raying 21143, Thailand
Received Order: 20 October 2022
Calibration Date: 20 October 2022
Ambient Temperature: (25 ± 1) °C
Relative Humidity: (50 ± 30) %
Calibrated by: Prascha Hahli
Approved by: [Signature]
Issue Date: 2 November 2022

The Uncertainty are for a confidence probability of approximately 95 %

-00-

A 0046906

Equipment: Water Bath
Condition As-Received: Used Item
Reference: 2210-03760C-4
Procedure Used: Calibration was conducted using in-house calibration procedure CP-0104 according to direct measurement method with Data Acquisition which connected with Industrial Platinum Resistance Thermometer (PRT).

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

Condition of this result of calibration:
1. Reference standard instrument:
Instrument: 1) Data Acquisition Model: 34970A Serial No.: MY44035217 Cert. No.: 21LM90 Due Date: 23 Dec 2022
2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certificate is traceable to the International System of Unit.
Result of Calibration: (*) Without Adjustment
Function of UUC: Temperature Source

Beginning of Calibration (°C)	Environmental		AC Voltage Supply
	(°C)	(%RH)	(V)
24	53	222	
24	50	221	

Position: 1 N37P300728
2 N37P300727
3 N37P300728
4 N37P300729
5 (ref.) N37P300730

-00-

a 1132471

Equipment: Water Bath
Condition As-Received: Used Item
Reference: 2210-03760C-4
Result of Calibration: (*) Without Adjustment
Function of UUC: Temperature Source

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

Calibration point (°C)	UUC Setting (°C)	UUC Reading (°C)	Average Standard Reading (°C)				
			1	2	3	4	5 (ref.)
85.0	85.0	85.0	84.527	84.593	84.628	84.516	84.580

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

Average: The average of 30 values in each position.
Uniformity: The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Stability: One-half of the greatest maximum difference of measured temperature at any one probe.
UUC: Unit Under Calibration
Note: The reported uncertainty of measurement was included stability and excluded uniformity.
The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %.

-00-

a 1132470

RYG_EN0061

Certificate of Calibration

Equipment: pH Meter
Manufacturer: Mettler Toledo
Model: SevenCompact 9220
Serial No.: C104059480
ID No.: RYG_EN0183
Condition As-Received: Used Item
Received Date: 24 February 2023
Calibration Date: 27 February 2023
Ambient Temperature: (25 ± 2.5) °C
Relative Humidity: (50 ± 15) %
Calibration Procedure: 1 - house method
2 - CP-CH8 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)
3 - CP-CH8 by comparison with standard thermometer
Calibrated by: Walak Sirinathan
Approved by: [Signature]
Issue Date: 28 February 2023
The Uncertainty are for a confidence probability of approximately 95 %

-00-

A 0051538

Condition of this calibration result:
1. Reference Standard Instrument:
Instrument: 1) Document Process Calibrator Serial No.: 5403049 ID No.: 130RC116 Cert. No.: 22E2769 Due Date: 24 Aug 2023
2) Ref. Standard Thermometer 480254 110RC044 221306 27 Oct 2023
This certificate is traceable to the International System of Unit maintained at:
- Traceable to National Institute of Metrology (Thailand), NIMT

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

Buffer Solution: pH 4.008
pH 6.987
pH 10.010
Manufacturer: CPA chem
CPA chem
CPA chem
Lot No.: 826558
826589
863635
Exp. date: 09 July 2024
09 July 2023
28 Dec 2023

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

Calibration Results:
Function: mV Measurement
Performing standard curve by Fluke at pH (4.7,10)

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (mV)	Coverage factor
			mV	pH		
pH Meter S/N: C104059480	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

-00-

a 1149525

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
pH Electrode S/N: 1453404	4.008	4.008	179.1	0.0046	2.00
	6.987	6.986	4.7	0.0094	2.00
	10.010	10.013	-172.4	0.0089	2.00

Function: Temperature Measurement
Condition: (*) Without adjustment
This equipment was connected with Temperature Probe:
- Model: HI-9142-001 Pro-OSM
- 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
25.0	25.001	24.8	-0.201	0.13	2.00

Remark: UUC = Unit Under Calibration
The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %.

-00-

a 1149924

RYG_EN0061

Certificate of Calibration

Equipment: pH Meter
Manufacturer: Mettler Toledo
Model: SevenCompact 9220
Serial No.: C104059480
ID No.: RYG_EN0183
Condition As-Received: Used Item
Received Date: 24 February 2023
Calibration Date: 28 February 2023
Ambient Temperature: (25 ± 2.5) °C
Relative Humidity: (50 ± 15) %
Calibration Procedure: 1 - house method
2 - CP-CH8 by direct measurement with standard voltage calibrator and direct measurement with certified reference material (CRM)
3 - CP-CH8 by comparison with standard thermometer
Calibrated by: Walak Sirinathan
Approved by: [Signature]
Issue Date: 02 March 2023

The Uncertainty are for a confidence probability of approximately 95 %

-00-

a 0309672

Result of calibration: (*) Without adjustment () After adjustment
Function: DC voltage measurement
Standard Value: 2000 mV
UUC Reading: 2000 mV
Error: 0.0 mV
Uncertainty: 0.0 mV

Unit Under Calibration	Standard Value (mV)	UUC Reading (mV)	Error (mV)	Uncertainty (mV)	Coverage factor
pH Meter S/N: C104059480	-200.000	-200.0	0.0	0.0	69
	-100.000	-100.0	0.0	0.0	85
	-50.000	-50.0	0.0	0.0	82
	0.000	0.0	0.0	0.0	56
	50.000	50.0	0.0	0.0	82
pH Meter S/N: C104059480	100.000	99.9	-0.1	0.1	65
	150.000	149.9	-0.1	0.1	69
	200.000	199.9	-0.1	0.1	72

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

UUC: Unit Under Calibration.

-00-

a 1150477

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
1394 PATTANAKARN ROAD 5th FL. BANGKOK, THAILAND 10260
TEL. 0-2719-8867 FAX. 0-2719-8864

Certificate of Calibration Certificate No. : 2271594
Page : 1 of 2

Equipment : Digital Thermometer With Sensor
Manufacturer : Testo
Model : 105
Serial No. : 01281438/504
Alt. No. : 01281438/504

Condition As-Received : Used Item
Received Date : 24 August 2022
Calibration Date : 31 August 2022
Reference : 2210-03760C-2
Ambient Temperature : (20 ± 3) °C
Relative Humidity : (50 ± 20) %

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

Procedure used : Calibration was conducted using in-house calibration procedure CP-T01 according to comparison with Industrial Platinum Resistance Thermometer (PRT) into liquid bath temperature controller.
The temperature value used was based on ITS-90.

Condition of this result of calibration
1. Reference standard instrument:
Instrument Model Serial No. Certificate No. Due Date
1) Digital Thermometer 1126 A7A69 2111126 14 Oct 2022
2) Industrial Platinum Resistance Thermometer 5027 824304 2111126 14 Oct 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 maintained by:-
National Institute of Metrology Thailand (NIMT)

Calibrated by : Pitsak Deongchit
Issue Date : 12 September 2022

Approved Signature :
[Signature]
[Signature]
[Signature]

REVIEW BY: [Signature]
APPROVED BY: [Signature]
NEXT CAL DATE: 30/09/24

a 0296663

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
1394 PATTANAKARN ROAD 5th FL. BANGKOK, THAILAND 10260
TEL. 0-2719-8867 FAX. 0-2719-8864

Certificate of Calibration Certificate No. : 2271594
Page : 2 of 2

Result of Calibration : Without Adjustment
Function : Temperature measurement
Dimension of probe : Diameter 3 mm, Length 35 mm Sheath material : Stainless Steel

Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of Measurement (± °C)	Coverage Factor (k)
50	25.0000	24.9	-0.1000	0.17	2.17
50	29.8888	29.9	-0.0112	0.12	2
50	40.0020	40.0	-0.0020	0.12	2

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

-o-o-

a 1125453

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
1394 PATTANAKARN ROAD 5th FL. BANGKOK, THAILAND 10260
TEL. 0-2719-8867 FAX. 0-2719-8864

Certificate of Calibration Certificate No. : 2271517
Page : 1 of 3

Equipment : Hot Air Oven
Manufacturer : Memmert
Model : UFE 500
Serial No. : 05111572
ID No. : RYG_EN0010

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

Location : Oven Room

Received Order : 20 October 2022
Calibration Date : 20 October 2022
Ambient Temperature : (26 ± 10) °C
Relative Humidity : (50 ± 30) %

Calibrated by : Man Pathanongkajalwan

Approved by : [Signature]
Approved Signature : [Signature]
[Signature]
[Signature]
[Signature]

Issue Date : 2 November 2022

The certification 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 0046308

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
1394 PATTANAKARN ROAD 5th FL. BANGKOK, THAILAND 10260
TEL. 0-2719-8867 FAX. 0-2719-8864

Certificate of Calibration Certificate No. : 2271517
Page : 2 of 3

Equipment : Hot Air Oven
Condition As-Received : Used Item
Reference : 2210-03760C-2
Procedure Used : Calibration was 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 819402/802 221.MH 29 Jul 2023

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Result of Calibration : (±) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

Environment during calibration
Temp. (°C) beginning finished
REL. Humid. (%) 54 59
AC Supply (Volt) 223 225

Ref. Std. ID No. : @ Calibration Point
Position : (98) °C (104) °C
1 21-16TC-01 20-16RTD-01
2 21-16TC-02 20-16RTD-02
3 21-16TC-03 20-16RTD-03
4 21-16TC-04 20-16RTD-04
5 21-16TC-05 20-16RTD-05
6 21-16TC-06 20-16RTD-06
7 21-16TC-07 20-16RTD-07
8 21-16TC-08 20-16RTD-08
9 (ref.) 21-16TC-09 20-16RTD-09

Probe Installation Details : Dimension of Chamber :
a = 50 cm D = 0.40 m
b = 50 cm W = 0.56 m
c = 50 cm H = 0.48 m
Capacity = 0.11 m³

a 1132466

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES & EQUIPMENT CALIBRATION AND TESTING SERVICES
1394 PATTANAKARN ROAD 5th FL. BANGKOK, THAILAND 10260
TEL. 0-2719-8867 FAX. 0-2719-8864

Certificate of Calibration Certificate No. : 2271517
Page : 3 of 3

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

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	0.078	0.52	0.60	0.42	2
180.0	180.0	180.0	0.13	0.88	1.2	1.1	2

Calibration Point (°C)	Measured Temperature (°C)								
	1	2	3	4	5	6	7	8	9 (ref.)
104.0	103.768	103.734	103.723	103.800	104.215	104.131	104.132	103.740	103.747
180.0	179.723	179.359	179.439	179.459	180.351	180.114	180.131	180.243	179.605

Average : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location, which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity.
The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k, providing a level of confidence of approximately 95 %.

-o-o-

a 1132465

ภาคผนวก จ

สำเนาหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

ที่ อก ๐๓๑๐(๑)/ ๑๐๖๙



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๔๐๐

๒๘ มกราคม ๒๕๖๕

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๓๐ กรกฎาคม ๒๕๖๓

- สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ แผ่น
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุ
หนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔
ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร
ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย)
จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

- ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖๒ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๕๙ รายการ น้ำใต้ดิน
จำนวน ๑๒๖ รายการ อากาศเสีย ๑๖ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๓๕ รายการ และดิน
จำนวน ๑๒๕ รายการ รวมทั้งสิ้นจำนวน ๓๖๑ รายการ ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ กันยายน ๒๕๖๖ หากประสงค์จะต่ออายุหนังสือ
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอ
ต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์
เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายศิริระ จันทรเจต)

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาการแทน
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๒๐๒ ๔๑๔๖ ๐ ๒๒๐๒ ๔๐๐๒

โทรสาร ๐ ๒๓๕๔ ๓๒๐๘ ๐ ๒๓๕๔ ๓๔๑๕

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ว-๒๐๔

ที่ อก ๐๓๑๐(๑)/

ลงวันที่ ๒๘ มกราคม ๒๕๖๕

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๖ ราย

๑) นางสาวยุพาพร จันทร์เปล่ง

ทะเบียนเลขที่ ว-๒๐๔-ค-๔๗๐๐

๒) นางสาวชัชชัย โกมารกุล ณ นคร

ทะเบียนเลขที่ ว-๒๐๔-ค-๔๗๐๑

๓) นายศรายุทธ จิตรานนท์

ทะเบียนเลขที่ ว-๒๐๔-ค-๔๗๐๒

๔) นางสาวกนกกร เอนก

ทะเบียนเลขที่ ว-๒๐๔-ค-๖๑๑๑

๕) นายสุริยา สอนแก้ว

ทะเบียนเลขที่ ว-๒๐๔-ค-๖๑๑๒

๖) นายวิชาญ ชูณหะวัณ

ทะเบียนเลขที่ ว-๒๐๔-ค-๖๑๑๓



(นายศิริระ จันทรเจ็ด)

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาการแทน

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน

ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ว-๒๐๔

ที่ อก ๐๓๑๐(๑)/ ๑๐๖๙

ลงวันที่ ๒๘ มกราคม ๒๕๖๕

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖๒ ราย

๑) นางสาวจินดา ไชจุลธรรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๐๘
๒) นางสาวสาวิตรี น้อยเสงี่ยม	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๐๙
๓) นางสาวชนัญญาญจน์ อัมขม	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๐
๔) นางสาวนรินทร์ สายเส็ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๕
๕) นางสาวนันทวดี สมบูรณ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๖
๖) นางสาวศรัณยา เฉลิมธำรงค์	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๗
๗) นางสาวสรารักษ์ มงคลจิรวุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๙
๘) นางสาวศิริลักษณ์ พึ่งแพง	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๒๐
๙) นายณพพงศ์ จันทรพันธุ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๐๘
๑๐) นายนรเศรษฐ์ โกมลาลัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๑
๑๑) นายธันวา จรียา	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๔
๑๒) นางสาวเกศรินทร์ แก้วมัน	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๖
๑๓) นางสาวสุวิมล ชัยเรืองวุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๗
๑๔) นางสาวสุชาดา ธรรมถาวร	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๑
๑๕) นางสาวเบมิกา ชัยเดชธนกุล	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๓
๑๖) นางสาวศศิธร หมูสวัสดิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๔
๑๗) นางสาวเสาวลักษณ์ ภู่นภาอำพร	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๕
๑๘) นายอภิสิทธิ์ สิงหา	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๖
๑๙) นายศักดิ์สิทธิ์ ไพศาลพิสุทธิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๗
๒๐) ว่าที่ร้อยตรีหญิง พรรณิภา ขำเจริญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๘
๒๑) นางจิตดา คำภูแก้ว	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๓๑
๒๒) นางสาวอรรพรรณ รักยง	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๕
๒๓) นางสาวนพรัตน์ แยมกรานต์	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๙
๒๔) นายจุลเดช วารินทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๐
๒๕) นางสาวดาญรัตน์ ร้องคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๑
๒๖) นายนคร สุขเจริญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๒
๒๗) นายบัญชา นามเขตต์	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๓
๒๘) นายพรมมี ศรีปัตเนตร	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๕
๒๙) นายอุทิศ อุ่นสิม	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๖
๓๐) ว่าที่ร้อยตรี เฉลิมเกียรติ อมรศรีเสริม	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๘
๓๑) นางสาววริยา สร้างนา	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๙
๓๒) นายอนุพงศ์ รัตนศรีประเสริฐ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๓๐
๓๓) นางสาวจุฑารัตน์ โอนสันเทียะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๔๒
๓๔) นางสาวจรรววรรณ พิมพ์อริกฤติยา	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๗๖

(นายศิระ จันทรเจ็ด)

๓๕) นางสาวปรารค์ทิพย์...

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาการแทน

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน

สำนักงานสิ่งแวดล้อมและเฝ้าระวังมลพิษทางอากาศ

๓๕) นางสาวปรางค์ทิพย์ กิจไพศาลศักดิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๗๙
๓๖) นางสาวเดือนใจ ทางกลาง	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๐
๓๗) นางสาวจิราพร ศิริเวช	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๑
๓๘) นายวรกร ผุ้รักษ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๒
๓๙) นายทอง วิริยะสทกิจ	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๓
๔๐) นายธนิต เจนจบ	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๔
๔๑) นายคณิศร ขำเพชร	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๕
๔๒) นายอรรคพล นิยมวิทยาพันธ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๖
๔๓) นายภูวิช พรหมสะอาด	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๗
๔๔) นายธนเดช โภคาพิพัฒน์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๘
๔๕) นายชวฤทธิ์ วงษ์จันทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๙
๔๖) นายอาทิตย์ ศรีแสน	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๐
๔๗) นายเจษฎินทร์ คงศักดิ์ไทย	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๑
๔๘) นายจรัส บุญยั้ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๒
๔๙) นายธนาณัติ เอนก	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๓
๕๐) นายอภิวัฒน์ ทุมหนู	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๔
๕๑) นางสาวสุภาขวัญ มาก	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๕
๕๒) นางสาวทัตพร ขวาลสมบูรณ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๐
๕๓) นางสาวธิดิมา บุญเพ็ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๑
๕๔) นางสาวกนกอร เข้มเพ็ชร	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๒
๕๕) นางสาวพัชรียา หงษ์สมดี	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๓
๕๖) นางสาวภาวนิดา สุรวงศ์ตระกูล	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๔
๕๗) นางสาวภาณุมาศ นามวัฒน์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๕
๕๘) นางสาวอุไรรัตน์ ทิงสร้างแป้น	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๖
๕๙) นายธีรวัฒน์ ปวงสุข	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๗
๖๐) นายอิทธิพล ยะโส	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๘
๖๑) นายประพจน์ วรรณชูชัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๙
๖๒) นายชยธร พวงทิพย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๑๐
๖๓) นางสาวกนกวรรณ จันทบาล	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๑๑
๖๔) นางสาวเกษร หลักบุญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๑๒
๖๕) นายสิทธิโชค ธงเงิน	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๑๓
๖๖) นางศิลปวรรณ ใจบุญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๐๕
๖๗) นางสาวพรรณธิดา พุ่มคง	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๐๘
๖๘) นางสาวศรณีย์ ยิ่งดี	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๐๙
๖๙) นายนวกัทร ศรีวิริยะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๐
๗๐) นายสุวิชา ทองอ่อน	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๑
๗๑) นายวิญญู บุญตะนัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๓

(นายศิริระ จันทรเจ็ด)

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาการแทน

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน

กระทรวงอุตสาหกรรม

๗๒) นายสมบูรณ์...

๑๐๙) นายนนทชัย...

๑๐๙) นายพนนพชัย อุปถัมภ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๔
๑๑๐) นายนิรุฬพล คุณสุทธิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๕
๑๑๑) นายนิพนธ์วัฒน์ สาริน	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๖
๑๑๒) นายปิยะนัฐ พลมะศรี	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๗
๑๑๓) นายพงศ์สิริ โสมเขียว	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๘
๑๑๔) นายพีรพัฒน์ กำคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๙
๑๑๕) นายภาณุพงศ์ มานิตย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๐
๑๑๖) นายมงคล ผลาทิพย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๑
๑๑๗) นายมนุรินทร์ พูลศิริ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๒
๑๑๘) นายสิรินันท์ ทองอ้น	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๓
๑๑๙) นายอเนชา ทันสมัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๔
๑๒๐) นายอดิศักดิ์ ผมไผ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๕
๑๒๑) นายอนันตชัย วิสุม	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๖
๑๒๒) นายณัฐดนัย เจือละออง	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๗
๑๒๓) นายวรวิธ คีนิก	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๘
๑๒๔) นายแสงตะวัน นະตะສັດ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๙
๑๒๕) นายยุทธพงศ์ รัตนะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๑๐
๑๒๖) นายชัยวัฒน์ ไซยะนิจ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๑๑
๑๒๗) นายวิศรุต ศรีธรรมมา	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๑๒
๑๒๘) นายพนนทกร เผือกผ่อง	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๑๓
๑๒๙) นายกำชัย สุทธะ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๑๔
๑๓๐) นางสาวณัฐภรณ์ รักทะเล	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๑๙
๑๓๑) นางสาวประภาภรณ์ บุตรพรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๐
๑๓๒) นางสาวนิลาวัลย์ นามพรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๑
๑๓๓) นางสาวพัชรินทร์ แสนสร้อย	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๒
๑๓๔) นายไพโรจน์ เปี่ยมพิมาย	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๓
๑๓๕) นางสาวศุภมาศ ทองมาก	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๔
๑๓๖) นางสาวลลิตา จิตรสว่าง	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๕
๑๓๗) นางสาวชไมพร เสิกภูเขียว	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๖
๑๓๘) นางสาวกฤติมาพร คำมีแก่น	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๗
๑๓๙) นางสาวสกลรัตน์ ภาควุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๘
๑๔๐) นางสาวกาญจนา คงคุณ	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๙
๑๔๑) นางสาวไพรินทร์ ศรีรูปี	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๐
๑๔๒) นางสาวทิพนันดา ฝูญปัญญา	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๑
๑๔๓) นางสาวสาธิตา ปานทอง	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๒
๑๔๔) นางสาวอริสา ทองนวล	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๓
๑๔๕) นางสาวอริยา คำคลอง	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๔

(นายศิริ จันทรเจ็ด)

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาการแทน

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน

๑๔๖) นางสาวบุษดาภรณ์...

๑๔๖) นางสาวชุตานกรณ์ สุนทรสนาน	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๕
๑๔๗) นางสาวสุภารัตน์ นนท์ประสาท	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๖
๑๔๘) นางสาวรัชนิกร เนียมกลาง	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๗
๑๔๙) นางสาวกัญญารัตน์ ศรีนิลทา	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๘
๑๕๐) นางสาวอัญชลี คำจันทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๙
๑๕๑) นายบุญฤทธิ์ เอี่ยมเทศ	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๐
๑๕๒) นายศิริวัฒน์ พานิชย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๑
๑๕๓) นางสาวศุภรดา ปันมยุรา	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๒
๑๕๔) นางสาวพาฤดี คุณนาน	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๓
๑๕๕) นางสาวจิราเจต พองดา	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๔
๑๕๖) นางสาวกนกภรณ์ อุระ	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๕
๑๕๗) นางสาวอารยา มีชัย	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๖
๑๕๘) นางสาวจิตสุภา ประเทืองสุข	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๗
๑๕๙) นางสาวอริสา วิริยขันติธรรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๘
๑๖๐) นางสาววิษุตา นาคผจญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๙
๑๖๑) นางสาวพนิดา ยอดอินทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๕๐
๑๖๒) นางสาวนันทิยา จันทะสุน	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๕๑



(นายศิริระ จันทรเจิด)

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาการแทน

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน

ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

เลขทะเบียน ว-๒๐๔

ที่ อก ๐๓๑๐(๑)/ ๑๐๖๕

ลงวันที่ ๒๘ มกราคม ๒๕๖๕

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๖๑ รายการ

น้ำเสีย จำนวน 59 รายการ

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

(นางริกาญจน์ จันทรกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

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

44 Methomyl...

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

น้ำใต้ดิน จำนวน 126 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]

วิภา

3 Aldrin...

(นางริภาณจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

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	Benzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
13	Benzoic Acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
15	Benzo[g,h,i]perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
16	Beryllium	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]

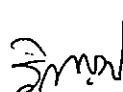
วิธีทาง)

18 Bis(2-ethylhexyl)phthalate...

(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

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

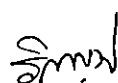


34 Chromium (III)...

(นางริกาญจน์ จิตรสกุลไธ)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

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



(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ

68 Fluorene...

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

ร.พ.ว.

84 Methanol...

(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิชาการวิเคราะห์ทดสอบมลพิษ

แบบฟอร์มรายงานผลการวิเคราะห์

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
84	Methanol	1) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4] 2) Equilibrium Headspace, Gas Chromatographic/ Mass Spectrometric Method ^[4]
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ^[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[4]
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB 1242 - PCB 1248 - PCB 1254 - PCB 1260	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]

วิมล

97 Pentachlorophenol...

(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

และทะเบียนห้องปฏิบัติการ

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 ₅ -C ₉)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,24]
110	TPH (C ₈ -C ₁₆)	Solvent Extraction, Gas Chromatographic Method ^[9,21]
111	TPH (C ₁₆ -C ₃₅)	Solvent Extraction, Gas Chromatographic Method ^[9,21]
112	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]
113	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[4]

วิมล

114 1,1,2-Trichloroethane...

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

อากาศเสีย (ปล่อยระบาย) จำนวน 16 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic, Digestion, Inductively Coupled Plasma Method ^[5]
2	Arsenic	Isokinetic, Digestion, Inductively Coupled Plasma Method ^[5]

วิฑูรย์

3 Carbon Monoxide...

(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

และหน่วยงานที่เกี่ยวข้อง

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

วิมล

สิ่งปลูก...

(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิชาการวิเคราะห์ทดสอบมลพิษ

กรมควบคุมมลพิษ

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[22,31]
2	Antimony	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
3	Arsenic	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
4	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]



(นางริกาญจน์ จิตรสกุลไชย)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

และทะเบียนห้องปฏิบัติการ

6 Cadmium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
7	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,19,25] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[22,31]
8	Chromium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
9	Chromium (III)	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation Method ^[1,6,15,17] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation Method ^[1,6,16,17] 3) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^[7,8,15,17] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^[7,8, 16,17]
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method ^[1,6,17] 2) Alkaline Digestion, Colorimetric Method ^[8,17]



(นางริกาญจน์ จิตรสกุลไชย)

11 Cobalt...

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

.....เรียน...../.....

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
11	Cobalt	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
13	2,4-D	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[22,31]
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[22,31]
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[22,31]
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,25]

จิรพร

2) Soxhlet...

(นางริกาญจน์ จัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

และทะเบียนห้องปฏิบัติการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Dieldrin	2) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[22,31] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,25]
18	Endrin	2) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[22,31] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,25]
19	Heptachlor	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]
20	Lead	2) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[22,31] 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16]
21	Lindane	3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,22]
22	Mercury	3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[22,31] 1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[1,6,18]

วิมล

2) Waste Extraction...

(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Methoxychlor	2) Waste Extraction, Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ^[1,6,19] 3) Waste Extraction, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^[1,6,20] 4) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[18] 5) Thermal Decomposition Amalgamation and Atomic Absorption Spectrometric Method ^[19] 6) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^[20]
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[22,31]
25	Molybdenum	1) Waste Extraction, 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]
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]

วิมล

27 Polychlorinated...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	<p>Polychlorinated biphenyls (PCBs)</p> <ul style="list-style-type: none"> - 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 	<p>1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method^[1,9,23]</p> <p>2) Soxhlet Extraction, Gas Chromatographic Method^[10,23]</p> <p>3) Automated Soxhlet Extraction, Gas Chromatographic Method^[22,31]</p>

วิมล

(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

28 Pentachlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[22,31]
29	pH	Electrometric Method ^[29,30]
30	Selenium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
31	Silver	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16]
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15] 4) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method ^[22,31]
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[1,6,16] 3) Digestion, Inductively Coupled Plasma Method ^[7,15]

วิมล

(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิชาการวิเคราะห์ทดสอบมลพิษ

4) Digestion...

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

ดิน จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
2	Acetone	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
3	Aldrin	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
4	Anthracene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
5	Antimony	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]
6	Arsenic	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]
7	Atrazine	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
8	Barium	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]

วิมล

(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

9 Benz(a)anthracene...

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

วิกรม

26 Carbon tetrachloride...

(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
28	p-Chloroaniline	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
32	2-Chlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
33	Chromium	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^[7,8,15,17] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method ^[7,8,16,17]
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^[8,17]
36	Chrysene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
37	Cyanide	Extraction, Distillation, Colorimetric Method ^[26,27,28]
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
39	DDD	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]

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]

วิภาณ

57 Dieldrin...

(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

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]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
71	Hexachlorobenzene	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,24]
73	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,24]
74	α -HCH	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
75	β -HCH	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
76	γ -HCH	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
77	Hexachlorocyclopentadiene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
78	Hexachloroethane	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
79	Indeno(1,2,3-cd)pyrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
80	Isophorone	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
81	Lead	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
82	Manganese	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[18]



(นางริกาญจน์ จิตตรสกุสโล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

และหน่วยงานบังคับปฏิบัติการ

2) Thermal...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
84	Methanol	2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry ^[19] 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method ^[20] Equilibrium Headspace, Gas Chromatographic/Mass Spectrometric Method ^[12,24]
85	Methoxychlor	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
86	Methyl Bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,24]
87	Methylene Chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,24]
88	2-methylphenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
89	2-Methylnaphthalene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[14,24]
91	Naphthalene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
92	Nickel	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/Mass Spectrometric Method ^[7,16]
93	Nitrobenzene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
94	N-Nitrosodiphenylamine	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
95	N-Nitrosodi-n-propylamine	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
96	Polychlorinated biphenyls (PCBs) - Aroclor 1016 - Aroclor 1221 - Aroclor 1232	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,23] 2) Automated Soxhlet Extraction, Gas Chromatographic Method ^[23,32]

วิฑูรย์

(นางริกาญจน์ ฉัตรสกุลวิไล)

- Aroclor 1242...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
	<ul style="list-style-type: none"> - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260 - 2-Chlorobiphenyl - 2,2',3,5'-Tetrachlorobiphenyl - 2,2',5,5'-Tetrachlorobiphenyl - 2,3',4,4'-Tetrachlorobiphenyl - 2,2',3,4,5'-Pentachlorobiphenyl - 2,2',4,5,5'-Pentachlorobiphenyl - 2,3,3',4',6-Pentachlorobiphenyl - 2,2',3,4,4',5'-Hexachlorobiphenyl - 2,2',3,4,5,5'-Hexachlorobiphenyl - 2,2',3,5,5',6-Hexachlorobiphenyl - 2,2',4,4',5,5'-Hexachlorobiphenyl - 2,2',3,3',4,4',5-Heptachlorobiphenyl - 2,2',3,4,4',5,5'-Heptachlorobiphenyl - 2,2',3,4,4',5',6-Heptachlorobiphenyl - 2,2',3,4',5,5',6-Heptachlorobiphenyl - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl 	
97	Pentachlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
98	Phenanthrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
99	Phenol	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]
100	Pyrene	Automated Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25,31]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
101	Selenium	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]
102	Silver	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]
103	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
107	Toxaphene	1) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
108	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
109	TPH (C ₈ - C ₁₆)	1) Solvent Extraction, Gas Chromatographic Method ^[11,21] 2) Automated Soxhlet Extraction, Gas Chromatographic Method ^[21,31]
110	TPH (C ₁₆ - C ₃₅)	1) Solvent Extraction, Gas Chromatographic Method ^[11,21] 2) Automated Soxhlet Extraction, Gas Chromatographic Method ^[21,31]
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
115	2,4,5-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]

วิมล

116 2,4,6-Trichlorophenol...

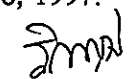
(นางริกาญจน์ ฉัตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
116	2,4,6-Trichlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25,31]
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
118	Vanadium	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]
119	Vinyl Acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
120	Vinyl Chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
121	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
122	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
123	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[14,24]
125	Zinc	1) Digestion, Inductively Coupled Plasma Method ^[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method ^[7,16]

เอกสารอ้างอิง

- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2548. เรื่อง การกำจัดสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว.ราชกิจจานุเบกษา. 25 มกราคม 2549. เล่มที่ 123 ตอนพิเศษ 11ง.
- กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้กลบเป็นเชื้อเพลิง.ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.
- สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.
- APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 23rd ed. Washington, DC: APHA, 2017.
- United States Environmental Protection Agency. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2019.
- United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. SW-846, 1997.


 (นางริกาญจน์ จิตรสกุลวิไล)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

7. United States...

20. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Mercury in Sediment and Tissue Sample by Atomic Fluorescence Spectrometry. SW-846 Method 7474, 2007.

21. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Nonhalogenated Organics Using GC/FID. SW-846 Method 8015B, 1996.

22. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Organochlorine Pesticides by Gas Chromatography. SW-846 Method 8081B, 2007.

23. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Polychlorinated Biphenyls (PCBs) by Gas Chromatography. SW-846 Method 8082, 1996.

24. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). SW-846 Method 8260D, 2018.

25. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). SW-846 Method 8270E, 2018.

26. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Total and Amenable Cyanide: Distillation SW-846 Method 9010B, 1996.

27. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Cyanide Extraction Procedure for Solids and Oil. SW-846 Method 9013A, 1996.

28. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Cyanide in Waters and Extracts Using Titrimetric and Manual Spectrophotometric Procedures. SW-846 Method 9014, 2014.

29. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. pH Electrometric Measurement. SW-846 Method 9040C, 2004.

30. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Soil and Waste pH. SW-846 Method 9045D, 2004.

31. United States Environmental Protection Agency. Test Methods for Evaluation Solid Waste Physical/Chemical Methods. Automated Soxhlet Extraction. SW-846 Method 3541, 1994.



(นางริกาญจน์ ฉัตรสกุลไธ)

ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ



ที่ อก ๐๓๑๐(๑)/ ๕ ๓ ๗ ๙

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๐ ๙ มีนาคม ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๔ กุมภาพันธ์ ๒๕๖๖

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๙ ราย

- | | |
|---------------------------------|----------------------------|
| ๑) นายนคร สุขเจริญ | ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๒ |
| ๒) นายบัญชา นามเขตต์ | ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๓ |
| ๓) นายอรรคพล นิยมวิทย์พาณ | ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๗ |
| ๔) นางสาวพัชรียา หงษ์สมดี | ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๓ |
| ๕) นางสาวภาณิดา สุรวงศ์ตระกูล | ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๔ |
| ๖) นางสาวศรณีย์ ยิ่งดี | ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๐๙ |
| ๗) นายสมโภช วันสา | ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๙ |
| ๘) นายณัฐนันท์ ปานประเสริฐ | ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๑๙ |
| ๙) ว่าที่ร้อยตรีภาณุพงศ์ แสนศรี | ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๖ |
| ๑๐) นายมนินทร์ พูลศิริ | ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๒ |
| ๑๑) นายณัฐดนัย เจือละออง | ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๗ |
| ๑๒) นางสาวกาญจนา คงคุณ | ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๙ |
| ๑๓) นางสาวรัชนิกร เนียมกลาง | ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๗ |
| ๑๔) นางสาวกัญญารัตน์ ศรีนิลทา | ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๘ |
| ๑๕) นายศิริวัฒน์ พานิชย์ | ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๑ |
| ๑๖) นางสาวกนกภรณ์ อูระ | ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๕ |
| ๑๗) นางสาวจิตสุภา ประเทืองสุข | ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๗ |
| ๑๘) นางสาวอริสา วิริยขันติธรรม | ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๘ |
| ๑๙) นางสาวพนิดา ยอดอินทร์ | ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๕๐ |

๒. ให้เพิ่มเจ้าหน้าที่...

๒. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๕ ราย

- | | |
|---------------------------------|----------------------------|
| ๑) นายกาจบัณฑิต กิตติสุขภวณิชย์ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๑ |
| ๒) นายภัทรพล สว่างใจธรรม์ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๒ |
| ๓) นายนราธิป เทือกชัยคำ | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๓ |
| ๔) นายศิริโชค พงษ์ประสม | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๔ |
| ๕) นายณัฐวุฒิ ดั่งแพง | ทะเบียนเลขที่ ว-๒๐๔-จ-๐๐๐๕ |

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ที่ อก ๐๓๑๐(๑)/๑๐๖๙ ลงวันที่ ๒๘ มกราคม ๒๕๖๔ คือในวันที่ ๒ กันยายน ๒๕๖๖ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ทำหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นางริกาญจน์ นัตรสกุลวิไล)

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาการแทน

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน

ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



ที่ อก ๐๓๑๐(๑)/ ๖ ๑ ๒ ๕



กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒ ๓ มีนาคม ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๑๐ มีนาคม ๒๕๖๖

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด
ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐
ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการ
วิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้เปลี่ยนแปลงชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการ
วิเคราะห์ จากเดิม นางสาวสรารค์มี มงคลจิรวุฒิ ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๙ เป็น นางสาวธัญญธร มงคลจิรวุฒิ
ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๙

ทั้งนี้ หากท่านมีความประสงค์จะยื่นคำขอใดๆ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์
ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

✓ (นายประสม ดำรงพงษ์)

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์



“อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”





ที่ อก ๐๓๑๐(๓)/ ๖๔๗๐

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๘ มิถุนายน ๒๕๖๕

เรื่อง ขันทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลборาทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๒๙ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลборาทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลборาทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียน
ห้องปฏิบัติการวิเคราะห์เอกชน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำ
ห้องปฏิบัติการวิเคราะห์ และรายการสารมลพิษที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลборาทอรี กรุ๊ป
(ประเทศไทย) จำกัด ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่
๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอลวกแดง จังหวัดระยอง โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

- | | | |
|--------------------------|---------------|--------------|
| ๑) นายเดช ช้างชน | ทะเบียนเลขที่ | ว-๓๒๓-ค-๙๔๔๒ |
| ๒) นางวิลาวัลย์ บริรักษ์ | ทะเบียนเลขที่ | ว-๓๒๓-ค-๙๔๔๓ |
| ๓) นายสุพจน์ สลามเต๊ะ | ทะเบียนเลขที่ | ว-๓๒๓-ค-๙๔๔๔ |

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

- | | | |
|---------------------------------|---------------|--------------|
| ๑) นางสาวนฤมล บรรจงกิจ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๔๕ |
| ๒) นางพจนา สีดา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๔๖ |
| ๓) นางสาวธนิดา กุลสุริวงศ์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๔๗ |
| ๔) นายพิทยา ทองแดง | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๔๘ |
| ๕) นางชลธิชา สุนงข | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๔๙ |
| ๖) ว่าที่ ร.ต.รณชัย ม่วงมา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๐ |
| ๗) นายวรารุณ ทัพพา | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๑ |
| ๘) นายศักดิ์รินทร์ จรัสกาย | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๒ |
| ๙) นายสุรศักดิ์ สาชิน | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๓ |
| ๑๐) นางสาวเพชรคุณ ภาภูตานนท์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๔ |
| ๑๑) นายสถาพร ถาแก้ว | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๕ |
| ๑๒) นายสุทธิดำรงค์ โชคปิตินันท์ | ทะเบียนเลขที่ | ว-๓๒๓-จ-๙๔๕๖ |

๑๓) นายวัลลภ หันไชยเนาว์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๕๗
๑๔) นางสาววนาลี เจริญตระกูล	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๕๘
๑๕) นางสาวนิตา ผดุงจิตต์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๕๙
๑๖) นายธนะสิทธิ์ วงศ์ไชย	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๐
๑๗) นายชัยนุสรณ์ เลิศนันทกุลชัย	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๑
๑๘) นายสัจจา เพ็ชรแสง	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๒
๑๙) นายกันตภณ มณีสัมพันธ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๓
๒๐) นางสาวจันทนีย์ โกเมนชนะ	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๔
๒๑) นายธารินทร์ อ็อกจินดา	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๕
๒๒) นายศุภณัฐ พิสัยพันธ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๖
๒๓) นายศุภชัย วงศ์สุริย์ฉาย	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๗
๒๔) นายปฐมพงศ์ กรสวัสดิ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๘
๒๕) นายไสว ตันโพธิ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๖๙
๒๖) นางสาวกิตติยา สัญญาอริยาภรณ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๐
๒๗) นางสาวเจษฎาพร ศรีบุญเรือง	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๑
๒๘) นางสาวมธุรินทร์ สิงห์เงา	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๒
๒๙) นางสาวธิดารัตน์ ศิริมั่งคะโร	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๓
๓๐) นายพิพัฒน์ นิภัทร์เศรษฐ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๔
๓๑) นายศิริวิทย์ เรืองสม	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๕
๓๒) นายปารามศ สัตยาคุณ	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๖
๓๓) นายนฤนาท ธรรมสโร	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๗
๓๔) นางสาวศุภรัตน์ โสจันทร์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๘
๓๕) นายพชรกร อินทรเสนา	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๗๙
๓๖) นายทิวากร เชื้อมาก	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๐
๓๗) นายอนุรักษ์ ทองขจรศักดิ์	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๑
๓๘) นายอภิชาติ วิชาศ	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๒
๓๙) นายจรัสระวี ศรีรักษา	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๓
๔๐) นายประสานมิตร เชื้อนเพชร	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๔
๔๑) นายภาณุวัฒน์ วังบง	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๕
๔๒) นายสันติ ชัยชนะ	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๖
๔๓) นายสิทธิชัย แก้วเกตุ	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๗
๔๔) นายทินกร กุลชาติ	ทะเบียนเลขที่	ว-๓๒๓-จ-๙๔๘๘

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

หนังสือฉบับนี้มีอายุ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นางจินดา เตชะศรีนทร์)

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๒๘ มิ.ย. ๒๕๖๔

กองวิจัยและเตือนภัยมลพิษโรงงาน

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

โทร. ๐ ๓๘๐๕ ๗๒๖๑-๓

ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๓๒๓

ที่ ออก ๐๓๑๐(๓)/

๖๔๗๐

ลงวันที่

๒๘

มิถุนายน

๒๕๖๔

ขอขยาสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๔ รายการ
น้ำเสีย จำนวน 14 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	1) 5-Day BOD Test, Membrane Electrode Method ^[2] 2) 5-Day BOD Test, Azide Modification Method ^[2]
2	Chemical Oxygen Demand	1) Open Reflux, Titrimetric Method ^[2] 2) Closed Reflux, Colorimetric Method ^[2] 3) Closed Reflux, Titrimetric Method ^[2]
3	Color	ADMI Weighted – Ordinate Spectrophotometric Method ^[2]
4	Cyanide	Distillation, Colorimetric Method ^[2]
5	Formaldehyde	Distillation, Colorimetric Method ^[1]
6	Free Chlorine	DPD-Ferrous Titrimetric Method ^[2]
7	Oil and Grease	Liquid-Liquid Partition-Gravimetric Method ^[2]
8	pH	Electrometric Method ^[2]
9	Phenols	1) Distillation, Chloroform Extraction Method ^[2] 2) Distillation, Direct Photometric Method ^[2]
10	Sulfide	ZnS Precipitation, Iodometric Method ^[2]
11	Temperature	Laboratory and Field Method ^[2]
12	Total Dissolved Solids	Dried at 180 °C ^[2]
13	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method ^[2]
14	Total Suspended Solids	Dried at 103-105 °C ^[2]

อากาศเสีย (ปล่อยระบาย) จำนวน 7 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Carbon Monoxide	1) Sampling Bag, Non-Dispersive Infrared Method ^[5] 2) Instrumental Analyzer Method ^[8]
2	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ^[5]
3	Opacity	Ringelmann's Method ^[3,4]
4	Oxide of Nitrogen	1) Absorption Sampling, Phenoldisulfonic Acid Method ^[6] 2) Instrumental Analyzer Method ^[9]
5	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Instrumental Analyzer Method ^[10]

วิภา สัมฤทธิ์ผล

(นางสาววิชุดา สัมฤทธิ์ผล)

ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก

Sulfuric Acid...

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

น้ำใต้ดิน จำนวน 3 รายการ

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

เอกสารอ้างอิง

1. ธงชัย พรณสวัสดิ์ และวิบูลย์ลักษณ์ วิสุมธิดักดิ์, บรรณาธิการ. (2547) คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย.

2. APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 23rd ed. Washington, DC : APHA, 2017

3. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้เกลบเป็นเชื้อเพลิง.

ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.

4. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549. เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของของหม้อน้ำของโรงงาน.

ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.

5. United States Environmental Protection. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2017.

6. United States Environmental Protection. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2019.

7. United States Environmental Protection. Standards of Performance for New Stationary Sources. 40 CFR 60. Appendix A, 2020.

8. United States Environmental Protection Agency. Determination of Carbon Monoxide Emissions from Stationary Sources; Instrumental Analyzer Procedure. 40 CFR 60. Appendix A Method 10, 2017.

9. United States Environmental Protection Agency. Determination of Oxide of Nitrogen Emissions from Stationary Sources; Instrumental Analyzer Procedure. 40 CFR 60. Appendix A Method 7E, 2019.

10. United States Environmental Protection Agency. Determination of Sulfur Dioxide Emissions from Stationary Sources; Instrumental Analyzer Procedure. 40 CFR 60. Appendix A Method 6C, 2017.

วิภา สัมฤทธิ์ผล

(นางสาววิชุดา สัมฤทธิ์ผล)

ผู้อำนวยการ

ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก



right solutions.
right partner.

บริษัท เอแอลเอส แล็บอราทอรี กรุ๊ป (ประเทศไทย) จำกัด (สำนักงานใหญ่)
104 ซอยพัฒนาการ 40 ถนนพัฒนาการ
แขวงพัฒนาการ เขตสวนหลวง กรุงเทพฯ 10250



ติดต่อเรา

