ภาคผนวก ญ

ใบรับรองผลการตรวจวิเคราะห์

Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372458
Date Received :Jun 30, 2023
Date Reported :Jul 05, 2023
Report Number :2694224-1

Sample Number 2372458-1
Sample Description Emission from Stationary Source
Location Boiler Stack
Measurement Date Jun 30, 2023

Stack Description

Ambient Temperature	32	°C	Diameter	0.49	m	Oxygen	6.49	%
Ambient Pressure	756	mmHg	Shape	Circle		Carbon dioxide	8.32	%
Type of Process	Combustion		Stack Temperature	142	°C	Gas Velocity	2.60	m/s
Type of Fuel	Natural Gas		Moisture	11.98	%	Flow Rate	1109	Nm3/hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)		Nitrogen Dioxide (ppm)	
				at Actual O_2	at 7% O_2	at Actual O_2	at 7% O_2
1	11:50 AM - 12:10 PM	6.53	8.30	55.64	53.80	1.36	1.32
2	12:11 PM - 12:31 PM	6.47	8.33	56.72	54.62	1.35	1.30
3	12:32 PM - 12:52 PM	6.48	8.33	55.44	53.45	1.42	1.37
Average (ppm)		6.49	8.32	55.93	53.96	1.38	1.33
Guideline (ppm)				-	200	-	-
Result (mg/Nm^3)				105.23	101.51	2.59	2.50
Emission Rate at Actual O_2 (g/s)				0.0324		0.0008	
Method				US EPA Method 7E		US EPA Method 10	

Sampled By : Saksit Phaisanphisut
Guideline : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Technical Management
Wichan Choonharat
Manager
ทะเบียนเลขที่ ว-204-ค-6113

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

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372459
Date Received : Jun 30, 2023
Date Reported : Jul 08, 2023
Report Number: 2694227-1

Sample Number 2372459-1
Sampled Date Jun 30, 2023
Sample Description Emission from Stationary Source
Location Boiler Stack
Date Analysis Commenced Jul 04, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish and one plastic bottle

Stack Description

Ambient Pressure	756	mmHg	Diameter	0.49	m	Oxygen	6.5	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	8.3	%
Type of Process	Combustion		Stack Temperature	142	°C	Gas Velocity	2.6	m/s
Type of Fuel	Natural Gas		Moisture	12.10	%	Flow Rate (Actual O2)	1107	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result at 7 %O_2	Guideline Limit	Method	Testing Location
Air Testing								
Total Suspended Particulate	12:00 PM - 12:48 PM	mg/m3	-	0.5	<0.5	320	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)
Sampled By : Tinnakorn Kulchart

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

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

Approved by
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Senior Manager
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Analysis / Test Report

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111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372460
Date Received :Jun 30, 2023
Date Reported :Jul 05, 2023
Report Number :2694234-1

Sample Number 2372460-1
Sample Description Emission from Stationary Source
Location Scrubber Stack
Measurement Date Jun 30, 2023

Stack Description

Ambient Temperature	32	°C	Diameter	1.59	m	Oxygen	18.77	%
Ambient Pressure	756	mmHg	Shape	Circle		Carbon dioxide	0.97	%
Type of Process	Process		Stack Temperature	57	°C	Gas Velocity	12.65	m/s
Type of Fuel	-		Moisture	13.38	%	Flow Rate	70350	Nm3/hr

Run No.	Sampling Time	Oxygen (%)	Carbon Dioxide (%)	Oxides of Nitrogen (ppm)		Nitrogen Dioxide (ppm)	
				at Actual O_2	at 7% O_2	at Actual O_2	at 7% O_2
1	10:10 AM - 10:30 AM	18.77	0.97	0.51	3.32	0.49	3.18
2	10:31 AM - 10:51 AM	18.76	0.97	0.53	3.45	0.49	3.20
3	10:52 AM - 11:12 AM	18.78	0.96	0.52	3.41	0.47	3.07
Average (ppm)		18.77	0.97	0.52	3.39	0.48	3.15
Guideline (ppm)				-	-	-	-
Result (mg/Nm^3)				0.98	6.38	0.91	5.93
Emission Rate at Actual O_2 (g/s)				0.0191		0.0177	
Method				US EPA Method 7E		US EPA Method 10	

Sampled By : Saksit Phaisanphisut
Guideline : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)

Technical Management
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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372461
Date Received : Jun 30, 2023
Date Reported : Jul 11, 2023
Report Number: 2694237-1

Sample Number 2372461-1
Sampled Date Jun 30, 2023
Sample Description Emission from Stationary Source
Location Scrubber Stack
Date Analysis Commenced Jul 04, 2023
Condition of Sample Extracted into one filter paper placed in plastic petri dish, one plastic bottle, one 10-L air sampling bag and two sorbent tubes, refrigerated

Stack Description

Ambient Pressure	756	mmHg	Diameter	1.59	m	Oxygen	18.8	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	1.0	%
Type of Process	Process		Stack Temperature	57.0	°C	Gas Velocity	12.6	m/s
Type of Fuel	-		Moisture	13.44	%	Flow Rate (Actual O2)	70221	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Testing Location
Air Testing								
Total Suspended Particulate	10:10 AM - 10:58 AM	mg/m3	-	0.5	1.2	400	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline : Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)
Sampled By : Tinnakorn Kulchart , Saksit Phaisanphisut

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Technical Management
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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372461
Date Received : Jun 30, 2023
Date Reported : Jul 11, 2023
Report Number: 2694237-2

Sample Number	2372461-1
Sampled Date	Jun 30, 2023
Sample Description	Emission from Stationary Source
Location	Scrubber Stack
Date Analysis Commenced	Jul 03, 2023
Condition of Sample	Extracted into one filter paper placed in plastic petri dish, one plastic bottle, one 10-L air sampling bag and two sorbent tubes, refrigerated

Stack Description

Ambient Pressure	756	mmHg	Diameter	1.59	m	Oxygen	18.8	%
Ambient Temperature	32.0	°C	Shape	Circle		Carbon Dioxide	1.0	%
Type of Process	Process		Stack Temperature	57.0	°C	Gas Velocity	12.6	m/s
Type of Fuel	-		Moisture	13.44	%	Flow Rate (Actual O2)	70221	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Method	Testing Location
Air Testing							
Acrylic Acid	10:25 AM - 10:40 AM	ppm	-	1.0	<1.0	Based on OSHA, ID 28	Bangkok
Propylene glycol	10:25 AM - 10:40 AM	ppm	-	1.00	<1.00	United States Environmental Protection Agency, EPA Method 18	Bangkok
Total VOCs as Propane	10:15 AM - 10:25 AM	ppm	-	1.0	53.4	United States Environmental Protection Agency, EPA Method 25A	Bangkok

Sampled By : Tinnakorn Kulchart , Saksit Phaisanphisut

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Approved by
Saranya Chalermthamrong
Scientist (4)

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Analysis / Test Report

TESTING No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372462
Date Received : Jun 29, 2023
Date Reported : Jul 05, 2023
Report Number: 2694291-1

Sample Number	2372462-1
Sampled Date	Jun 29, 2023
Sample Description	Emission from Stationary Source
Location	Process Baghouse Stack (GPS 47P 0733140, 1438817)
Date Analysis Commenced	Jun 30, 2023
Condition of Sample	Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description

Ambient Pressure	756	mmHg	Diameter	0.50 x 0.45	m	Oxygen	20.7	%
Ambient Temperature	32.0	°C	Shape	Rectangular		Carbon Dioxide	0.1	%
Type of Process	Process		Stack Temperature	102	°C	Gas Velocity	21.2	m/s
Type of Fuel	-		Moisture	3.52	%	Flow Rate (Actual O2)	13166	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate	10:15 AM - 11:09 AM	mg/m3	-	0.5	0.8	400	53.3	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline : Guideline (1) Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)
Guideline (2) Environmental Impact Assessment Report of BASF (Thai) Limited.

Approved by
Thanita Kulsuriwong
Scientist (4)

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Analysis / Test Report

TESTING No.0042

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372462
Date Received : Jun 29, 2023
Date Reported : Jul 05, 2023
Report Number: 2694291-1

Sample Number	2372462-1
Sampled Date	Jun 29, 2023
Sample Description	Emission from Stationary Source
Location	Process Baghouse Stack (GPS 47P 0733140, 1438817)
Date Analysis Commenced	Jun 30, 2023
Condition of Sample	Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description

Ambient Pressure	756	mmHg	Diameter	0.50 x 0.45	m	Oxygen	20.7	%
Ambient Temperature	32.0	°C	Shape	Rectangular		Carbon Dioxide	0.1	%
Type of Process	Process		Stack Temperature	102	°C	Gas Velocity	21.2	m/s
Type of Fuel	-		Moisture	3.52	%	Flow Rate (Actual O2)	13166	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result Emission Rate	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate *	10:15 AM - 11:09 AM	g/s	-	-	0.003	-	0.206	Calculated	Rayong

Guideline : Guideline (1) Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)
Guideline (2) Environmental Impact Assessment Report of BASF (Thai) Limited.

Sampled By : Saknarin Jaraskay

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Thanita Kulsuriwong
Scientist (4)

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Analysis / Test Report

TESTING No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372893
Date Received : Jun 29, 2023
Date Reported : Jul 05, 2023
Report Number: 2694292-1

Sample Number	2372893-1
Sampled Date	Jun 29, 2023
Sample Description	Emission from Stationary Source
Location	Packaging Baghouse Stack (GPS 47P 0733163, 1438822)
Date Analysis Commenced	Jun 30, 2023
Condition of Sample	Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description

Ambient Pressure	756	mmHg	Diameter	0.45 x 0.35	m	Oxygen	20.9	%
Ambient Temperature	32.0	°C	Shape	Rectangular		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	49.3	°C	Gas Velocity	5.9	m/s
Type of Fuel	-		Moisture	2.90	%	Flow Rate (Actual O2)	2998	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate	11:40 AM - 12:25 PM	mg/m3	-	0.5	0.5	400	45.0	United States Environmental Protection Agency, EPA Method 5	Rayong

Guideline : Guideline (1) Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)
Guideline (2) Environmental Impact Assessment Report of BASF (Thai) Limited.

Technical Management
Thanita Kulsuriwong
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Approved by
Dej Changchon
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Analysis / Test Report

TESTING
No.0042

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111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372893
Date Received : Jun 29, 2023
Date Reported : Jul 05, 2023
Report Number: 2694292-1

Sample Number	2372893-1
Sampled Date	Jun 29, 2023
Sample Description	Emission from Stationary Source
Location	Packaging Baghouse Stack (GPS 47P 0733163, 1438822)
Date Analysis Commenced	Jun 30, 2023
Condition of Sample	Extracted into one filter paper placed in plastic petri dish, one plastic bottle and one 10-L air sampling bag

Stack Description

Ambient Pressure	756	mmHg	Diameter	0.45 x 0.35	m	Oxygen	20.9	%
Ambient Temperature	32.0	°C	Shape	Rectangular		Carbon Dioxide	0.0	%
Type of Process	Process		Stack Temperature	49.3	°C	Gas Velocity	5.9	m/s
Type of Fuel	-		Moisture	2.90	%	Flow Rate (Actual O2)	2998	Nm3/hr

Analyte	Sampled Time	Unit	LOD	LOQ (LOR)	Result	Guideline (1)	Guideline (2)	Method	Testing Location
Air Testing									
Total Suspended Particulate *	11:40 AM - 12:25 PM	g/s	-	-	0.0004	-	0.063	Calculated	Rayong

Guideline : Guideline (1) Notification of the Ministry of Industry 2006 (B.E. 2549) Published in the Royal Government Gazette, Vol.123 Special Part 125 D, dated December 4, 2006 (B.E. 2549)
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Sampled By : Saknarin Jaraskay

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Technical Management Thanita Kulsuriwong
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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372455
Date Received : Jul 03, 2023
Date Reported : Jul 07, 2023
Report Number: 2694130-1

Sample Description	Air Quality
Location	ภายในนิคมอุตสาหกรรม (GPS 47P 0733097, 1439770)
Parameter	Nitrogen dioxide (ppm)
Measurement Date	Jun 24, 2023 - Jul 01, 2023
Measurement by	Apichart Wilars

Time	2372455-1 Jun 24, 2023	2372455-2 Jun 25, 2023	2372455-3 Jun 26, 2023	2372455-4 Jun 27, 2023	2372455-5 Jun 28, 2023	2372455-6 Jun 29, 2023	2372455-7 Jun 30, 2023
11:00 AM - 12:00 PM	0.002	0.002	0.002	0.003	0.003	0.007	0.004
12:00 PM - 01:00 PM	0.003	0.001	0.002	0.003	0.003	0.007	0.004
01:00 PM - 02:00 PM	0.005	0.001	0.001	0.003	0.008	0.009	0.004
02:00 PM - 03:00 PM	0.005	0.002	0.001	0.003	0.010	0.008	0.005
03:00 PM - 04:00 PM	0.004	0.002	0.001	0.002	0.013	0.008	0.004
04:00 PM - 05:00 PM	0.004	0.002	0.002	0.002	0.012	0.007	0.004
05:00 PM - 06:00 PM	0.004	0.002	0.002	0.007	0.013	0.010	0.006
06:00 PM - 07:00 PM	0.005	0.003	0.003	0.007	0.018	0.014	0.011
07:00 PM - 08:00 PM	0.006	0.005	0.003	0.006	0.019	0.013	0.011
08:00 PM - 09:00 PM	0.016	0.005	0.005	0.007	0.017	0.011	0.012
09:00 PM - 10:00 PM	0.019	0.006	0.005	0.006	0.018	0.011	0.010
10:00 PM - 11:00 PM	0.013	0.007	0.006	0.005	0.017	0.009	0.006
11:00 PM - 12:00 AM	0.008	0.010	0.005	0.006	0.013	0.010	0.006
12:00 AM - 01:00 AM	0.008	0.012	0.004	0.006	0.013	0.009	0.006
01:00 AM - 02:00 AM	0.007	0.006	0.004	0.006	0.011	0.008	0.005
02:00 AM - 03:00 AM	0.008	0.005	0.003	0.005	0.009	0.007	0.006
03:00 AM - 04:00 AM	0.006	0.005	0.002	0.006	0.009	0.006	0.004
04:00 AM - 05:00 AM	0.005	0.004	0.004	0.005	0.008	0.006	0.004
05:00 AM - 06:00 AM	0.004	0.004	0.004	0.007	0.008	0.005	0.005
06:00 AM - 07:00 AM	0.006	0.004	0.006	0.008	0.008	0.006	0.007
07:00 AM - 08:00 AM	0.006	0.005	0.007	0.008	0.007	0.006	0.010
08:00 AM - 09:00 AM	0.007	0.005	0.007	0.008	0.010	0.005	0.009
09:00 AM - 10:00 AM	0.005	0.002	0.006	0.006	0.010	0.005	0.006
10:00 AM - 11:00 AM	0.005	0.002	0.005	0.003	0.006	0.004	0.006
Average	0.007	0.004	0.004	0.005	0.011	0.008	0.006
1hr - Maximum	0.019	0.012	0.007	0.008	0.019	0.014	0.012
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 EPAMethod Part 50 App. F (Chemiluminescence)

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Approved by Orawan Rakyong
Scientist (3)

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372455
Date Received : Jul 03, 2023
Date Reported : Jul 07, 2023
Report Number: 2711282-1

Sample Description	Air Quality
Location	บ้านห้วยปราบ (GPS 47P 0728363, 1441336)
Parameter	Nitrogen dioxide (ppm)
Measurement Date	Jun 24, 2023 - Jul 01, 2023
Measurement by	Apichart Wilars

Time	2372455-8 Jun 24, 2023	2372455-9 Jun 25, 2023	2372455-10 Jun 26, 2023	2372455-11 Jun 27, 2023	2372455-12 Jun 28, 2023	2372455-13 Jun 29, 2023	2372455-14 Jun 30, 2023
10:00 AM - 11:00 AM	0.009	0.008	0.006	0.009	0.007	0.006	0.005
11:00 AM - 12:00 PM	0.006	0.008	0.005	0.008	0.005	0.006	0.004
12:00 PM - 01:00 PM	0.005	0.005	0.004	0.005	0.004	0.006	0.004
01:00 PM - 02:00 PM	0.005	0.005	0.003	0.007	0.009	0.008	0.004
02:00 PM - 03:00 PM	0.005	0.006	0.003	0.005	0.018	0.009	0.005
03:00 PM - 04:00 PM	0.005	0.004	0.004	0.007	0.024	0.013	0.004
04:00 PM - 05:00 PM	0.006	0.004	0.006	0.006	0.016	0.009	0.003
05:00 PM - 06:00 PM	0.004	0.004	0.007	0.007	0.021	0.011	0.005
06:00 PM - 07:00 PM	0.007	0.009	0.010	0.015	0.025	0.015	0.011
07:00 PM - 08:00 PM	0.008	0.011	0.014	0.016	0.035	0.018	0.013
08:00 PM - 09:00 PM	0.014	0.012	0.016	0.014	0.030	0.015	0.013
09:00 PM - 10:00 PM	0.028	0.011	0.014	0.010	0.030	0.012	0.012
10:00 PM - 11:00 PM	0.030	0.015	0.011	0.008	0.029	0.013	0.014
11:00 PM - 12:00 AM	0.015	0.016	0.008	0.006	0.022	0.011	0.014
12:00 AM - 01:00 AM	0.011	0.011	0.009	0.005	0.008	0.007	0.013
01:00 AM - 02:00 AM	0.014	0.009	0.008	0.009	0.009	0.007	0.009
02:00 AM - 03:00 AM	0.011	0.007	0.005	0.007	0.009	0.006	0.005
03:00 AM - 04:00 AM	0.009	0.008	0.002	0.006	0.008	0.006	0.006
04:00 AM - 05:00 AM	0.014	0.010	0.005	0.010	0.008	0.006	0.004
05:00 AM - 06:00 AM	0.007	0.011	0.007	0.009	0.011	0.006	0.007
06:00 AM - 07:00 AM	0.009	0.012	0.010	0.010	0.013	0.006	0.006
07:00 AM - 08:00 AM	0.011	0.012	0.013	0.012	0.013	0.008	0.008
08:00 AM - 09:00 AM	0.007	0.011	0.013	0.011	0.014	0.006	0.011
09:00 AM - 10:00 AM	0.006	0.006	0.012	0.008	0.014	0.005	0.008
Average	0.010	0.009	0.008	0.009	0.016	0.009	0.008
1hr - Maximum	0.030	0.016	0.016	0.016	0.035	0.018	0.014
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 EPAMethod Part 50 App. F (Chemiluminescence)

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Approved by Orawan Rakyong
Scientist (3)

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372824
Date Received : Jul 03, 2023
Date Reported : Jul 07, 2023
Report Number: 2694148-1

Sample Description	Air Quality
Location	ภายในนิคมอุตสาหกรรม (GPS 47P 0733097, 1439770)
Date Analysis Commenced	Jul 04, 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)
2372824-1	Jun 24 - Jun 25, 2023	0.053	756	31
2372824-2	Jun 25 - Jun 26, 2023	0.056	756	31
2372824-3	Jun 26 - Jun 27, 2023	0.046	756	30
2372824-4	Jun 27 - Jun 28, 2023	0.062	756	30
2372824-5	Jun 28 - Jun 29, 2023	0.065	756	30
2372824-6	Jun 29 - Jun 30, 2023	0.051	756	30
2372824-7	Jun 30 - Jul 01, 2023	0.048	756	30
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 : Apichart Wilars
Remark :
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by Thanita Kulsuriwong
Scientist (4)

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372824
Date Received : Jul 03, 2023
Date Reported : Jul 07, 2023
Report Number: 2694148-2

Sample Description Air Quality
Location บ้านห้วยปราบ (GPS 47P 0728363, 1441336)
Date Analysis Commenced Jul 04, 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)
2372824-8	Jun 24 - Jun 25, 2023	0.052	756	31
2372824-9	Jun 25 - Jun 26, 2023	0.053	756	31
2372824-10	Jun 26 - Jun 27, 2023	0.053	756	30
2372824-11	Jun 27 - Jun 28, 2023	0.081	756	30
2372824-12	Jun 28 - Jun 29, 2023	0.093	756	30
2372824-13	Jun 29 - Jun 30, 2023	0.098	756	30
2372824-14	Jun 30 - Jul 01, 2023	0.092	756	30
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 : Apichart Wilars

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

Approved by
Thanita Kulsuriwong
Scientist (4)

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID : 2372456
Date Received : Jul 03, 2023
Date Reported : Jul 10, 2023
Report Number : 2694152-1

Sample Number 2372456-1 to 7
Parameter Wind Speed / Wind Direction
Location พื้นที่โครงการ (GPS 47P 0733222, 1438992)
Sampling Date Jun 24 - Jul 01, 2023
Sampling by Apichart Wilars

Time	Jun 24 - Jun 25, 2023		Jun 25 - Jun 26, 2023		Jun 26 - Jun 27, 2023		Jun 27 - Jun 28, 2023		Jun 28 - Jun 29, 2023		Jun 29 - Jun 30, 2023		Jun 30 - Jul 01, 2023	
	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)	WS (m/s)	WD (deg)
12:00 PM - 01:00 PM	1.5	296.0 WNW	4.5	355.0 N	4.2	355.0 N	1.5	282.0 WNW	1.8	204.0 SSW	3.6	124.0 SE	0.8	226.0 SW
01:00 PM - 02:00 PM	2.6	285.0 WNW	2.1	291.0 WNW	2.0	284.0 WNW	2.6	281.0 W	2.4	130.0 SE	2.9	244.0 WSW	1.4	236.0 SW
02:00 PM - 03:00 PM	2.6	288.0 WNW	3.9	332.0 NNW	5.0	315.0 NW	2.4	324.0 NW	0.7	174.0 S	2.1	248.0 WSW	4.0	238.0 WSW
03:00 PM - 04:00 PM	2.8	300.0 WNW	3.3	263.0 W	2.0	320.0 NW	2.4	268.0 W	2.1	147.0 SSE	2.2	272.0 W	1.4	244.0 WSW
04:00 PM - 05:00 PM	2.4	282.0 WNW	2.3	311.0 NW	4.3	296.0 WNW	0.5	191.0 S	2.3	175.0 S	2.4	234.0 SW	2.4	177.0 S
05:00 PM - 06:00 PM	1.4	317.0 NW	3.2	302.0 WNW	2.4	284.0 WNW	3.5	173.0 S	1.7	138.0 SE	2.5	177.0 S	1.7	158.0 SSE
06:00 PM - 07:00 PM	0.9	332.0 NNW	1.8	319.0 NW	2.0	267.0 W	1.6	167.0 SSE	0.3	133.0 SE	2.2	142.0 SE	2.7	112.0 ESE
07:00 PM - 08:00 PM	0.7	335.0 NNW	1.5	286.0 WNW	1.8	230.0 SW	2.3	197.0 SSW	1.4	192.0 SSW	0.4	154.0 SSE	2.9	201.0 SSW
08:00 PM - 09:00 PM	0.0	- -	0.3	252.0 WSW	1.6	291.0 WNW	1.3	184.0 S	1.0	181.0 S	1.1	187.0 S	1.9	172.0 S
09:00 PM - 10:00 PM	1.5	128.0 SE	0.7	45.0 NE	1.3	240.0 WSW	0.3	163.0 SSE	1.3	111.0 ESE	1.7	178.0 S	1.7	159.0 SSE
10:00 PM - 11:00 PM	1.9	166.0 SSE	0.0	- -	0.7	247.0 WSW	1.5	195.0 SSW	0.7	170.0 S	1.4	181.0 S	1.2	166.0 SSE
11:00 PM - 12:00 AM	0.0	- -	0.8	157.0 SSE	0.7	246.0 WSW	1.4	190.0 S	0.0	- -	1.2	136.0 SE	1.9	174.0 S
12:00 AM - 01:00 AM	0.6	257.0 WSW	1.0	138.0 SE	1.3	280.0 W	1.4	157.0 SSE	0.0	- -	1.4	169.0 S	1.6	164.0 SSE
01:00 AM - 02:00 AM	0.4	279.0 W	1.3	105.0 ESE	0.0	- -	0.1	- -	0.0	- -	0.8	155.0 SSE	0.1	- -
02:00 AM - 03:00 AM	0.5	270.0 W	0.4	110.0 ESE	1.1	342.0 NNW	0.0	- -	0.0	- -	0.6	126.0 SE	0.5	201.0 SSW
03:00 AM - 04:00 AM	0.5	333.0 NNW	0.2	- -	0.0	- -	0.0	- -	0.8	120.0 ESE	1.0	181.0 S	2.0	177.0 S
04:00 AM - 05:00 AM	0.6	48.0 NE	0.3	137.0 SE	0.0	- -	0.0	- -	0.7	152.0 SSE	1.8	251.0 WSW	2.7	145.0 SE
05:00 AM - 06:00 AM	0.0	- -	0.0	- -	0.0	- -	0.0	- -	0.6	87.0 E	1.6	233.0 SW	0.0	- -
06:00 AM - 07:00 AM	0.0	- -	0.0	- -	0.4	129.0 SE	0.0	- -	0.8	113.0 ESE	0.0	- -	0.0	- -
07:00 AM - 08:00 AM	0.8	326.0 NW	0.2	- -	0.0	- -	0.0	- -	0.0	- -	0.5	286.0 WNW	0.0	- -
08:00 AM - 09:00 AM	1.9	327.0 NNW	1.2	285.0 WNW	0.0	- -	0.2	- -	1.7	112.0 ESE	2.0	242.0 WSW	1.4	217.0 SW
09:00 AM - 10:00 AM	2.6	288.0 WNW	2.3	297.0 WNW	0.7	343.0 NNW	2.0	359.0 N	1.6	121.0 ESE	1.4	244.0 WSW	1.0	260.0 W
10:00 AM - 11:00 AM	3.9	272.0 W	0.7	342.0 NNW	1.7	278.0 W	0.6	314.0 NW	1.9	111.0 ESE	1.9	225.0 SW	1.2	342.0 NNW
11:00 AM - 12:00 PM	2.4	275.0 W	2.8	322.0 NW	1.2	306.0 NW	2.2	300.0 WNW	1.9	273.0 W	1.8	142.0 SE	1.6	250.0 WSW

Reference Method : Cup Anemometer & Anodized Aluminium Vane Method

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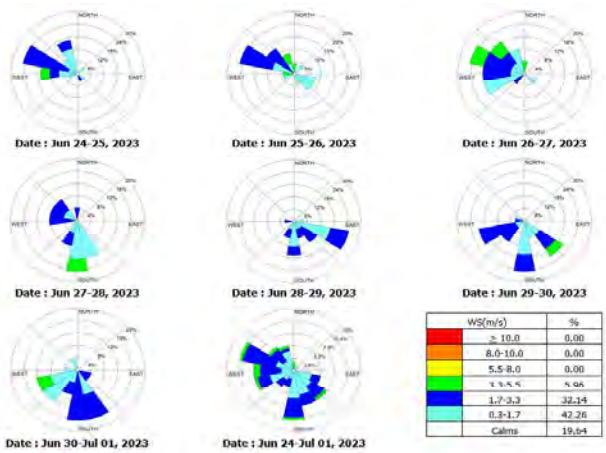
Approved by
Sarayuth Jittranont
Assistant General Manager

Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID : 2372456
Date Received : Jul 03, 2023
Date Reported : Jul 10, 2023
Report Number : 2694152-1

Wind Rose



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Approved by
Sarayuth Jittranont
Assistant General Manager

Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 22149327
Date Received : Jan 09, 2023
Date Reported : Jan 16, 2023
Report Number : 2522590-1

Sample Number 22149327-1
Sampled Date Jan 09, 2023 3:22 PM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced Jan 09, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	46.9	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B	Rayong
COD	mg/L	1.5	5	221	≤750	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease *	mg/L	-	3	5	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH (on site) *		-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	29.1	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	57.4	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	36	≤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 : Paramet Sattayakun ทะเบียนเลขที่ ว-323-จ-9476 , Panupong Manit ทะเบียนเลขที่ ว-204-จ-8600

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
Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

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

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Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 22149327
Date Received : Jan 09, 2023
Date Reported : Jan 16, 2023
Report Number : 2522590-1

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

Technical Management
Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

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

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Analysis / Test Report

TESTING
No.0009

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 22149327
Date Received : Jan 09, 2023
Date Reported : Jan 16, 2023
Report Number : 2522590-2

Sample Number 22149327-1
Sampled Date Jan 09, 2023 3:22 PM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced Jan 10, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Zinc	mg/L	0.003	0.005	0.92	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Paramet Sattayakun ทะเบียนเลขที่ ว-323-จ-9476 , Panupong Manit ทะเบียนเลขที่ ว-204-จ-8600

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
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-4709

Approved by
Kanokkorn Anek
Senior Manager
ทะเบียนเลขที่ ว-204-ค-6111

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 22149327
Date Received : Jan 09, 2023
Date Reported : Jan 16, 2023
Report Number : 2522590-3

Sample Number 22149327-1
Sampled Date Jan 09, 2023 3:22 PM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced Jan 11, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phosphate as P	mg/L	0.002	0.005	5.414	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (E)	Rayong

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

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

Approved by
Dej Changchon
Senior Manager

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 237951
Date Received : Feb 10, 2023
Date Reported : Feb 16, 2023
Report Number : 2551310-1

Sample Number 237951-1
Sampled Date Feb 10, 2023 10:50 AM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced Feb 10, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, some odour, a lot of solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	14.5	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B	Rayong
COD	mg/L	1.5	25	70	≤750	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease *	mg/L	-	3	5	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH (on site) *		-	-	8.2	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	-	-	34.3	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	15.9	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	42	≤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 , Panupong Manit ทะเบียนเลขที่ ว-204-จ-8600

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
Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

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

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 237951
Date Received : Feb 10, 2023
Date Reported : Feb 16, 2023
Report Number : 2551310-1

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

Technical Management
Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

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

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0009

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 237951
Date Received : Feb 10, 2023
Date Reported : Feb 16, 2023
Report Number : 2551310-2

Sample Number 237951-1
Sampled Date Feb 10, 2023 10:50 AM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced Feb 13, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, some odour, a lot of solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Zinc	mg/L	0.003	0.005	1.29	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Tanasit Wongsachai ทะเบียนเลขที่ ว-323-จ-9460 , Panupong Manit ทะเบียนเลขที่ ว-204-จ-8600

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
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-4709

Approved by
Kanokkorn Anek
Senior Manager
ทะเบียนเลขที่ ว-204-จ-6111

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 237951
Date Received : Feb 10, 2023
Date Reported : Feb 16, 2023
Report Number : 2551310-3

Sample Number 237951-1
Sampled Date Feb 10, 2023 10:50 AM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced Feb 14, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, some odour, a lot of solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phosphate as P	mg/L	0.002	0.005	3.063	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (E)	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 , Panupong Manit

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

Approved by
Narumon Banchongkit
Supervisor

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2320145
Date Received : Mar 07, 2023
Date Reported : Mar 14, 2023
Report Number : 2576462-1

Sample Number 2320145-1
Sampled Date Mar 07, 2023 9:55 AM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced Mar 07, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, some odour, a lot of solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	7.8	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B	Rayong
COD	mg/L	1.5	25	79	≤750	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease *	mg/L	-	3	5	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH (on site) *		-	-	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	-	-	31.7	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	16.0	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	6	≤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 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-7830

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

Technical Management
Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

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

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Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2320145
Date Received : Mar 07, 2023
Date Reported : Mar 14, 2023
Report Number : 2576462-1

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

Technical Management
Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

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

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Analysis / Test Report

TESTING
No.0009

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2320145
Date Received : Mar 07, 2023
Date Reported : Mar 14, 2023
Report Number : 2576462-2

Sample Number	2320145-1
Sampled Date	Mar 07, 2023 9:55 AM
Sample Description	Wastewater
Contract ID	L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced	Mar 08, 2023
Condition of Sample	Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property	Yellow, some odour, a lot of solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Zinc	mg/L	0.003	0.005	0.76	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Tanasit Wongsachai ทะเบียนเลขที่ ว-323-จ-9460 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-7830

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

Technical Management
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-4709

Approved by
Kanokkorn Anek
Senior Manager
ทะเบียนเลขที่ ว-204-จ-6111

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Analysis / Test Report

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2320145
Date Received : Mar 07, 2023
Date Reported : Mar 14, 2023
Report Number : 2576462-3

Sample Number	2320145-1
Sampled Date	Mar 07, 2023 9:55 AM
Sample Description	Wastewater
Contract ID	L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced	Mar 13, 2023
Condition of Sample	Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property	Yellow, some odour, a lot of solid and some turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phosphate as P	mg/L	0.002	0.005	4.100	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (E)	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 , Samart Khumphlee

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

Approved by
Narumon Banchongkit
Supervisor

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Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2333946
Date Received : Apr 04, 2023
Date Reported : Apr 10, 2023
Report Number : 2605480-1

Sample Number	2333946-1
Sampled Date	Apr 04, 2023 10:22 AM
Sample Description	Wastewater
Contract ID	L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced	Apr 04, 2023
Condition of Sample	Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property	Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	5.9	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B	Rayong
COD	mg/L	1.5	25	54	≤750	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease *	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH (on site) *		-	-	8.4	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	-	-	34.2	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	12.4	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	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 : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-จ-0006 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-7830

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

Technical Management
Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

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

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Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2333946
Date Received : Apr 04, 2023
Date Reported : Apr 10, 2023
Report Number : 2605480-1

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

Technical Management
Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

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

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

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Analysis / Test Report

TESTING
No.0009

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2333946
Date Received : Apr 04, 2023
Date Reported : Apr 11, 2023
Report Number : 2605480-2

Sample Number 2333946-1
Sampled Date Apr 04, 2023 10:22 AM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced Apr 06, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Zinc	mg/L	0.003	0.005	1.21	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Nattawut Athomprommarat ทะเบียนเลขที่ ว-323-จ-0006 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-7830

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

Technical Management
Chanattagarn Imchom
Supervisor
ทะเบียนเลขที่ ว-204-จ-4710

Approved by
Kanokkorn Anek
Senior Manager
ทะเบียนเลขที่ ว-204-ค-6111

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Analysis / Test Report

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2333946
Date Received : Apr 04, 2023
Date Reported : Apr 10, 2023
Report Number : 2605480-3

Sample Number 2333946-1
Sampled Date Apr 04, 2023 10:22 AM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced Apr 05, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phosphate as P	mg/L	0.002	0.005	2.609	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (E)	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 : Nattawut Athomprommarat , Samart Khumphlee

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

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Approved by
Narumon Banchongkit
Supervisor

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Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2344804
Date Received : May 10, 2023
Date Reported : May 17, 2023
Report Number : 2637788-1

Sample Number 2344804-1
Sampled Date May 10, 2023 11:24 AM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced May 10, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, a lot of odour, some solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	8.3	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B	Rayong
COD	mg/L	1.5	25	61	≤750	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease *	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH (on site) *		-	-	7.7	5.5-9.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Rayong
Temperature *	Degree C	-	-	32.7	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	23.5	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	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 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-7830

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

Technical Management
Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

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

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Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2344804
Date Received : May 10, 2023
Date Reported : May 17, 2023
Report Number : 2637788-1

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

Technical Management
Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

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

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Analysis / Test Report

TESTING
No.0009

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2344804
Date Received : May 10, 2023
Date Reported : May 17, 2023
Report Number : 2637788-2

Sample Number 2344804-1
Sampled Date May 10, 2023 11:24 AM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced May 11, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, a lot of odour, some solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Zinc	mg/L	0.003	0.005	0.67	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Tanasit Wongsachai ทะเบียนเลขที่ ว-323-จ-9460 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-7830

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

Technical Management
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-4709

Approved by
Kanokkorn Anek
Senior Manager
ทะเบียนเลขที่ ว-204-จ-6111

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Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2344804
Date Received : May 10, 2023
Date Reported : May 17, 2023
Report Number : 2637788-3

Sample Number 2344804-1
Sampled Date May 10, 2023 11:24 AM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced May 12, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, a lot of odour, some solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phosphate as P	mg/L	0.002	0.005	3.353	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (E)	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 , Samart Khumphlee

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

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Approved by
Narumon Banchongkit
Supervisor

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Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2359593
Date Received : Jun 12, 2023
Date Reported : Jun 19, 2023
Report Number : 2664601-1

Sample Number 2359593-1
Sampled Date Jun 12, 2023 11:12 AM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced Jun 12, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
BOD (5 days at 20 Degree C)	mg/L	-	2.0	16.7	≤500	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5210 B, part 4500 - O G	Rayong
COD	mg/L	1.5	25	74	≤750	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5220 D	Rayong
Oil & Grease *	mg/L	-	3	<3	≤10	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 5520 B	Rayong
pH (on site) *		-	-	7.5	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	-	-	31.7	≤45	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 2550 B	Rayong
Total Kjeldahl Nitrogen as N	mg/L	-	1.0	9.4	≤100	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-Norg (C), part NH3 (D)	Rayong
Total Suspended Solids Dried at 103-105 degree C	mg/L	-	5	5	≤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 : Paramet Sattayakun ทะเบียนเลขที่ ว-323-จ-9476 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-7830

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

Technical Management
Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

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

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Analysis / Test Report

TESTING
No.0042

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2359593
Date Received : Jun 12, 2023
Date Reported : Jun 19, 2023
Report Number : 2664601-1

- 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
Narumon Banchongkit
Supervisor
ทะเบียนเลขที่ ว-323-จ-9445

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

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Analysis / Test Report

TESTING
No.0009

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2359593
Date Received : Jun 12, 2023
Date Reported : Jun 19, 2023
Report Number : 2664601-2

Sample Number 2359593-1
Sampled Date Jun 12, 2023 11:12 AM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced Jun 13, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Zinc	mg/L	0.003	0.005	1.84	≤5.0	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok

Guideline : Notification of the Industrial Estate Authority of Thailand No.76, B.E. 2560 : Criteria of wastewater characteristic from factory discharge to central wastewater Treatment Plant
Sampling By : Paramet Sattayakun ทะเบียนเลขที่ ว-323-จ-9476 , Samart Khumphlee ทะเบียนเลขที่ ว-204-จ-7830

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

Technical Management
Sawitree Noisangiam
Manager
ทะเบียนเลขที่ ว-204-จ-4709

Approved by
Kanokkorn Anek
Senior Manager
ทะเบียนเลขที่ ว-204-ค-6111

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Analysis / Test Report

Client : Eastern Seaboard Industrial Estate (Rayong) Co., Ltd.
112 Moo 4, Highway 331 Road, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Factory I Monthly
Project Location : ESIE

Lot ID: 2359593
Date Received : Jun 12, 2023
Date Reported : Jun 19, 2023
Report Number : 2664601-3

Sample Number 2359593-1
Sampled Date Jun 12, 2023 11:12 AM
Sample Description Wastewater
Contract ID L_ESIE_022_2550 **Plot** S-40 **Site** BASF (Thai) Limited.
Date Analysis Commenced Jun 16, 2023
Condition of Sample Contained in one amber glass bottle and five plastic bottles. Sample containers comply to pretreatment - preservation standards (APHA / USEPA)
Physical Property Yellow, some odour, solid and turbid

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Phosphate as P	mg/L	0.002	0.005	3.255	No Standard	In-house method based on Standard Methods for the Examination of Water and Wastewater. APHA, AWWA & WEF, 23rd ed., 2017, part 4500-P (E)	Rayong

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

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

Approved by
Dej Changchon
Senior Manager

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707450-1

Sample Number 2372457-1
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศเหนือภายในโรงงาน (GPS 47P 0733191, 1438992)
Measurement Date Jun 24 - Jun 25, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120936

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	61.0	84.2	57.0
12:00 PM - 01:00 PM	58.0	62.8	56.7
01:00 PM - 02:00 PM	61.7	69.7	59.7
02:00 PM - 03:00 PM	57.1	62.4	55.7
03:00 PM - 04:00 PM	57.9	64.4	56.6
04:00 PM - 05:00 PM	58.4	62.5	57.1
05:00 PM - 06:00 PM	57.9	67.2	56.8
06:00 PM - 07:00 PM	57.4	66.3	56.5
07:00 PM - 08:00 PM	56.9	67.8	56.0
08:00 PM - 09:00 PM	56.9	63.2	56.1
09:00 PM - 10:00 PM	56.7	63.3	55.9
10:00 PM - 11:00 PM	56.9	63.5	56.0
11:00 PM - 12:00 AM	57.2	62.5	56.4
12:00 AM - 01:00 AM	57.1	66.5	56.2
01:00 AM - 02:00 AM	57.1	62.4	56.3
02:00 AM - 03:00 AM	57.0	62.4	56.3
03:00 AM - 04:00 AM	57.5	65.6	56.8
04:00 AM - 05:00 AM	57.8	65.1	57.0
05:00 AM - 06:00 AM	57.9	71.3	57.1
06:00 AM - 07:00 AM	57.8	65.7	57.0
07:00 AM - 08:00 AM	57.3	66.0	56.4
08:00 AM - 09:00 AM	57.1	65.5	56.0
09:00 AM - 10:00 AM	57.1	64.5	55.9
10:00 AM - 11:00 AM	57.1	68.2	56.0
Leq Average 24 hrs. (dB(A))	57.9		
Lmax (dB(A))		84.2	
L90 (dB(A))			56.4
Ldn (dB(A))	63.9		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบกวน และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management
Thanita Kulsuriwong
Scientist (4)

Approved by
Supot Salamteh
Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707451-1

Sample Number 2372457-2
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศเหนือภายในโรงงาน (GPS 47P 0733191, 1438992)
Measurement Date Jun 25 - Jun 26, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120936

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	57.5	65.1	56.1
12:00 PM - 01:00 PM	57.5	62.9	56.1
01:00 PM - 02:00 PM	57.5	66.0	56.2
02:00 PM - 03:00 PM	57.8	65.8	56.3
03:00 PM - 04:00 PM	57.7	65.2	56.2
04:00 PM - 05:00 PM	57.9	82.2	56.2
05:00 PM - 06:00 PM	57.3	64.7	56.0
06:00 PM - 07:00 PM	56.9	74.7	55.6
07:00 PM - 08:00 PM	56.4	65.9	55.5
08:00 PM - 09:00 PM	56.9	63.5	56.1
09:00 PM - 10:00 PM	56.9	61.7	56.2
10:00 PM - 11:00 PM	57.0	64.7	56.3
11:00 PM - 12:00 AM	56.7	61.2	56.0
12:00 AM - 01:00 AM	56.9	63.6	56.2
01:00 AM - 02:00 AM	56.9	64.7	56.2
02:00 AM - 03:00 AM	57.1	65.9	56.4
03:00 AM - 04:00 AM	56.9	66.1	56.2
04:00 AM - 05:00 AM	57.0	63.9	56.3
05:00 AM - 06:00 AM	57.3	66.2	56.6
06:00 AM - 07:00 AM	57.4	69.3	56.7
07:00 AM - 08:00 AM	57.1	69.8	56.1
08:00 AM - 09:00 AM	57.7	70.8	56.4
09:00 AM - 10:00 AM	58.3	64.6	57.1
10:00 AM - 11:00 AM	58.7	70.6	57.2
Leq Average 24 hrs. (dB(A))	57.3		
Lmax (dB(A))		82.2	
L90 (dB(A))			56.2
Ldn (dB(A))	63.5		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707452-1

Sample Number 2372457-3
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศเหนือภายในโรงงาน (GPS 47P 0733191, 1438992)
Measurement Date Jun 26 - Jun 27, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120936

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	58.6	74.8	56.6
12:00 PM - 01:00 PM	58.6	66.3	57.0
01:00 PM - 02:00 PM	59.3	64.5	57.7
02:00 PM - 03:00 PM	59.3	82.3	57.7
03:00 PM - 04:00 PM	58.5	71.4	57.1
04:00 PM - 05:00 PM	58.5	63.8	57.1
05:00 PM - 06:00 PM	57.8	67.4	56.6
06:00 PM - 07:00 PM	58.2	65.5	57.0
07:00 PM - 08:00 PM	57.1	64.8	56.1
08:00 PM - 09:00 PM	57.3	63.9	56.3
09:00 PM - 10:00 PM	57.6	73.5	56.5
10:00 PM - 11:00 PM	57.1	62.5	56.3
11:00 PM - 12:00 AM	57.4	61.5	56.5
12:00 AM - 01:00 AM	57.5	65.0	56.5
01:00 AM - 02:00 AM	58.7	66.2	57.5
02:00 AM - 03:00 AM	58.3	66.5	57.2
03:00 AM - 04:00 AM	57.5	65.1	56.7
04:00 AM - 05:00 AM	57.9	64.8	57.2
05:00 AM - 06:00 AM	57.8	63.9	57.0
06:00 AM - 07:00 AM	57.6	67.3	56.8
07:00 AM - 08:00 AM	57.8	64.7	57.0
08:00 AM - 09:00 AM	57.5	64.1	56.6
09:00 AM - 10:00 AM	58.1	63.2	57.0
10:00 AM - 11:00 AM	58.1	79.3	57.1
Leq Average 24 hrs. (dB(A))	58.0		
Lmax (dB(A))		82.3	
L90 (dB(A))			57.0
Ldn (dB(A))	64.3		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707453-1

Sample Number 2372457-4
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศเหนือภายในโรงงาน (GPS 47P 0733191, 1438992)
Measurement Date Jun 27 - Jun 28, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120936

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	57.4	62.7	56.5
12:00 PM - 01:00 PM	57.6	63.1	56.4
01:00 PM - 02:00 PM	58.6	68.7	57.3
02:00 PM - 03:00 PM	58.9	70.1	57.7
03:00 PM - 04:00 PM	57.8	61.8	56.8
04:00 PM - 05:00 PM	56.7	64.5	55.6
05:00 PM - 06:00 PM	57.2	64.5	55.9
06:00 PM - 07:00 PM	57.4	64.1	56.1
07:00 PM - 08:00 PM	56.9	62.6	55.9
08:00 PM - 09:00 PM	57.1	63.0	56.1
09:00 PM - 10:00 PM	57.3	62.4	56.5
10:00 PM - 11:00 PM	57.0	63.0	56.2
11:00 PM - 12:00 AM	57.0	61.8	56.2
12:00 AM - 01:00 AM	56.9	60.9	56.1
01:00 AM - 02:00 AM	57.2	63.1	56.4
02:00 AM - 03:00 AM	57.0	62.4	56.3
03:00 AM - 04:00 AM	56.9	64.5	56.1
04:00 AM - 05:00 AM	57.7	62.5	56.9
05:00 AM - 06:00 AM	57.2	63.4	56.4
06:00 AM - 07:00 AM	57.6	64.7	56.8
07:00 AM - 08:00 AM	57.8	63.0	56.9
08:00 AM - 09:00 AM	57.2	61.5	56.3
09:00 AM - 10:00 AM	57.8	72.1	56.7
10:00 AM - 11:00 AM	57.8	64.1	56.7
Leq Average 24 hrs. (dB(A))	57.4		
Lmax (dB(A))		72.1	
L90 (dB(A))			56.4
Ldn (dB(A))	63.6		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707454-1

Sample Number 2372457-5
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศเหนือภายในโรงงาน (GPS 47P 0733191, 1438992)
Measurement Date Jun 28 - Jun 29, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120936

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	57.9	83.9	56.3
12:00 PM - 01:00 PM	63.3	93.5	57.9
01:00 PM - 02:00 PM	58.2	66.3	57.3
02:00 PM - 03:00 PM	57.6	65.4	56.8
03:00 PM - 04:00 PM	57.5	63.1	56.6
04:00 PM - 05:00 PM	57.2	62.6	56.4
05:00 PM - 06:00 PM	57.2	62.2	56.4
06:00 PM - 07:00 PM	57.1	62.6	56.3
07:00 PM - 08:00 PM	57.0	63.4	56.2
08:00 PM - 09:00 PM	57.4	63.1	56.6
09:00 PM - 10:00 PM	58.1	65.5	57.2
10:00 PM - 11:00 PM	57.5	64.3	56.8
11:00 PM - 12:00 AM	58.2	62.6	57.4
12:00 AM - 01:00 AM	57.9	64.0	57.1
01:00 AM - 02:00 AM	57.6	65.1	56.9
02:00 AM - 03:00 AM	57.3	63.4	56.6
03:00 AM - 04:00 AM	57.2	71.5	56.4
04:00 AM - 05:00 AM	57.6	64.2	56.8
05:00 AM - 06:00 AM	57.9	72.6	57.2
06:00 AM - 07:00 AM	58.0	64.9	57.3
07:00 AM - 08:00 AM	57.7	69.8	56.7
08:00 AM - 09:00 AM	56.9	72.3	56.0
09:00 AM - 10:00 AM	56.8	62.4	55.9
10:00 AM - 11:00 AM	56.7	62.5	55.7
Leq Average 24 hrs. (dB(A))	58.0		
Lmax (dB(A))		93.5	
L90 (dB(A))			56.6
Ldn (dB(A))	64.2		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707455-1

Sample Number 2372457-6
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศเหนือภายในโรงงาน (GPS 47P 0733191, 1438992)
Measurement Date Jun 29 - Jun 30, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120936

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	58.7	76.9	56.4
12:00 PM - 01:00 PM	56.5	74.5	55.5
01:00 PM - 02:00 PM	56.9	60.9	56.1
02:00 PM - 03:00 PM	56.9	61.1	56.1
03:00 PM - 04:00 PM	57.4	61.7	56.5
04:00 PM - 05:00 PM	57.9	62.7	56.8
05:00 PM - 06:00 PM	57.1	63.2	56.1
06:00 PM - 07:00 PM	56.8	63.1	55.8
07:00 PM - 08:00 PM	56.9	62.8	56.1
08:00 PM - 09:00 PM	57.4	62.6	56.6
09:00 PM - 10:00 PM	57.7	63.3	56.9
10:00 PM - 11:00 PM	57.3	65.4	56.5
11:00 PM - 12:00 AM	57.4	63.1	56.6
12:00 AM - 01:00 AM	57.3	62.9	56.5
01:00 AM - 02:00 AM	57.6	64.8	56.8
02:00 AM - 03:00 AM	57.4	61.4	56.6
03:00 AM - 04:00 AM	57.1	61.1	56.4
04:00 AM - 05:00 AM	57.6	62.1	56.7
05:00 AM - 06:00 AM	57.4	63.2	56.6
06:00 AM - 07:00 AM	57.9	63.5	57.2
07:00 AM - 08:00 AM	57.5	67.4	56.5
08:00 AM - 09:00 AM	57.2	64.1	56.2
09:00 AM - 10:00 AM	60.6	84.1	56.4
10:00 AM - 11:00 AM	58.0	64.1	57.0
Leq Average 24 hrs. (dB(A))	57.6		
Lmax (dB(A))		84.1	
L90 (dB(A))			56.5
Ldn (dB(A))	63.9		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707456-1

Sample Number 2372457-7
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศเหนือภายในโรงงาน (GPS 47P 0733191, 1438992)
Measurement Date Jun 30 - Jul 01, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120936

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	57.3	61.6	56.2
12:00 PM - 01:00 PM	57.2	61.5	56.1
01:00 PM - 02:00 PM	58.1	71.2	56.6
02:00 PM - 03:00 PM	57.4	62.5	56.2
03:00 PM - 04:00 PM	57.5	62.8	56.4
04:00 PM - 05:00 PM	57.3	61.7	56.1
05:00 PM - 06:00 PM	56.9	62.9	55.9
06:00 PM - 07:00 PM	56.9	62.8	56.0
07:00 PM - 08:00 PM	56.8	65.2	55.9
08:00 PM - 09:00 PM	56.9	71.1	56.1
09:00 PM - 10:00 PM	57.2	65.1	56.3
10:00 PM - 11:00 PM	56.8	62.7	56.0
11:00 PM - 12:00 AM	56.9	64.8	56.0
12:00 AM - 01:00 AM	56.6	64.7	55.8
01:00 AM - 02:00 AM	57.0	64.2	56.2
02:00 AM - 03:00 AM	63.0	87.5	61.1
03:00 AM - 04:00 AM	58.5	70.0	57.3
04:00 AM - 05:00 AM	58.4	64.4	57.5
05:00 AM - 06:00 AM	58.5	62.3	57.7
06:00 AM - 07:00 AM	58.5	63.7	57.7
07:00 AM - 08:00 AM	58.6	73.8	57.8
08:00 AM - 09:00 AM	57.9	71.5	56.9
09:00 AM - 10:00 AM	57.9	73.6	56.7
10:00 AM - 11:00 AM	57.5	63.6	56.7
Leq Average 24 hrs. (dB(A))	58.0		
Lmax (dB(A))		87.5	
L90 (dB(A))			56.2
Ldn (dB(A))	65.0		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707457-1

Sample Number 2372457-8
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศใต้ภายในโรงงาน (GPS 47P 0733219, 1438820)
Measurement Date Jun 24 - Jun 25, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120937

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	64.4	78.9	63.5
12:00 PM - 01:00 PM	64.4	84.2	63.4
01:00 PM - 02:00 PM	64.4	77.5	63.4
02:00 PM - 03:00 PM	64.2	73.1	63.3
03:00 PM - 04:00 PM	64.7	90.5	63.4
04:00 PM - 05:00 PM	64.3	82.9	63.4
05:00 PM - 06:00 PM	64.3	86.2	63.4
06:00 PM - 07:00 PM	64.1	80.5	63.3
07:00 PM - 08:00 PM	64.1	71.1	63.4
08:00 PM - 09:00 PM	64.1	72.9	63.4
09:00 PM - 10:00 PM	64.1	68.4	63.6
10:00 PM - 11:00 PM	64.1	69.5	63.6
11:00 PM - 12:00 AM	64.2	68.1	63.6
12:00 AM - 01:00 AM	64.3	70.1	63.7
01:00 AM - 02:00 AM	64.2	68.4	63.6
02:00 AM - 03:00 AM	64.2	67.9	63.6
03:00 AM - 04:00 AM	64.3	69.7	63.8
04:00 AM - 05:00 AM	64.3	68.1	63.8
05:00 AM - 06:00 AM	64.3	68.0	63.8
06:00 AM - 07:00 AM	64.2	74.1	63.6
07:00 AM - 08:00 AM	64.1	72.6	63.4
08:00 AM - 09:00 AM	64.0	68.1	63.2
09:00 AM - 10:00 AM	64.0	69.6	63.3
10:00 AM - 11:00 AM	64.0	68.4	63.3
Leq Average 24 hrs. (dB(A))	64.2		
Lmax (dB(A))		90.5	
L90 (dB(A))			63.4
Ldn (dB(A))	70.6		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707458-1

Sample Number 2372457-9
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศใต้ภายในโรงงาน (GPS 47P 0733219, 1438820)
Measurement Date Jun 25 - Jun 26, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120937

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	64.1	69.4	63.4
12:00 PM - 01:00 PM	64.0	68.9	63.3
01:00 PM - 02:00 PM	64.1	90.3	63.3
02:00 PM - 03:00 PM	64.1	77.0	63.4
03:00 PM - 04:00 PM	64.1	69.2	63.3
04:00 PM - 05:00 PM	64.0	70.8	63.2
05:00 PM - 06:00 PM	63.9	68.9	63.2
06:00 PM - 07:00 PM	64.3	71.7	63.6
07:00 PM - 08:00 PM	64.1	71.4	63.5
08:00 PM - 09:00 PM	63.7	68.1	63.2
09:00 PM - 10:00 PM	63.5	68.9	62.9
10:00 PM - 11:00 PM	63.4	67.2	62.9
11:00 PM - 12:00 AM	63.4	67.9	63.0
12:00 AM - 01:00 AM	63.4	67.5	62.9
01:00 AM - 02:00 AM	63.3	69.5	62.8
02:00 AM - 03:00 AM	63.4	67.5	62.9
03:00 AM - 04:00 AM	63.3	67.7	62.8
04:00 AM - 05:00 AM	63.6	67.4	63.0
05:00 AM - 06:00 AM	64.3	74.7	63.8
06:00 AM - 07:00 AM	64.5	80.1	63.9
07:00 AM - 08:00 AM	64.1	75.1	63.5
08:00 AM - 09:00 AM	64.2	79.2	63.4
09:00 AM - 10:00 AM	64.6	88.4	63.5
10:00 AM - 11:00 AM	63.9	70.6	63.2
Leq Average 24 hrs. (dB(A))	63.9		
Lmax (dB(A))		90.3	
L90 (dB(A))			63.2
Ldn (dB(A))	70.1		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707459-1

Sample Number 2372457-10
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางหัวด้านทิศใต้ภายในโรงงาน (GPS 47P 0733219, 1438820)
Measurement Date Jun 26 - Jun 27, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120937

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	64.3	84.4	63.4
12:00 PM - 01:00 PM	64.2	77.1	63.4
01:00 PM - 02:00 PM	64.3	84.7	63.5
02:00 PM - 03:00 PM	64.4	91.4	63.4
03:00 PM - 04:00 PM	64.4	86.9	63.5
04:00 PM - 05:00 PM	64.1	73.8	63.4
05:00 PM - 06:00 PM	64.3	83.0	63.5
06:00 PM - 07:00 PM	64.8	91.6	63.6
07:00 PM - 08:00 PM	64.1	71.1	63.6
08:00 PM - 09:00 PM	64.2	81.9	63.5
09:00 PM - 10:00 PM	64.1	69.3	63.6
10:00 PM - 11:00 PM	64.1	68.1	63.6
11:00 PM - 12:00 AM	64.1	72.6	63.6
12:00 AM - 01:00 AM	64.1	67.5	63.6
01:00 AM - 02:00 AM	64.3	68.5	63.8
02:00 AM - 03:00 AM	64.4	68.0	63.8
03:00 AM - 04:00 AM	64.3	68.1	63.8
04:00 AM - 05:00 AM	64.3	69.2	63.8
05:00 AM - 06:00 AM	64.3	71.7	63.8
06:00 AM - 07:00 AM	64.4	77.4	63.8
07:00 AM - 08:00 AM	64.3	80.0	63.7
08:00 AM - 09:00 AM	64.5	89.6	63.4
09:00 AM - 10:00 AM	64.2	81.6	63.3
10:00 AM - 11:00 AM	64.1	80.9	63.3
Leq Average 24 hrs. (dB(A))	64.3		
Lmax (dB(A))		91.6	
L90 (dB(A))			63.6
Ldn (dB(A))	70.7		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707460-1

Sample Number 2372457-11
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางหัวด้านทิศใต้ภายในโรงงาน (GPS 47P 0733219, 1438820)
Measurement Date Jun 27 - Jun 28, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120937

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	64.1	80.1	63.3
12:00 PM - 01:00 PM	64.1	79.7	63.2
01:00 PM - 02:00 PM	64.2	75.8	63.5
02:00 PM - 03:00 PM	63.9	82.1	63.1
03:00 PM - 04:00 PM	64.4	90.8	63.2
04:00 PM - 05:00 PM	63.9	72.1	63.2
05:00 PM - 06:00 PM	63.9	79.0	63.3
06:00 PM - 07:00 PM	64.0	70.2	63.4
07:00 PM - 08:00 PM	64.3	70.7	63.7
08:00 PM - 09:00 PM	64.2	68.7	63.6
09:00 PM - 10:00 PM	64.2	68.0	63.6
10:00 PM - 11:00 PM	64.2	67.8	63.6
11:00 PM - 12:00 AM	64.2	69.6	63.7
12:00 AM - 01:00 AM	64.3	68.1	63.8
01:00 AM - 02:00 AM	64.1	67.8	63.6
02:00 AM - 03:00 AM	64.2	67.9	63.7
03:00 AM - 04:00 AM	64.3	68.2	63.8
04:00 AM - 05:00 AM	64.3	69.9	63.8
05:00 AM - 06:00 AM	64.4	68.0	63.9
06:00 AM - 07:00 AM	64.3	76.0	63.8
07:00 AM - 08:00 AM	64.2	79.0	63.6
08:00 AM - 09:00 AM	64.3	88.9	63.2
09:00 AM - 10:00 AM	64.0	80.6	63.3
10:00 AM - 11:00 AM	63.8	72.3	63.1
Leq Average 24 hrs. (dB(A))	64.2		
Lmax (dB(A))		90.8	
L90 (dB(A))			63.6
Ldn (dB(A))	70.6		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707461-1

Sample Number 2372457-12
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางหัวด้านทิศใต้ภายในโรงงาน (GPS 47P 0733219, 1438820)
Measurement Date Jun 28 - Jun 29, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120937

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	64.6	79.1	63.2
12:00 PM - 01:00 PM	67.7	94.9	64.9
01:00 PM - 02:00 PM	65.0	92.2	64.0
02:00 PM - 03:00 PM	64.7	86.3	63.8
03:00 PM - 04:00 PM	64.4	72.7	63.8
04:00 PM - 05:00 PM	64.5	74.7	63.8
05:00 PM - 06:00 PM	64.6	76.0	64.1
06:00 PM - 07:00 PM	64.5	71.8	64.0
07:00 PM - 08:00 PM	64.7	71.5	64.2
08:00 PM - 09:00 PM	64.6	69.4	64.1
09:00 PM - 10:00 PM	65.1	87.0	64.1
10:00 PM - 11:00 PM	64.5	68.6	64.0
11:00 PM - 12:00 AM	64.5	68.2	63.9
12:00 AM - 01:00 AM	64.4	70.7	63.8
01:00 AM - 02:00 AM	64.4	68.0	63.8
02:00 AM - 03:00 AM	64.4	68.6	63.9
03:00 AM - 04:00 AM	64.5	72.0	63.9
04:00 AM - 05:00 AM	64.5	68.4	64.0
05:00 AM - 06:00 AM	64.7	77.5	64.2
06:00 AM - 07:00 AM	64.7	72.2	64.1
07:00 AM - 08:00 AM	64.5	70.1	63.8
08:00 AM - 09:00 AM	64.8	91.4	63.5
09:00 AM - 10:00 AM	64.0	80.1	63.2
10:00 AM - 11:00 AM	64.1	76.2	63.3
Leq Average 24 hrs. (dB(A))	64.7		
Lmax (dB(A))		94.9	
L90 (dB(A))			63.9
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 เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707462-1

Sample Number 2372457-13
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางหัวด้านทิศใต้ภายในโรงงาน (GPS 47P 0733219, 1438820)
Measurement Date Jun 29 - Jun 30, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120937

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	64.4	85.1	63.3
12:00 PM - 01:00 PM	63.1	81.0	62.3
01:00 PM - 02:00 PM	63.1	84.3	62.5
02:00 PM - 03:00 PM	63.8	90.8	62.8
03:00 PM - 04:00 PM	63.9	76.8	63.1
04:00 PM - 05:00 PM	64.1	78.1	63.4
05:00 PM - 06:00 PM	64.3	69.5	63.6
06:00 PM - 07:00 PM	64.3	73.6	63.6
07:00 PM - 08:00 PM	64.5	72.0	63.9
08:00 PM - 09:00 PM	64.5	71.6	63.9
09:00 PM - 10:00 PM	64.5	68.3	64.0
10:00 PM - 11:00 PM	64.5	68.8	63.9
11:00 PM - 12:00 AM	64.5	68.7	63.9
12:00 AM - 01:00 AM	64.5	68.4	64.0
01:00 AM - 02:00 AM	64.5	68.3	64.0
02:00 AM - 03:00 AM	64.5	68.3	64.0
03:00 AM - 04:00 AM	64.6	68.4	64.1
04:00 AM - 05:00 AM	64.6	68.8	64.1
05:00 AM - 06:00 AM	64.6	73.3	64.1
06:00 AM - 07:00 AM	64.7	75.8	64.1
07:00 AM - 08:00 AM	64.5	79.9	63.8
08:00 AM - 09:00 AM	64.7	89.5	63.6
09:00 AM - 10:00 AM	64.0	75.1	63.2
10:00 AM - 11:00 AM	64.1	78.0	63.4
Leq Average 24 hrs. (dB(A))	64.3		
Lmax (dB(A))		90.8	
L90 (dB(A))			63.8
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 เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707463-1

Sample Number 2372457-14
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางหัวค้ำนทิศตะวันออกภายในโรงงาน (GPS 47P 0733219, 1438820)
Measurement Date Jun 30 - Jul 01, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120937

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	64.0	78.2	63.1
12:00 PM - 01:00 PM	64.3	79.3	63.4
01:00 PM - 02:00 PM	64.9	76.5	63.8
02:00 PM - 03:00 PM	64.8	71.4	63.5
03:00 PM - 04:00 PM	64.9	90.0	63.5
04:00 PM - 05:00 PM	64.3	78.2	63.3
05:00 PM - 06:00 PM	64.4	76.3	63.5
06:00 PM - 07:00 PM	64.8	86.3	63.6
07:00 PM - 08:00 PM	64.5	72.0	63.9
08:00 PM - 09:00 PM	64.5	69.4	63.9
09:00 PM - 10:00 PM	64.4	70.1	63.9
10:00 PM - 11:00 PM	64.6	83.1	63.9
11:00 PM - 12:00 AM	64.4	68.2	63.9
12:00 AM - 01:00 AM	64.4	70.2	63.9
01:00 AM - 02:00 AM	64.4	69.0	63.9
02:00 AM - 03:00 AM	68.7	87.6	66.8
03:00 AM - 04:00 AM	65.0	71.1	64.3
04:00 AM - 05:00 AM	64.9	69.1	64.4
05:00 AM - 06:00 AM	65.0	72.5	64.5
06:00 AM - 07:00 AM	65.0	73.0	64.3
07:00 AM - 08:00 AM	64.7	79.2	64.0
08:00 AM - 09:00 AM	65.1	89.6	64.0
09:00 AM - 10:00 AM	64.7	78.6	63.9
10:00 AM - 11:00 AM	64.6	69.8	64.0
Leq Average 24 hrs. (dB(A))	64.9		
Lmax (dB(A))		90.0	
L90 (dB(A))			63.9
Ldn (dB(A))	71.7		
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 Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707464-1

Sample Number 2372457-15
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางหัวค้ำนทิศตะวันออกภายในโรงงาน (GPS 47P 0733267, 1438947)
Measurement Date Jun 24 - Jun 25, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 920833

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	54.1	83.8	51.5
12:00 PM - 01:00 PM	52.9	62.0	51.2
01:00 PM - 02:00 PM	56.7	66.0	54.3
02:00 PM - 03:00 PM	52.3	63.6	50.8
03:00 PM - 04:00 PM	54.1	63.9	52.0
04:00 PM - 05:00 PM	53.9	63.6	52.0
05:00 PM - 06:00 PM	52.8	63.7	51.5
06:00 PM - 07:00 PM	52.1	69.8	51.1
07:00 PM - 08:00 PM	52.3	63.2	51.2
08:00 PM - 09:00 PM	51.6	62.1	50.8
09:00 PM - 10:00 PM	51.7	62.3	50.8
10:00 PM - 11:00 PM	52.1	63.0	51.3
11:00 PM - 12:00 AM	52.6	64.1	51.6
12:00 AM - 01:00 AM	52.8	65.7	51.7
01:00 AM - 02:00 AM	53.3	66.2	52.2
02:00 AM - 03:00 AM	52.0	64.9	51.1
03:00 AM - 04:00 AM	51.3	62.5	50.6
04:00 AM - 05:00 AM	52.8	66.9	51.4
05:00 AM - 06:00 AM	52.6	64.8	51.5
06:00 AM - 07:00 AM	52.6	63.2	51.5
07:00 AM - 08:00 AM	51.5	65.2	50.4
08:00 AM - 09:00 AM	53.0	63.5	50.4
09:00 AM - 10:00 AM	51.0	62.9	49.4
10:00 AM - 11:00 AM	51.0	61.3	49.5
Leq Average 24 hrs. (dB(A))	52.8		
Lmax (dB(A))		83.8	
L90 (dB(A))			51.2
Ldn (dB(A))	59.0		
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 Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707465-1

Sample Number 2372457-16
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางหัวค้ำนทิศตะวันออกภายในโรงงาน (GPS 47P 0733267, 1438947)
Measurement Date Jun 25 - Jun 26, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 920833

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	50.5	66.0	48.9
12:00 PM - 01:00 PM	51.3	61.6	49.7
01:00 PM - 02:00 PM	51.5	66.9	49.9
02:00 PM - 03:00 PM	51.5	63.8	49.8
03:00 PM - 04:00 PM	51.4	62.5	49.8
04:00 PM - 05:00 PM	51.5	65.4	49.9
05:00 PM - 06:00 PM	51.6	66.7	50.1
06:00 PM - 07:00 PM	54.3	82.1	51.1
07:00 PM - 08:00 PM	52.2	63.9	50.8
08:00 PM - 09:00 PM	49.9	61.5	49.0
09:00 PM - 10:00 PM	49.8	66.2	49.2
10:00 PM - 11:00 PM	51.0	65.6	50.2
11:00 PM - 12:00 AM	51.3	66.5	50.6
12:00 AM - 01:00 AM	50.9	64.5	50.2
01:00 AM - 02:00 AM	50.0	65.2	49.3
02:00 AM - 03:00 AM	49.7	66.5	48.9
03:00 AM - 04:00 AM	49.6	60.4	49.0
04:00 AM - 05:00 AM	50.3	66.0	49.7
05:00 AM - 06:00 AM	51.8	74.1	50.5
06:00 AM - 07:00 AM	52.8	68.8	51.6
07:00 AM - 08:00 AM	52.7	74.3	51.2
08:00 AM - 09:00 AM	54.2	74.6	52.7
09:00 AM - 10:00 AM	54.8	63.6	53.2
10:00 AM - 11:00 AM	55.2	67.6	53.1
Leq Average 24 hrs. (dB(A))	52.0		
Lmax (dB(A))		82.1	
L90 (dB(A))			49.9
Ldn (dB(A))	57.6		
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 Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707466-1

Sample Number 2372457-17
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางหัวค้ำนทิศตะวันออกภายในโรงงาน (GPS 47P 0733267, 1438947)
Measurement Date Jun 26 - Jun 27, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 920833

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	53.6	64.8	52.0
12:00 PM - 01:00 PM	54.8	64.9	52.6
01:00 PM - 02:00 PM	56.0	66.7	53.8
02:00 PM - 03:00 PM	55.6	73.9	53.5
03:00 PM - 04:00 PM	55.2	64.1	53.3
04:00 PM - 05:00 PM	54.6	65.7	52.8
05:00 PM - 06:00 PM	54.4	69.0	52.6
06:00 PM - 07:00 PM	55.1	66.4	53.5
07:00 PM - 08:00 PM	53.7	66.7	52.4
08:00 PM - 09:00 PM	54.1	72.3	52.7
09:00 PM - 10:00 PM	54.0	65.2	52.7
10:00 PM - 11:00 PM	53.0	70.6	52.0
11:00 PM - 12:00 AM	54.2	68.3	52.7
12:00 AM - 01:00 AM	53.0	64.8	51.8
01:00 AM - 02:00 AM	55.1	63.4	52.8
02:00 AM - 03:00 AM	53.1	62.6	51.8
03:00 AM - 04:00 AM	51.9	66.3	51.3
04:00 AM - 05:00 AM	52.7	63.2	51.5
05:00 AM - 06:00 AM	52.1	61.0	51.1
06:00 AM - 07:00 AM	52.4	65.1	51.3
07:00 AM - 08:00 AM	52.3	64.5	51.1
08:00 AM - 09:00 AM	53.5	69.4	51.7
09:00 AM - 10:00 AM	55.4	66.9	54.0
10:00 AM - 11:00 AM	55.2	66.9	53.8
Leq Average 24 hrs. (dB(A))	54.1		
Lmax (dB(A))		73.9	
L90 (dB(A))			52.6
Ldn (dB(A))	59.8		
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 Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707467-1

Sample Number	2372457-18
Parameter	Noise (Leq 24 hrs.)
Location	กึ่งกลางหัวด้านทิศตะวันออกภายในโรงงาน (GPS 47P 0733267, 1438947)
Measurement Date	Jun 27 - Jun 28, 2023
Measurement by	Apichart Wilars
Sound Level meter	Serial No. 920833

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	53.9	66.3	52.7
12:00 PM - 01:00 PM	54.1	67.0	52.6
01:00 PM - 02:00 PM	56.1	73.7	53.9
02:00 PM - 03:00 PM	55.4	68.2	53.5
03:00 PM - 04:00 PM	53.1	65.9	51.7
04:00 PM - 05:00 PM	51.9	62.2	50.8
05:00 PM - 06:00 PM	52.3	62.1	51.2
06:00 PM - 07:00 PM	52.7	64.0	51.6
07:00 PM - 08:00 PM	52.3	64.6	51.3
08:00 PM - 09:00 PM	53.0	64.6	52.0
09:00 PM - 10:00 PM	53.1	65.0	52.0
10:00 PM - 11:00 PM	52.2	66.9	51.1
11:00 PM - 12:00 AM	52.8	62.0	51.7
12:00 AM - 01:00 AM	52.0	63.2	51.0
01:00 AM - 02:00 AM	52.6	63.1	51.5
02:00 AM - 03:00 AM	51.6	65.1	50.9
03:00 AM - 04:00 AM	51.2	63.8	50.6
04:00 AM - 05:00 AM	52.3	62.3	51.2
05:00 AM - 06:00 AM	51.7	66.1	50.8
06:00 AM - 07:00 AM	52.8	68.3	51.5
07:00 AM - 08:00 AM	52.8	66.1	51.3
08:00 AM - 09:00 AM	53.0	72.2	51.5
09:00 AM - 10:00 AM	54.3	71.3	53.0
10:00 AM - 11:00 AM	54.3	66.7	52.7
Leq Average 24 hrs. (dB(A))	53.1		
Lmax (dB(A))		73.7	
L90 (dB(A))			51.5
Ldn (dB(A))	58.8		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707468-1

Sample Number	2372457-19
Parameter	Noise (Leq 24 hrs.)
Location	กึ่งกลางหัวด้านทิศตะวันออกภายในโรงงาน (GPS 47P 0733267, 1438947)
Measurement Date	Jun 28 - Jun 29, 2023
Measurement by	Apichart Wilars
Sound Level meter	Serial No. 920833

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	53.7	76.1	52.1
12:00 PM - 01:00 PM	63.7	94.9	57.0
01:00 PM - 02:00 PM	54.6	62.7	53.5
02:00 PM - 03:00 PM	53.3	76.1	52.2
03:00 PM - 04:00 PM	52.8	65.1	51.7
04:00 PM - 05:00 PM	52.1	62.4	51.2
05:00 PM - 06:00 PM	51.7	64.7	50.7
06:00 PM - 07:00 PM	51.9	66.4	51.0
07:00 PM - 08:00 PM	51.6	64.0	50.8
08:00 PM - 09:00 PM	52.4	64.8	51.5
09:00 PM - 10:00 PM	53.1	68.4	51.9
10:00 PM - 11:00 PM	53.0	66.5	52.0
11:00 PM - 12:00 AM	53.9	67.1	52.6
12:00 AM - 01:00 AM	52.5	61.6	51.5
01:00 AM - 02:00 AM	53.1	71.8	52.0
02:00 AM - 03:00 AM	51.7	64.8	50.9
03:00 AM - 04:00 AM	51.5	70.6	50.5
04:00 AM - 05:00 AM	52.4	62.7	51.2
05:00 AM - 06:00 AM	52.1	65.4	51.0
06:00 AM - 07:00 AM	52.9	64.4	51.7
07:00 AM - 08:00 AM	51.6	64.6	50.6
08:00 AM - 09:00 AM	52.2	66.2	50.9
09:00 AM - 10:00 AM	52.0	62.7	50.9
10:00 AM - 11:00 AM	52.7	66.4	51.6
Leq Average 24 hrs. (dB(A))	54.4		
Lmax (dB(A))		94.9	
L90 (dB(A))			51.5
Ldn (dB(A))	59.5		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707469-1

Sample Number	2372457-20
Parameter	Noise (Leq 24 hrs.)
Location	กึ่งกลางหัวด้านทิศตะวันออกภายในโรงงาน (GPS 47P 0733267, 1438947)
Measurement Date	Jun 29 - Jun 30, 2023
Measurement by	Apichart Wilars
Sound Level meter	Serial No. 920833

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	59.1	75.8	52.7
12:00 PM - 01:00 PM	52.9	70.9	51.8
01:00 PM - 02:00 PM	53.8	67.8	52.7
02:00 PM - 03:00 PM	53.8	70.4	51.9
03:00 PM - 04:00 PM	53.4	65.8	52.1
04:00 PM - 05:00 PM	52.9	66.7	51.7
05:00 PM - 06:00 PM	52.2	62.0	51.2
06:00 PM - 07:00 PM	52.0	62.2	51.0
07:00 PM - 08:00 PM	51.9	64.6	51.1
08:00 PM - 09:00 PM	53.4	72.9	52.4
09:00 PM - 10:00 PM	53.5	62.4	52.5
10:00 PM - 11:00 PM	52.3	68.7	51.3
11:00 PM - 12:00 AM	52.8	64.6	51.7
12:00 AM - 01:00 AM	51.8	63.8	50.9
01:00 AM - 02:00 AM	52.7	68.4	51.6
02:00 AM - 03:00 AM	51.9	62.6	51.2
03:00 AM - 04:00 AM	52.8	64.0	52.0
04:00 AM - 05:00 AM	53.8	70.0	52.5
05:00 AM - 06:00 AM	52.5	68.3	51.5
06:00 AM - 07:00 AM	53.8	66.0	52.5
07:00 AM - 08:00 AM	53.5	66.6	52.1
08:00 AM - 09:00 AM	53.3	62.6	51.9
09:00 AM - 10:00 AM	53.9	69.7	52.3
10:00 AM - 11:00 AM	55.9	62.9	54.8
Leq Average 24 hrs. (dB(A))	53.7		
Lmax (dB(A))		75.8	
L90 (dB(A))			51.9
Ldn (dB(A))	59.4		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707470-1

Sample Number	2372457-21
Parameter	Noise (Leq 24 hrs.)
Location	กึ่งกลางหัวด้านทิศตะวันออกภายในโรงงาน (GPS 47P 0733267, 1438947)
Measurement Date	Jun 30 - Jul 01, 2023
Measurement by	Apichart Wilars
Sound Level meter	Serial No. 920833

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	53.3	65.5	52.2
12:00 PM - 01:00 PM	53.2	67.9	52.0
01:00 PM - 02:00 PM	55.2	72.4	53.3
02:00 PM - 03:00 PM	54.0	63.8	52.7
03:00 PM - 04:00 PM	53.9	70.3	52.5
04:00 PM - 05:00 PM	52.4	62.8	51.4
05:00 PM - 06:00 PM	51.7	66.1	50.7
06:00 PM - 07:00 PM	52.2	60.3	51.2
07:00 PM - 08:00 PM	51.8	63.7	50.8
08:00 PM - 09:00 PM	52.8	65.0	51.8
09:00 PM - 10:00 PM	52.9	64.1	51.8
10:00 PM - 11:00 PM	52.5	62.9	51.5
11:00 PM - 12:00 AM	52.2	64.3	51.2
12:00 AM - 01:00 AM	51.0	65.5	50.3
01:00 AM - 02:00 AM	52.2	60.7	51.1
02:00 AM - 03:00 AM	59.7	72.1	56.9
03:00 AM - 04:00 AM	53.5	70.3	51.9
04:00 AM - 05:00 AM	53.2	64.0	52.3
05:00 AM - 06:00 AM	52.4	61.0	51.7
06:00 AM - 07:00 AM	53.3	67.5	52.1
07:00 AM - 08:00 AM	53.1	68.8	51.8
08:00 AM - 09:00 AM	53.5	69.4	52.0
09:00 AM - 10:00 AM	53.3	66.0	52.1
10:00 AM - 11:00 AM	52.9	66.0	51.9
Leq Average 24 hrs. (dB(A))	53.6		
Lmax (dB(A))		72.4	
L90 (dB(A))			51.8
Ldn (dB(A))	60.5		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707471-1

Sample Number 2372457-22
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศตะวันตกภายในโรงงาน (GPS 47P 0733052, 1438860)
Measurement Date Jun 24 - Jun 25, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120938

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	62.2	82.9	58.4
12:00 PM - 01:00 PM	60.0	79.1	58.2
01:00 PM - 02:00 PM	60.3	73.0	58.4
02:00 PM - 03:00 PM	59.2	73.7	57.1
03:00 PM - 04:00 PM	59.8	77.5	58.0
04:00 PM - 05:00 PM	60.4	73.2	58.5
05:00 PM - 06:00 PM	61.5	73.5	59.0
06:00 PM - 07:00 PM	60.6	78.6	58.5
07:00 PM - 08:00 PM	61.2	78.2	58.6
08:00 PM - 09:00 PM	60.9	75.5	58.6
09:00 PM - 10:00 PM	60.6	78.6	58.6
10:00 PM - 11:00 PM	60.1	76.3	58.5
11:00 PM - 12:00 AM	60.0	78.9	58.5
12:00 AM - 01:00 AM	60.4	80.4	58.6
01:00 AM - 02:00 AM	59.4	73.9	58.3
02:00 AM - 03:00 AM	59.4	75.7	58.5
03:00 AM - 04:00 AM	59.5	73.1	58.5
04:00 AM - 05:00 AM	59.6	70.6	58.6
05:00 AM - 06:00 AM	59.5	67.4	58.6
06:00 AM - 07:00 AM	59.9	75.1	58.6
07:00 AM - 08:00 AM	61.2	80.2	58.7
08:00 AM - 09:00 AM	60.8	71.7	58.5
09:00 AM - 10:00 AM	60.1	76.4	58.2
10:00 AM - 11:00 AM	60.3	75.1	58.1
Leq Average 24 hrs. (dB(A))	60.4		
Lmax (dB(A))		82.9	
L90 (dB(A))			58.5
Ldn (dB(A))	66.3		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707472-1

Sample Number 2372457-23
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศตะวันตกภายในโรงงาน (GPS 47P 0733052, 1438860)
Measurement Date Jun 25 - Jun 26, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120938

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	59.9	72.6	58.1
12:00 PM - 01:00 PM	60.1	71.9	58.3
01:00 PM - 02:00 PM	60.3	75.6	58.1
02:00 PM - 03:00 PM	60.0	73.2	58.0
03:00 PM - 04:00 PM	59.8	67.9	58.1
04:00 PM - 05:00 PM	60.0	71.4	58.2
05:00 PM - 06:00 PM	60.4	71.0	58.7
06:00 PM - 07:00 PM	60.3	76.0	58.0
07:00 PM - 08:00 PM	62.1	87.6	58.3
08:00 PM - 09:00 PM	60.2	77.4	58.4
09:00 PM - 10:00 PM	60.2	74.7	58.7
10:00 PM - 11:00 PM	59.9	71.6	58.6
11:00 PM - 12:00 AM	59.6	70.2	58.5
12:00 AM - 01:00 AM	59.8	75.2	58.6
01:00 AM - 02:00 AM	59.5	74.0	58.3
02:00 AM - 03:00 AM	59.5	77.2	58.5
03:00 AM - 04:00 AM	59.3	75.5	58.4
04:00 AM - 05:00 AM	59.2	67.4	58.4
05:00 AM - 06:00 AM	59.9	73.1	58.7
06:00 AM - 07:00 AM	60.5	77.1	58.9
07:00 AM - 08:00 AM	62.0	81.1	59.7
08:00 AM - 09:00 AM	62.5	74.7	59.3
09:00 AM - 10:00 AM	65.5	72.9	60.3
10:00 AM - 11:00 AM	66.5	77.3	65.5
Leq Average 24 hrs. (dB(A))	61.2		
Lmax (dB(A))		87.6	
L90 (dB(A))			58.4
Ldn (dB(A))	66.5		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707473-1

Sample Number 2372457-24
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศตะวันตกภายในโรงงาน (GPS 47P 0733052, 1438860)
Measurement Date Jun 26 - Jun 27, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120938

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	60.3	74.1	58.5
12:00 PM - 01:00 PM	60.7	81.9	58.4
01:00 PM - 02:00 PM	60.4	75.7	58.6
02:00 PM - 03:00 PM	60.7	82.0	58.4
03:00 PM - 04:00 PM	60.6	78.7	58.5
04:00 PM - 05:00 PM	60.9	75.6	58.7
05:00 PM - 06:00 PM	62.2	84.9	59.0
06:00 PM - 07:00 PM	61.8	79.4	59.0
07:00 PM - 08:00 PM	62.1	76.7	59.3
08:00 PM - 09:00 PM	61.2	76.0	58.6
09:00 PM - 10:00 PM	60.4	79.7	58.3
10:00 PM - 11:00 PM	60.0	72.9	58.3
11:00 PM - 12:00 AM	59.4	74.3	58.0
12:00 AM - 01:00 AM	59.3	75.3	58.0
01:00 AM - 02:00 AM	59.4	71.0	58.3
02:00 AM - 03:00 AM	59.3	66.6	58.3
03:00 AM - 04:00 AM	59.0	68.6	58.1
04:00 AM - 05:00 AM	59.6	72.9	58.7
05:00 AM - 06:00 AM	60.7	78.2	58.9
06:00 AM - 07:00 AM	60.9	73.7	59.4
07:00 AM - 08:00 AM	62.4	75.2	60.1
08:00 AM - 09:00 AM	61.5	84.6	59.0
09:00 AM - 10:00 AM	65.1	72.3	63.7
10:00 AM - 11:00 AM	67.7	79.4	67.0
Leq Average 24 hrs. (dB(A))	61.6		
Lmax (dB(A))		84.9	
L90 (dB(A))			58.6
Ldn (dB(A))	66.7		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707474-1

Sample Number 2372457-25
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศตะวันตกภายในโรงงาน (GPS 47P 0733052, 1438860)
Measurement Date Jun 27 - Jun 28, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120938

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	66.3	84.7	65.4
12:00 PM - 01:00 PM	59.8	80.8	57.8
01:00 PM - 02:00 PM	66.7	80.8	65.8
02:00 PM - 03:00 PM	67.8	81.5	67.0
03:00 PM - 04:00 PM	62.4	71.7	60.2
04:00 PM - 05:00 PM	60.8	74.5	59.0
05:00 PM - 06:00 PM	61.6	73.7	59.1
06:00 PM - 07:00 PM	61.0	74.0	58.9
07:00 PM - 08:00 PM	62.1	76.2	59.6
08:00 PM - 09:00 PM	62.0	76.7	58.9
09:00 PM - 10:00 PM	59.9	74.5	58.5
10:00 PM - 11:00 PM	59.8	71.7	58.5
11:00 PM - 12:00 AM	60.0	78.6	58.6
12:00 AM - 01:00 AM	59.6	75.4	58.4
01:00 AM - 02:00 AM	59.7	77.0	58.5
02:00 AM - 03:00 AM	59.3	63.3	58.6
03:00 AM - 04:00 AM	59.5	66.0	58.7
04:00 AM - 05:00 AM	59.4	66.1	58.7
05:00 AM - 06:00 AM	60.5	74.8	58.9
06:00 AM - 07:00 AM	61.0	72.3	59.5
07:00 AM - 08:00 AM	62.2	79.2	59.8
08:00 AM - 09:00 AM	60.8	78.6	58.9
09:00 AM - 10:00 AM	60.3	75.9	58.6
10:00 AM - 11:00 AM	60.2	74.8	58.4
Leq Average 24 hrs. (dB(A))	62.2		
Lmax (dB(A))		84.7	
L90 (dB(A))			58.9
Ldn (dB(A))	66.9		
Standard (dB(A))	70	115	

Reference Method : ISO1996-1 and 1996-2
Standard : 1. ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติ ฉบับที่ 15 (พ.ศ. 2540) เรื่องกำหนดมาตรฐานระดับเสียงโดยทั่วไป
2. ประกาศกระทรวงอุตสาหกรรม เรื่องกำหนดค่าระดับเสียงการบวก และระดับเสียงที่เกิดจากการประกอบกิจการโรงงาน พ.ศ. 2548
Remark : The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707475-1

Sample Number 2372457-26
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศตะวันตกภายในโรงงาน (GPS 47P 0733052, 1438860)
Measurement Date Jun 28 - Jun 29, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120938

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	60.1	80.6	58.3
12:00 PM - 01:00 PM	67.2	95.2	62.1
01:00 PM - 02:00 PM	61.5	69.6	60.1
02:00 PM - 03:00 PM	62.2	81.3	60.8
03:00 PM - 04:00 PM	60.7	72.0	59.4
04:00 PM - 05:00 PM	61.3	76.3	59.7
05:00 PM - 06:00 PM	61.7	72.6	60.2
06:00 PM - 07:00 PM	61.6	75.8	59.7
07:00 PM - 08:00 PM	61.7	76.3	59.7
08:00 PM - 09:00 PM	61.7	81.6	59.5
09:00 PM - 10:00 PM	60.8	75.2	59.1
10:00 PM - 11:00 PM	60.2	79.3	58.7
11:00 PM - 12:00 AM	59.7	74.0	58.7
12:00 AM - 01:00 AM	59.8	73.2	58.6
01:00 AM - 02:00 AM	59.5	70.3	58.7
02:00 AM - 03:00 AM	59.3	66.8	58.5
03:00 AM - 04:00 AM	59.5	72.0	58.6
04:00 AM - 05:00 AM	59.7	68.2	58.8
05:00 AM - 06:00 AM	60.5	70.2	59.2
06:00 AM - 07:00 AM	61.2	72.4	59.6
07:00 AM - 08:00 AM	62.6	81.4	60.3
08:00 AM - 09:00 AM	61.3	73.1	59.3
09:00 AM - 10:00 AM	60.6	78.5	58.8
10:00 AM - 11:00 AM	60.0	78.7	58.5
Leq Average 24 hrs. (dB(A))	61.4		
Lmax (dB(A))		95.2	
L90 (dB(A))			59.2
Ldn (dB(A))	66.8		
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 Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707476-1

Sample Number 2372457-27
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศตะวันตกภายในโรงงาน (GPS 47P 0733052, 1438860)
Measurement Date Jun 29 - Jun 30, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120938

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	62.3	84.4	58.9
12:00 PM - 01:00 PM	62.6	81.1	59.5
01:00 PM - 02:00 PM	66.5	80.9	65.1
02:00 PM - 03:00 PM	66.3	83.7	65.7
03:00 PM - 04:00 PM	64.1	72.9	62.8
04:00 PM - 05:00 PM	61.3	76.1	59.2
05:00 PM - 06:00 PM	62.0	74.1	59.9
06:00 PM - 07:00 PM	61.6	75.4	59.9
07:00 PM - 08:00 PM	61.8	75.1	60.0
08:00 PM - 09:00 PM	62.0	77.0	59.9
09:00 PM - 10:00 PM	60.7	75.1	59.3
10:00 PM - 11:00 PM	60.5	74.9	59.1
11:00 PM - 12:00 AM	59.9	71.4	59.0
12:00 AM - 01:00 AM	60.2	75.3	58.9
01:00 AM - 02:00 AM	59.7	69.2	58.8
02:00 AM - 03:00 AM	59.6	67.6	58.8
03:00 AM - 04:00 AM	59.2	68.5	58.3
04:00 AM - 05:00 AM	59.3	71.7	58.3
05:00 AM - 06:00 AM	60.4	74.9	59.0
06:00 AM - 07:00 AM	61.1	75.4	59.6
07:00 AM - 08:00 AM	62.8	78.1	60.1
08:00 AM - 09:00 AM	62.4	77.6	60.1
09:00 AM - 10:00 AM	62.1	81.3	58.6
10:00 AM - 11:00 AM	68.8	78.9	66.1
Leq Average 24 hrs. (dB(A))	62.8		
Lmax (dB(A))		84.4	
L90 (dB(A))			59.3
Ldn (dB(A))	67.2		
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 Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

TESTING
No.0042

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372457
Date Received : Jul 03, 2023
Date Reported : Jul 05, 2023
Report Number: 2707477-1

Sample Number 2372457-28
Parameter Noise (Leq 24 hrs.)
Location กึ่งกลางรั้วด้านทิศตะวันตกภายในโรงงาน (GPS 47P 0733052, 1438860)
Measurement Date Jun 30 - Jul 01, 2023
Measurement by Apichart Wilars
Sound Level meter Serial No. 1120938

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
11:00 AM - 12:00 PM	60.5	82.9	58.1
12:00 PM - 01:00 PM	60.0	81.1	58.0
01:00 PM - 02:00 PM	60.8	87.8	58.2
02:00 PM - 03:00 PM	60.7	75.4	58.4
03:00 PM - 04:00 PM	60.5	71.8	58.5
04:00 PM - 05:00 PM	61.4	78.5	59.5
05:00 PM - 06:00 PM	62.5	73.7	60.5
06:00 PM - 07:00 PM	61.5	76.6	59.5
07:00 PM - 08:00 PM	62.3	80.4	59.9
08:00 PM - 09:00 PM	61.8	77.1	59.5
09:00 PM - 10:00 PM	61.2	80.4	59.4
10:00 PM - 11:00 PM	60.6	76.2	59.0
11:00 PM - 12:00 AM	60.7	81.0	59.0
12:00 AM - 01:00 AM	60.2	71.9	59.0
01:00 AM - 02:00 AM	60.6	75.1	58.9
02:00 AM - 03:00 AM	63.6	84.9	60.3
03:00 AM - 04:00 AM	60.7	69.4	59.7
04:00 AM - 05:00 AM	60.5	78.1	59.5
05:00 AM - 06:00 AM	62.0	92.4	59.4
06:00 AM - 07:00 AM	61.1	71.6	59.8
07:00 AM - 08:00 AM	62.6	80.5	60.4
08:00 AM - 09:00 AM	61.8	74.0	59.4
09:00 AM - 10:00 AM	62.0	81.0	59.3
10:00 AM - 11:00 AM	61.7	80.5	59.5
Leq Average 24 hrs. (dB(A))	61.4		
Lmax (dB(A))		92.4	
L90 (dB(A))			59.4
Ldn (dB(A))	67.7		
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 Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333240
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number: 2611749-1

Sample Number 2333240-1
Parameter Noise (Leq 12 hrs.)
Location Packing (1st Floor)
Measurement Date Mar 27, 2023
Measurement by Sawai Tonpho

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:42 PM - 09:42 PM	73.7	89.4	71.8
09:42 PM - 10:42 PM	73.7	80.6	72.3
10:42 PM - 11:42 PM	73.3	84.0	71.7
11:42 PM - 12:42 AM	73.1	84.4	62.1
12:42 AM - 01:42 AM	72.1	91.0	62.0
01:42 AM - 02:42 AM	73.8	83.4	72.6
02:42 AM - 03:42 AM	73.3	84.0	72.1
03:42 AM - 04:42 AM	73.5	85.3	72.3
04:42 AM - 05:42 AM	73.4	85.1	72.3
05:42 AM - 06:42 AM	73.6	85.9	72.5
06:42 AM - 07:42 AM	72.2	84.3	62.5
07:42 AM - 08:42 AM	73.8	88.9	62.6
Leq Average 12 hrs. (dB(A))	73.3		
Lmax (dB(A))		91.0	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management Thanita Kulsuriwong, Scientist (4)
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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333240
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number: 2611750-1

Sample Number 2333240-2
Parameter Noise (Leq 12 hrs.)
Location Band Dryer Area (2nd Floor)
Measurement Date Mar 27, 2023
Measurement by Sawai Tonpho

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:45 PM - 09:45 PM	90.1	92.4	89.6
09:45 PM - 10:45 PM	90.1	92.6	89.6
10:45 PM - 11:45 PM	90.2	92.6	89.6
11:45 PM - 12:45 AM	90.2	92.8	89.7
12:45 AM - 01:45 AM	90.2	92.6	89.7
01:45 AM - 02:45 AM	90.3	92.5	89.7
02:45 AM - 03:45 AM	90.3	92.9	89.7
03:45 AM - 04:45 AM	90.3	92.5	89.7
04:45 AM - 05:45 AM	90.3	92.5	89.7
05:45 AM - 06:45 AM	90.4	92.7	89.8
06:45 AM - 07:45 AM	90.3	92.8	89.8
07:45 AM - 08:45 AM	90.3	92.6	89.7
Leq Average 12 hrs. (dB(A))	90.3		
Lmax (dB(A))		92.9	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333240
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number: 2611751-1

Sample Number 2333240-3
Parameter Noise (Leq 12 hrs.)
Location Polybelt Area (3rd Floor)
Measurement Date Mar 27, 2023
Measurement by Sawai Tonpho

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:11 AM - 09:11 AM	80.6	84.9	80.4
09:11 AM - 10:11 AM	80.6	84.8	80.4
10:11 AM - 11:11 AM	80.9	94.2	80.3
11:11 AM - 12:11 PM	80.5	84.7	80.3
12:11 PM - 01:11 PM	80.6	84.7	80.4
01:11 PM - 02:11 PM	80.6	84.7	80.3
02:11 PM - 03:11 PM	80.6	84.7	80.4
03:11 PM - 04:11 PM	80.6	84.9	80.4
04:11 PM - 05:11 PM	80.6	84.7	80.4
05:11 PM - 06:11 PM	80.7	84.8	80.5
06:11 PM - 07:11 PM	80.5	84.6	80.3
07:11 PM - 08:11 PM	80.8	94.1	80.2
Leq Average 12 hrs. (dB(A))	80.6		
Lmax (dB(A))		94.2	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management Thanita Kulsuriwong, Scientist (4)
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Client : BASF (Thai) Limited
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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333240
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number: 2611752-1

Sample Number 2333240-4
Parameter Noise (Leq 12 hrs.)
Location Extruder 2 (2nd Floor) ชั้นลอย
Measurement Date Mar 27, 2023
Measurement by Sawai Tonpho

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:15 AM - 09:15 AM	88.8	90.9	88.2
09:15 AM - 10:15 AM	88.8	92.0	88.2
10:15 AM - 11:15 AM	88.7	90.8	88.0
11:15 AM - 12:15 PM	88.7	93.4	88.0
12:15 PM - 01:15 PM	89.1	92.6	87.7
01:15 PM - 02:15 PM	88.8	92.8	87.6
02:15 PM - 03:15 PM	88.8	92.4	87.6
03:15 PM - 04:15 PM	89.0	92.4	87.7
04:15 PM - 05:15 PM	88.9	92.8	87.7
05:15 PM - 06:15 PM	89.1	92.6	87.8
06:15 PM - 07:15 PM	88.9	92.3	87.6
07:15 PM - 08:15 PM	88.7	92.1	87.4
Leq Average 12 hrs. (dB(A))	88.9		
Lmax (dB(A))		93.4	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333240
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number: 2611753-1

Sample Number 2333240-5
Parameter Noise (Leq 12 hrs.)
Location Product Surge Tank (2nd Floor)
Measurement Date Mar 27, 2023
Measurement by Sawai Tonpho

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:49 PM - 09:49 PM	85.3	88.1	84.7
09:49 PM - 10:49 PM	85.3	90.4	84.7
10:49 PM - 11:49 PM	85.3	88.1	84.7
11:49 PM - 12:49 AM	85.4	88.1	84.8
12:49 AM - 01:49 AM	85.3	88.4	84.7
01:49 AM - 02:49 AM	85.4	88.3	84.8
02:49 AM - 03:49 AM	85.5	88.3	84.9
03:49 AM - 04:49 AM	85.5	88.4	84.9
04:49 AM - 05:49 AM	85.4	88.3	84.8
05:49 AM - 06:49 AM	85.5	88.6	84.9
06:49 AM - 07:49 AM	85.4	88.3	84.8
07:49 AM - 08:49 AM	85.4	98.9	84.8
Leq Average 12 hrs. (dB(A))	85.4		
Lmax (dB(A))		98.9	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333240
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number: 2611754-1

Sample Number 2333240-6
Parameter Noise (Leq 12 hrs.)
Location Sifter room (3rd Floor)
Measurement Date Mar 27, 2023
Measurement by Sawai Tonpho

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:13 AM - 09:13 AM	84.4	86.0	84.2
09:13 AM - 10:13 AM	84.4	86.0	84.3
10:13 AM - 11:13 AM	84.6	94.1	84.3
11:13 AM - 12:13 PM	84.5	86.0	84.3
12:13 PM - 01:13 PM	84.6	86.0	84.4
01:13 PM - 02:13 PM	84.7	86.1	84.5
02:13 PM - 03:13 PM	84.6	86.1	84.5
03:13 PM - 04:13 PM	84.5	86.0	84.3
04:13 PM - 05:13 PM	84.3	85.9	84.2
05:13 PM - 06:13 PM	84.3	85.8	84.2
06:13 PM - 07:13 PM	84.4	85.9	84.2
07:13 PM - 08:13 PM	84.2	85.7	84.0
Leq Average 12 hrs. (dB(A))	84.5		
Lmax (dB(A))		94.1	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333240
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number: 2611755-1

Sample Number 2333240-7
Parameter Noise (Leq 12 hrs.)
Location Rotex SZ 1080 (3rd Floor)
Measurement Date Mar 27, 2023
Measurement by Sawai Tonpho

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:16 AM - 09:16 AM	82.8	90.4	81.9
09:16 AM - 10:16 AM	82.8	87.8	81.8
10:16 AM - 11:16 AM	82.8	92.3	81.8
11:16 AM - 12:16 PM	82.7	88.3	81.8
12:16 PM - 01:16 PM	82.7	88.1	81.8
01:16 PM - 02:16 PM	82.7	87.5	81.9
02:16 PM - 03:16 PM	82.5	87.0	81.8
03:16 PM - 04:16 PM	82.7	87.5	81.9
04:16 PM - 05:16 PM	83.0	86.9	82.2
05:16 PM - 06:16 PM	83.2	86.9	82.5
06:16 PM - 07:16 PM	82.6	88.2	81.7
07:16 PM - 08:16 PM	82.5	88.1	81.6
Leq Average 12 hrs. (dB(A))	82.8		
Lmax (dB(A))		92.3	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333240
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number: 2611756-1

Sample Number 2333240-8
Parameter Noise (Leq 12 hrs.)
Location K Tron PC1060 (3rd Floor)
Measurement Date Mar 27, 2023
Measurement by Sawai Tonpho

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:07 AM - 09:07 AM	84.7	99.7	79.5
09:07 AM - 10:07 AM	84.9	99.6	80.0
10:07 AM - 11:07 AM	84.8	99.6	80.0
11:07 AM - 12:07 PM	84.8	99.6	80.2
12:07 PM - 01:07 PM	84.8	99.5	80.3
01:07 PM - 02:07 PM	84.8	99.6	80.1
02:07 PM - 03:07 PM	84.9	99.5	80.3
03:07 PM - 04:07 PM	84.9	99.6	80.0
04:07 PM - 05:07 PM	84.6	99.6	79.7
05:07 PM - 06:07 PM	84.6	99.8	79.5
06:07 PM - 07:07 PM	84.5	99.5	79.3
07:07 PM - 08:07 PM	84.6	99.6	79.4
Leq Average 12 hrs. (dB(A))	84.7		
Lmax (dB(A))		99.8	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333240
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number: 2611757-1

Sample Number 2333240-9
Parameter Noise (Leq 12 hrs.)
Location Control Room (1st Floor)
Measurement Date Mar 27, 2023
Measurement by Sawai Tonpho

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:29 PM - 09:29 PM	62.2	73.6	53.0
09:29 PM - 10:29 PM	61.1	73.6	52.7
10:29 PM - 11:29 PM	57.3	72.0	52.8
11:29 PM - 12:29 AM	57.9	75.1	52.5
12:29 AM - 01:29 AM	57.4	72.1	53.2
01:29 AM - 02:29 AM	59.4	73.0	52.3
02:29 AM - 03:29 AM	56.8	71.5	52.4
03:29 AM - 04:29 AM	57.7	71.7	52.8
04:29 AM - 05:29 AM	55.1	68.8	52.5
05:29 AM - 06:29 AM	62.0	72.7	53.1
06:29 AM - 07:29 AM	59.1	75.6	52.7
07:29 AM - 08:29 AM	65.7	82.4	52.7
Leq Average 12 hrs. (dB(A))	60.4		
Lmax (dB(A))		82.4	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333240
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number: 2611758-1

Sample Number 2333240-10
Parameter Noise (Leq 12 hrs.)
Location BH 1101 4Fl.
Measurement Date Mar 27, 2023
Measurement by Sawai Tonpho

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:12 AM - 09:12 AM	87.0	88.4	86.5
09:12 AM - 10:12 AM	86.9	88.5	86.5
10:12 AM - 11:12 AM	86.9	94.6	86.4
11:12 AM - 12:12 PM	86.9	88.9	86.4
12:12 PM - 01:12 PM	87.0	88.6	86.5
01:12 PM - 02:12 PM	86.9	88.9	86.5
02:12 PM - 03:12 PM	86.9	88.3	86.4
03:12 PM - 04:12 PM	86.8	88.2	86.4
04:12 PM - 05:12 PM	86.9	88.2	86.5
05:12 PM - 06:12 PM	87.5	88.7	87.1
06:12 PM - 07:12 PM	86.6	88.0	86.1
07:12 PM - 08:12 PM	87.3	88.7	86.8
Leq Average 12 hrs. (dB(A))	87.0		
Lmax (dB(A))		94.6	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333240
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number: 2611759-1

Sample Number 2333240-11
Parameter Noise (Leq 12 hrs.)
Location EM Room (1st Floor)
Measurement Date Mar 27, 2023
Measurement by Sawai Tonpho

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:45 PM - 09:45 PM	89.1	100.3	86.0
09:45 PM - 10:45 PM	88.0	105.3	85.4
10:45 PM - 11:45 PM	88.3	102.0	85.9
11:45 PM - 12:45 AM	87.8	100.5	85.7
12:45 AM - 01:45 AM	87.9	101.4	85.7
01:45 AM - 02:45 AM	87.4	99.3	85.3
02:45 AM - 03:45 AM	87.2	96.9	85.2
03:45 AM - 04:45 AM	86.7	96.7	84.9
04:45 AM - 05:45 AM	87.5	99.5	85.2
05:45 AM - 06:45 AM	86.9	100.0	84.8
06:45 AM - 07:45 AM	86.5	98.4	84.8
07:45 AM - 08:45 AM	86.2	96.8	84.9
Leq Average 12 hrs. (dB(A))	87.5		
Lmax (dB(A))		105.3	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333240
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number: 2611760-1

Sample Number 2333240-12
Parameter Noise (Leq 12 hrs.)
Location Utility Room (1st Floor)
Measurement Date Mar 27, 2023
Measurement by Sawai Tonpho

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
08:47 PM - 09:47 PM	88.8	92.2	85.6
09:47 PM - 10:47 PM	88.8	92.6	85.5
10:47 PM - 11:47 PM	88.5	92.5	85.3
11:47 PM - 12:47 AM	88.4	92.1	85.0
12:47 AM - 01:47 AM	88.3	92.7	84.9
01:47 AM - 02:47 AM	88.5	92.7	84.9
02:47 AM - 03:47 AM	88.2	92.3	84.8
03:47 AM - 04:47 AM	87.6	93.8	82.5
04:47 AM - 05:47 AM	88.6	93.7	86.6
05:47 AM - 06:47 AM	88.4	92.3	84.8
06:47 AM - 07:47 AM	88.6	95.1	84.9
07:47 AM - 08:47 AM	87.0	92.0	82.6
Leq Average 12 hrs. (dB(A))	88.3		
Lmax (dB(A))		95.1	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372905
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number: 2705802-1

Sample Number 2372905-1
Parameter Noise (Leq 12 hrs.)
Location Packing (1st Floor)
Measurement Date Jun 29, 2023
Measurement by Ronnachai Moungma

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:13 PM - 10:13 PM	75.6	82.6	74.8
10:13 PM - 11:13 PM	75.1	91.0	73.4
11:13 PM - 12:13 AM	74.9	86.5	73.8
12:13 AM - 01:13 AM	75.4	89.8	73.9
01:13 AM - 02:13 AM	75.3	90.0	74.0
02:13 AM - 03:13 AM	75.0	86.8	74.0
03:13 AM - 04:13 AM	75.3	88.6	74.5
04:13 AM - 05:13 AM	75.1	87.0	73.7
05:13 AM - 06:13 AM	75.1	88.3	74.3
06:13 AM - 07:13 AM	74.9	85.6	74.0
07:13 AM - 08:13 AM	75.5	92.7	74.2
08:13 AM - 09:13 AM	75.1	88.7	73.9
Leq Average 12 hrs. (dB(A))	75.2		
Lmax (dB(A))		92.7	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖
Note : LCpeak = 116.3 dB (C)

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372905
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number: 2705803-1

Sample Number 2372905-2
Parameter Noise (Leq 12 hrs.)
Location Band Dryer Area (2nd Floor)
Measurement Date Jun 29, 2023
Measurement by Ronnachai Moungma

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:15 AM - 10:15 AM	88.8	90.2	88.5
10:15 AM - 11:15 AM	87.7	89.9	75.7
11:15 AM - 12:15 PM	75.8	82.2	75.1
12:15 PM - 01:15 PM	86.5	104.8	75.4
01:15 PM - 02:15 PM	88.0	105.6	86.8
02:15 PM - 03:15 PM	88.5	90.9	87.1
03:15 PM - 04:15 PM	88.8	91.0	88.4
04:15 PM - 05:15 PM	89.0	90.3	88.7
05:15 PM - 06:15 PM	89.0	90.1	88.7
06:15 PM - 07:15 PM	88.6	90.0	88.3
07:15 PM - 08:15 PM	88.2	90.4	76.2
08:15 PM - 09:15 PM	87.8	105.4	86.6
Leq Average 12 hrs. (dB(A))	88.0		
Lmax (dB(A))		105.6	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖
Note : LCpeak = 119.7 dB (C)

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372905
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number: 2705804-1

Sample Number 2372905-3
Parameter Noise (Leq 12 hrs.)
Location Polybelt Area (3rd Floor)
Measurement Date Jun 29, 2023
Measurement by Ronnachai Moungma

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:09 AM - 10:09 AM	81.2	85.1	81.1
10:09 AM - 11:09 AM	80.9	85.1	79.8
11:09 AM - 12:09 PM	79.8	80.8	79.7
12:09 PM - 01:09 PM	79.8	81.2	79.7
01:09 PM - 02:09 PM	80.2	82.1	79.8
02:09 PM - 03:09 PM	80.8	81.9	79.9
03:09 PM - 04:09 PM	81.2	85.0	81.1
04:09 PM - 05:09 PM	81.2	85.1	81.1
05:09 PM - 06:09 PM	81.2	85.0	81.0
06:09 PM - 07:09 PM	81.0	84.9	80.9
07:09 PM - 08:09 PM	80.0	81.4	79.9
08:09 PM - 09:09 PM	81.1	82.2	80.2
Leq Average 12 hrs. (dB(A))	80.7		
Lmax (dB(A))		85.1	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖
Note : LCpeak = 103.5 dB (C)

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111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372905
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number: 2705805-1

Sample Number 2372905-4
Parameter Noise (Leq 12 hrs.)
Location Extruder 2 (2nd Floor) ชั้นลอย
Measurement Date Jun 29, 2023
Measurement by Ronnachai Moungma

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:07 PM - 10:07 PM	88.5	92.0	88.1
10:07 PM - 11:07 PM	88.2	90.8	86.5
11:07 PM - 12:07 AM	88.6	92.2	88.2
12:07 AM - 01:07 AM	88.6	90.0	88.2
01:07 AM - 02:07 AM	88.7	92.0	88.3
02:07 AM - 03:07 AM	88.7	91.4	88.3
03:07 AM - 04:07 AM	88.7	90.2	88.3
04:07 AM - 05:07 AM	88.7	92.0	88.3
05:07 AM - 06:07 AM	88.8	91.8	88.4
06:07 AM - 07:07 AM	88.8	92.2	88.4
07:07 AM - 08:07 AM	88.7	91.6	88.3
08:07 AM - 09:07 AM	88.7	92.3	88.3
Leq Average 12 hrs. (dB(A))	88.6		
Lmax (dB(A))		92.3	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖
Note : LCpeak = 113.3 dB (C)

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372905
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number: 2705806-1

Sample Number 2372905-5
Parameter Noise (Leq 12 hrs.)
Location Product Surge Tank (2nd Floor)
Measurement Date Jun 29, 2023
Measurement by Ronnachai Moungma

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:18 PM - 10:18 PM	85.1	85.8	84.9
10:18 PM - 11:18 PM	84.9	85.8	83.9
11:18 PM - 12:18 AM	85.1	85.9	84.8
12:18 AM - 01:18 AM	84.9	85.6	84.7
01:18 AM - 02:18 AM	84.8	85.7	84.4
02:18 AM - 03:18 AM	84.8	85.7	84.6
03:18 AM - 04:18 AM	84.7	85.5	84.5
04:18 AM - 05:18 AM	84.7	85.5	84.3
05:18 AM - 06:18 AM	84.7	85.6	84.5
06:18 AM - 07:18 AM	84.6	91.4	84.4
07:18 AM - 08:18 AM	84.8	85.7	84.5
08:18 AM - 09:18 AM	84.9	86.2	84.5
Leq Average 12 hrs. (dB(A))	84.8		
Lmax (dB(A))		91.4	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖
Note : LCpeak = 111.4 dB (C)

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372905
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number: 2705807-1

Sample Number 2372905-6
Parameter Noise (Leq 12 hrs.)
Location Sifter room (3rd Floor)
Measurement Date Jun 29, 2023
Measurement by Ronnachai Moungma

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:05 AM - 10:05 AM	84.1	85.7	83.9
10:05 AM - 11:05 AM	84.0	86.1	83.6
11:05 AM - 12:05 PM	84.8	86.4	84.5
12:05 PM - 01:05 PM	85.0	86.5	84.8
01:05 PM - 02:05 PM	84.7	86.4	84.2
02:05 PM - 03:05 PM	84.4	86.3	84.2
03:05 PM - 04:05 PM	84.3	85.9	84.1
04:05 PM - 05:05 PM	84.2	86.0	84.1
05:05 PM - 06:05 PM	84.3	85.9	84.1
06:05 PM - 07:05 PM	84.3	85.9	84.1
07:05 PM - 08:05 PM	84.6	86.2	84.3
08:05 PM - 09:05 PM	84.5	86.2	84.0
Leq Average 12 hrs. (dB(A))	84.4		
Lmax (dB(A))		86.5	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖
Note : LCpeak = 108.8 dB (C)

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372905
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number: 2705808-1

Sample Number 2372905-7
Parameter Noise (Leq 12 hrs.)
Location Rotex SZ 1080 (3rd Floor)
Measurement Date Jun 29, 2023
Measurement by Ronnachai Moungma

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:02 AM - 10:02 AM	82.6	86.2	81.9
10:02 AM - 11:02 AM	82.5	87.3	81.7
11:02 AM - 12:02 PM	82.6	85.5	82.0
12:02 PM - 01:02 PM	82.8	85.1	82.1
01:02 PM - 02:02 PM	82.6	84.4	82.2
02:02 PM - 03:02 PM	82.6	84.9	82.2
03:02 PM - 04:02 PM	82.9	85.0	82.4
04:02 PM - 05:02 PM	82.9	85.6	82.4
05:02 PM - 06:02 PM	82.6	85.0	82.0
06:02 PM - 07:02 PM	82.6	87.4	81.8
07:02 PM - 08:02 PM	82.7	85.0	82.0
08:02 PM - 09:02 PM	82.8	85.1	82.4
Leq Average 12 hrs. (dB(A))	82.7		
Lmax (dB(A))		87.4	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖
Note : LCpeak = 106.6 dB (C)

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372905
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number: 2705809-1

Sample Number 2372905-8
Parameter Noise (Leq 12 hrs.)
Location K Tron PC1060 (3rd Floor)
Measurement Date Jun 29, 2023
Measurement by Ronnachai Moungma

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:18 AM - 10:18 AM	85.0	101.9	79.0
10:18 AM - 11:18 AM	84.9	101.8	78.9
11:18 AM - 12:18 PM	76.9	82.0	76.0
12:18 PM - 01:18 PM	76.3	78.0	75.9
01:18 PM - 02:18 PM	77.7	101.6	75.5
02:18 PM - 03:18 PM	82.9	101.8	75.4
03:18 PM - 04:18 PM	84.4	101.8	77.1
04:18 PM - 05:18 PM	85.1	101.9	79.3
05:18 PM - 06:18 PM	85.1	101.9	79.3
06:18 PM - 07:18 PM	85.2	102.1	79.2
07:18 PM - 08:18 PM	84.7	102.1	77.4
08:18 PM - 09:18 PM	85.3	102.1	79.5
Leq Average 12 hrs. (dB(A))	83.8		
Lmax (dB(A))		102.1	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖
Note : LCpeak = 117.8 dB (C)

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372905
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number: 2705810-1

Sample Number 2372905-9
Parameter Noise (Leq 12 hrs.)
Location Control Room (1st Floor)
Measurement Date Jun 29, 2023
Measurement by Ronnachai Moungma

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:22 PM - 10:22 PM	58.1	72.7	52.8
10:22 PM - 11:22 PM	55.7	72.2	52.7
11:22 PM - 12:22 AM	55.7	75.9	53.2
12:22 AM - 01:22 AM	59.8	76.7	52.6
01:22 AM - 02:22 AM	60.3	72.8	52.8
02:22 AM - 03:22 AM	59.0	69.9	54.9
03:22 AM - 04:22 AM	62.3	72.3	54.2
04:22 AM - 05:22 AM	55.2	71.4	50.9
05:22 AM - 06:22 AM	60.7	73.1	53.9
06:22 AM - 07:22 AM	58.9	72.5	53.1
07:22 AM - 08:22 AM	69.6	85.1	55.0
08:22 AM - 09:22 AM	62.7	78.6	53.3
Leq Average 12 hrs. (dB(A))	62.0		
Lmax (dB(A))		85.1	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๔๖
Note : LCpeak = 103.5 dB (C)

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372905
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number: 2705811-1

Sample Number 2372905-10
Parameter Noise (Leq 12 hrs.)
Location BH 1101 4Fl.
Measurement Date Jun 29, 2023
Measurement by Ronnachai Moungma

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:11 AM - 10:11 AM	87.5	90.6	86.9
10:11 AM - 11:11 AM	86.8	89.4	85.1
11:11 AM - 12:11 PM	85.3	86.5	85.0
12:11 PM - 01:11 PM	85.1	86.3	84.9
01:11 PM - 02:11 PM	85.1	86.5	84.8
02:11 PM - 03:11 PM	85.7	87.4	84.5
03:11 PM - 04:11 PM	86.8	91.0	86.0
04:11 PM - 05:11 PM	88.2	92.5	87.3
05:11 PM - 06:11 PM	88.3	91.7	87.5
06:11 PM - 07:11 PM	87.8	90.9	87.2
07:11 PM - 08:11 PM	85.7	86.9	85.4
08:11 PM - 09:11 PM	87.3	91.5	86.5
Leq Average 12 hrs. (dB(A))	86.8		
Lmax (dB(A))		92.5	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๕๖
Note : LCpeak = 109.5 dB (C)

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372905
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number: 2705812-1

Sample Number 2372905-11
Parameter Noise (Leq 12 hrs.)
Location EM Room (1st Floor)
Measurement Date Jun 29, 2023
Measurement by Ronnachai Moungma

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:07 PM - 10:07 PM	82.1	88.0	81.2
10:07 PM - 11:07 PM	82.1	92.2	81.2
11:07 PM - 12:07 AM	81.8	88.1	80.9
12:07 AM - 01:07 AM	82.7	93.6	81.1
01:07 AM - 02:07 AM	82.4	87.4	81.2
02:07 AM - 03:07 AM	81.6	86.1	80.9
03:07 AM - 04:07 AM	81.7	87.6	80.9
04:07 AM - 05:07 AM	81.9	87.1	80.9
05:07 AM - 06:07 AM	81.7	88.0	80.9
06:07 AM - 07:07 AM	81.5	93.8	80.8
07:07 AM - 08:07 AM	81.6	87.0	80.9
08:07 AM - 09:07 AM	81.7	87.3	80.9
Leq Average 12 hrs. (dB(A))	81.9		
Lmax (dB(A))		93.8	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๕๖
Note : LCpeak = 114.1 dB (C)

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372905
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number: 2705813-1

Sample Number 2372905-12
Parameter Noise (Leq 12 hrs.)
Location Utility Room (1st Floor)
Measurement Date Jun 29, 2023
Measurement by Ronnachai Moungma

Time	Leq (dB(A))	Lmax (dB(A))	L90 (dB(A))
09:15 PM - 10:15 PM	90.6	93.9	89.8
10:15 PM - 11:15 PM	90.5	94.4	89.7
11:15 PM - 12:15 AM	90.4	93.3	89.4
12:15 AM - 01:15 AM	90.0	93.2	85.0
01:15 AM - 02:15 AM	89.8	93.7	84.5
02:15 AM - 03:15 AM	90.6	93.6	89.7
03:15 AM - 04:15 AM	90.3	96.1	89.4
04:15 AM - 05:15 AM	90.4	96.6	89.4
05:15 AM - 06:15 AM	90.6	95.0	89.4
06:15 AM - 07:15 AM	90.4	94.1	89.5
07:15 AM - 08:15 AM	91.1	97.4	88.9
08:15 AM - 09:15 AM	86.5	90.8	84.1
Leq Average 12 hrs. (dB(A))	90.2		
Lmax (dB(A))		97.4	
Standard (dB(A))	87	140	

Reference Method : ISO1996-1 and 1996-2
Standard : ประกาศกระทรวงอุตสาหกรรม เรื่อง มาตรการคุ้มครองความปลอดภัย ในการประกอบกิจการโรงงานเกี่ยวกับสภาวะแวดล้อมในการทำงาน พ.ศ.๒๕๕๖
Note : LCpeak = 107.9 dB (C)

Technical Management Thanita Kulsuriwong, Scientist (4)
Approved by Supot Salamteh, Section Head

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333258
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2614025-1

Sample Number 2333258-1
Parameter Octave band
Location Packing (1st Floor)
Measurement Date Mar 27, 2023
Measurement By Sawai Tonpho

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:42 PM - 09:42 PM	73.7	28.1	41.6	49.5	55.4	59.0	63.4	65.1	71.8	60.3	56.0	50.3
09:42 PM - 10:42 PM	73.7	27.5	40.9	48.7	54.5	57.6	62.7	64.1	72.2	59.7	55.9	50.3
10:42 PM - 11:42 PM	73.3	27.7	41.2	49.1	54.7	57.9	63.4	64.5	71.4	60.2	56.0	50.3
11:42 PM - 12:42 AM	73.1	26.0	39.6	47.6	54.3	58.1	64.0	64.4	71.2	59.3	54.6	48.5
12:42 AM - 01:42 AM	72.1	22.5	36.7	45.0	53.7	57.4	62.6	62.8	70.4	56.6	50.8	44.5
01:42 AM - 02:42 AM	73.8	28.0	41.5	49.1	55.0	58.3	64.3	65.1	71.9	60.4	55.8	50.2
02:42 AM - 03:42 AM	73.3	27.2	40.8	48.4	54.7	58.5	62.9	64.6	71.5	60.1	56.8	51.7
03:42 AM - 04:42 AM	73.5	27.8	41.3	49.1	54.9	58.6	63.7	64.9	71.5	60.4	56.8	51.3
04:42 AM - 05:42 AM	73.4	27.0	40.6	48.4	54.7	58.4	63.5	64.4	71.6	59.7	55.5	49.6
05:42 AM - 06:42 AM	73.6	27.4	41.0	48.8	54.9	58.6	64.0	64.9	71.7	60.2	55.7	49.8
06:42 AM - 07:42 AM	72.2	24.5	38.6	47.0	54.2	57.9	62.3	63.4	70.3	58.5	53.9	47.6
07:42 AM - 08:42 AM	73.8	26.7	40.2	48.3	54.7	58.5	62.9	65.3	71.9	62.0	56.0	49.2
Average	73.3	26.9	40.5	48.4	54.7	58.3	63.4	64.5	71.5	59.9	55.5	49.8

Reference Method : ANSI Standard S1.6-1984

Technical Management Tanyatorn Mongkonjirawut, Supervisor
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Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333258
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2614026-1

Sample Number 2333258-2
Parameter Octave band
Location Band Dryer Area (2nd Floor)
Measurement Date Mar 27, 2023
Measurement By Sawai Tonpho

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:45 PM - 09:45 PM	90.1	42.5	55.1	70.8	80.8	86.4	82.6	82.3	78.7	72.5	64.3	53.0
09:45 PM - 10:45 PM	90.1	42.5	55.0	70.8	81.0	86.4	82.7	82.4	78.7	72.5	64.3	53.0
10:45 PM - 11:45 PM	90.2	42.6	55.1	70.8	81.4	86.5	82.7	82.4	78.8	72.6	64.3	53.2
11:45 PM - 12:45 AM	90.2	42.9	55.1	70.8	81.5	86.5	82.7	82.4	78.8	72.6	64.5	53.6
12:45 AM - 01:45 AM	90.2	42.8	55.1	70.8	81.5	86.5	82.7	82.4	78.8	72.6	64.4	53.4
01:45 AM - 02:45 AM	90.3	42.8	55.1	70.8	81.6	86.5	82.8	82.4	78.8	72.7	64.5	53.7
02:45 AM - 03:45 AM	90.3	42.8	55.1	70.8	81.5	86.5	82.8	82.5	78.8	72.8	64.4	53.5
03:45 AM - 04:45 AM	90.3	42.7	55.1	70.8	81.6	86.5	82.8	82.5	78.8	72.7	64.5	53.7
04:45 AM - 05:45 AM	90.3	42.8	55.1	70.8	81.8	86.5	82.8	82.5	78.9	72.6	64.6	53.8
05:45 AM - 06:45 AM	90.4	43.1	55.1	70.9	81.9	86.6	82.8	82.6	78.9	72.6	64.6	53.8
06:45 AM - 07:45 AM	90.3	43.0	55.2	70.8	81.5	86.6	82.8	82.6	78.8	72.6	64.5	53.5
07:45 AM - 08:45 AM	90.3	42.7	55.1	70.8	81.4	86.6	82.8	82.4	78.8	72.9	64.5	53.3
Average	90.3	42.8	55.1	70.8	81.5	86.5	82.8	82.5	78.8	72.6	64.5	53.5

Reference Method : ANSI Standard S1.6-1984

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333258
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2614027-1

Sample Number 2333258-3
Parameter Octave band
Location Polybelt Area (3rd Floor)
Measurement Date Mar 27, 2023
Measurement By Sawai Tonpho

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:11 AM - 09:11 AM	80.6	27.6	46.6	54.2	67.1	72.4	73.2	74.1	73.8	72.0	67.1	55.5
09:11 AM - 10:11 AM	80.6	27.5	46.4	54.2	67.2	72.4	73.1	74.1	73.7	72.0	67.0	55.4
10:11 AM - 11:11 AM	80.9	27.6	46.3	54.1	67.1	72.3	74.2	74.6	73.8	71.9	66.9	55.3
11:11 AM - 12:11 PM	80.5	27.7	46.2	54.0	67.2	72.4	73.1	74.1	73.7	71.9	66.9	55.2
12:11 PM - 01:11 PM	80.6	27.9	46.2	54.2	67.9	72.6	73.1	74.1	73.7	72.0	66.8	55.1
01:11 PM - 02:11 PM	80.6	27.8	46.3	54.0	67.8	72.5	73.1	74.1	73.7	71.9	66.8	55.1
02:11 PM - 03:11 PM	80.6	27.7	46.3	54.1	67.7	72.4	73.1	74.1	73.8	71.9	66.9	55.2
03:11 PM - 04:11 PM	80.6	27.7	46.1	54.3	68.0	72.4	73.2	74.1	73.8	72.0	66.9	55.4
04:11 PM - 05:11 PM	80.6	28.1	46.5	54.6	67.9	72.3	73.2	74.2	73.8	72.0	67.1	55.5
05:11 PM - 06:11 PM	80.7	28.1	46.3	54.8	67.9	72.3	73.3	74.2	73.9	72.0	67.1	55.6
06:11 PM - 07:11 PM	80.5	28.0	46.4	54.5	67.8	72.2	73.1	74.1	73.7	71.9	67.0	55.4
07:11 PM - 08:11 PM	80.8	27.5	46.2	54.0	67.0	72.2	74.1	74.5	73.7	71.8	66.8	55.2
Average	80.6	27.8	46.3	54.3	67.6	72.4	73.3	74.2	73.8	71.9	66.9	55.3

Reference Method : ANSI Standard S1.6-1984

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333258
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2614028-1

Sample Number 2333258-4
Parameter Octave band
Location Extruder 2 (2nd Floor) ข้างลอย
Measurement Date Mar 27, 2023
Measurement By Sawai Tonpho

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:15 AM - 09:15 AM	88.8	32.9	49.1	63.1	79.8	85.5	81.1	78.9	76.0	76.8	72.3	55.5
09:15 AM - 10:15 AM	88.8	32.8	49.1	63.1	79.7	85.6	81.1	78.8	76.0	76.5	71.9	57.1
10:15 AM - 11:15 AM	88.7	32.6	49.1	63.1	79.6	85.5	80.9	78.8	75.9	75.9	71.7	56.7
11:15 AM - 12:15 PM	88.7	32.6	49.0	63.2	79.5	85.5	81.0	79.1	75.9	75.9	71.6	56.5
12:15 PM - 01:15 PM	89.1	32.4	48.8	61.7	79.4	86.2	81.4	78.8	75.9	75.9	71.3	56.1
01:15 PM - 02:15 PM	88.8	32.4	48.7	61.9	79.4	85.9	81.1	78.7	75.9	75.8	71.1	56.1
02:15 PM - 03:15 PM	88.8	32.8	48.8	61.9	79.5	85.9	81.1	78.6	75.7	75.5	70.9	55.9
03:15 PM - 04:15 PM	89.0	32.7	48.8	61.7	79.8	86.1	81.2	78.6	75.9	75.8	71.3	56.5
04:15 PM - 05:15 PM	88.9	33.0	48.8	61.8	79.9	85.9	80.9	78.9	76.1	75.9	71.4	56.7
05:15 PM - 06:15 PM	89.1	32.9	48.7	61.7	80.0	86.1	81.0	79.2	76.0	75.8	71.4	57.1
06:15 PM - 07:15 PM	88.9	32.6	48.7	61.6	79.7	86.0	81.1	78.5	75.8	75.7	71.2	56.4
07:15 PM - 08:15 PM	88.7	32.4	48.5	61.4	79.5	85.8	80.9	78.3	75.6	75.5	71.0	56.2
Average	88.9	32.7	48.8	62.2	79.7	85.8	81.1	78.8	75.9	75.9	71.4	56.4

Reference Method : ANSI Standard S1.6-1984

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333258
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2614029-1

Sample Number 2333258-5
Parameter Octave band
Location Product Surge Tank (2nd Floor)
Measurement Date Mar 27, 2023
Measurement By Sawai Tonpho

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:49 PM - 09:49 PM	85.3	28.1	51.2	60.3	70.3	78.5	81.1	78.2	76.1	71.5	68.5	58.1
09:49 PM - 10:49 PM	85.3	28.1	50.7	60.2	70.3	78.5	81.1	78.2	76.1	71.4	68.4	58.1
10:49 PM - 11:49 PM	85.3	28.1	50.4	60.3	70.2	78.4	81.2	78.2	76.1	71.4	68.5	58.2
11:49 PM - 12:49 AM	85.4	28.1	50.4	60.3	70.3	78.5	81.3	78.2	76.1	71.5	68.6	58.3
12:49 AM - 01:49 AM	85.3	28.2	50.4	60.4	70.3	78.4	81.3	78.1	76.0	71.4	68.6	58.4
01:49 AM - 02:49 AM	85.4	28.1	50.3	60.3	70.4	78.4	81.5	78.2	76.1	71.5	68.5	58.3
02:49 AM - 03:49 AM	85.5	28.2	50.2	60.3	70.3	78.4	81.5	78.2	76.1	71.5	68.5	58.3
03:49 AM - 04:49 AM	85.5	28.1	50.2	60.3	70.3	78.4	81.6	78.2	76.1	71.4	68.4	58.0
04:49 AM - 05:49 AM	85.4	28.2	50.4	60.4	70.4	78.4	81.5	78.2	76.1	71.5	68.5	58.0
05:49 AM - 06:49 AM	85.5	28.1	50.4	60.4	70.4	78.5	81.6	78.3	76.1	71.6	68.5	58.0
06:49 AM - 07:49 AM	85.4	28.1	50.3	60.4	70.2	78.3	81.5	78.2	76.0	71.5	68.5	58.0
07:49 AM - 08:49 AM	85.4	28.1	50.3	60.4	70.1	78.3	81.4	78.2	76.1	71.6	68.6	58.2
Average	85.4	28.1	50.4	60.3	70.3	78.4	81.4	78.2	76.1	71.5	68.5	58.2

Reference Method : ANSI Standard S1.6-1984

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333258
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2614030-1

Sample Number 2333258-6
Parameter Octave band
Location Sifter room (3rd Floor)
Measurement Date Mar 27, 2023
Measurement By Sawai Tonpho

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:13 AM - 09:13 AM	84.4	29.7	49.8	60.7	72.3	78.8	77.5	78.5	75.5	71.5	65.7	56.9
09:13 AM - 10:13 AM	84.4	30.0	49.9	60.6	72.2	78.7	77.4	79.0	75.2	71.7	65.7	56.8
10:13 AM - 11:13 AM	84.6	30.3	49.7	60.6	72.2	78.7	77.6	79.3	75.4	71.9	65.6	56.7
11:13 AM - 12:13 PM	84.5	30.4	49.6	60.5	72.1	78.6	77.1	79.2	75.5	71.8	65.6	56.6
12:13 PM - 01:13 PM	84.6	30.4	49.6	60.5	72.1	78.6	77.1	79.5	75.8	71.5	65.4	56.4
01:13 PM - 02:13 PM	84.7	30.7	50.1	60.3	72.2	78.6	77.0	79.8	76.0	71.3	65.2	56.2
02:13 PM - 03:13 PM	84.6	30.6	50.6	60.4	72.3	78.7	77.1	79.5	75.9	71.6	65.2	56.2
03:13 PM - 04:13 PM	84.5	30.5	51.2	60.5	72.4	78.7	77.2	79.2	75.7	71.6	64.7	56.0
04:13 PM - 05:13 PM	84.3	30.3	51.6	60.5	72.5	78.7	77.3	78.7	75.4	71.2	64.8	56.1
05:13 PM - 06:13 PM	84.3	30.1	51.4	60.6	72.6	78.7	77.5	78.2	75.8	71.1	64.8	56.3
06:13 PM - 07:13 PM	84.4	30.3	49.5	60.4	72.0	78.5	77.0	79.1	75.4	71.7	65.5	56.5
07:13 PM - 08:13 PM	84.2	30.1	49.3	60.2	71.8	78.3	76.8	78.9	75.2	71.5	65.3	56.3
Average	84.5	30.3	50.3	60.5	72.2	78.6	77.2	79.1	75.6	71.5	65.3	56.4

Reference Method : ANSI Standard S1.6-1984

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333258
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2614031-1

Sample Number 2333258-7
Parameter Octave band
Location Rotex SZ 1080 (3rd Floor)
Measurement Date Mar 27, 2023
Measurement By Sawai Tonpho

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:16 AM - 09:16 AM	82.8	27.7	43.0	55.8	69.0	72.8	75.5	77.5	76.0	73.6	69.8	59.6
09:16 AM - 10:16 AM	82.8	27.6	43.0	55.9	69.1	73.0	75.6	77.5	75.7	73.6	69.5	59.2
10:16 AM - 11:16 AM	82.8	27.3	42.9	55.8	68.9	72.9	75.9	77.4	75.8	73.4	69.4	59.2
11:16 AM - 12:16 PM	82.7	27.1	43.2	55.9	69.0	73.0	75.5	77.2	75.9	73.3	69.3	59.0
12:16 PM - 01:16 PM	82.7	27.3	43.1	55.9	68.9	72.9	75.4	77.2	76.0	73.2	69.3	59.0
01:16 PM - 02:16 PM	82.7	26.7	42.9	55.8	69.0	73.1	75.6	77.2	75.8	73.1	69.1	58.9
02:16 PM - 03:16 PM	82.5	26.6	42.9	55.8	69.0	72.8	75.5	77.1	75.7	73.0	69.1	58.9
03:16 PM - 04:16 PM	82.7	26.2	43.1	55.9	69.0	72.9	75.5	77.2	76.2	73.1	69.2	59.2
04:16 PM - 05:16 PM	83.0	26.2	43.0	55.9	69.2	73.1	75.8	77.7	76.3	73.2	69.3	59.3
05:16 PM - 06:16 PM	83.2	27.3	43.0	56.0	69.5	73.7	76.2	77.9	76.5	73.0	69.2	59.2
06:16 PM - 07:16 PM	82.6	27.0	43.1	55.8	68.9	72.9	75.4	77.1	75.8	73.2	69.2	58.9
07:16 PM - 08:16 PM	82.5	26.9	43.0	55.7	68.8	72.8	75.3	77.0	75.7	73.1	69.1	58.8
Average	82.8	27.0	43.0	55.9	69.0	73.0	75.6	77.3	76.0	73.2	69.3	59.1

Reference Method : ANSI Standard S1.6-1984

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333258
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2614032-1

Sample Number 2333258-8
Parameter Octave band
Location K Tron PC1060 (3rd Floor)
Measurement Date Mar 27, 2023
Measurement By Sawai Tonpho

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:07 AM - 09:07 AM	84.7	24.8	46.9	52.5	65.0	70.6	74.5	77.3	77.4	78.5	77.7	70.5
09:07 AM - 10:07 AM	84.9	24.8	47.1	52.4	65.0	70.7	74.6	77.8	78.0	78.4	77.7	70.5
10:07 AM - 11:07 AM	84.8	24.7	47.2	52.5	64.9	70.5	74.5	77.7	77.8	78.4	77.7	70.5
11:07 AM - 12:07 PM	84.8	24.5	47.3	52.5	65.3	70.6	74.5	77.8	77.9	78.2	77.5	70.2
12:07 PM - 01:07 PM	84.8	24.6	47.3	52.5	65.4	70.7	74.6	77.7	77.7	78.4	77.7	70.4
01:07 PM - 02:07 PM	84.8	24.8	47.5	52.4	65.3	70.6	74.6	77.7	77.9	78.4	77.7	70.4
02:07 PM - 03:07 PM	84.9	24.9	47.6	52.6	65.5	70.6	74.6	77.8	78.1	78.4	77.7	70.4
03:07 PM - 04:07 PM	84.9	24.8	47.8	52.8	65.5	70.7	74.5	77.8	78.0	78.4	77.8	70.6
04:07 PM - 05:07 PM	84.6	24.8	47.8	53.2	65.5	70.8	74.5	77.1	77.2	78.5	77.8	70.7
05:07 PM - 06:07 PM	84.6	24.5	47.6	53.4	65.3	71.0	74.5	76.8	76.9	78.6	77.8	70.8
06:07 PM - 07:07 PM	84.5	24.6	46.7	52.3	64.8	70.4	74.3	77.1	77.2	78.3	77.5	70.3
07:07 PM - 08:07 PM	84.6	24.7	46.8	52.4	64.9	70.5	74.4	77.2	77.3	78.4	77.6	70.4
Average	84.7	24.7	47.3	52.6	65.2	70.6	74.5	77.5	77.6	78.4	77.7	70.5

Reference Method : ANSI Standard S1.6-1984

Technical Management Tanyatorn Mongkonjirawut, Supervisor
Approved by Supot Salamteh, Section Head

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111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333258
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2614033-1

Sample Number 2333258-9
Parameter Octave band
Location Control Room (1st Floor)
Measurement Date Mar 27, 2023
Measurement By Sawai Tonpho

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:29 PM - 09:29 PM	62.2	7.9	23.7	40.5	39.9	48.4	55.2	57.6	57.7	46.0	39.8	29.4
09:29 PM - 10:29 PM	61.1	7.6	23.4	37.4	39.4	47.1	54.1	57.3	55.7	45.6	40.5	29.0
10:29 PM - 11:29 PM	57.3	7.8	23.0	33.4	37.3	43.2	48.7	50.9	54.6	42.8	36.1	25.0
11:29 PM - 12:29 AM	57.9	7.2	22.8	36.0	37.3	42.1	49.0	50.7	55.4	47.2	34.0	25.8
12:29 AM - 01:29 AM	57.4	8.0	22.1	35.4	39.7	44.3	49.1	52.3	53.6	44.3	38.5	27.1
01:29 AM - 02:29 AM	59.4	7.5	22.3	38.4	39.6	50.6	51.5	55.0	53.7	44.3	43.5	32.1
02:29 AM - 03:29 AM	56.8	7.6	22.0	36.1	37.4	42.2	49.0	53.0	51.9	41.3	37.1	26.6
03:29 AM - 04:29 AM	57.7	7.6	22.1	39.6	38.1	43.1	49.6	52.9	53.7	42.4	37.0	27.9
04:29 AM - 05:29 AM	55.1	7.6	21.9	35.6	37.3	42.5	48.0	51.3	49.5	40.3	34.5	27.0
05:29 AM - 06:29 AM	62.0	8.0	26.6	52.7	45.1	47.5	52.5	55.5	57.3	49.0	51.6	40.4
06:29 AM - 07:29 AM	59.1	8.7	24.7	42.7	40.7	44.8	51.2	54.2	54.3	46.5	46.0	36.9
07:29 AM - 08:29 AM	65.7	9.7	25.7	31.7	40.5	50.2	61.1	61.1	59.4	52.5	41.3	29.3
Average	60.4	8.0	23.6	43.3	40.0	46.6	53.7	55.5	55.5	46.6	43.5	32.8

Reference Method : ANSI Standard S1.6-1984

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Approved by Supot Salamteh, Section Head

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333258
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2614034-1

Sample Number 2333258-10
Parameter Octave band
Location BH 1101 (4th Floor)
Measurement Date Mar 27, 2023
Measurement By Sawai Tonpho

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:12 AM - 09:12 AM	87.0	33.7	48.8	54.7	70.8	80.3	82.5	82.0	75.4	70.5	65.6	54.2
09:12 AM - 10:12 AM	86.9	34.1	49.0	54.7	70.8	80.3	82.2	82.1	75.4	70.4	65.5	54.0
10:12 AM - 11:12 AM	86.9	34.1	49.2	54.7	70.6	80.0	82.3	82.1	75.7	70.5	65.5	54.0
11:12 AM - 12:12 PM	86.9	33.8	49.1	54.7	70.5	80.0	82.1	82.3	75.6	70.4	65.4	53.8
12:12 PM - 01:12 PM	87.0	33.8	48.7	54.6	70.4	80.0	82.1	82.4	75.6	70.3	65.4	53.8
01:12 PM - 02:12 PM	86.9	33.8	49.0	54.6	70.3	80.1	82.2	82.3	75.5	70.2	65.4	53.9
02:12 PM - 03:12 PM	86.9	33.3	48.7	54.5	70.4	80.2	82.1	82.0	75.8	70.3	65.4	53.9
03:12 PM - 04:12 PM	86.8	33.1	49.5	54.5	70.6	80.2	82.1	81.9	75.8	70.3	65.5	54.1
04:12 PM - 05:12 PM	86.9	33.5	49.7	54.8	70.9	79.8	82.8	81.7	75.6	70.6	65.7	54.4
05:12 PM - 06:12 PM	87.5	33.7	50.0	55.0	71.1	79.8	83.7	82.3	75.8	70.9	65.9	54.8
06:12 PM - 07:12 PM	86.6	33.0	48.4	54.2	70.1	79.9	81.8	81.7	75.5	70.0	65.1	53.6
07:12 PM - 08:12 PM	87.3	33.7	49.1	54.9	70.8	80.6	82.5	82.4	76.2	70.7	65.8	54.3
Average	87.0	33.6	49.1	54.7	70.6	80.1	82.4	82.1	75.7	70.4	65.5	54.1

Reference Method : ANSI Standard S1.6-1984

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333258
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2614035-1

Sample Number 2333258-11
Parameter Octave band
Location EM Room (1st Floor)
Measurement Date Mar 27, 2023
Measurement By Sawai Tonpho

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:45 PM - 09:45 PM	89.1	28.9	54.0	70.7	80.2	80.4	82.4	82.1	80.8	80.0	75.5	65.1
09:45 PM - 10:45 PM	88.0	28.9	51.8	68.9	79.2	79.0	80.9	81.1	80.1	79.2	74.8	64.0
10:45 PM - 11:45 PM	88.3	28.9	52.3	69.5	79.7	79.5	81.2	81.3	80.1	79.1	74.9	64.0
11:45 PM - 12:45 AM	87.8	28.7	52.1	69.1	79.2	79.0	80.7	80.8	79.6	78.8	74.6	63.8
12:45 AM - 01:45 AM	87.9	28.7	52.3	69.1	79.3	79.1	80.7	81.0	79.7	78.9	74.6	63.9
01:45 AM - 02:45 AM	87.4	29.1	52.5	68.8	78.6	78.5	80.0	80.5	79.2	78.6	74.3	63.6
02:45 AM - 03:45 AM	87.2	29.2	52.4	68.6	78.4	78.3	79.8	80.2	79.0	78.4	74.2	63.5
03:45 AM - 04:45 AM	86.7	29.4	51.9	68.0	77.9	77.8	79.2	79.6	78.6	78.1	73.9	63.2
04:45 AM - 05:45 AM	87.5	29.4	52.0	68.8	78.9	78.8	80.2	80.4	79.4	78.7	74.4	63.7
05:45 AM - 06:45 AM	86.9	29.5	51.4	68.1	78.1	78.1	79.5	79.9	78.9	78.3	74.0	63.4
06:45 AM - 07:45 AM	86.5	29.4	50.7	67.5	77.6	77.6	78.9	79.7	78.5	78.0	73.8	63.1
07:45 AM - 08:45 AM	86.2	29.2	50.1	66.8	77.1	77.0	78.2	80.0	78.2	77.7	73.6	62.8
Average	87.5	29.1	52.1	68.8	78.8	78.7	80.3	80.6	79.4	78.7	74.4	63.7

Reference Method : ANSI Standard S1.6-1984

Technical Management Tanyatorn Mongkonjirawut, Supervisor
Approved by Supot Salamteh, Section Head

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333258
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2614036-1

Sample Number 2333258-12
Parameter Octave band
Location Utility Room (1st Floor)
Measurement Date Mar 27, 2023
Measurement By Sawai Tonpho

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
08:47 PM - 09:47 PM	88.8	32.2	44.6	59.8	63.9	69.7	75.7	82.1	80.5	85.5	79.2	62.4
09:47 PM - 10:47 PM	88.8	32.2	44.6	59.7	63.9	69.7	75.5	81.9	79.8	85.8	79.3	62.6
10:47 PM - 11:47 PM	88.5	32.0	44.6	59.6	64.4	69.6	75.3	81.7	79.6	85.4	79.0	62.5
11:47 PM - 12:47 AM	88.4	32.2	44.7	59.6	64.5	69.5	75.2	81.3	79.7	85.3	78.9	62.5
12:47 AM - 01:47 AM	88.3	32.1	44.6	59.7	64.5	69.6	75.2	80.5	79.4	85.4	79.0	62.6
01:47 AM - 02:47 AM	88.5	32.1	44.6	59.7	64.9	69.6	75.3	80.4	79.8	85.6	79.1	62.5
02:47 AM - 03:47 AM	88.2	32.0	44.5	59.6	64.9	69.6	75.3	79.4	79.7	85.5	79.0	62.3
03:47 AM - 04:47 AM	87.6	32.0	44.5	59.6	65.0	69.6	75.1	79.4	79.6	84.6	78.1	61.5
04:47 AM - 05:47 AM	88.6	32.1	44.6	59.6	64.8	69.7	75.3	79.4	80.0	86.1	79.6	62.7
05:47 AM - 06:47 AM	88.4	32.2	44.6	59.6	65.2	69.7	75.4	79.4	79.7	85.8	79.2	62.3
06:47 AM - 07:47 AM	88.6	32.3	44.4	59.7	64.7	69.7	75.5	79.3	79.9	86.0	79.4	62.1
07:47 AM - 08:47 AM	87.0	32.2	44.4	59.3	64.4	69.7	75.3	79.5	79.7	83.4	77.0	61.2
Average	88.3	32.1	44.6	59.6	64.6	69.6	75.3	80.5	79.8	85.4	78.9	62.3

Reference Method : ANSI Standard S1.6-1984

Technical Management Tanyatorn Mongkonjirawut, Supervisor
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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372909
Date Received : Jun 30, 2023
Date Reported : Jul 06, 2023
Report Number : 2709665-1

Sample Number 2372909-1
Parameter Octave band
Location Packing (1st Floor)
Measurement Date Jun 29, 2023
Measurement By Ronnachai Moungma

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:13 PM - 10:13 PM	75.6	25.4	38.6	46.3	53.7	58.3	64.6	69.5	73.6	59.8	53.7	43.5
10:13 PM - 11:13 PM	75.1	26.1	38.9	46.3	54.0	58.5	64.0	68.7	72.7	62.8	59.2	50.8
11:13 PM - 12:13 AM	74.9	25.7	39.0	46.9	53.9	58.6	63.3	68.3	72.8	61.4	57.8	50.0
12:13 AM - 01:13 AM	75.4	23.3	36.9	44.4	52.7	57.8	63.6	68.6	72.6	65.1	64.7	56.9
01:13 AM - 02:13 AM	75.3	25.3	38.6	46.6	53.8	58.3	64.2	68.1	73.0	63.9	62.6	54.9
02:13 AM - 03:13 AM	75.0	25.7	38.9	47.0	53.8	58.4	64.5	67.5	73.2	60.3	54.2	43.8
03:13 AM - 04:13 AM	75.3	26.3	39.4	47.0	54.2	58.7	64.6	69.6	73.0	61.1	54.7	44.0
04:13 AM - 05:13 AM	75.1	25.9	38.9	46.5	54.0	58.2	63.9	69.2	72.6	62.1	59.4	52.2
05:13 AM - 06:13 AM	75.1	26.0	39.2	47.0	53.9	58.3	64.2	68.7	72.9	61.1	56.5	47.7
06:13 AM - 07:13 AM	74.9	23.1	37.0	45.1	52.6	57.6	64.2	68.2	72.9	60.5	54.3	43.5
07:13 AM - 08:13 AM	75.5	23.7	37.6	46.0	53.4	58.0	65.7	68.3	73.6	60.1	53.7	43.4
08:13 AM - 09:13 AM	75.1	22.7	36.9	45.2	53.0	57.9	64.4	69.2	72.8	60.6	56.4	48.3
Average	75.2	25.1	38.4	46.3	53.6	58.2	64.3	68.7	73.0	61.9	58.9	50.8

Reference Method : ANSI Standard S1.6-1984

Technical Management Orawan Rakyong, Scientist (3)
Approved by Supot Salamteh, Section Head

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372909
Date Received : Jun 30, 2023
Date Reported : Jul 06, 2023
Report Number : 2709666-1

Sample Number 2372909-2
Parameter Octave band
Location Band Dryer Area (2nd Floor)
Measurement Date Jun 29, 2023
Measurement By Ronnachai Moungma

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:15 AM - 10:15 AM	88.8	40.7	53.2	67.7	75.9	85.2	82.0	81.7	78.1	72.4	65.1	57.9
10:15 AM - 11:15 AM	87.7	39.8	52.7	66.1	75.2	83.7	81.1	80.8	77.3	71.9	65.3	59.4
11:15 AM - 12:15 PM	75.8	22.3	43.5	48.6	67.2	70.0	69.6	68.9	66.1	61.6	54.1	41.0
12:15 PM - 01:15 PM	86.5	38.2	52.5	62.8	72.3	78.5	79.5	81.5	79.7	75.3	65.1	50.9
01:15 PM - 02:15 PM	88.0	40.9	54.1	66.4	75.5	82.1	81.0	82.6	79.7	74.3	65.4	56.3
02:15 PM - 03:15 PM	88.5	40.5	53.3	66.8	77.0	84.3	81.8	81.6	78.2	72.2	64.3	57.3
03:15 PM - 04:15 PM	88.8	39.0	53.0	66.5	77.6	84.9	82.0	81.5	78.1	72.6	65.8	59.8
04:15 PM - 05:15 PM	89.0	39.5	53.0	66.5	77.4	85.0	82.3	81.7	78.5	72.9	65.8	59.5
05:15 PM - 06:15 PM	89.0	39.7	53.2	66.4	77.4	85.1	82.4	81.7	78.4	72.9	65.9	60.0
06:15 PM - 07:15 PM	88.6	40.5	53.0	67.5	75.7	85.0	81.8	81.5	77.9	72.2	64.9	57.7
07:15 PM - 08:15 PM	88.2	40.3	53.2	66.6	75.7	84.2	81.6	81.3	77.8	72.4	65.8	59.9
08:15 PM - 09:15 PM	87.8	40.7	53.9	66.2	75.3	81.9	80.8	82.4	79.5	74.1	65.2	56.1
Average	88.0	39.7	52.9	66.1	75.8	83.6	81.2	81.3	78.2	72.8	65.0	57.9

Reference Method : ANSI Standard S1.6-1984

Technical Management Orawan Rakyong, Scientist (3)
Approved by Supot Salamteh, Section Head

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372909
Date Received : Jun 30, 2023
Date Reported : Jul 06, 2023
Report Number : 2709667-1

Sample Number 2372909-3
Parameter Octave band
Location Polybelt Area (3rd Floor)
Measurement Date Jun 29, 2023
Measurement By Ronnachai Moungma

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:09 AM - 10:09 AM	81.2	29.4	44.3	55.0	67.2	73.2	73.8	74.3	74.4	72.7	69.1	57.5
10:09 AM - 11:09 AM	80.9	29.3	44.1	54.6	66.3	72.7	73.4	74.0	74.2	72.5	68.7	57.0
11:09 AM - 12:09 PM	79.8	25.7	43.7	54.8	62.6	69.7	72.6	73.0	73.6	72.1	68.1	56.5
12:09 PM - 01:09 PM	79.8	28.1	44.7	54.8	62.7	69.9	72.7	73.0	73.6	72.0	68.1	56.5
01:09 PM - 02:09 PM	80.2	29.8	45.1	55.4	64.0	70.5	73.0	73.4	73.8	72.1	68.2	56.7
02:09 PM - 03:09 PM	80.8	29.3	45.0	55.1	66.2	72.4	73.6	74.0	74.1	72.4	68.5	56.9
03:09 PM - 04:09 PM	81.2	29.4	44.3	54.9	67.0	73.1	73.8	74.4	74.4	72.6	68.8	57.2
04:09 PM - 05:09 PM	81.2	29.5	44.0	55.7	67.0	72.9	73.9	74.4	74.5	72.7	68.9	57.2
05:09 PM - 06:09 PM	81.2	29.5	44.1	56.2	67.0	72.7	73.8	74.4	74.5	72.7	68.9	57.3
06:09 PM - 07:09 PM	81.0	29.2	44.1	54.8	67.0	73.0	73.6	74.1	74.2	72.5	68.9	57.3
07:09 PM - 08:09 PM	80.0	28.3	44.9	55.0	62.9	70.1	72.9	73.2	73.8	72.2	68.3	56.7
08:09 PM - 09:09 PM	81.1	29.6	45.3	55.4	66.5	72.7	73.9	74.3	74.4	72.7	68.8	57.2
Average	80.7	29.0	44.5	55.2	65.9	72.1	73.4	73.9	74.1	72.4	68.6	57.0

Reference Method : ANSI Standard S1.6-1984

Technical Management Orawan Rakyong, Scientist (3)
Approved by Supot Salamteh, Section Head

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372909
Date Received : Jun 30, 2023
Date Reported : Jul 06, 2023
Report Number : 2709668-1

Sample Number 2372909-4
Parameter Octave band
Location Extruder 2 (2nd Floor) ข้างลอย
Measurement Date Jun 29, 2023
Measurement By Ronnachai Moungma

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:07 PM - 10:07 PM	88.5	32.7	47.9	63.6	78.5	86.0	81.0	77.8	74.6	71.5	65.3	57.5
10:07 PM - 11:07 PM	88.2	32.6	47.8	63.5	78.2	85.7	80.7	77.6	74.4	71.5	65.3	52.0
11:07 PM - 12:07 AM	88.6	32.8	47.9	63.6	78.4	86.2	81.3	77.9	74.7	71.8	65.4	52.1
12:07 AM - 01:07 AM	88.6	32.9	47.8	63.6	78.4	86.2	81.3	77.7	74.4	71.2	64.7	50.8
01:07 AM - 02:07 AM	88.7	33.1	47.8	63.7	78.4	86.3	81.4	77.8	74.4	71.6	65.5	52.6
02:07 AM - 03:07 AM	88.7	33.2	47.8	63.6	78.2	86.2	81.4	77.9	74.5	71.8	65.6	51.8
03:07 AM - 04:07 AM	88.7	33.2	47.7	63.7	78.2	86.3	81.4	77.9	74.2	71.5	64.9	50.6
04:07 AM - 05:07 AM	88.7	33.1	47.6	63.8	78.0	86.3	81.5	78.0	74.3	71.7	65.3	51.6
05:07 AM - 06:07 AM	88.8	32.9	47.6	63.7	78.0	86.4	81.6	78.0	74.3	72.0	66.0	52.7
06:07 AM - 07:07 AM	88.8	32.7	47.7	63.6	78.0	86.4	81.6	78.0	74.1	71.9	66.0	52.9
07:07 AM - 08:07 AM	88.7	32.6	47.8	63.5	78.1	86.3	81.5	77.9	74.0	71.6	65.2	51.2
08:07 AM - 09:07 AM	88.7	32.7	47.8	63.4	78.0	86.3	81.5	78.0	74.4	72.0	65.4	51.7
Average	88.6	32.9	47.8	63.6	78.2	86.2	81.4	77.9	74.4	71.7	65.4	52.7

Reference Method : ANSI Standard S1.6-1984

Technical Management Orawan Rakyong, Scientist (3)
Approved by Supot Salamteh, Section Head

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372909
Date Received : Jun 30, 2023
Date Reported : Jul 06, 2023
Report Number : 2709669-1

Sample Number 2372909-5
Parameter Octave band
Location Product Surge Tank (2nd Floor)
Measurement Date Jun 29, 2023
Measurement By Ronnachai Moungma

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:18 PM - 10:18 PM	85.1	31.7	48.8	59.0	69.5	79.0	80.7	78.4	75.5	71.2	64.0	50.9
10:18 PM - 11:18 PM	84.9	31.9	48.8	59.1	69.4	78.6	80.6	78.2	75.4	70.9	64.0	51.0
11:18 PM - 12:18 AM	85.1	31.8	48.9	59.3	69.6	78.9	80.7	78.3	75.6	71.1	64.0	50.9
12:18 AM - 01:18 AM	84.9	31.9	49.0	59.1	69.4	78.7	80.5	78.1	75.6	71.0	63.9	51.0
01:18 AM - 02:18 AM	84.8	32.0	48.8	59.1	69.3	78.7	80.4	78.0	75.4	70.6	63.8	50.9
02:18 AM - 03:18 AM	84.8	31.8	48.8	59.2	69.3	78.7	80.4	78.0	75.7	70.6	63.9	51.0
03:18 AM - 04:18 AM	84.7	31.9	48.8	59.2	69.4	78.7	80.2	77.8	75.7	70.5	63.9	50.9
04:18 AM - 05:18 AM	84.7	31.8	48.9	59.2	69.4	78.6	80.2	77.9	75.5	70.3	63.8	50.8
05:18 AM - 06:18 AM	84.7	31.9	49.0	59.2	69.3	78.7	80.2	77.8	75.7	70.2	63.9	50.9
06:18 AM - 07:18 AM	84.6	31.8	48.9	59.3	69.3	78.6	80.0	77.5	75.5	70.3	63.9	50.9
07:18 AM - 08:18 AM	84.8	31.8	48.9	59.2	69.2	78.6	80.3	77.9	75.6	70.4	63.8	50.8
08:18 AM - 09:18 AM	84.9	31.7	48.9	59.1	69.1	78.6	80.5	78.2	75.4	70.3	63.8	50.8
Average	84.8	31.8	48.9	59.2	69.4	78.7	80.4	78.0	75.6	70.6	63.9	50.9

Reference Method : ANSI Standard S1.6-1984

Technical Management Orawan Rakyong, Scientist (3)
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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372909
Date Received : Jun 30, 2023
Date Reported : Jul 06, 2023
Report Number : 2709670-1

Sample Number 2372909-6
Parameter Octave band
Location Sifter room (3rd Floor)
Measurement Date Jun 29, 2023
Measurement By Ronnachai Moungma

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:05 AM - 10:05 AM	84.1	32.9	47.1	58.3	72.7	78.7	78.5	77.6	73.6	70.1	65.0	56.3
10:05 AM - 11:05 AM	84.0	32.5	46.9	58.3	72.7	78.7	78.4	77.3	73.3	70.0	64.8	56.1
11:05 AM - 12:05 PM	84.8	31.2	49.6	60.0	73.2	79.8	79.4	77.8	73.7	70.4	64.8	56.6
12:05 PM - 01:05 PM	85.0	28.6	51.5	60.7	73.4	80.1	79.5	78.0	73.8	70.6	65.0	56.9
01:05 PM - 02:05 PM	84.7	30.9	50.0	60.5	73.3	79.7	79.0	77.8	73.7	70.3	64.9	56.7
02:05 PM - 03:05 PM	84.4	31.5	46.5	58.9	73.0	79.5	78.7	77.7	73.4	70.3	65.0	56.9
03:05 PM - 04:05 PM	84.3	33.2	46.7	58.9	72.9	78.9	78.8	77.6	73.3	70.4	65.3	57.1
04:05 PM - 05:05 PM	84.2	33.4	46.3	59.1	72.9	78.7	78.5	78.0	73.8	70.4	65.4	57.0
05:05 PM - 06:05 PM	84.3	33.7	46.3	59.1	72.8	78.7	78.6	78.0	73.8	70.3	65.4	57.0
06:05 PM - 07:05 PM	84.3	33.1	47.3	58.5	72.9	78.9	78.7	77.8	73.8	70.3	65.2	56.5
07:05 PM - 08:05 PM	84.6	31.0	49.4	59.8	73.0	79.6	79.2	77.6	73.5	70.2	64.6	56.4
08:05 PM - 09:05 PM	84.5	30.7	49.8	60.3	73.1	79.5	78.8	77.6	73.5	70.1	64.7	56.5
Average	84.4	32.1	48.5	59.4	73.0	79.3	78.9	77.7	73.6	70.3	65.0	56.7

Reference Method : ANSI Standard S1.6-1984

Technical Management Orawan Rakyong, Scientist (3)
Approved by Supot Salamteh, Section Head

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372909
Date Received : Jun 30, 2023
Date Reported : Jul 06, 2023
Report Number : 2709671-1

Sample Number 2372909-7
Parameter Octave band
Location Rotex SZ 1080 (3rd Floor)
Measurement Date Jun 29, 2023
Measurement By Ronnachai Moungma

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:02 AM - 10:02 AM	82.6	29.5	42.2	55.0	68.2	72.1	74.9	77.8	75.8	72.9	69.5	58.8
10:02 AM - 11:02 AM	82.5	29.9	42.3	54.7	68.0	72.0	74.8	77.5	76.0	73.2	69.7	58.8
11:02 AM - 12:02 PM	82.6	29.0	42.4	54.8	68.2	72.3	75.2	77.6	75.6	73.3	69.4	58.6
12:02 PM - 01:02 PM	82.8	29.6	42.7	54.8	68.2	72.5	75.3	77.9	76.0	73.4	69.7	59.0
01:02 PM - 02:02 PM	82.6	27.9	42.3	54.9	68.2	72.4	75.1	77.8	75.7	73.1	69.2	58.6
02:02 PM - 03:02 PM	82.6	27.1	42.2	54.7	68.3	72.6	75.2	77.9	75.4	72.7	68.8	58.0
03:02 PM - 04:02 PM	82.9	27.7	41.9	54.8	68.4	72.9	75.4	78.0	75.9	73.1	69.1	58.2
04:02 PM - 05:02 PM	82.9	28.1	42.0	54.9	68.5	72.9	75.7	78.1	75.7	73.4	69.3	58.6
05:02 PM - 06:02 PM	82.6	27.9	42.2	54.7	68.2	72.3	75.2	77.8	75.6	73.2	69.3	58.9
06:02 PM - 07:02 PM	82.6	30.0	42.4	54.8	68.1	72.1	74.9	77.6	76.1	73.3	69.8	58.9
07:02 PM - 08:02 PM	82.7	29.5	42.6	54.7	68.1	72.4	75.2	77.8	75.9	73.3	69.6	58.9
08:02 PM - 09:02 PM	82.8	27.3	42.4	54.9	68.5	72.8	75.4	78.1	75.6	72.9	69.0	58.2
Average	82.7	28.7	42.3	54.8	68.2	72.5	75.2	77.8	75.8	73.2	69.4	58.6

Reference Method : ANSI Standard S1.6-1984

Technical Management Orawan Rakyong, Scientist (3)
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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372909
Date Received : Jun 30, 2023
Date Reported : Jul 06, 2023
Report Number : 2709672-1

Sample Number 2372909-8
Parameter Octave band
Location K Tron PC1060 (3rd Floor)
Measurement Date Jun 29, 2023
Measurement By Ronnachai Moungma

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:18 AM - 10:18 AM	85.0	24.9	44.4	50.4	66.4	72.4	73.8	75.2	75.1	79.7	79.5	73.9
10:18 AM - 11:18 AM	84.9	25.0	44.6	50.4	66.4	72.5	73.9	75.0	75.3	79.5	79.3	73.7
11:18 AM - 12:18 PM	76.9	25.9	41.6	49.6	61.8	67.6	69.0	70.8	71.6	67.1	62.7	51.1
12:18 PM - 01:18 PM	76.3	26.2	41.8	49.8	61.9	66.2	68.3	70.1	71.4	66.6	62.5	51.0
01:18 PM - 02:18 PM	77.7	26.4	43.6	50.0	62.3	68.7	69.2	70.9	71.4	69.0	67.2	61.1
02:18 PM - 03:18 PM	82.9	25.6	43.5	50.1	64.1	71.1	72.2	74.0	73.3	77.3	76.9	71.3
03:18 PM - 04:18 PM	84.4	25.6	43.9	50.4	64.6	72.8	73.5	75.0	74.8	78.9	78.5	73.0
04:18 PM - 05:18 PM	85.1	25.6	44.4	50.3	64.7	72.7	74.1	75.5	75.6	79.7	79.3	73.8
05:18 PM - 06:18 PM	85.1	25.6	44.4	50.3	64.3	72.6	74.1	75.4	75.9	79.7	79.3	73.8
06:18 PM - 07:18 PM	85.2	25.1	44.6	50.6	66.6	72.6	74.0	75.4	75.3	79.9	79.7	74.1
07:18 PM - 08:18 PM	84.7	25.9	44.2	50.7	64.9	73.1	73.8	75.3	75.1	79.2	78.8	73.3
08:18 PM - 09:18 PM	85.3	25.8	44.6	50.5	64.9	72.9	74.3	75.7	75.8	79.9	79.5	74.0
Average	83.8	25.7	43.9	50.3	64.7	71.7	73.0	74.4	74.5	78.2	77.9	72.3

Reference Method : ANSI Standard S1.6-1984

Technical Management Orawan Rakyong, Scientist (3)
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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372909
Date Received : Jun 30, 2023
Date Reported : Jul 06, 2023
Report Number : 2709673-1

Sample Number 2372909-9
Parameter Octave band
Location Control Room (1st Floor)
Measurement Date Jun 29, 2023
Measurement By Ronnachai Moungma

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:22 PM - 10:22 PM	58.1	8.8	22.3	33.2	39.1	47.4	52.5	53.3	51.5	45.8	41.3	31.5
10:22 PM - 11:22 PM	55.7	9.3	22.0	29.8	37.7	44.8	48.6	50.2	50.7	45.3	36.1	27.8
11:22 PM - 12:22 AM	55.7	8.9	21.7	33.1	37.9	44.8	48.6	50.7	50.3	45.2	36.4	26.8
12:22 AM - 01:22 AM	59.8	9.1	22.2	44.7	41.7	48.3	51.6	53.2	56.0	47.6	43.1	34.1
01:22 AM - 02:22 AM	60.3	9.0	22.0	48.0	43.2	48.4	51.7	55.1	55.5	47.6	44.9	36.5
02:22 AM - 03:22 AM	59.0	8.9	21.6	41.9	39.4	46.4	54.0	53.1	52.9	47.8	41.1	28.7
03:22 AM - 04:22 AM	62.3	9.3	21.2	36.4	39.0	46.7	57.8	56.8	55.2	52.5	43.9	31.4
04:22 AM - 05:22 AM	55.2	10.3	21.3	32.6	38.0	43.8	48.1	49.7	50.4	44.3	36.3	28.1
05:22 AM - 06:22 AM	60.7	9.1	26.3	51.1	43.6	46.9	52.0	54.2	54.4	49.7	52.0	44.1
06:22 AM - 07:22 AM	58.9	10.4	23.6	43.5	40.4	46.4	52.7	54.2	52.5	46.7	43.8	36.8
07:22 AM - 08:22 AM	69.6	10.5	24.5	29.9	42.4	53.3	65.3	65.2	62.5	55.1	44.3	33.4
08:22 AM - 09:22 AM	62.7	10.2	24.8	29.8	38.4	47.0	57.1	57.5	57.5	51.9	39.7	28.6
Average	62.0	9.5	23.1	43.6	40.6	47.8	56.8	57.1	55.8	49.6	44.4	35.8

Reference Method : ANSI Standard S1.6-1984

Technical Management Orawan Rakyong, Scientist (3)
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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372909
Date Received : Jun 30, 2023
Date Reported : Jul 06, 2023
Report Number : 2709674-1

Sample Number 2372909-10
Parameter Octave band
Location BH 1101 (4th Floor)
Measurement Date Jun 29, 2023
Measurement By Ronnachai Moungma

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:11 AM - 10:11 AM	87.5	32.9	49.4	52.4	69.1	78.3	83.1	83.2	74.2	73.6	72.3	58.6
10:11 AM - 11:11 AM	86.8	33.0	49.2	52.0	68.5	77.9	82.6	82.6	72.7	72.4	71.1	57.2
11:11 AM - 12:11 PM	85.3	32.6	50.1	51.6	67.8	77.0	82.0	80.2	69.5	69.3	66.8	55.3
12:11 PM - 01:11 PM	85.1	32.1	50.2	51.5	67.7	76.8	81.7	80.1	69.3	69.1	66.8	55.4
01:11 PM - 02:11 PM	85.1	32.5	49.9	51.4	67.8	76.7	81.5	80.4	69.3	69.1	66.7	55.3
02:11 PM - 03:11 PM	85.7	32.3	49.4	51.2	68.2	77.3	82.0	81.1	71.3	70.2	67.8	55.8
03:11 PM - 04:11 PM	86.8	33.0	49.6	51.9	68.8	77.9	82.7	82.5	73.4	71.9	69.9	57.4
04:11 PM - 05:11 PM	88.2	32.7	50.1	52.3	69.4	78.2	83.1	84.9	76.2	73.4	71.6	58.7
05:11 PM - 06:11 PM	88.3	32.4	50.3	52.5	69.6	78.5	83.7	84.8	75.0	73.1	71.6	58.2
06:11 PM - 07:11 PM	87.8	33.2	49.7	52.7	69.4	78.6	83.4	83.5	74.5	73.9	72.6	58.9
07:11 PM - 08:11 PM	85.7	33.0	50.5	52.0	68.2	77.4	82.4	80.6	69.9	69.7	67.2	55.7
08:11 PM - 09:11 PM	87.3	33.5	50.1	52.4	69.3	78.4	83.2	83.0	73.9	72.4	70.4	57.9
Average	86.8	32.8	49.9	52.0	68.7	77.8	82.7	82.6	73.0	71.9	70.1	57.2

Reference Method : ANSI Standard S1.6-1984

Technical Management Orawan Rakyong, Scientist (3)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372909
Date Received : Jun 30, 2023
Date Reported : Jul 06, 2023
Report Number : 2709675-1

Sample Number 2372909-11
Parameter Octave band
Location EM Room (1st Floor)
Measurement Date Jun 29, 2023
Measurement By Ronnachai Moungma

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:07 PM - 10:07 PM	82.1	24.4	43.4	57.6	67.2	73.1	74.8	76.0	74.8	74.1	70.4	58.4
10:07 PM - 11:07 PM	82.1	24.4	43.4	57.6	67.2	73.1	74.7	76.0	74.8	74.1	70.4	58.4
11:07 PM - 12:07 AM	81.8	24.7	43.3	57.3	66.5	72.6	74.3	75.8	74.8	73.7	70.2	58.2
12:07 AM - 01:07 AM	82.7	25.0	44.0	58.1	67.9	74.1	75.5	76.3	75.3	74.6	70.5	58.4
01:07 AM - 02:07 AM	82.4	24.9	43.7	58.0	67.4	73.7	75.2	76.1	75.1	74.2	70.3	58.6
02:07 AM - 03:07 AM	81.6	24.8	43.1	57.5	65.8	72.3	74.4	75.4	74.5	73.4	69.8	58.2
03:07 AM - 04:07 AM	81.7	24.4	43.6	56.8	65.9	72.8	74.6	75.7	74.3	73.5	70.0	58.0
04:07 AM - 05:07 AM	81.9	24.3	43.7	56.8	66.0	72.8	74.4	76.0	74.7	73.5	70.0	58.0
05:07 AM - 06:07 AM	81.7	24.3	44.5	56.7	66.0	72.7	74.1	76.0	74.1	73.3	69.9	57.8
06:07 AM - 07:07 AM	81.5	24.3	43.6	55.7	65.3	72.4	73.8	75.9	74.1	73.1	69.8	57.8
07:07 AM - 08:07 AM	81.6	24.3	43.4	55.6	65.3	72.5	73.8	76.0	74.2	73.2	70.1	58.0
08:07 AM - 09:07 AM	81.7	24.4	43.7	56.2	65.8	72.9	74.3	75.7	74.5	73.6	70.2	58.4
Average	81.9	24.5	43.6	57.1	66.4	72.9	74.5	75.9	74.6	73.7	70.1	58.2

Reference Method : ANSI Standard S1.6-1984

Technical Management Orawan Rakyong, Scientist (3)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372909
Date Received : Jun 30, 2023
Date Reported : Jul 06, 2023
Report Number : 2709676-1

Sample Number 2372909-12
Parameter Octave band
Location Utility Room (1st Floor)
Measurement Date Jun 29, 2023
Measurement By Ronnachai Moungma

Time	Result (dB(A))											
	Leq	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
09:15 PM - 10:15 PM	90.6	30.9	44.4	56.5	65.6	69.1	77.5	81.2	82.1	88.0	81.9	65.6
10:15 PM - 11:15 PM	90.5	30.9	44.4	56.9	65.7	69.2	77.6	81.1	82.1	87.8	81.7	65.5
11:15 PM - 12:15 AM	90.4	31.0	44.3	56.7	65.6	69.2	78.2	81.1	82.1	87.6	81.6	65.5
12:15 AM - 01:15 AM	90.0	30.9	44.7	56.4	65.4	69.1	78.7	80.9	81.7	87.1	81.1	65.1
01:15 AM - 02:15 AM	89.8	30.8	44.7	56.6	65.6	69.2	78.1	80.8	81.0	87.0	80.8	64.6
02:15 AM - 03:15 AM	90.6	30.8	44.8	56.9	65.7	69.2	78.7	80.9	82.7	87.8	81.7	65.5
03:15 AM - 04:15 AM	90.3	30.9	44.8	56.9	65.6	69.2	78.6	80.8	82.3	87.4	81.5	65.5
04:15 AM - 05:15 AM	90.4	30.8	44.7	56.8	65.6	69.0	78.3	81.0	82.2	87.6	81.7	65.4
05:15 AM - 06:15 AM	90.6	31.0	44.8	56.4	65.4	69.3	78.7	80.9	82.6	87.8	81.7	65.3
06:15 AM - 07:15 AM	90.4	31.1	44.6	57.0	65.5	69.1	78.8	80.9	82.6	87.5	81.5	65.3
07:15 AM - 08:15 AM	91.1	30.9	44.5	56.4	65.5	68.9	78.7	80.9	82.2	88.6	82.4	65.0
08:15 AM - 09:15 AM	86.5	30.6	44.2	56.4	65.4	68.7	77.0	80.8	79.6	81.3	75.8	61.5
Average	90.2	30.9	44.6	56.7	65.6	69.1	78.3	80.9	82.0	87.4	81.3	65.1

Reference Method : ANSI Standard S1.6-1984

Technical Management Orawan Rakyong, Scientist (3)
Approved by Supot Salamteh, Section Head

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333266
Date Received : Mar 29, 2023
Date Reported : Apr 06, 2023
Report Number : 2603863-1 Rev. No.1

Sample Number 2333266-1
Sampled Date Mar 27, 2023
Sample Description Noise Dose
Location Operator Technician
Personal Sampling คณปิยะนัฐ พุทธโคตร
Date Analysis Commenced Mar 30, 2023

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:30 AM - 08:30 PM	%	-	-	34.7	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	08:30 AM - 08:30 PM	%	-	1	32.4	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	08:30 AM - 08:30 PM	dB(A)	-	-	78.4	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	08:30 AM - 08:30 PM	dB(A)	-	-	80.1	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

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

Note : 1.LCpeak = 140.0 dB (C)
2.This Analysis test report is reissued to supersede report No. 2603863-1 Date Reported : Apr 04, 2023 due to revise analytical information.

Sampled By : Supot Salamteh

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

Approved by Wichan Choonharat, Assistant Manager

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333266
Date Received : Mar 29, 2023
Date Reported : Apr 06, 2023
Report Number : 2603863-1 Rev. No.1

Sample Number 2333266-2
Sampled Date Mar 27, 2023
Sample Description Noise Dose
Location Shift Leader
Personal Sampling คุณสมศักดิ์ โกระวิโยธิน
Date Analysis Commenced Mar 30, 2023

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:30 AM - 08:30 PM	%	-	-	20.0	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	08:30 AM - 08:30 PM	%	-	1	18.6	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	08:30 AM - 08:30 PM	dB(A)	-	-	76.0	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	08:30 AM - 08:30 PM	dB(A)	-	-	77.7	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)
Note : 1.LCpeak = 134.7 dB (C)
2.This Analysis test report is reissued to supersede report No. 2603863-1 Date Reported : Apr 04, 2023 due to revise analytical information.
Sampled By : Supot Salamteh

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

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Approved by
Wichan Choonharat
Assistant Manager

Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333266
Date Received : Mar 29, 2023
Date Reported : Apr 06, 2023
Report Number : 2603863-1 Rev. No.1

Sample Number 2333266-4
Sampled Date Mar 27, 2023
Sample Description Noise Dose
Location Packaging Technician
Personal Sampling คุณสวัสดิ์ มาจวง
Date Analysis Commenced Mar 30, 2023

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:30 AM - 08:30 PM	%	-	-	24.0	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	08:30 AM - 08:30 PM	%	-	1	22.4	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	08:30 AM - 08:30 PM	dB(A)	-	-	76.8	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	08:30 AM - 08:30 PM	dB(A)	-	-	78.5	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)
Note : 1.LCpeak = 129.2 dB (C)
2.This Analysis test report is reissued to supersede report No. 2603863-1 Date Reported : Apr 04, 2023 due to revise analytical information.
Sampled By : Supot Salamteh

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

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Wichan Choonharat
Assistant Manager

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333270
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2603873-1

Sample Number 2333270-1
Sampled Date Mar 27, 2023
Sample Description Noise Dose
Location Mechanical Technician
Personal Sampling คุณจงกล ปิมมา
Date Analysis Commenced Mar 30, 2023

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (8 hrs.)	08:30 AM - 04:30 PM	%	-	1	63.1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	08:30 AM - 04:30 PM	dB(A)	-	-	83.0	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
Note : LCpeak = 131.7 dB (C)
Sampled By : Supot Salamteh

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

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Wichan Choonharat
Assistant Manager

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2372451
Date Received : Jun 27, 2023
Date Reported : Jun 30, 2023
Report Number : 2693724-1

Sample Number 2372451-1
Sampled Date Jun 23, 2023
Sample Description Noise Dose
Location E&I Technician
Personal Sampling คุณวราเทพ พราหมณ์ทอง
Date Analysis Commenced Jun 29, 2023

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	%	-	-	93.3	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	08:00 AM - 08:00 PM	%	-	1	89.1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	dB(A)	-	-	82.7	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	08:00 AM - 08:00 PM	dB(A)	-	-	84.5	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)
Note : LCpeak = 130.4 dB(C)

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

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372927
Date Received : Jun 30, 2023
Date Reported : Jul 04, 2023
Report Number : 2694393-1

Sample Number 2372927-1
Sampled Date Jun 29, 2023
Sample Description Noise Dose
Location Operator Technician
Personal Sampling คุณปิยะนัฐ พุทธโคตร
Date Analysis Commenced Jul 04, 2023

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	%	-	-	81.3	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	08:00 AM - 08:00 PM	%	-	1	75.9	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	dB(A)	-	-	82.1	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	08:00 AM - 08:00 PM	dB(A)	-	-	83.8	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)
Note : LCpeak = 131.7 dB (C)

Sampled By : Supot Salamteh

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

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Wichan Choonharat
Assistant Manager

Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372927
Date Received : Jun 30, 2023
Date Reported : Jul 04, 2023
Report Number : 2694393-1

Sample Number 2372927-2
Sampled Date Jun 29, 2023
Sample Description Noise Dose
Location Shift Leader
Personal Sampling คุณกวเตช์ ศรีทอง
Date Analysis Commenced Jul 04, 2023

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	%	-	-	1.1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	08:00 AM - 08:00 PM	%	-	1	1.0	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	dB(A)	-	-	63.5	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	08:00 AM - 08:00 PM	dB(A)	-	-	65.2	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)
Note : LCpeak = 125.5 dB (C)

Sampled By : Supot Salamteh

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

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Approved by
Wichan Choonharat
Assistant Manager

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372927
Date Received : Jun 30, 2023
Date Reported : Jul 04, 2023
Report Number : 2694393-1

Sample Number 2372927-3
Sampled Date Jun 29, 2023
Sample Description Noise Dose
Location E&I Technician
Personal Sampling คุณสุพจน์ สุพร
Date Analysis Commenced Jul 04, 2023

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	%	-	-	182	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	08:00 AM - 08:00 PM	%	-	1	170	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	dB(A)	-	-	85.6	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	08:00 AM - 08:00 PM	dB(A)	-	-	87.3	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)
Note : LCpeak = 140.2 dB (C)

Sampled By : Supot Salamteh

Remark :
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Analysis / Test Report

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111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372927
Date Received : Jun 30, 2023
Date Reported : Jul 04, 2023
Report Number : 2694393-1

Sample Number 2372927-4
Sampled Date Jun 29, 2023
Sample Description Noise Dose
Location Packaging Technician
Personal Sampling คุณเกียรติชัย ชมภูทิพย์
Date Analysis Commenced Jul 04, 2023

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	%	-	-	398	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
Noise Dose (8 hrs.)	08:00 AM - 08:00 PM	%	-	1	372	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (12 hrs.) (Calculated from Lavg)	08:00 AM - 08:00 PM	dB(A)	-	-	89.0	83*	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	08:00 AM - 08:00 PM	dB(A)	-	-	90.7	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
* MOL: Recommended guideline limit for 12 working hours should not be over 83 dB(A)
Note : LCpeak = 138.4 dB (C)

Sampled By : Supot Salamteh

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372929
Date Received : Jun 30, 2023
Date Reported : Jul 04, 2023
Report Number : 2694396-1

Sample Number 2372929-1
Sampled Date Jun 29, 2023
Sample Description Noise Dose
Location Mechanical Technician
Personal Sampling คุณจงกล มีมา
Date Analysis Commenced Jul 04, 2023

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Noise Dose (8 hrs.)	08:00 AM - 04:00 PM	%	-	1	63.1	No Standard	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok
TWA (8 hrs.)	08:00 AM - 04:00 PM	dB(A)	-	-	83.0	85	MOL, Department Labour Protection and Welfare (B.E.2561)	MOL	Bangkok

Guideline :
MOL : 1. Notification of Department Labour Protection and Welfare on the Criteria and Procedures for Measurement and Analysis of Working Conditions in relation to Heat, Light or Noise Levels, including Duration and Types of Business that must perform (B.E. 2561)
2. Notification of Department of Labour Protection and Welfare on the Standard of Time Weighted Average (TWA) Noise Level (B.E. 2561)
Note : LCpeak = 129.6 dB (C)
Sampled By : Supot Salamteh

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333235
Date Received : Mar 29, 2023
Date Reported : Apr 18, 2023
Report Number : 2603947-1

Sample Number 2333235-1
Sampled Date Mar 29, 2023
Sample Description Air Quality
Location AA Storage Tank area
Date Analysis Commenced Mar 30, 2023
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 757 mmHg
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	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 : Supot Salamteh

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Approved by
Orawan Rakyong
Scientist (3)

Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333235
Date Received : Mar 29, 2023
Date Reported : Apr 18, 2023
Report Number : 2603947-1

Sample Number 2333235-2
Sampled Date Mar 29, 2023
Sample Description Air Quality
Location Mix Tank Room area 1st
Date Analysis Commenced Mar 30, 2023
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 757 mmHg
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	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 : Supot Salamteh

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Orawan Rakyong
Scientist (3)

Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333235
Date Received : Mar 29, 2023
Date Reported : Apr 18, 2023
Report Number : 2603947-1

Sample Number 2333235-3
Sampled Date Mar 29, 2023
Sample Description Air Quality
Location Mix Tank Room area 2nd
Date Analysis Commenced Mar 30, 2023
Condition of Sample Drawn into one sorbent tube, refrigerated
Barometric Pressure 757 mmHg
Atmospheric Temperature 30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	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 : Supot Salamteh

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Analysis / Test Report

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111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333235
Date Received : Mar 29, 2023
Date Reported : Apr 18, 2023
Report Number : 2603947-1

Sample Number	2333235-4
Sampled Date	Mar 29, 2023
Sample Description	Air Quality
Location	Stripping column 3rd floor
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	757 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	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 : Supot Salamteh

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Orawan Rakyong
Scientist (3)

Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333235
Date Received : Mar 29, 2023
Date Reported : Apr 18, 2023
Report Number : 2603947-1

Sample Number	2333235-5
Sampled Date	Mar 29, 2023
Sample Description	Air Quality
Location	QA lab
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	757 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	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 : Supot Salamteh

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333235
Date Received : Mar 29, 2023
Date Reported : Apr 18, 2023
Report Number : 2603947-1

Sample Number	2333235-6
Sampled Date	Mar 29, 2023
Sample Description	Air Quality
Location	RD lab
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	757 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	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 : Supot Salamteh

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Analysis / Test Report

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111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333235
Date Received : Mar 29, 2023
Date Reported : Apr 18, 2023
Report Number : 2603947-1

Sample Number	2333235-7
Sampled Date	Mar 28, 2023
Sample Description	Air Quality
Location	Unloading Technician
Personal Sampling	คุณกฤษณะ สมบัติ
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into one filter paper placed in plastic cassette and two sorbent tubes, refrigerated
Barometric Pressure	757 mmHg
Atmospheric Temperature	31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok
Propylene glycol	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	Bangkok
Sodium hydroxide as NaOH	10:00 AM - 12:00 PM	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 : Supot Salamteh

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333235
Date Received : Mar 29, 2023
Date Reported : Apr 18, 2023
Report Number : 2603947-1

Sample Number	2333235-8
Sampled Date	Mar 28, 2023
Sample Description	Air Quality
Location	Operator Technician
Personal Sampling	คุณปิยะมัฐ พงรโคราช
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into two sorbent tubes, refrigerated
Barometric Pressure	757 mmHg
Atmospheric Temperature	31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok
Propylene glycol	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	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 : Supot Salamteh

Remark :
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Analysis / Test Report

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111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333235
Date Received : Mar 29, 2023
Date Reported : Apr 18, 2023
Report Number : 2603947-1

Sample Number	2333235-9
Sampled Date	Mar 29, 2023
Sample Description	Air Quality
Location	PG Storage Tank area
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	757 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Propylene glycol	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	Bangkok

Guideline :
Sampled By : Supot Salamteh

Remark :
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Analysis / Test Report

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111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333235
Date Received : Mar 29, 2023
Date Reported : Apr 18, 2023
Report Number : 2603947-1

Sample Number	2333235-10
Sampled Date	Mar 29, 2023
Sample Description	Air Quality
Location	Coating Room area
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	757 mmHg
Atmospheric Temperature	30.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Propylene glycol	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	Bangkok

Guideline :
Sampled By : Supot Salamteh

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

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Approved by
Orawan Rakyong
Scientist (3)

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333272
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2603905-1

Sample Number	2333272-1
Sampled Date	Mar 28, 2023
Sample Description	Air Quality
Location	Packaging Area
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into three filter papers placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	31.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong
Total Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	15	Based on NIOSH (1994), 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Supot Salamteh

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

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Approved by
Thanita Kulsuriwong
Scientist (4)

Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333272
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2603905-1

Sample Number	2333272-2
Sampled Date	Mar 28, 2023
Sample Description	Air Quality
Location	Roller Mill Area
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into three filter papers placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	31.0 ℃

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong
Total Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	15	Based on NIOSH (1994), 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Supot Salamteh

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

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Thanita Kulsuriwong
Scientist (4)

Analysis / Test Report

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333272
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2603905-1

Sample Number	2333272-3
Sampled Date	Mar 28, 2023
Sample Description	Air Quality
Location	EM Room area
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into three filter papers placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	31.0 ℃

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong
Total Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	15	Based on NIOSH (1994), 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Supot Salamteh

Remark :
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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333272
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2603905-1

Sample Number	2333272-4
Sampled Date	Mar 28, 2023
Sample Description	Air Quality
Location	Zig Zag Area
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into three filter papers placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	31.0 ℃

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong
Total Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	0.31	15	Based on NIOSH (1994), 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Supot Salamteh

Remark :
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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333272
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2603905-1

Sample Number	2333272-5
Sampled Date	Mar 28, 2023
Sample Description	Air Quality
Location	TS Lab
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into three filter papers placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	26.0 ℃

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong
Total Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	0.94	15	Based on NIOSH (1994), 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Supot Salamteh

Remark :
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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333272
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2603905-1

Sample Number	2333272-6
Sampled Date	Mar 28, 2023
Sample Description	Air Quality
Location	Shift Leader
Personal Sampling	คุณสมศักดิ์ โกระวิโยธิน
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into one filter paper placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	31.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	0.21	5	Based on NIOSH (1998), 0600	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Supot Salamteh

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333272
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2603905-1

Sample Number	2333272-7
Sampled Date	Mar 28, 2023
Sample Description	Air Quality
Location	Operator Technician
Personal Sampling	คุณเปี๊ยะบัฐ พุทธโครต
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into one filter paper placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	31.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Supot Salamteh

Remark :
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Thanita Kulsuriwong
Scientist (4)

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333272
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2603905-1

Sample Number	2333272-8
Sampled Date	Mar 28, 2023
Sample Description	Air Quality
Location	Machanical Technician
Personal Sampling	คุณจงกล ปีมมา
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into one filter paper placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	31.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Supot Salamteh

Remark :
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Thanita Kulsuriwong
Scientist (4)

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333272
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2603905-1

Sample Number	2333272-9
Sampled Date	Mar 28, 2023
Sample Description	Air Quality
Location	Packaging Technician
Personal Sampling	คุณสวัสดิ์ ผาจวง
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into one filter paper placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	31.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Supot Salamteh

Remark :
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Thanita Kulsuriwong
Scientist (4)

Analysis / Test Report

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P/O :
Project Name : Monitoring
Project Location :

Lot ID: 2333272
Date Received : Mar 29, 2023
Date Reported : Apr 04, 2023
Report Number : 2603905-1

Sample Number	2333272-10
Sampled Date	Mar 28, 2023
Sample Description	Air Quality
Location	TS Technician
Personal Sampling	คุณเกษรินทร์ พลเยี่ยม
Date Analysis Commenced	Mar 30, 2023
Condition of Sample	Drawn into one filter paper placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	26.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	0.48	5	Based on NIOSH (1998), 0600	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Supot Salamteh

Remark :
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Thanita Kulsuriwong
Scientist (4)

Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372931
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number : 2694399-1

Sample Number	2372931-1
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	Packaging Area
Date Analysis Commenced	Jun 30, 2023
Condition of Sample	Drawn into two filter papers placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong
Total Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	15	Based on NIOSH (1994), 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Saknarin Jaraskay

Remark :
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Thanita Kulsuriwong
Scientist (4)

Analysis / Test Report

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372931
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number : 2694399-1

Sample Number	2372931-2
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	Roller Mill Area
Date Analysis Commenced	Jun 30, 2023
Condition of Sample	Drawn into two filter papers placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong
Total Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	15	Based on NIOSH (1994), 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Saknarin Jaraskay

Remark :
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Thanita Kulsuriwong
Scientist (4)

Analysis / Test Report

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372931
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number : 2694399-1

Sample Number	2372931-3
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	EM Room area
Date Analysis Commenced	Jun 30, 2023
Condition of Sample	Drawn into two filter papers placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong
Total Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	15	Based on NIOSH (1994), 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Saknarin Jaraskay

Remark :
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Thanita Kulsuriwong
Scientist (4)

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372931
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number : 2694399-1

Sample Number 2372931-4
Sampled Date Jun 29, 2023
Sample Description Air Quality
Location Zig Zag Area
Date Analysis Commenced Jun 30, 2023
Condition of Sample Drawn into two filter papers placed in plastic cassette
Barometric Pressure 756 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong
Total Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	15	Based on NIOSH (1994), 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Saknarin Jaraskay

Remark :
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ThanitaK.
Thanita Kulsuriwong
Scientist (4)

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372931
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number : 2694399-1

Sample Number 2372931-5
Sampled Date Jun 29, 2023
Sample Description Air Quality
Location TS Lab
Date Analysis Commenced Jun 30, 2023
Condition of Sample Drawn into two filter papers placed in plastic cassette
Barometric Pressure 756 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	01:30 PM - 03:30 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong
Total Dust	01:30 PM - 03:30 PM	mg/m3	-	0.15	<0.15	15	Based on NIOSH (1994), 0500	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Saknarin Jaraskay

Remark :
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ThanitaK.
Thanita Kulsuriwong
Scientist (4)

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372931
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number : 2694399-1

Sample Number 2372931-6
Sampled Date Jun 29, 2023
Sample Description Air Quality
Location Shift Leader
Personal Sampling คุณกุวเดช ศิริทอง
Date Analysis Commenced Jun 30, 2023
Condition of Sample Drawn into one filter paper placed in plastic cassette
Barometric Pressure 756 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Saknarin Jaraskay

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

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Approved by
ThanitaK.
Thanita Kulsuriwong
Scientist (4)

Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372931
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number : 2694399-1

Sample Number 2372931-7
Sampled Date Jun 29, 2023
Sample Description Air Quality
Location Operator Technician
Personal Sampling คุณเบียะบัฐ พุทธโคต
Date Analysis Commenced Jun 30, 2023
Condition of Sample Drawn into one filter paper placed in plastic cassette
Barometric Pressure 756 mmHg
Atmospheric Temperature 32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Saknarin Jaraskay

Remark :
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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372931
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number : 2694399-1

Sample Number	2372931-8
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	Machanical Technician
Personal Sampling	คุณจงกล ปิ่นมา
Date Analysis Commenced	Jun 30, 2023
Condition of Sample	Drawn into one filter paper placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Saknarin Jaraskay

Remark :
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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372931
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number : 2694399-1

Sample Number	2372931-9
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	Packaging Technician
Personal Sampling	คุณเกียรติชัย ชมภูทิพย์
Date Analysis Commenced	Jun 30, 2023
Condition of Sample	Drawn into one filter paper placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	<0.15	5	Based on NIOSH (1998), 0600	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Saknarin Jaraskay

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372931
Date Received : Jun 30, 2023
Date Reported : Jul 05, 2023
Report Number : 2694399-1

Sample Number	2372931-10
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	TS Technician
Personal Sampling	คุณเกษรินทร์ พลเยี่ยม
Date Analysis Commenced	Jun 30, 2023
Condition of Sample	Drawn into one filter paper placed in plastic cassette
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Respirable Dust	10:00 AM - 12:00 PM	mg/m3	-	0.15	0.17	5	Based on NIOSH (1998), 0600	OSHA	Rayong

Guideline :
OSHA : Occupational Safety and Health Administration
Sampled By : Saknarin Jaraskay

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372895
Date Received : Jun 30, 2023
Date Reported : Jul 14, 2023
Report Number : 2694296-1

Sample Number	2372895-1
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	AA Storage Tank area
Date Analysis Commenced	Jul 04, 2023
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	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 : Saknarin Jaraskay

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372895
Date Received : Jun 30, 2023
Date Reported : Jul 14, 2023
Report Number : 2694296-1

Sample Number	2372895-2
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	Mix Tank Room area 1st
Date Analysis Commenced	Jul 04, 2023
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	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 : Saknarin Jaraskay

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372895
Date Received : Jun 30, 2023
Date Reported : Jul 14, 2023
Report Number : 2694296-1

Sample Number	2372895-3
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	Mix Tank Room area 2nd
Date Analysis Commenced	Jul 04, 2023
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	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 : Saknarin Jaraskay

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372895
Date Received : Jun 30, 2023
Date Reported : Jul 14, 2023
Report Number : 2694296-1

Sample Number	2372895-4
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	Stripping column 3rd floor
Date Analysis Commenced	Jul 04, 2023
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	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 : Saknarin Jaraskay

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Analysis / Test Report

Client : BASF (Thai) Limited
111/3, 111/5 Moo 4, Eastern Seaboard Industrial Estate, Tambol Pluakdaeng, Amphur Pluakdaeng, Rayong Thailand 21140
P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372895
Date Received : Jun 30, 2023
Date Reported : Jul 14, 2023
Report Number : 2694296-1

Sample Number	2372895-5
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	QA lab
Date Analysis Commenced	Jul 04, 2023
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	01:30 PM - 03:30 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	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 : Saknarin Jaraskay

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372895
Date Received : Jun 30, 2023
Date Reported : Jul 14, 2023
Report Number : 2694296-1

Sample Number	2372895-6
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	RD lab
Date Analysis Commenced	Jul 04, 2023
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	01:30 PM - 03:30 PM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	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)
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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372895
Date Received : Jun 30, 2023
Date Reported : Jul 14, 2023
Report Number : 2694296-1

Sample Number	2372895-7
Sampled Date	Jun 30, 2023
Sample Description	Air Quality
Location	Unloading Technician
Personal Sampling	คุณกฤษณะ สมบัติ
Date Analysis Commenced	Jul 01, 2023
Condition of Sample	Drawn into one filter paper placed in plastic cassette and two sorbent tubes, refrigerated
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	09:00 AM - 11:00 AM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok
Propylene glycol	09:00 AM - 11:00 AM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	Bangkok
Sodium hydroxide as NaOH	09:00 AM - 11:00 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)
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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372895
Date Received : Jun 30, 2023
Date Reported : Jul 14, 2023
Report Number : 2694296-1

Sample Number	2372895-8
Sampled Date	Jun 30, 2023
Sample Description	Air Quality
Location	Operator Technician
Personal Sampling	คุณมิยะบัฮ พุทธโครส
Date Analysis Commenced	Jul 03, 2023
Condition of Sample	Drawn into two sorbent tubes, refrigerated
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Acrylic Acid	09:00 AM - 11:00 AM	ppm	-	0.10	<0.10	2	Based on OSHA, 28	MOL	Bangkok
Propylene glycol	09:00 AM - 11:00 AM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	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 : Saknarin Jaraskay

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372895
Date Received : Jun 30, 2023
Date Reported : Jul 14, 2023
Report Number : 2694296-1

Sample Number	2372895-9
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	PG Storage Tank area
Date Analysis Commenced	Jul 03, 2023
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 ºC

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Propylene glycol	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	Bangkok

Guideline :
Sampled By : Saknarin Jaraskay

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P/O : 4979696798
Project Name : Monitoring
Project Location :

Lot ID: 2372895
Date Received : Jun 30, 2023
Date Reported : Jul 14, 2023
Report Number : 2694296-1

Sample Number	2372895-10
Sampled Date	Jun 29, 2023
Sample Description	Air Quality
Location	Coating Room area
Date Analysis Commenced	Jul 03, 2023
Condition of Sample	Drawn into one sorbent tube, refrigerated
Barometric Pressure	756 mmHg
Atmospheric Temperature	32.0 °C

Analyte	Sampled Date/time	Unit	LOD	LOQ (LOR)	Result	Guideline Limit	Method	Guideline	Testing Location
Air Testing									
Propylene glycol	10:00 AM - 12:00 PM	ppm	-	0.10	<0.10	No Standard	NIOSH (1994), 5523	-	Bangkok

Guideline :

Sampled By : Saknarin Jaraskay

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ภาคผนวก ฎ

ใบรับรองการสอบเทียบเครื่องมือ

รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Stack (CEMs)	Oxides of Nitrogen	Analyzer , System calibration, Sta	-	-	-	-
Stack	Acrylic Acid	Console Control Unit	RYG_FS0315	13-Jan-23	13-Jul-23	6
Stack	Acrylic Acid	Flue gas Analyzer	RYG_FS0464	23-Jan-23	23-Jan-24	12
Stack	Acrylic Acid	Field Rotameter	BKK_FS1042	1-Apr-23	1-Jul-23	3
Stack	Acrylic Acid	HPLC	BKK_FL0083	2-Jun-22	2-Dec-23	18
Stack	Total Suspended Particulate	Console Control Unit	RYG_FS0315	13-Jan-23	13-Jul-23	6
Stack	Total Suspended Particulate	Console Control Unit	BKK_FS0518	13-Jan-23	13-Jul-23	6
Stack	Total Suspended Particulate	Flue gas Analyzer	RYG_FS0464	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
Stack	Total VOC	Console Control Unit	RYG_FS0315	13-Jan-23	13-Jul-23	6
Stack	Total VOC	Flue gas Analyzer	RYG_FS0464	23-Jan-23	23-Jan-24	12
Stack	Total VOC	FID Analyzer	BKK_FS0758	4-Jan-23	4-Jul-23	6
Ambient	Total Suspended Particulate	High Volume	RYG_FS0177	-	-	On site Calibration
Ambient	Total Suspended Particulate	High Volume	RYG_FS0396	-	-	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_FS0264	5-Jan-23	5-Jul-23	6
Ambient	Nitrogen Dioxide	NO_2 Analyzer	RYG_FS0261	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
Noise	Leq 24 hrs	Sound Calibrator	RYG_FS0496	17-Jan-23	17-Jan-24	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0627	26-Jan-23	26-Jan-24	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0628	26-Jan-23	26-Jan-24	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0624	23-Jan-23	23-Jan-24	12
Noise	Leq 24 hrs	Sound Level Meter	RYG_FS0629	26-Jan-23	26-Jan-24	12
Noise	Leq 12 hrs	Sound Calibrator	RYG_FS0496	17-Jan-23	17-Jan-24	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0615	12-Oct-22	12-Oct-23	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0616	12-Oct-22	12-Oct-23	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0617	20-Oct-22	20-Oct-23	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0618	20-Oct-22	20-Oct-23	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0619	20-Oct-22	20-Oct-23	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0620	20-Oct-22	20-Oct-23	12
Noise	Leq 12 hrs	Sound Calibrator	RYG_FS0496	17-Jan-23	17-Jan-24	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0431	25-Jan-23	25-Jan-24	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0437	7-Sep-22	7-Sep-23	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0438	7-Sep-22	7-Sep-23	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0439	7-Sep-22	7-Sep-23	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0491	13-Jan-23	13-Jan-24	12
Noise	Leq 12 hrs	Sound Level Meter	RYG_FS0492	13-Jan-23	13-Jan-24	12
Noise	Octave band	Sound Calibrator	RYG_FS0496	17-Jan-23	17-Jan-24	12
Noise	Octave band	Sound Level Meter	RYG_FS0615	12-Oct-22	12-Oct-23	12
Noise	Octave band	Sound Level Meter	RYG_FS0616	12-Oct-22	12-Oct-23	12
Noise	Octave band	Sound Level Meter	RYG_FS0617	20-Oct-22	20-Oct-23	12
Noise	Octave band	Sound Level Meter	RYG_FS0618	20-Oct-22	20-Oct-23	12
Noise	Octave band	Sound Level Meter	RYG_FS0619	20-Oct-22	20-Oct-23	12
Noise	Octave band	Sound Level Meter	RYG_FS0620	20-Oct-22	20-Oct-23	12
Noise	Octave band	Sound Calibrator	RYG_FS0496	17-Jan-23	17-Jan-24	12
Noise	Octave band	Sound Level Meter	RYG_FS0431	25-Jan-23	25-Jan-24	12
Noise	Octave band	Sound Level Meter	RYG_FS0437	7-Sep-22	7-Sep-23	12
Noise	Octave band	Sound Level Meter	RYG_FS0438	7-Sep-22	7-Sep-23	12
Noise	Octave band	Sound Level Meter	RYG_FS0439	7-Sep-22	7-Sep-23	12
Noise	Octave band	Sound Level Meter	RYG_FS0491	13-Jan-23	13-Jan-24	12
Noise	Octave band	Sound Level Meter	RYG_FS0492	13-Jan-23	13-Jan-24	12
Noise	Noise Dose, TWA	Dose Badge Reader	RYG_FS0210	1-Dec-22	1-Dec-23	12
Noise	Noise Dose, TWA	Dose Badge Reader	RYG_FS0440	5-Jan-23	5-Jan-24	12
Noise	Noise Dose, TWA	Dose Badge Reader	RYG_FS0211	1-Nov-22	1-Nov-23	12

รายการเครื่องมือที่ใช้ในการวิเคราะห์ / ทดสอบ

Sample Name	Parameter	Equipment Name	ID No.	Calibrated Date	Next Cal	Freq. Calibrate (Months)
Workplace	Acrylic Acid	Field Rotameter	RYG_FS0199	3-Jan-23	3-Apr-23	12
Workplace	Acrylic Acid	Field Rotameter	RYG_FS0199	1-Apr-23	1-Jul-23	12
Workplace	Acrylic Acid	HPLC	BKK_FL0083	2-Jun-22	2-Dec-23	18
Workplace	Total Dust	Field Rotameter	RYG_FS0197	3-Jan-23	3-Apr-23	3
Workplace	Total Dust	Field Rotameter	RYG_FS0198	1-Apr-23	1-Jul-23	3
Workplace	Total Dust	Analytical Balance 5 D.	RYG_EN0004	1-Mar-23	1-Mar-24	12
Workplace	Respirable Dust	Field Rotameter	RYG_FS0197	3-Jan-23	3-Apr-23	3
Workplace	Respirable Dust	Field Rotameter	RYG_FS0198	1-Apr-23	1-Jul-23	3
Workplace	Respirable Dust	Analytical Balance 5 D.	RYG_EN0004	1-Mar-23	1-Mar-24	12
Workplace	Propylene Glycol	Field Rotameter	BKK_FS1004	3-Jan-23	3-Apr-23	3
Workplace	Propylene Glycol	Field Rotameter	BKK_FS1005	1-Apr-23	1-Jul-23	3
Workplace	Propylene Glycol	GC-FID	BKK_EN0126	21-Apr-23	21-Oct-24	18
Rayong Lab	BOD (5 days at 20°C)	DO meter with Sensor	RYG_EN0032	14-Feb-22	15-Aug-23	18
Rayong Lab	BOD (5 days at 20°C)	Incubator	RYG_EN0154	22-Apr-22	21-Oct-23	18
Rayong Lab	COD	SPECTROPHOTOMETER	RYG_EN0037	27-Sep-22	27-Mar-24	18
Rayong Lab	Oil & Grease	Electronic Balance	RYG_EN0002	1-Mar-23	1-Mar-24	12
Rayong Lab	Oil & Grease	Chember 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 on site	pH meter	RYG_FS0607	7-Sep-22	7-Sep-23	12
Rayong Lab	Temperature	pH meter	RYG_FS0607	7-Sep-22	7-Sep-23	12
Rayong Lab	Total Suspended Solids	Electronic Balance	RYG_EN0002	1-Mar-23	1-Mar-24	12
Rayong Lab	Total Suspended Solids	Chember Oven	RYG_EN0010	20-Oct-22	20-Apr-24	18
Rayong Lab	Total Kjeldahl Nitrogen	Block Digestion Unit	RYG_EN0188	15-Mar-23	15-Mar-24	12
Rayong Lab	Total Kjeldahl Nitrogen	pH Meter	RYG_EN0183	27-Feb-23	27-Feb-24	12
Rayong Lab	Phosphate	Spectrophotometer	RYG_EN0037	27-Sep-22	27-Mar-24	18

Lot No. 2372458-1

ANALYZER CALIBRATION DATA

Client : BASF (Thai) Limited **Location** : Boiler Stack
Date : 30 Jun 23 **Test Operator** : Sakait P.

O_2 ANALYZER
Model : TELEDYNE API 200EH **Serial No.** : 774
Span (%) : 25

	Cylinder Value (%)	Initial Analyzers Calibration Response (%)	Final Analyzers Calibration Response (%)	Difference (Percent of Span)
Zero Gas	0.00	-0.01	0.00	0.04
Low-Level Gas	7.93	7.92	7.93	0.04
Span Gas	16.00	15.99	16.00	0.04

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

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.06	0.01	0.03
Low-Level Gas	50.41	50.47	50.42	0.02
Span Gas	80.27	80.33	80.28	0.02

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

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.02	0.01	0.01
Low-Level Gas	51.61	51.63	51.62	0.01
Span Gas	79.00	79.02	79.01	0.01

CO ANALYZER
Model : TELEDYNE API 300EM **Serial No.** : 451
Span (ppm) : 5000

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.04	0.01	0.00
Low-Level Gas	50.31	50.35	50.32	0.00
Span Gas	80.53	80.57	80.54	0.00

Calibrated by

Sakait P.

(Mr.Sakait Phaisanphisut)

Environmental Field Scientist (4)

Lot No. 2372458-1

SYSTEM CALIBRATION BIAS AND DRIFT DATA

Client : BASF (Thai) Limited **Location** : Boiler Stack
Date : 30 Jun 23 **Test Operator** : Sakait P.

O_2 ANALYZER
Cylinder Conc. (%) : 16.00 **Span (%)** : 25

	O_2 Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	-0.01	-0.01	0.00	0.00	0.04	0.04
Upscale Gas	15.99	15.99	0.00	16.00	0.04	0.04

NO_X ANALYZER
Cylinder Conc. (ppm) : 80.27 **Span (ppm)** : 200

	NO_X Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.06	0.06	0.00	0.01	0.03	0.03
Upscale Gas	80.33	80.33	0.00	80.28	0.02	0.02

SO_2 ANALYZER
Cylinder Conc. (ppm) : 79.00 **Span (ppm)** : 100

	SO_2 Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.02	0.02	0.00	0.01	0.01	0.01
Upscale Gas	79.02	79.02	0.00	79.01	0.01	0.01

CO ANALYZER
Cylinder Conc. (ppm) : 80.53 **Span (ppm)** : 5000

	CO Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.04	0.04	0.00	0.01	0.00	0.00
Upscale Gas	80.57	80.57	0.00	80.54	0.00	0.00

Calibrated by

Sakait P.

(Mr.Sakait Phaisanphisut)

Environmental Field Scientist (4)

EMISSION TEST RESULT

		Run #	1
Client	BASF (Thai) Limited	Location	Boiler Stack
Date	30 Jun 23	Test Operator	Sakait P.
Start Time	11:50	Finish Time	12:10
SO_2 Analyzer Model	TELEDYNE API 100EH	Serial No.	437
NO_x/O_2 Analyzer Model	TELEDYNE API 200EH	Serial No.	774
CO/CO_2 Analyzer Model	TELEDYNE API 300EM	Serial No.	451

Time (min)	O_2 (%)	CO_2 (%)	NOx (ppm)	SO_2 (ppm)	CO (ppm)	NO_2 (ppm)
11:50	6.68	8.21	57.82	0.36	22.81	1.29
11:51	6.64	8.26	55.61	0.35	24.87	1.64
11:52	6.70	8.23	54.21	0.34	24.08	1.49
11:53	6.13	8.54	54.41	0.36	16.27	1.45
11:54	6.57	8.22	54.85	0.37	12.19	1.27
11:55	7.37	7.83	56.29	0.37	6.57	1.01
11:56	7.29	7.85	57.76	0.39	5.41	0.62
11:57	6.99	8.05	58.62	0.35	9.88	0.96
11:58	6.99	8.07	57.29	0.33	19.49	1.26
11:59	6.95	8.07	55.51	0.31	21.77	1.60
12:00	6.81	8.16	53.95	0.30	22.52	1.56
12:01	6.33	8.48	54.48	0.32	16.00	1.57
12:02	6.01	8.60	55.30	0.32	12.23	1.51
12:03	5.96	8.63	56.50	0.34	12.16	1.43
12:04	6.01	8.59	56.54	0.33	12.45	1.36
12:05	6.06	8.58	56.35	0.31	12.45	1.34
12:06	6.20	8.50	56.09	0.29	15.54	1.41
12:07	6.57	8.27	55.08	0.26	25.91	1.52
12:08	6.59	8.26	53.82	0.26	27.76	1.63
12:09	6.26	8.48	53.57	0.28	19.40	1.41
12:10	6.03	8.58	54.47	0.28	14.23	1.40
Average	**6.53**	**8.30**	**55.64**	**0.32**	**16.86**	**1.36**

Sakait P.

(Mr.Sakait Phaisanphisut)

Environmental Field Scientist (4)

EMISSION TEST RESULT

		Run #	2
Client	BASF (Thai) Limited	Location	Boiler Stack
Date	30 Jun 23	Test Operator	Sakait P.
Start Time	12:11	Finish Time	12:31
SO_2 Analyzer Model	TELEDYNE API 100EH	Serial No.	437
NO_x/O_2 Analyzer Model	TELEDYNE API 200EH	Serial No.	774
CO/CO_2 Analyzer Model	TELEDYNE API 300EM	Serial No.	451

Time (min)	O_2 (%)	CO_2 (%)	NOx (ppm)	SO_2 (ppm)	CO (ppm)	NO_2 (ppm)
12:11	6.02	8.61	55.31	0.26	13.75	1.37
12:12	6.69	8.17	56.29	0.27	9.84	1.08
12:13	7.06	7.98	57.55	0.32	5.88	0.88
12:14	6.77	8.15	58.43	0.27	16.25	1.20
12:15	6.61	8.25	57.01	0.25	23.26	1.54
12:16	6.73	8.24	55.11	0.23	22.56	1.57
12:17	6.72	8.19	55.04	0.35	21.02	1.59
12:18	5.97	8.61	55.89	0.41	14.15	1.48
12:19	5.83	8.66	56.89	0.43	12.52	1.44
12:20	5.88	8.68	57.44	0.42	12.81	1.57
12:21	5.86	8.65	57.00	0.40	13.20	1.51
12:22	5.89	8.71	56.77	0.40	14.67	1.44
12:23	6.51	8.30	55.96	0.37	23.24	1.57
12:24	6.68	8.22	55.03	0.35	25.01	1.74
12:25	6.35	8.43	54.63	0.34	18.15	1.58
12:26	6.00	8.62	55.22	0.35	12.89	1.43
12:27	6.29	8.43	55.88	0.38	11.49	1.23
12:28	7.00	8.03	57.24	0.38	6.39	1.02
12:29	7.06	7.99	58.87	0.38	5.09	0.80
12:30	7.10	7.96	60.07	0.39	4.71	0.92
12:31	6.88	8.09	59.57	0.34	12.06	1.39
Average	**6.47**	**8.33**	**56.72**	**0.34**	**14.24**	**1.35**

Sakait P.

(Mr.Sakait Phaisanphisut)

Environmental Field Scientist (4)

EMISSION TEST RESULT

		Run #	3
Client	BASF (Thai) Limited	Location	Boiler Stack
Date	30 Jun 23	Test Operator	Sakait P.
Start Time	12:32	Finish Time	12:52
SO_2 Analyzer Model	TELEDYNE API 100EH	Serial No.	437
NO_x/O_2 Analyzer Model	TELEDYNE API 200EH	Serial No.	774
CO/CO_2 Analyzer Model	TELEDYNE API 300EM	Serial No.	451

Time (min)	O_2 (%)	CO_2 (%)	NOx (ppm)	SO_2 (ppm)	CO (ppm)	NO_2 (ppm)
12:32	6.74	8.20	54.07	0.31	20.49	1.51
12:33	6.71	8.22	53.95	0.32	21.75	1.58
12:34	6.29	8.45	54.32	0.33	17.41	1.50
12:35	5.96	8.62	55.24	0.33	12.80	1.51
12:36	6.23	8.46	55.85	0.32	11.69	1.32
12:37	6.95	8.05	57.06	0.35	6.46	0.99
12:38	7.03	8.02	58.43	0.34	5.15	0.65
12:39	7.07	8.00	59.77	0.35	4.71	0.78
12:40	6.86	8.12	59.06	0.27	15.43	1.34
12:41	6.75	8.16	56.81	0.29	21.99	1.56
12:42	6.73	8.20	54.49	0.26	22.94	1.57
12:43	6.59	8.25	53.75	0.26	21.12	1.34
12:44	5.95	8.63	54.38	0.28	14.01	1.35
12:45	5.88	8.70	55.12	0.30	12.78	1.25
12:46	5.84	8.72	56.09	0.29	12.95	1.36
12:47	6.11	8.52	55.99	0.37	17.60	1.57
12:48	6.57	8.31	55.12	0.37	27.31	1.62
12:49	6.66	8.22	53.68	0.39	27.90	1.77
12:50	6.66	8.22	53.40	0.37	27.44	1.80
12:51	6.38	8.41	53.66	0.38	18.39	1.81
12:52	6.27	8.45	54.06	0.39	12.38	1.69
Average	**6.48**	**8.33**	**55.44**	**0.32**	**16.79**	**1.42**

Sakait P.

(Mr.Sakait Phaisanphisut)

Environmental Field Scientist (4)

Lot No. 2372460-1

ANALYZER CALIBRATION DATA

Client	: BASF (Thai) Limited	Location	: Scrubber Stack
Date	: 30 Jun 23	Test Operator	: Sakait P.

O_2 ANALYZER

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

	Cylinder Value (%)	Initial Analyzers Calibration Response (%)	Final Analyzers Calibration Response (%)	Difference (Percent of Span)
Zero Gas	0.00	-0.01	0.00	0.04
Low-Level Gas	7.93	7.92	7.93	0.04
Span Gas	16.00	15.99	16.00	0.04

NO_x ANALYZER

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

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.06	0.01	0.03
Low-Level Gas	50.41	50.47	50.42	0.02
Span Gas	80.27	80.33	80.28	0.02

SO2 ANALYZER

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

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.02	0.01	0.01
Low-Level Gas	51.61	51.63	51.62	0.01
Span Gas	79.00	79.02	79.01	0.01

CO ANALYZER

Model	: TELEDYNE API 300EM	Serial No.	: 451
Span (ppm)	: 5000		

	Cylinder Value (ppm)	Initial Analyzers Calibration Response (ppm)	Final Analyzers Calibration Response (ppm)	Difference (Percent of Span)
Zero Gas	0.00	0.04	0.01	0.00
Low-Level Gas	50.31	50.35	50.32	0.00
Span Gas	80.53	80.57	80.54	0.00

Calibrated by

Sakait P.

(Mr. Sakait Phaisanphisut)

Environmental Field Scientist (4)

Lot No. 2372460-1

SYSTEM CALIBRATION BIAS AND DRIFT DATA

Client	: BASF (Thai) Limited	**Location**	: Scrubber Stack
Date	: 30 Jun 23	**Test Operator**	: Saksit P.

O_2 ANALYZER

Cylinder Conc. (%) : 16.00 **Span (%)** : 25

	O_2 Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	-0.01	-0.01	0.00	0.00	0.04	0.04
Upscale Gas	15.99	15.99	0.00	16.00	0.04	0.04

NO_X ANALYZER

Cylinder Conc. (ppm) : 80.27 **Span (ppm)** : 200

	NO_X Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.06	0.06	0.00	0.01	0.03	0.03
Upscale Gas	80.33	80.33	0.00	80.28	0.02	0.02

SO_2 ANALYZER

Cylinder Conc. (ppm) : 79.00 **Span (ppm)** : 100

	SO_2 Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.02	0.02	0.00	0.01	0.01	0.01
Upscale Gas	79.02	79.02	0.00	79.01	0.01	0.01

CO ANALYZER

Cylinder Conc. (ppm) : 80.53 **Span (ppm)** : 5000

	CO Analyzer Calibration Response	Initial Values		Final Values		Drift (% of Span)
		System Calibration Response	System Cal Bias (% of Span)	System Calibration Response	System Cal Bias (% of Span)	
Zero Gas	0.04	0.04	0.00	0.01	0.00	0.00
Upscale Gas	80.57	80.57	0.00	80.54	0.00	0.00

Calibrated by

(Mr. Saksit Phaisanphisut)

Environmental Field Scientist (4)

EMISSION TEST RESULT

Client	BASF (Thai) Limited	**Run #**	1
Date	30 Jun 23	**Location**	Scrubber Stack
Start Time	10:10	**Test Operator**	Saksit P.
SO_2 Analyzer Model	TELEDYNE API 100EH	**Finish Time**	10:30
NO_x/O_3 Analyzer Model	TELEDYNE API 200EH	**Serial No.**	437
CO/CO_2 Analyzer Model	TELEDYNE API 300EM	**Serial No.**	774
		Serial No.	451

Time (min)	O_2 (%)	CO_2 (%)	NOx (ppm)	SO_2 (ppm)	CO (ppm)	NO_2 (ppm)
10:10	18.79	0.96	0.45	0.24	75.67	0.46
10:11	18.81	0.96	0.47	0.27	84.82	0.47
10:12	18.79	0.97	0.48	0.26	81.80	0.47
10:13	18.79	0.97	0.48	0.24	78.38	0.48
10:14	18.78	0.97	0.49	0.25	78.16	0.48
10:15	18.77	0.97	0.50	0.11	81.99	0.49
10:16	18.75	0.97	0.52	0.11	79.39	0.50
10:17	18.78	0.98	0.53	0.10	81.83	0.51
10:18	18.79	0.97	0.53	0.10	84.63	0.50
10:19	18.79	0.98	0.53	0.11	79.67	0.51
10:20	18.78	0.97	0.53	0.11	81.52	0.51
10:21	18.78	0.97	0.53	0.12	81.24	0.50
10:22	18.79	0.97	0.53	0.14	76.81	0.50
10:23	18.77	0.97	0.52	0.14	80.17	0.50
10:24	18.75	0.98	0.53	0.06	75.46	0.50
10:25	18.75	0.98	0.52	0.06	76.82	0.49
10:26	18.78	0.97	0.53	0.08	81.65	0.50
10:27	18.78	0.97	0.53	0.12	79.11	0.50
10:28	18.75	0.98	0.53	0.12	73.34	0.50
10:29	18.75	0.98	0.52	0.11	75.41	0.49
10:30	18.77	0.98	0.52	0.13	76.53	0.49
Average	**18.77**	**0.97**	**0.51**	**0.14**	**79.26**	**0.49**

(Mr. Saksit Phaisanphisut)

Environmental Field Scientist (4)

EMISSION TEST RESULT

Client	BASF (Thai) Limited	**Run #**	2
Date	30 Jun 23	**Location**	Scrubber Stack
Start Time	10:31	**Test Operator**	Saksit P.
SO_2 Analyzer Model	TELEDYNE API 100EH	**Finish Time**	10:51
NO_x/O_3 Analyzer Model	TELEDYNE API 200EH	**Serial No.**	437
CO/CO_2 Analyzer Model	TELEDYNE API 300EM	**Serial No.**	774
		Serial No.	451

Time (min)	O_2 (%)	CO_2 (%)	NOx (ppm)	SO_2 (ppm)	CO (ppm)	NO_2 (ppm)
10:31	18.78	0.97	0.52	0.12	74.66	0.49
10:32	18.76	0.98	0.52	0.04	73.86	0.49
10:33	18.77	0.97	0.51	0.06	76.76	0.48
10:34	18.77	0.98	0.51	0.12	80.46	0.48
10:35	18.75	0.98	0.52	0.12	81.66	0.49
10:36	18.74	0.99	0.55	0.08	79.44	0.51
10:37	18.77	0.99	0.55	0.08	79.04	0.52
10:38	18.79	0.99	0.56	0.13	74.45	0.52
10:39	18.81	0.97	0.56	0.13	75.12	0.51
10:40	18.75	0.97	0.55	0.13	76.47	0.51
10:41	18.75	0.98	0.56	0.11	77.45	0.51
10:42	18.77	0.98	0.55	0.11	82.36	0.50
10:43	18.75	0.98	0.54	0.04	78.31	0.50
10:44	18.78	0.97	0.54	0.04	81.22	0.49
10:45	18.77	0.96	0.53	0.05	84.48	0.49
10:46	18.75	0.98	0.53	0.06	75.50	0.48
10:47	18.76	0.98	0.52	0.13	79.32	0.49
10:48	18.75	0.98	0.54	0.11	80.99	0.50
10:49	18.75	0.97	0.54	0.12	81.18	0.50
10:50	18.73	0.98	0.54	0.13	81.10	0.50
10:51	18.75	0.98	0.54	0.14	82.35	0.49
Average	**18.76**	**0.97**	**0.53**	**0.09**	**78.87**	**0.49**

(Mr. Saksit Phaisanphisut)

Environmental Field Scientist (4)

EMISSION TEST RESULT

Client	BASF (Thai) Limited	**Run #**	3
Date	30 Jun 23	**Location**	Scrubber Stack
Start Time	10:52	**Test Operator**	Saksit P.
SO_2 Analyzer Model	TELEDYNE API 100EH	**Finish Time**	11:12
NO_x/O_3 Analyzer Model	TELEDYNE API 200EH	**Serial No.**	437
CO/CO_2 Analyzer Model	TELEDYNE API 300EM	**Serial No.**	774
		Serial No.	451

Time (min)	O_2 (%)	CO_2 (%)	NOx (ppm)	SO_2 (ppm)	CO (ppm)	NO_2 (ppm)
10:52	18.75	0.98	0.54	0.14	83.65	0.48
10:53	18.75	0.98	0.55	0.15	82.02	0.50
10:54	18.76	0.98	0.56	0.17	81.29	0.51
10:55	18.77	0.97	0.56	0.17	82.87	0.51
10:56	18.78	0.96	0.54	0.17	79.73	0.49
10:57	18.79	0.96	0.50	0.11	81.24	0.45
10:58	18.77	0.96	0.49	0.11	80.03	0.45
10:59	18.78	0.96	0.48	0.11	79.13	0.44
11:00	18.78	0.96	0.49	0.11	81.03	0.44
11:01	18.79	0.96	0.49	0.11	78.66	0.44
11:02	18.81	0.93	0.50	0.13	82.38	0.45
11:03	18.79	0.96	0.51	0.13	76.22	0.46
11:04	18.79	0.96	0.52	0.14	76.20	0.47
11:05	18.77	0.97	0.53	0.15	72.78	0.48
11:06	18.78	0.96	0.54	0.16	76.22	0.49
11:07	18.81	0.96	0.54	0.06	81.92	0.48
11:08	18.83	0.95	0.53	0.08	81.59	0.48
11:09	18.83	0.96	0.53	0.07	79.37	0.47
11:10	18.82	0.96	0.54	0.08	81.13	0.48
11:11	18.80	0.96	0.53	0.09	82.98	0.48
11:12	18.79	0.96	0.53	0.11	83.30	0.48
Average	**18.78**	**0.96**	**0.52**	**0.12**	**80.18**	**0.47**

(Mr. Saksit Phaisanphisut)

Environmental Field Scientist (4)

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
6141 Easton Road
Bldg 1
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E04NI99E15A0440	Reference Number:	160-401907847-1
Cylinder Number:	EB0137377	Cylinder Volume:	144.4 Cubic Feet
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2015 PSIG
PGVP Number:	A12020	Valve Outlet:	660
Gas Code:	CO,NO,NOX,SO2,BALN	Certification Date:	Oct 06, 2020

Expiration Date: Oct 06, 2028

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a molar/mole basis unless otherwise noted.

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	80.00 PPM	80.27 PPM	G1	+/- 1.4% NIST Traceable	09/29/2020, 10/06/2020
CARBON MONOXIDE	80.00 PPM	80.53 PPM	G1	+/- 1.0% NIST Traceable	09/29/2020
NITRIC OXIDE	80.00 PPM	80.27 PPM	G1	+/- 1.4% NIST Traceable	09/28/2020, 10/06/2020
SULFUR DIOXIDE	80.00 PPM	79.00 PPM	G1	+/- 1.0% NIST Traceable	09/28/2020, 10/06/2020
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	11010430	KAL004636	97.31 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	Oct 04, 2022
PRM	12380	D685025	9.01 PPM AIR/NITROGEN DIOXIDE	2.0%	Feb 20, 2020
NTRM	17060226	EB0079109	100.3 PPM NITRIC OXIDE/NITROGEN	+/- 1.0%	Jul 23, 2023
GMIS	124206889	CC323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN	2.1%	Aug 15, 2021
NTRM	07060227	EB0079116	100.6 PPM NOX/NITROGEN	+/- 1.0%	Jul 23, 2023
NTRM	16010235	KAL004419	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.9%	Dec 23, 2021
NTRM	11010416	KAL004802	99.8 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Jul 28, 2023

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

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO	FTIR	Sep 21, 2020
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Sep 14, 2020
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Sep 22, 2020
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Sep 16, 2020

Triad Data Available Upon Request

NOTES: Gross Weight: 27.4 Kg. Net Weight: 4.6 Kg.

Approved for Release

Airgas
an Air Liquids company

Airgas Specialty Gases
Airgas USA, LLC
6141 Easton Road
Bldg 1
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E04NI99E15A0440	Reference Number:	160-401907847-1
Cylinder Number:	EB0137377	Cylinder Volume:	144.4 Cubic Feet
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2015 PSIG
PGVP Number:	A12020	Valve Outlet:	660
Gas Code:	CO,NO,NOX,SO2,BALN	Certification Date:	Oct 06, 2020

Expiration Date: Oct 06, 2028

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a molar/mole basis unless otherwise noted.

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	80.00 PPM	80.27 PPM	G1	+/- 1.4% NIST Traceable	09/29/2020, 10/06/2020
CARBON MONOXIDE	80.00 PPM	80.53 PPM	G1	+/- 1.0% NIST Traceable	09/29/2020
NITRIC OXIDE	80.00 PPM	80.27 PPM	G1	+/- 1.4% NIST Traceable	09/28/2020, 10/06/2020
SULFUR DIOXIDE	80.00 PPM	79.00 PPM	G1	+/- 1.0% NIST Traceable	09/28/2020, 10/06/2020
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	11010430	KAL004636	97.31 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	Oct 04, 2022
PRM	12380	D685025	9.01 PPM AIR/NITROGEN DIOXIDE	2.0%	Feb 20, 2020
NTRM	17060226	EB0079109	100.3 PPM NITRIC OXIDE/NITROGEN	+/- 1.0%	Jul 23, 2023
GMIS	124206889	CC323707	4.028 PPM NITROGEN DIOXIDE/NITROGEN	2.1%	Aug 15, 2021
NTRM	07060227	EB0079116	100.6 PPM NOX/NITROGEN	+/- 1.0%	Jul 23, 2023
NTRM	16010235	KAL004419	97.69 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.9%	Dec 23, 2021
NTRM	11010416	KAL004802	99.8 PPM SULFUR DIOXIDE/NITROGEN	+/- 0.8%	Jul 28, 2023

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

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 CO	FTIR	Sep 21, 2020
Nicolet iS50 FTIR AUP2010245 NO	FTIR	Sep 14, 2020
Nicolet iS50 FTIR AUP2010245 NO2	FTIR	Sep 22, 2020
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Sep 16, 2020

Triad Data Available Upon Request

NOTES: Gross Weight: 27.4 Kg. Net Weight: 4.6 Kg.

Approved for Release

THE LINDE GROUP

Linde

CERTIFICATE OF ANALYSIS

Customer Detail: **ALS Laboratory Group (Thailand)**	Production Order Number: **90132928** Material Number: **478100-J-44** Certification Date: **20-Jan-2016** Expiry Date: **20-Jan-2024**
Cylinder Description: **Steel 47 L**	
The measurement of this reference material is traceable to SI through the reference standard which is traceable to Swiss National Standard of Mass. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1. The results are expressed on a molemole basis, unless otherwise specified. The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k=2, providing a level of confidence of approximately 95%.	
Certificate Number: **4676/15**	Analyst: THITIRAT LOYRAT
Cylinder Number: **S50730**	
Nominal Cylinder Content: **6.520 M³**	Approve: SUKANYA KAMUTHARAT
Nominal Pressure: **145.0 Bar**	
Valve Outlet: **CGA 590 BRASS**	To Re-Order Please Quote: **478100-J-44**
Comment:	• It is recommended that this product be not used below 5% of actual contents or should not be used when its gas pressure is below 150psig. • Other impurities that detect by analytical condition of this mixture shall be report if it is more than 10% of minimum minor component. • Keep and use in well-ventilated and secure area.

บริษัท ลินเด้ (ประเทศไทย) จำกัด (มหาชน)
ชั้น 15 อาคารเทรดทาวเวอร์ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 ตำบลบางแก้ว
อำเภอบางพลี สมุทรปราการ 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333
โรงงานวังน้อย: 105 หมู่ 5 ตำบลหนองน้ำแดง อำเภอวังน้อย 24180
โทรศัพท์ (66) 38.570-479-93 โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited
15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna-Trad KM. 6.5 Road, Bangkaew,
Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333
Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180
Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

THE LINDE GROUP

Linde

CERTIFICATE OF ANALYSIS

Analytical Result

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

Reference Standard used in Assay

Reference Standard	Cylinder No.	Concentration	Expired Date
Oxygen in Nitrogen	**243625SG**	**25.08 ± 0.13 %**	**19-Aug-2017**

Analytical Instruments used in Assay

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

Method of Analysis
1. Gas Chromatograph
2. Paramagnetic Oxygen Analyser
3. Electrochemical Oxygen Analyser
4. Electrochemical Moisture Analyser
5. Total Hydrocarbon Analyses
6. Other specified

Cylinder Number S50730
Production Order Number 90132928

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

บริษัท ลินเด้ (ประเทศไทย) จำกัด (มหาชน)
ชั้น 15 อาคารเทรดทาวเวอร์ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 ตำบลบางแก้ว
อำเภอบางพลี สมุทรปราการ 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333
โรงงานวังน้อย: 105 หมู่ 5 ตำบลหนองน้ำแดง อำเภอวังน้อย 24180
โทรศัพท์ (66) 38.570-479-93 โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited
15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna-Trad KM. 6.5 Road, Bangkaew,
Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333
Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180
Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

THE LINDE GROUP

Linde

CERTIFICATE OF ANALYSIS

Customer Detail:
ALS Laboratory Group (Thailand)

Production Order Number: 90137389
Material Number: 557200-J-44
Certification Date: 24 Sep 2016
Expiry Date: 24-Sep-2024

Cylinder Description:
STEEL 47 L

The measurement of this reference material is traceable to SI through the reference standard which is traceable to Swiss National Standards of Mass. The Assay of this Standard has been performed in accordance with the EPA Traceability Protocol EPA-600/R-12/531 for the Assay and Certification of Gaseous Calibration Standards using procedure G1. The results are expressed on a mole/mole basis, unless otherwise specified. The reported uncertainty is based on a standard uncertainty multiplied by coverage factor k=2, providing a level of confidence of approximately 95%.

Certificate Number:
2857/16

Analyst:
THITIRAT LOYRAT

Cylinder Number:
363075

Nominal Cylinder Content:
6.560 M³

Approve:
SUKANYA KAMUTHARAT

Nominal Pressure:
145.0 Bar

Valve Outlet:
CGA 590 BRASS

To Re-Order Please Quote:
557200-J-44

Comment:
- It is recommended that this product be not used below 6% of actual contents or should not be used when its gas pressure is below 150psig.
- Other impurities that detect by analytical condition of this mixture shall be report if it is more than 10% of minimum minor component.
- Keep and use in well-ventilated and secure area.

Linde (Thailand) Public Company Limited

THE LINDE GROUP

Linde

CERTIFICATE OF ANALYSIS

Analytical Result

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

Reference Standard used in Assay

Reference Standard	Cylinder No.	Concentration	Expired Date
Oxygen in Nitrogen	24362589	23.01 ± 0.13 %	19-Aug-2017

Analytical Instruments used in Assay

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

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

Cylinder Number 363075
Production Order Number 90137389

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

Linde (Thailand) Public Company Limited

CONSOLE CONTROL UNIT CALIBRATION TEST REPORT

Calibration of Date : 13-Jan-23
Next Cal. Date : 13-Jul-23

Barometric Pressure (mmHg) : 760
Relative Humidity (%) : 55.0
Temperature (C°) : 30.0

Console Control Meter Data

Calibration No. : C-130123-RYG_FS0315
Dry Gas Meter ID : RYG_FS0315
Serial No. : 17060911
Model No. : XC-572-V

Reference Dry Gas Meter Data

Reference Dry Gas Meter ID : BKK_FS1122
Serial No. : A2003240
Correction Factor (Y) : 1.0160
Next Calibration Date : 05/27/23

ΔH (mm.H2O)	Θ Minutes	Reference Dry Gas Meter Calibration Vr (Liters) Final	Vr (Liters) Initial	Vr (Liters) Total	Tr (°C)	Console Control : Drygas Meter Vm (Liters) Final	Vm (Liters) Initial	Vm (Liters) Total	Ti (°C)	To (°C)	Avg.Tm (°C)	Dry Gas Meter Correction Factor (Y)	Orifice Calibration Factor ΔHg
15	12.16	150.00	0.00	150.00	36.0	1659065.4	1658920.0	145.40	34.0	34.0	34.0	1.0432	46.1318
25	9.33	150.00	0.00	150.00	36.0	1659215.2	1659070.0	145.20	35.0	35.0	35.0	1.0471	45.1163
50	6.61	150.00	0.00	150.00	36.0	1659625.2	1659380.0	145.20	36.0	36.0	36.0	1.0479	45.1435
80	5.20	150.00	0.00	150.00	36.0	1660005.0	1659860.0	145.00	36.0	36.0	36.0	1.0453	44.7012
120	4.21	150.00	0.00	150.00	37.0	1660164.0	1660020.0	144.00	37.0	37.0	Avg.	1.0451	45.0945

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

ΔHg : Orifice pressure differential that equates to 21.24 lm of air @ 25.C and 760 mm of mercury . mmH2O ; tolerance for individual values ± 5.08 from average .

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

Calibrated by: Saksit Phaisanphisut
(Mr. Saksit Phaisanphisut)
Field Scientist(4)

Approved by: Natthapol Jiengwareewong
(Mr.Natthapol Jiengwareewong)
Field Specialist(1)

FORM NO.: F 06-034 REVISION NO.: 2 ISSUE DATE: 30-Jun-22

Location	Reference Temperature °C	Digital Temperature °C	Error °C	Remark
Stack	0	1	1	
	25	26	1	
	50	51	1	
	100	101	1	
	150	151	1	
	200	201	1	
	250	251	1	
	300	301	1	
	500	501	1	
	1000	1001	1	
	1200	1201	1	
Probe	100	101	1	
	120	121	1	
	140	141	1	
Filter	100	101	1	
	120	121	1	
	140	141	1	
Exit	0	1	1	
	10	11	1	
	20	21	1	
Meter	0	1	1	
	25	26	1	
	50	51	1	
AUX	0	1	1	
	25	26	1	
	50	51	1	

Calibrated by : Saksit Phaisanphisut
Mr. Saksit Phaisanphisut
Field Scientist (4)

Approved by : Natthapol Jiengwareewong
Mr.Natthapol Jiengwareewong
Specialist (1)

FORM NO.: F 06-027 REVISION NO.: - ISSUE DATE: 2/5/02

PROBE NOZZLE DIAMETER

CALIBRATION DATA SHEET

Calibration Date :	13 Jan 23	Nozzle Set ID. :	RYG_FS0319
Calibration Sheet No. :	C-130123-RYG_FS0319	Vernier Caliper ID.:	BKK_FS1123

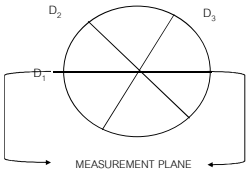
Nozzle ID #	Nozzle Diameter (cm.)			Hi - Lo	$(D_1 + D_2 + D_3) / 3$
	D_1	D_2	D_3	ΔD	D_{avg}
1	0.300	0.300	0.300	0.000	0.300
2	0.470	0.465	0.465	0.005	0.467
3	0.600	0.600	0.600	0.000	0.600
4	0.770	0.760	0.755	0.015	0.762
5	0.920	0.930	0.930	0.010	0.927
6	1.080	1.080	1.085	0.005	1.082
7	1.240	1.230	1.235	0.010	1.235
8	1.594	1.598	1.597	0.004	1.596

Where :

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

ΔD = Maximum distance between any two diameters, must be $\leq$ 0.100 mm.

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



Calibrated by : Saksit Phaisanphisut

(Mr. Saksit Phaisanphisut)

Field Scientist (4)

Approved by : Natthapon Jiengwareewong

(Mr.Natthapol Jiengwareewong)

Field Specialist (1)

Pitot Tube Calibration Data

Pitot Tube Identification Number :	RYG_FS0320	Calibration Date :	13 Jan 23
Lab test duct Number :	258-1-13-01	Standard Pitot ID :	BKK_FS0441
Calibration Sheet No. :	C-130123-RYG_FS0320	Cp Standard :	0.99

Type S Pitot Tube Coefficient Data

	Type s pitot tube Leg A,B	Standard pitot tube (ΔP, mm.H_2O)	Type s pitot tube (ΔP, mm.H_2O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 2	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 3	A	12.00	16.80	0.845	-
	B	12.00	16.80	-	0.845
			$\overline{Cp}$	0.842	0.842

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

$$\left[\overline{Cp}_{(A)} - \overline{Cp}_{(B)}\right] must\ BE \leq 0.01$$

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

Calibrated by : Saksit Phaisanphisut

(Mr. Saksit Phaisanphisut)

Field Scientist (4)

Approved by : Natthapon Jiengwareewong

(Mr.Natthapol Jiengwareewong)

Specialist (1)

Pitot Tube Calibration Data

Pitot Tube Identification Number :	RYG_FS0321	Calibration Date :	13 Jan 23
Lab test duct Number :	258-1-13-01	Standard Pitot ID :	BKK_FS0441
Calibration Sheet No. :	C-130123-RYG_FS0321	Cp Standard :	0.99

Type S Pitot Tube Coefficient Data

	Type s pitot tube Leg A,B	Standard pitot tube (ΔP, mm.H_2O)	Type s pitot tube (ΔP, mm.H_2O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 2	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 3	A	12.00	16.80	0.845	-
	B	12.00	16.80	-	0.845
			$\overline{Cp}$	0.842	0.842

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

$$\left[\overline{Cp}_{(A)} - \overline{Cp}_{(B)}\right] must\ BE \leq 0.01$$

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

Calibrated by : Saksit Phaisanphisut

(Mr. Saksit Phaisanphisut)

Field Scientist (4)

Approved by : Natthapon Jiengwareewong

(Mr.Natthapol Jiengwareewong)

Specialist (1)

ENTECH

Calibration Certificate

Certificate No: G 660042

Date of issue : 24-Jan-23

Instrument description	:	Flue gas Analyzer
Instrument model	:	Testo 350 New
Instrument serial no.	:	62087344
ID no. or control no.	:	RYG_FS0464
Manufacturer	:	Testo SE & Co. KGaA
Probe description	:	-
Probe model	:	-
Probe serial	:	-
Customer name	:	ALS LABORATORY GROUP (THAILAND) CO.,LTD.
Customer address	:	104 Phatthanakan 40, Phatthanakan Road, Khwaeng Phatthanakan, Khet Suan Luang, Bangkok, 10250 Thailand
Total pages of certificate	:	3 Pages
Receiving no.	:	L-230167
Receiving date.	:	20-Jan-23
Parameter of calibration	:	Gas Calibration(Oxygen,2.498,10.04,21.02 %vol, Carbon Monoxide 80.14,309.9,1003 ppm, Nitrogen Dioxide 30.34,80.96,202.2 ppm, Nitric Oxide 30.08,150.9,320.6 ppm, Sulphur Dioxide 50.04,100.8,601.1 ppm)
Condition of UUC.	:	Used
Ambient condition	:	All of the Measurment were caried out the stabilized labotary Temperature : 23 ±5 °C Humidity : 55 ± 15 %RH
Calibration place	:	17/121 Soi Ngeonwongwen 47 Yaek 48, Toongsonghong, Laksi, Bangkok 10210
Calibration procedure no.	:	WI-CL-25-C

REVIEW BY Nimitkorn P.

APPROVED BY

NEXT CAL DATE 23/1/24

The calibration certificate expanded uncertainty of measurement is stated as the standard uncertainty of measurement Multiplied by coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

This certificate is applied only to item under test Environmental condition.

This Calibration Certificate may not be reproduced other than in full except with the permission of the issuing laboratory. Calibration certificates without signature and seal not valid.

This calibration certificate documents are traceability to national standards, which realize measurement according to the International System of Units (SI).

Date of calibration : 23-Jan-23

Mr. Sedtawut Nueathong
Calibration Technician

Mrs. Nongluck Wongsettee
Technical Manager

Entech Industrial Solution Co.,Ltd.
17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Laksi, Bangkok 10210 THAILAND Tel.0-2979-8888 Calibration@entech.co.th
Tax ID: 0105536035591 www.entech.co.th

ENTECH

Calibration Certificate

Certificate No.: G 660042

Standard References (Table 1)

Standard	Certificate No.	Vendor	Due date
Oxygen (O2) 2.498 % Vol	4219/21	Linde	30-Sep-25
Oxygen (O2) 10.04 % Vol	CG-0193-21	Nimt	18-Nov-26
Oxygen (O2) 21.02 % Vol	CG-0041-22	Nimt	10-Feb-27
Carbon monoxide (CO) 80.14 ppm	CG-0040-22	Nimt	14-Feb-27
Carbon monoxide (CO) 309.9 ppm	2803/21	Linde	22-Jun-23
Carbon monoxide (CO) 1003 ppm	2583/22	Linde	09-Aug-24
Nitrogen Dioxide (NO2) 30.34 ppm	2703/22	Linde	22-Aug-24
Nitrogen Dioxide (NO2) 80.96 ppm	2041/22	Linde	26-Jun-24
Nitrogen Dioxide (NO2) 202.2 ppm	3239/21	Linde	20-Jul-23
Nitric Oxide (NO) 30.08 ppm	CG-0089-22	Nimt	13-Jun-24
Nitric Oxide (NO) 150.9 ppm	3057/21	Linde	22-Jun-23
Nitric Oxide (NO) 320.6 ppm	2944/21	Linde	02-Jul-23
Sulphur Dioxide (SO2) 50.04 ppm	3205/21	Linde	25-Jul-23
Sulphur Dioxide (SO2) 100.8 ppm	3507/22	Linde	09-Nov-24
Sulphur Dioxide (SO2) 601.1 ppm	3204/21	Linde	20-Jul-23

Measured room conditions

Temperature : 22.2 °C Humidity : 58.9 %RH Pressure : 1014.9 mbar

Calibration conditions

Gas Temperature : 23 °C Flow rate : 1,200 ml/min Gas pressure : 1021.0 mbar

Calibration Results Before Adjustment (Table 2)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O2 (%Vol)	2.498	2.47	-0.028	0.20
O2 (%Vol)	10.04	9.95	-0.09	0.40
O2 (%Vol)	21.02	21.08	0.06	0.80
CO (ppm)	80.14	80	-0.14	3.0
CO (ppm)	309.9	306	-3.9	6.0
CO (ppm)	1003	995	-8	12
NO2 (ppm)	30.34	27.9	-2.44	8.0
NO2 (ppm)	80.96	74.4	-6.56	8.0
NO2 (ppm)	202.2	195.1	-7.1	12
NO (ppm)	30.08	32	1.92	8.0
NO (ppm)	150.9	153	2.1	8.0
NO (ppm)	320.6	315	-5.6	12
SO2 (ppm)	50.04	49	-1.04	6.0
SO2 (ppm)	100.8	101	0.2	6.0
SO2 (ppm)	601.1	602	1.0	13

Entech Industrial Solution Co.,Ltd.
17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Laksi, Bangkok 10210 THAILAND Tel. 0-2779-8888 Calibration@entech.co.th
Tax ID : 0105536035591 www.entech.co.th

ENTECH

Calibration Certificate

Certificate No.: G 660042

Calibration Results After Adjustment (Table 3)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O2 (%Vol)	2.498	2.47	-0.028	0.20
O2 (%Vol)	10.04	9.95	-0.09	0.40
O2 (%Vol)	21.02	21.08	0.06	0.80
CO (ppm)	80.14	80	-0.14	3.0
CO (ppm)	309.9	306	-3.9	6.0
CO (ppm)	1003	995	-8	12
NO2 (ppm)	30.34	29.2	-1.14	8.0
NO2 (ppm)	80.96	81.3	0.34	8.0
NO2 (ppm)	202.2	204.4	2.2	12
NO (ppm)	30.08	32	1.92	8.0
NO (ppm)	150.9	153	2.1	8.0
NO (ppm)	320.6	315	-5.6	12
SO2 (ppm)	50.04	49	-1.04	6.0
SO2 (ppm)	100.8	101	0.2	6.0
SO2 (ppm)	601.1	602	1.0	13

Remark : 1 cmol/mol = 1 %vol. , 1 µmol/mol = 1 ppm.

End of Report

Entech Industrial Solution Co.,Ltd.
17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Laksi, Bangkok 10210 THAILAND Tel. 0-2779-8888 Calibration@entech.co.th
Tax ID : 0105536035591 www.entech.co.th

ALS

ROTA METER CALIBRATION RESULT APRIL 2023

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R^2)
BKK_FS0577	03 Apr 23	Y = 1.0246x - 1.1844	0.9982
BKK_FS0579	03 Apr 23	Y = 1.0313x - 0.8177	0.9999
BKK_FS0583	03 Apr 23	Y = 1.0023x - 0.0969	0.9995
BKK_FS0584	03 Apr 23	Y = 1.0025x + 2.25	0.9999
BKK_FS0585	03 Apr 23	Y = 0.9881x + 5.4452	0.9993
BKK_FS0586	03 Apr 23	Y = 0.9915x + 4.7452	1.0000
BKK_FS0588	03 Apr 23	Y = 1.0067x + 0.6738	0.9998
BKK_FS0589	03 Apr 23	Y = 0.9823x + 0.3286	0.9936
BKK_FS0590	03 Apr 23	Y = 0.9961x + 2.8786	0.9999
BKK_FS0591	03 Apr 23	Y = 0.9985x + 4.579	1.0000
BKK_FS0592	03 Apr 23	Y = 0.9975x + 3.6419	1.0000
BKK_FS0593	03 Apr 23	Y = 0.9966x + 16.005	1.0000
BKK_FS0595	03 Apr 23	Y = 0.9957x + 5.1368	0.9999
BKK_FS0596	03 Apr 23	Y = 1.017x - 14.044	0.9967
BKK_FS0597	03 Apr 23	Y = 1.0063x - 10.787	1.0000
BKK_FS1004	01 Apr 23	Y = 0.9943x + 7.1533	0.9996
BKK_FS1005	01 Apr 23	Y = 1.0035x + 3.1167	0.9998
BKK_FS1006	01 Apr 23	Y = 1.0273x - 0.4922	0.9998
BKK_FS1007	03 Apr 23	Y = 1.0452x - 1.5374	0.9998
BKK_FS1009	03 Apr 23	Y = 1.0351x - 1.3224	0.9999
BKK_FS1010	03 Apr 23	Y = 1.0108x - 0.0888	1.0000
BKK_FS1011	03 Apr 23	Y = 1.2946x - 6.6325	0.9861
BKK_FS1012	03 Apr 23	Y = 1.0976x - 27.969	0.9996
BKK_FS1013	03 Apr 23	Y = 1.0821x - 200.52	0.9998
BKK_FS1017	03 Apr 23	Y = 1.0333x + 7.0584	0.9694
BKK_FS1018	03 Apr 23	Y = 0.9551x - 18.832	0.9997
BKK_FS1019	03 Apr 23	Y = 1.0649x - 156.67	0.9976
BKK_FS1020	03 Apr 23	Y = 0.9911x + 0.0364	0.9994
BKK_FS1021	03 Apr 23	Y = 0.979x + 8.2333	0.9992
BKK_FS1022	03 Apr 23	Y = 0.9988x - 2.4905	0.9997
BKK_FS1023	03 Apr 23	Y = 1.0245x - 1.3878	0.9996
BKK_FS1024	03 Apr 23	Y = 0.7414x + 47.3	0.9923
BKK_FS1025	03 Apr 23	Y = 0.9997x + 5.4438	1.0000
BKK_FS1026	03 Apr 23	Y = 1.0172x - 0.9531	1.0000
BKK_FS1027	03 Apr 23	Y = 0.7331x + 49.317	0.9921
BKK_FS1028	03 Apr 23	Y = 0.9995x + 0.2124	1.0000
BKK_FS1039	01 Apr 23	Y = 1.025x - 3.795	0.9994
BKK_FS1040	01 Apr 23	Y = 1.0035x - 2.4295	0.9998

ALS

ROTA METER CALIBRATION RESULT APRIL 2023

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R^2)
BKK_FS1041	01 Apr 23	Y = 1.0329x - 0.6769	0.9999
BKK_FS1042	01 Apr 23	Y = 1.0144x + 1.94	0.9997
BKK_FS1043	01 Apr 23	Y = 1.0038x - 1.539	0.9999
BKK_FS1044	01 Apr 23	Y = 1.0273x - 1.6922	0.9998
BKK_FS1164	03 Apr 23	Y = 0.9913x + 0.8537	0.9997
BKK_FS1165	03 Apr 23	Y = 1.0005x + 2.0857	1.0000
BKK_FS1166	03 Apr 23	Y = 1.0842x - 169.6	0.9987
BKK_FS1200	03 Apr 23	Y = 0.9452x + 5.2959	0.9981
BKK_FS1201	03 Apr 23	Y = 1.0045x - 1.8786	1.0000
BKK_FS1202	03 Apr 23	Y = 0.9768x + 26.572	0.9973
RYG_FS0197	01 Apr 23	Y = 1.0042x + 15.442	0.9999
RYG_FS0198	01 Apr 23	Y = 1.0081x - 13.26	0.9999
RYG_FS0199	01 Apr 23	Y = 1.0255x - 1.2364	0.9999

Review By : (Mr. Wichan Choonharat) Enviro Field Services Manager

Approved By : (Mr.Sarayuth Jittranont) Assistant General Manager

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Certificate of System Qualification

LC-OQ

REVIEW BY
APPROVED BY
NEXT CAL. DATE 2 Dec 23

System ID:	DE62964837
Organization Name:	ALS Laboratory Group (Thailand) Co.,Ltd.
Organization Location:	104 Phatthanakarn Rd.,Suan Luang,Bangkok 10250 Thailand.
Date:	June 2, 2022 1:27:42 PM
EQP Name:	AgilentRecommended
EQP Revision:	LC 02.50
Overall Qualification Status:	Pass

Pump Flow Accuracy

Model/Serial No.: G1311A DE62964837
Channel: A

Setpoint Status: Pass

	Setpoint/Average		
Pump Flow Rate:	0.500	0.501	mL/min
Accuracy (as % error):		0.20	%
Agilent Recommended:	<=	5.00	

Setpoint Status: Pass

	Setpoint/Average		
Pump Flow Rate:	5.000	5.00417	mL/min
Accuracy (as % error):		0.08	%
Agilent Recommended:	<=	5.00	

Overall Pump Flow Accuracy Test Status

Pass

Pump Flow Precision

Model/Serial No.: G1311A DE62964837
Channel: A

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Setpoint Status: Pass

	Setpoint/Average		
Pump Flow Rate:	0.500	0.501	mL/min
Precision RSD:		0.00	%
Agilent Recommended:	<=	0.50	

Setpoint Status: Pass

	Setpoint/Average		
Pump Flow Rate:	5.000	5.00417	mL/min
Precision RSD:		0.04	%
Agilent Recommended:	<=	0.50	

Overall Pump Flow Precision Test Status

Pass

Column Temperature Accuracy

Model/Serial No.: G1316A DE63068461

Setpoint Status: Pass

	Setpoint/Actual		
Column Compartment Temperature:	80.0	/ 80.1	°C
Accuracy:		0.1	°C
Agilent Recommended:	<=	3.0	

Setpoint Status: Pass

	Setpoint/Actual		
Column Compartment Temperature:	40.0	/ 40.0	°C
Accuracy:		0.0	°C
Agilent Recommended:	<=	2.0	

Overall Column Temperature Accuracy Test Status

Pass

Column Temperature Stability

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Model/Serial No.: G1316A DE63068461

Setpoint Status: Pass

	Setpoint/Average		
Column Compartment Temperature:	40.0	/ 40.06667	°C
Stability:		0.1	°C
Agilent Recommended:	<=	1.0	

Overall Column Temperature Stability Test Status

Pass

Wavelength Accuracy

Detector Type: FLD
Model/Serial No.: G1321A DE60556998

Setpoint Status: Pass

	WL 1:		WL 2:	
Setpoint:	350	nm	397	nm
Actual:	349	nm	399	nm
Acc.:*	1	nm	2	nm
Agilent Recommended:	<= 3		<= 3	

* Accuracy (error in nm)

Overall Wavelength Accuracy Test Status

Pass

Signal to Noise

Detector Type: FLD
Model/Serial No.: G1321A DE60556998

Setpoint Status: Pass

Signal to Noise:		568
Agilent Recommended:	>=	400

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Overall Signal to Noise Test Status

Pass

Scouting Run

Detector Type: FLD
Model/Serial No.: G1329A DE64766191
Model/Serial No.: G1321A DE60556998

Setpoint Status: Completed

Overall Scouting Run Status

Completed

Injection Precision

Detector Type: FLD
Model/Serial No.: G1329A DE64766191
Model/Serial No.: G1321A DE60556998

Setpoint Status: Pass

	From EQP		Actual		
Injection Volume on Column:	5	/	5	µL	
Area RSD:		0.29	%	Height RSD:	0.43 %
Agilent Recommended:	<=	1.00		<=	1.00

Overall Injection Precision Test Status

Pass

Injection Carry Over

Detector Type: FLD
Model/Serial No.: G1329A DE64766191
Model/Serial No.: G1321A DE60556998

Setpoint Status: Pass

	From EQP		Actual	
Injection Volume on Column:	5	/	5	µL
Area Carry Over:	0.00	%	Height Carry Over:	0.00	%
Agilent Recommended:	<= 0.20		<= 0.40	

Overall Injection Carry Over Test Status

Pass

Instrument Details

Purpose

This section describes the as found system configuration.

Details

System

System ID	DE62964837
Manufacturer	Agilent Technologies
System Scale	Analytical
Typical System Pressure	HPLC (<= 400 bar)

Pumps 1

Manufacturer	Agilent Technologies
Name	1200
Model Number	G1311A
Scale	Analytical
Gradient Capability	Quaternary
Gradient Valve	Installed
Serial Number	DE62964837
Firmware Revision	A.06.55
Component ID/Asset No.	LC-2

Injectors 1

Manufacturer	Agilent Technologies
Name	1200
Model Number	G1329A
Maximum Injection Volume	100 ul
Serial Number	DE64766191
Firmware Revision	A.06.54
Component ID/Asset No.	LC-2

Column Compartments 1

Manufacturer	Agilent Technologies
Name	1260
Model Number	G1316A
Type	Heated and cooled
Serial Number	DE63068461
Firmware Revision	A.06.50
Component ID/Asset No.	LC-2

Detectors 1

Manufacturer	Agilent Technologies
Detector Type	FLD
Name	1200
Model Number	G1321A
Flow Cell	Standard
Serial Number	DE60556998
Firmware Revision	A.07.01
Component ID/Asset No.	LC-2

Electronic Signature

Purpose

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Details

Full Name of Signer:	Weerachai Singthong
Logged On User Name:	weerachai.singthong@non.agilent.com
Signature Creation Date:	June 2, 2022
Reason for Signature:	Executed protocol and published this original version of document

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User Name: weerachai.singthong
Hostname: DESKTOP-JTNDOHG

System Id: DE62964837
Print Date: June 2, 2022 1:27:43 PM

LCOQ_6005117561_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 2, 2022 1:16:50 PM	Audit	SessionCreated	Session	None
June 2, 2022 1:16:50 PM	Start	Configuration	Session	None
June 2, 2022 1:16:50 PM	Audit	Entitlement	Licensing	User is Nonpaying and does not require an unlock code
June 2, 2022 1:16:57 PM	Audit	EqpLoaded	Session	EQP details for primary technique [Lc] - File path: [Protocol\Packs\Lc\Configurations\02.50\Lc.02.50.eqp], EQP File Name: [Lc.02.50.eqp], EQP Name: [AgilentRecommended]
June 2, 2022 1:17:00 PM	End	Configuration	Session	None
June 2, 2022 1:17:03 PM	Start	Qualification	Session	OQ
June 2, 2022 1:17:03 PM	Start	Execution	Pump Flow Accuracy : Pumps 1, G1311A, Channel 1: Flow 1	None
June 2, 2022 1:17:06 PM	Audit	AceClosed	Session	None
June 2, 2022 1:18:28 PM	Audit	AceRestarted	Session	None
June 2, 2022 1:18:30 PM	Audit	SessionReloaded	Session	None
June 2, 2022 1:18:33 PM	Start	Qualification	Session	OQ
June 2, 2022 1:18:44 PM	Start	Execution	Injection Carry Over : Injectors 1, G1329A - G1321A, FLD: Injection Volume 1	None
June 2, 2022 1:19:07 PM	Audit	Data	Injection Carry Over : Injectors 1, G1329A - G1321A, FLD: Injection Volume 1	Data files Path : C:\Users\weera\Desktop\OQData_02Jun2022\OQPV_02JUN22 2022-06-02 12-33-35\FLDIP_01.D\fld1A.ch

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User Name: weerachai.singthong
Hostname: DESKTOP-JTNDOHG

System Id: DE62964837
Print Date: June 2, 2022 1:27:43 PM

LCOQ_6005117561_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
June 2, 2022 1:19:07 PM	Audit	Data	Injection Carry Over : Injectors 1, G1329A - G1321A, FLD: Injection Volume 1	Data files Path : C:\Users\weera\Desktop\OQData_02Jun2022\OQPV_02JUN22 2022-06-02 12-33-35\FLDIP_07.D\fld1A.ch
June 2, 2022 1:19:07 PM	Audit	Data	Injection Carry Over : Injectors 1, G1329A - G1321A, FLD: Injection Volume 1	Data files Path : C:\Users\weera\Desktop\OQData_02Jun2022\OQPV_02JUN22 2022-06-02 12-33-35\FLDIP_08.D\fld1A.ch
June 2, 2022 1:20:11 PM	End	Execution	Injection Carry Over : Injectors 1, G1329A - G1321A, FLD: Injection Volume 1	Run Count : 1
June 2, 2022 1:20:15 PM	End	Qualification	Session	OQ
June 2, 2022 1:20:15 PM	Start	Reporting	Session	None
June 2, 2022 1:26:49 PM	Audit	Reporting	Session	Report Generated : Certificate
June 2, 2022 1:27:10 PM	Audit	Reporting	Session	Report Generated : Report

Date: June 2, 2022 1:27:42 PM
System ID: DE62964837

CONSOLE CONTROL UNIT CALIBRATION TEST REPORT

Calibration of Date : 13-Jan-23
Next Cal. Date : 13-Jul-23

Console Control Meter Data
Calibration No. : C-130123-BKK_FS0518
Dry Gas Meter ID : BKK_FS0518
Serial No. : 1504025
Model No. : XC-572-V

Barometric Pressure (mmHg) : . .
Relative Humidity (%) : . .
Temperature (C°) : . .

Reference Dry Gas Meter Data
Reference Dry Gas Meter ID : . .
Serial No. : . .
Correction Factor (Y) : . .
Next Calibration Date : . .

ΔH (mm.H2O)	Θ Minutes	Reference Dry Gas Meter Calibration Vr (Liters) Final	Vr (Liters) Initial	Vr (Liters) Total	Tr (°C)	Console Control : Drygas Meter Vm (Liters) Final	Vm (Liters) Initial	Vm (Liters) Total	Ti (°C)	To (°C)
15	12.56	150.00	0.00	150.00	31.0	311219.8	311064.0	155.80	29.0	29.0
25	9.48	150.00	0.00	150.00	31.0	311379.6	311225.0	154.60	29.0	29.0
50	6.58	150.00	0.00	150.00	30.0	311544.0	311390.0	154.00	29.0	29.0
80	5.16	150.00	0.00	150.00	30.0	311708.6	311555.0	153.60	30.0	30.0
120	4.16	150.00	0.00	150.00	30.0	311867.8	311715.0	152.80	30.0	30.0

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

ΔH@ : Orifice pressure differential that equates to 21.24 lm of air @ 25.C and 760 mm of mercury , mmH2O ; tolerance for individual values ± 5.08 f

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

Calibrated by: Saksit Phaisanphisut (Mr. Saksit Phaisanphisut) Field Scientist(4)

Approved by: Natthapol (Mr.Natthapol) Field Spe

Pitot Tube Calibration Data

Pitot Tube Identification Number : BKK_FS0522
Calibration Date : 13 Jan 23
Lab test duct Number : 258-1-13-01
Standard Pitot ID : BKK_FS0441
Calibration Sheet No. : C-130123-BKK_FS0522
Cp Standard : 0.99

Type S Pitot Tube Coefficient Data

	Type s pitot tube Leg A,B	Standard pitot tube (ΔP, mm.H_2O)	Type s pitot tube (ΔP, mm.H_2O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 2	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 3	A	12.00	16.80	0.845	-
	B	12.00	16.80	-	0.845
			$\overline{Cp}$	0.842	0.842

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

$$\left[\overline{Cp}_{(A)} - \overline{Cp}_{(B)}\right] must\ BE \leq 0.01$$

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

Calibrated by : Saksit Phaisanphisut (Mr. Saksit Phaisanphisut) Field Scientist (4)

Approved by : Natthapol Jiengwareewong (Mr.Natthapol Jiengwareewong) Specialist (1)

Pitot Tube Calibration Data

Pitot Tube Identification Number : BKK_FS0523
Calibration Date : 13 Jan 23
Lab test duct Number : 258-1-13-01
Standard Pitot ID : BKK_FS0441
Calibration Sheet No. : C-130123-BKK_FS0523
Cp Standard : 0.99

Type S Pitot Tube Coefficient Data					
	Type s pitot tube Leg A,B	Standard pitot tube (ΔP, mm.H_2O)	Type s pitot tube (ΔP, mm.H_2O)	Cp (s) Leg A	Cp (s) Leg B
Test 1	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 2	A	12.00	17.00	0.840	-
	B	12.00	17.00	-	0.840
Test 3	A	12.00	16.80	0.845	-
	B	12.00	16.80	-	0.845
			$\overline{Cp}$	0.842	0.842

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

$$\left[\overline{Cp}_{(A)} - \overline{Cp}_{(B)}\right] must\ BE \leq 0.01$$

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

Calibrated by : Saksit Phaisanphisut
(Mr. Saksit Phaisanphisut)
Field Scientist (4)

Approved by : Natthapon Jiengwareewong
(Mr.Natthapol Jiengwareewong)
Specialist (1)

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

DIGITAL TEMPERATURE CALIBRATION DATA SHEET

Calibration Date : 13 Jan 23
Ambient Temperature (°C) :30
Calibration sheet No. : C-130123-BKK_FS0519
Relative Humidity (%) : 55

Digital Temperature ID : BKK_FS0519
Reference Temperature ID : BKK_FS0609
Console Serial No. : 1504025
Serial No. : 7688004
Model : XC-572-V
Model : FLUKE 714
Last Calibrate : 25 Jan 22

Location	Reference Temperature °C	Digital Temperature °C	Error °C	Remark
Stack	0	0	0	
	25	25	0	
	50	50	0	
	100	100	0	
	150	150	0	
	200	200	0	
	250	250	0	
	300	300	0	
	500	500	0	
	1000	1001	1	
	1200	1201	1	
Probe	100	100	0	
	120	120	0	
	140	140	0	
Filter	100	100	0	
	120	120	0	
	140	140	0	
Exit	0	0	0	
	10	10	0	
	20	20	0	
Meter	0	0	0	
	25	25	0	
	50	50	0	
AUX	0	0	0	
	25	25	0	
	50	50	0	

Calibrated by : Saksit Phaisanphisut
Mr. Saksit Phaisanphisut
Field Scientist (4)

Approved by : Natthapon Jiengwareewong
Mr.Natthapol Jiengwareewong
Specialist (1)

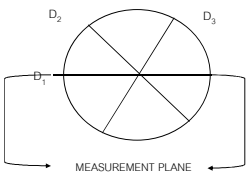
FORM NO.: F 06-027 REVISION NO.: - ISSUE DATE: 2/5/02

PROBE NOZZLE DIAMETER
CALIBRATION DATA SHEET

Calibration Date : 13 Jan 23
Nozzle Set ID. : BKK_FS0524
Calibration Sheet No. : C-130123-BKK_FS0524
Vernier Caliper ID.: BKK_FS1123

Nozzle ID #	Nozzle Diameter (cm.)			Hi - Lo	$(D_1 + D_2 + D_3) / 3$
	D_1	D_2	D_3	ΔD	D_{avg}
1	0.318	0.318	0.318	0.000	0.318
2	0.472	0.474	0.475	0.003	0.474
3	0.632	0.635	0.634	0.003	0.634
4	0.792	0.792	0.792	0.000	0.792
5	0.952	0.952	0.952	0.000	0.952
6	1.091	1.110	1.092	0.019	1.098
7	1.256	1.262	1.262	0.006	1.260
8	1.601	1.598	1.600	0.003	1.600

Where :
D_1, D_2, D_3 = There different nozzle diameters at 60 degrees to each other, each measured the nearest 0.025 mm.
ΔD = Maximum distance between any two diameters, must be $\leq$ 0.100 mm.
D_{avg} = $(D_1 + D_2 + D_3) / 3$



Calibrated by : Saksit Phaisanphisut
(Mr. Saksit Phaisanphisut)
Field Scientist (4)

Approved by : Natthapon Jiengwareewong
(Mr.Natthapol Jiengwareewong)
Field Specialist (1)

FORM NO.: F 06-026 REVISION NO.: - ISSUE DATE: 9/1/03

ENTECH

Calibration Certificate

Certificate No: G 660018
Date of issue : 23-Jan-23

REVIEW BY
APPROVED BY
NEXT CAL. DATE 20/1/24

Instrument description : Flue gas Analyzer
Instrument model : Testo 350 New
Instrument serial no. : 62985049
ID no. or control no. : RYG_FS0564
Manufacturer : Testo SE & Co. KGaA
Probe description : -
Probe model : -
Probe serial : -
Customer name : ALS LABORATORY GROUP (THAILAND) CO.,LTD.
Customer address : 104 Phatthanakan 40, Phatthanakan Road, Khwaeng Phatthanakan, Khet Suan Luang, Bangkok, 10250 Thailand
Total pages of certificate : 3 Pages
Receiving no. : L-230153
Receiving date. : 19-Jan-23
Parameter of calibration : Gas Calibration(Oxygen 2.498,10.04,21.02 %vol, Carbon Monoxide 80.14,309.9,1003 ppm, Nitrogen Dioxide 30.34,80.96,202.2 ppm, Nitric Oxide 30.08,150.9,320.6 ppm, Sulphur Dioxide 50.04,100.8,601.1 ppm)

Condition of UUC. : Used
Ambient condition : All of the Measurment were carried out the stabilized laboratory
Temperature : 23 ±5 °C
Humidity : 55 ± 15 %RH
Calibration place : 17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Laksi, Bangkok 10210
Calibration procedure no. : WI-CL-28-C

The calibration certificate expanded uncertainty of measurement is stated as the standard uncertainty of measurement Multiplied by coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.
This certificate is applied only to item under test Environmental condition.
This Calibration Certificate may not be reproduced other than in full except with the permission of the issuing laboratory. Calibration certificates without signature and seal not valid.
This calibration certificate documents are traceability to national standards, which realize measurement according to the International System of Units (SI).

Date of calibration : 20-Jan-23

Mr. Seittawut Nuealthong
Calibration Technician

Mrs. Nongluck Wongsettee
Technical Manager

FM-CL-09-C Rev.8 Page 1 of 3 Issued Date 26/02/16

Entech Industrial Solution Co.,Ltd.
17/121 Soi Ngamwongwan 47 Yaek 48, Toongsonghong, Laksi, Bangkok 10210 THAILAND Tel 0-2779-8888 Calibration@entech.co.th
Tax ID : 0105560035591 www.entech.co.th

ENTECH

Calibration Certificate

Certificate No.: G 660018

Standard References (Table 1)

Standard	Certificate No.	Vendor	Due date
Oxygen (O2) 2.498 % Vol	4219/21	Linde	30-Sep-25
Oxygen (O2) 10.04 % Vol	CG-0153-21	Nimt	18-Nov-26
Oxygen (O2) 21.02 % Vol	CG-0041-22	Nimt	10-Feb-27
Carbon monoxide (CO) 80.14 ppm	CG-0040-22	Nimt	14-Feb-27
Carbon monoxide (CO) 309.9 ppm	2803/21	Linde	22-Jun-23
Carbon monoxide (CO) 1003 ppm	2583/22	Linde	09-Aug-24
Nitrogen Dioxide (NO2) 30.34 ppm	2703/22	Linde	22-Aug-24
Nitrogen Dioxide (NO2) 80.96 ppm	2041/22	Linde	26-Jun-24
Nitrogen Dioxide (NO2) 202.2 ppm	3239/21	Linde	20-Jul-23
Nitric Oxide (NO) 30.08 ppm	CG-0089-22	Nimt	13-Jun-24
Nitric Oxide (NO) 150.9 ppm	2857/21	Linde	27-Jun-23
Nitric Oxide (NO) 320.6 ppm	2944/21	Linde	02-Jul-23
Sulphur Dioxide (SO2) 50.04 ppm	2786/21	Linde	25-Jul-23
Sulphur Dioxide (SO2) 100.8 ppm	3507/22	Linde	09-Nov-24
Sulphur Dioxide (SO2) 601.1 ppm	3204/21	Linde	20-Jul-23

Measured room conditions

Temperature : 22.8 °C Humidity : 58.5 %RH Pressure : 1013.5 mbar

Calibration conditions

Gas Temperature : 23 °C Flow rate : 1,200 ml/min Gas pressure : 1021.9 mbar

Calibration Results Before Adjustment (Table 2)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O2 (%Vol)	2.498	2.45	-0.048	0.20
O2 (%Vol)	10.04	9.89	-0.15	0.40
O2 (%Vol)	21.02	21.16	0.14	0.80
CO (ppm)	80.14	82	1.86	3.0
CO (ppm)	309.9	313	13.1	6.0
CO (ppm)	1003	1014	11	12
NO2 (ppm)	30.34	21.9	-8.44	8.0
NO2 (ppm)	80.96	55.3	-25.66	8.0
NO2 (ppm)	202.2	154.8	-47.4	12
NO (ppm)	30.08	27	-3.08	8.0
NO (ppm)	150.9	145	5.9	8.0
NO (ppm)	320.6	304	-16.6	12
SO2 (ppm)	50.04	50	-0.04	6.0
SO2 (ppm)	100.8	100	-0.8	6.0
SO2 (ppm)	601.1	598	-3.1	13

Entech Industrial Solution Co.,Ltd.
17/121 Soi Ngamwongwan 47 Yaek 4B, Toongsonghong, Laksi, Bangkok 10210 THAILAND Tel. 0-2779-8888 Calibration@entech.co.th
Tax ID : 0105536035591 www.entech.co.th

ENTECH

Calibration Certificate

Certificate No.: G 660018

Calibration Results After Adjustment (Table 3)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O2 (%Vol)	2.498	2.45	-0.048	0.20
O2 (%Vol)	10.04	9.89	-0.15	0.40
O2 (%Vol)	21.02	21.16	0.14	0.80
CO (ppm)	80.14	82	1.86	3.0
CO (ppm)	309.9	313	3.1	6.0
CO (ppm)	1003	1014	11	12
NO2 (ppm)	30.34	31.2	0.86	8.0
NO2 (ppm)	80.96	82.7	1.74	8.0
NO2 (ppm)	202.2	205.6	3.4	12
NO (ppm)	30.08	32	1.92	8.0
NO (ppm)	150.9	153	2.1	8.0
NO (ppm)	320.6	322	1.4	12
SO2 (ppm)	50.04	50	-0.04	6.0
SO2 (ppm)	100.8	100	-0.8	6.0
SO2 (ppm)	601.1	598	-3.1	13

Remark : 1 cmol/mol = 1 %vol. , 1 µmol/mol = 1 ppm.

End of Report

Entech Industrial Solution Co.,Ltd.
17/121 Soi Ngamwongwan 47 Yaek 4B, Toongsonghong, Laksi, Bangkok 10210 THAILAND Tel. 0-2779-8888 Calibration@entech.co.th
Tax ID : 0105536035591 www.entech.co.th

RYG_EN0003

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

SARTORIUS

NSC-TISI-TIS 17025
CALIBRATION 0426

REVIEW BY Thanakit
APPROVED BY
NEXT CAL. DATE 01/05/24

Certificate of Calibration

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

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

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

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

Metrological data :
Capacity : 220 g Readability : 0.0001 g

Ambients Conditions:
Temperature : 23.0 °C ± 5.0 °C
Humidity : 56.0 % RH ± 10.0 % RH
Pressure ±

Reasons for calibration
☐ New Installation ☐ Service / Repaired ☑ Re-calibration/ Maintenance

Equipment Condition: ☑ Good Operate ☐ Fair

Measurement Method UKAS Publication Ref :Lab 14

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

Traceability:

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 5000g E2 YCS011-522-00	SPC-RT	C02212585	14-Sep-2023
MHB-382SD	Humidity/Barometer/Temp. Lutron MHB-382SD	DKSH	C19220444	5-Sep-2023

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

Mr.chonchai Inthana(Technical Manager)

STAMP

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-6 Fax: +66 2643-8357, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

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

Calibration Results : Without Adjustment

Repeatability

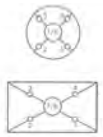
The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.

Nominal Value : (Low Load)			
20	g	20.0000	200.0000
Tolerance		20.0001	200.0000
0.0001	g	20.0000	200.0001
		20.0000	200.0000
		20.0000	200.0001
Nominal Value : (High Load)		20.0001	200.0001
200	g	20.0000	200.0001
Tolerance		20.0000	200.0000
0.0001	g	20.0000	200.0001
		20.0000	200.0001
Standard Deviation		0.00004	0.00005

Eccentricity (Off-center loading error)

The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximim capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).

Nominal value : 100 g
Tolerance 0.0004 g



	Difference
1	-
2	0.0001
3	0.0000
4	0.0000
5	0.0001
6	-

Linearity

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

Tolerance 0.0002 g

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

End of Report

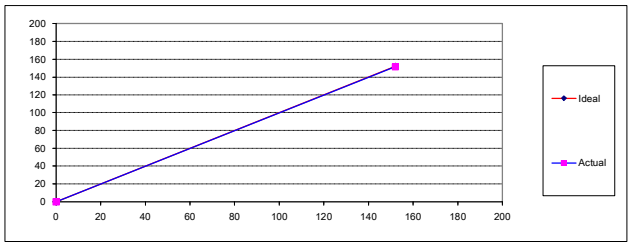
SOP FM 33 03 February 2022

CALIBRATION REPORT

Calibration Date	4-Jan-23	**Equipment ID**	BKK_FS0758
Equipment Name	FID Analyzer	**Manufacturer**	Baseline Mocon
Model	9000H	**Serial No.**	0315EF0047
Std.Gas Conc.(ppm)	152	**Cylinder No.**	D878173
Certified Date	27-Jun-18	**Expired Date**	27-Jun-26

CALIBRATION RESULTS

Point	CALIBRATION RESULTS			
	Ideal	Actual	Error	%Error
ZERO	0.00	0.05	0.05	0.05
SPAN	152.00	151.50	-0.50	-0.33
AVERAGE (%)				-0.14



Calibrated By

(Mr.Apisit Sing-ha)
Field Environmental Scientist (4)

Approved By

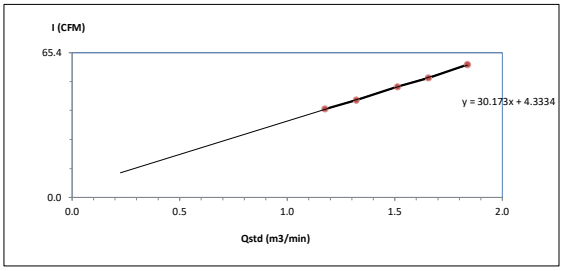
(Mr.Sarayuth Jittranont)
Assistant General Manager

ALS Laboratory Group

High Volume Air Sampler Calibration Worksheet

Project Site :	BASF (Thai) Limited	**Barometric Pressure (mm Hg) :**	756
Calibrate Location :	ภายในนิคมอุตสาหกรรม	**Temperature (°C) :**	31
Calibrate Date :	24-Jun-23	**High Volume ID :**	RYG_FS0177
CalibrationSheet No.:	C-240623-RYG_FS0177	**High Volume Model :**	TE-5170D
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	4803
Calibrator Model :	TE-5028A	**Calibrator Slope :**	1.47433
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.01503

Test No.	Delta H_2O (inch)	Q_{std} (m^3/min)	I : Chart (CFM)	Linear Regression
1	3.0	1.1751	40	Slope : 30.1733
2	3.8	1.3207	44	Intercept : 4.3334
3	5.0	1.5127	50	Correlation Coefficient : 0.9996
4	6.0	1.6556	54	
5	7.4	1.8370	60	



Calibrated by _____
(Mr.Apichart Wilars)
Field Scientist (1)

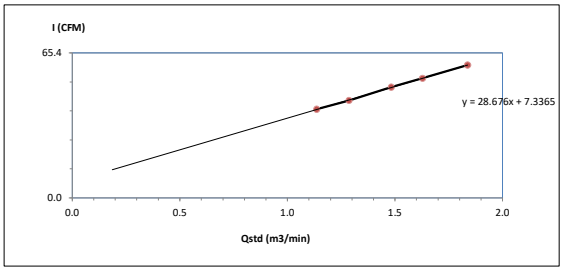
Approved by : _____
(Mr. Noppong Juntarupan)
Enviro Field Coordinator Scientist (3)

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

High Volume Air Sampler Calibration Worksheet

Project Site :	BASF (Thai) Limited	**Barometric Pressure (mm Hg) :**	756
Calibrate Location :	บ้านห้วยปราบ	**Temperature (°C) :**	31
Calibrate Date :	24-Jun-23	**High Volume ID :**	RYG_FS0396
CalibrationSheet No.:	C-240623-RYG_FS0396	**High Volume Model :**	TE-5170D
Calibrator ID:	RYG_FS0206	**High Volume S/N :**	5688
Calibrator Model :	TE-5028A	**Calibrator Slope :**	1.47433
Calibrator S/N :	1543	**Calibrator Intercept :**	-0.01503

Test No.	Delta H_2O (inch)	Q_{std} (m^3/min)	I : Chart (CFM)	Linear Regression
1	2.8	1.1358	40	Slope : 28.6762
2	3.6	1.2858	44	Intercept : 7.3365
3	4.8	1.4824	50	Correlation Coefficient : 0.9998
4	5.8	1.6281	54	
5	7.4	1.8370	60	



Calibrated by _____
(Mr.Apichart Wilars)
Field Scientist (1)

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

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

RYG_EN0001

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

NSC-TISI-TIS 17025
CALIBRATION 0426

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

Certificate of Calibration

Model Number :	LA130S-F	Certificate No. :	23BCI0110
Description :	Analytical Balance	Issued Date :	Friday, March 03, 2023
Serial Number :	25409664	Reference No. :	204833
ID No. :	RYG_EN0001		
Manufacturer :	Sartorius	Page No. :	1 of 2

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

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

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

Calibration Procedure No : This calibration was conducted by Using in-house calibration procedure number (WI-003) Based on UKAS LAB 14 : 2019

Metrological data :
Capacity : 150 g Readability : 0.0001 g

Ambients Conditions:
Temperature : 24.2 °C ± 5.0 °C
Humidity : 60.0 % RH ± 10.0 % RH
Pressure ± _____

Reasons for calibration
☐ New Installation ☐ Service / Repaired ☑ Re-calibration/ Maintenance

Equipment Condition: ☑ Good Operate ☐ Fair

Measurement Method UKAS Publication Ref :Lab 14

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

Traceability:

Model Number	Description	Traceability	Certificate No.	Due Date
YCS011-522-00	Sartorius weight set 1mg - 5000g E2,YCS011-522-00	SPC-RT	C022112565	14-Sep-2023
MHB-382SD	Humidity/Barometer/Temp Lutron MHB-382SD	DKSH	C19220444	6-Sep-2023

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

Mr.chonchai inthana(Technical Manager)

STAMP

SOP FM 33 03 February 2023

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8361-8 Fax: +66 2643-8367, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

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

Calibration Results : Without Adjustment

Repeatability

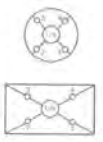
The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.

Nominal Value : (Low Load)	10.0000	100.0001
10 g	10.0000	100.0002
Tolerance	10.0001	100.0001
0.0001 g	10.0000	100.0000
	9.9999	100.0002
Nominal Value : (High Load)	10.0000	100.0001
100 g	10.0001	100.0001
Tolerance	10.0000	100.0001
0.0001 g	9.9999	100.0002
	9.9998	100.0001
Standard Deviation	0.00009	0.00006

Eccentricity (Off-center loading error)

The off-center loading error is yielded by the difference between the readout of the load 1 e, 1/3 or 1/4 of maximum capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).

Nominal value 50 g
Tolerance 0.0004 g



	Difference
1	–
2	0.0000
3	-0.0001
4	0.0001
5	0.0000
6	–

Linearity

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

Tolerance 0.0002 g

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

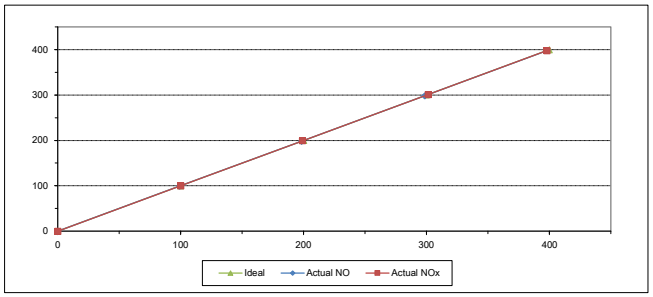
End of Report

SOP FM 33 03 February 2022

MULTIPOINT CALIBRATION REPORT

Calibration Date	5-Jan-23	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	8G314J3K	Equipment ID	RYG_FS0264
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.05	0.05	0.05	0.10	0.10	0.10
1	100.00	99.20	-0.80	-0.80	100.10	0.10	0.10
2	200.00	198.40	-1.60	-0.80	199.10	-0.90	-0.45
3	300.00	298.60	-1.40	-0.47	301.50	1.50	0.50
4	400.00	398.10	-1.90	-0.47	398.00	-2.00	-0.50
AVERAGE (%)				-0.50			-0.05



Calibrated By

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

Approved By

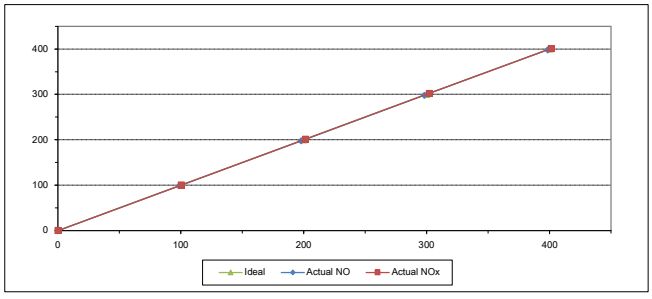
(Mr.Sarayuth Jittranont)
Assistant General Manager

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

MULTIPOINT CALIBRATION REPORT

Calibration Date	5-Jan-23	Equipment Name	NOx Analyzer
Manufacturer	HORIBA	Model	APNA-370
Serial No.	SEEAW53E	Equipment ID	RYG_FS0261
Calibrator Manufacturer	Teledyne API	Model	700
Serial No.	947		
Std. Gas Concentration (PPM)	55.88	Cylinder No.	GN0027222
Cylinder Pressure (psi)	1800	Certified By	Airgas Inc.
Certified Date	9-Feb-22	Expired Date	9-Feb-30

Point	CALIBRATION RESULTS						
	Ideal	Actual NO	Error NO	%Error NO	Actual NOx	Error NOx	%Error NOx
ZERO	0.00	0.10	0.10	0.10	0.10	0.10	0.10
1	100.00	98.70	-1.30	-1.30	100.40	0.40	0.40
2	200.00	197.80	-2.20	-1.10	201.50	1.50	0.75
3	300.00	298.10	-1.90	-0.63	302.20	2.20	0.73
4	400.00	398.50	-1.50	-0.38	401.40	1.40	0.35
AVERAGE (%)				-0.66			0.47



Calibrated By

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

Approved By

(Mr.Sarayuth Jittranont)
Assistant General Manager

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

JNAC
JIRANATEE ASSOCIATES CO.,LTD.

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TSI-TIS 17025
CALIBRATION 0367

Air speed measurement laboratory
Calibration services department.

Jiranatee Associates Co.,Ltd
63/14-15, 67/35-36
Petchkasem 77/1, Rd. Watthana, Bangkokyai,
Bangkok 10600(Thailand)
Tel: +6629830812
Mobile: 0818139453
E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

REVIEW BY Monalorn P.
APPROVED BY
NEXT CAL. DATE 10/5/24

Certificate Number
C1-019.66

CERTIFICATE OF CALIBRATION

Page 1 of 2 Pages

MEASUREMENT ITEM	: Cup anemometer
MANUFACTURER	: Novalynx
MODEL/TYPE	: Sensor: WS-02H Data logger: 200-WS-25LB
SERIAL NUMBER	: Sensor: - Data logger: A5374
ID NUMBER	: RYG_FS0417
CONDITION AS-RECEIVED	: Used item
CUSTOMER	: ALS laboratory group (Thailand) Co., Ltd. : 104 Phatthanakan 40, Phatthanakan Rd. Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.
RECEIVED DATE	: 27 Jan 2023
MEASUREMENT DATE	: 10 Feb 2023
ISSUE DATE	: 10 Feb 2023

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow.

Temperature	: 23.0 ± 3.0	°C
Relative Humidity	: 55.0 ± 15.0	%RH
Atmospheric Pressure	: 1010 ± 10	hPa

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

CALIBRATION CONDITIONS

Wind tunnel cross section area[1]	900	cm²
Win direction frontal area[2]	100	cm²
Diameter of mounting pipe[3]	-	mm
Blockage ratio of test object[4]	0.111	[-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (23.5) °C, (49.2) %RH and (1010.3) hPa.

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibrated by:
☑ Mr. Sorawit Thachalad
☐ Miss Jittraporn Lertsomphol

JNAC JIRANATE ASSOCIATES CO.,LTD.

Approved signatory:
Mr. Parinya Booncharoen
Calibration Department Manager

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [2] to [1]

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

Certificate Number
CL-017-66

MEASUREMENT RESULTS [1]

The cup anemometer, Unit Under Calibration (UUC) was exercise at 10 m/s for 5 minutes prior to calibration being performed. The standard air velocity 0.5 m/s to 5 m/s was calculated by a standard air velocity transducer and above 5 m/s to 30 m/s was calculated by a pitot tube with precision differential pressure meter which was installed 40 mm and 360 mm respectively away from wind tunnel nozzle. UUC was installed at center of the test section. The calibration was carried out under both rising and falling air velocity in the range of 1 m/s to 16 m/s at calibration interval of 1 m/s. The results of calibration and associated measurement uncertainties are reported in the table below.

v_{std} [2] (m/s)	Temp. wind tunnel (°C)	Temp. room (°C)	v_{uuc} [3] (m/s)	Error (m/s)	U (k=2) (m/s)
0.981	23.52	23.50	0.8	-0.2	0.15
2.049	23.46	23.50	1.8	-0.2	0.16
3.040	23.50	23.50	2.9	-0.2	0.17
4.144	23.56	23.50	3.9	-0.2	0.20
5.00	23.38	23.50	4.8	-0.2	0.19
5.98	23.56	23.50	5.8	-0.2	0.17
7.05	23.26	23.50	6.9	-0.2	0.18
8.15	23.50	23.50	7.9	-0.2	0.19
9.09	23.30	23.50	8.9	-0.2	0.19
10.09	23.50	23.50	9.9	-0.2	0.20
11.14	23.24	23.50	10.9	-0.2	0.21
12.13	23.36	23.50	12.0	-0.2	0.21
13.18	23.32	23.50	13.0	-0.2	0.21
14.26	23.18	23.50	14.0	-0.2	0.23
15.21	23.30	23.50	14.9	-0.3	0.24
16.28	23.12	23.50	16.1	-0.2	0.24

Remark:

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

[2] Velocity of standard

[3] Velocity of Unit Under Calibration

PHOTO OF CALIBRATION SET-UP



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

End of Certificate of Calibration

Jiranatee Associates Co., Ltd.

JIRANATEE ASSOCIATES CO.,LTD.

Jiranatee Associates Co.,Ltd.
63/14-15, 67/33-35
Petchkasem 57/2, Rd. Nonthaburi, Bangkoknoi,
Bangkok 10700(Thailand)
Tel: +6628028012
Mobile: +66883999453
E-mail: jnac-calibration@jiranatee.com
Web site: www.jiranatee.com

Accredited calibration laboratory
ISO/IEC 17025:2017
NSC-TISI-TIS 17025
CALIBRATION 0367

Air speed measurement laboratory
Calibration services department.

Certificate Number
CL-017-66

CERTIFICATE OF CALIBRATION

MEASUREMENT ITEM : Wind Direction Sensor
MANUFACTURER : Novalynx
MODEL/TYPE : Sensor: WS-02F
Data logger: 200-WS-25i.0
SERIAL NUMBER : Sensor: -
Data logger: A5374
ID NUMBER : RYG_FS0412
CONDITION AS-RECEIVED : Used item.
CUSTOMER : ALS laboratory group (Thailand) Co., Ltd.
104 Phatthanakan 40, Phatthanakan Rd, Khwaeng Suan Luang, Khet Suan Luang, Bangkok 10250 Thailand.

RECEIVED DATE : 27 Jan 2023
MEASUREMENT DATE : 10 Feb 2023
ISSUE DATE : 10 Feb 2023

ENVIRONMENTAL CONDITIONS:
Ambient condition in the laboratory are as follow:

Temperature	: 23.0 ± 3.0	°C
Relative Humidity	: 55.0 ± 15.0	%RH
Atmospheric Pressure	: 1010± 10	hPa

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

CALIBRATION CONDITION

Wind tunnel cross-section area [1]	900	cm^2
Win direction frontal area [2]	129	cm^2
Diameter of mounting pipe [3]	-	mm
Blockage ratio of Test object [4]	0.143	[-]

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are (23.9)°C, (50.6) %RH and (1011.8) hPa.

TABULATION OF RESULTS:
The table on next page give the measured values.

Calibration procedure:
The wind direction sensor was calibrated against Standard Rotary Encoder model AX400YTS-DM34-P3-S-U0 in an close end-section of Eiffel-type wind tunnel with 900 cm² cross sect ional area. The WT-CL-008 based on IEC 61400-12-1, Wind energy generation systems – Part 12-1: Power performance measurements of electricity producing wind turbines, March 2017 was used as a calibration guideline.

Traceability:
The compliance provides a traceability of the measurement to recognized the national standards, and to realization of the International system of units (SI) through the NIMT (National Metrology Institute of Thailand) via Certificate number: DA-0043-22

Uncertainty of Measurement:
The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with the GUM 'Evaluation of measurement data - Guide to the expression of uncertainty in measurement'

Calibrated by:
☑ Mr. Sorawit Thatchalad
☐ Miss Jitraporn Lertsomphol

Approved signatory:
Mr. Parinya Boonchanuen
Calibration Department Manager

Remark:
[1] Nozzle cross-section area of the wind tunnel
[2] Projected cross-section area of the tested object include mounting pipe
[3] Diameter of mounting pipe
[4] Ratio [2] to [1]

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

Certificate Number
CL-017-66

MEASUREMENT RESULTS [1]

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

Air speed	D°_{std}	D°_{uuc}	Error	U (k=2)
m/s	Degree (°)	Degree (°)	Degree (°)	Degree (°)
	0.000	0	0	0.58
	45.000	41	-4	0.58
	90.000	89	-1	0.74
4.66	135.000	132	-3	0.74
	180.000	178	-2	0.74
	225.000	227	2	0.58
	270.000	274	4	0.58
	315.000	320	5	0.58

Remark:

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

[2] Direction of standard

[3] Direction of Unit Under Calibration

End of Certificate of Calibration

Jiranatee Associates Co., Ltd.

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

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

NSC-TISI-TIS 17025
CALIBRATION 0394

Cert. No. : ACC23005
Pages : 1 of 3

Calibration Certificate

Equipment : SOUND CALIBRATOR
Manufacturer : RION
Model : NC-75
Serial No.: 35002736
ID No.: RYG_FS0496

Condition As Found : GOOD

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

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

Received Date : 06 JANUARY 2023
Calibration Date : 17 JANUARY 2023
Date of Issue : 19 JANUARY 2023

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petchurai
(Thanakul Petchurai)

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

Continuation of Calibration Certificate

Cert. No. : ACC23005
Job No. : VC66AC0024
Pages : 2 of 3

Calibration Procedure : CP-AC-03

Calibration Method :

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

Condition of this result of calibration :

1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33511B	MY52302742	EF-0008-22	04-Feb-23
Digital Multimeter	33461A	MY53220104	EEL.BP. 04/0265	09-Feb-23
Digital Multimeter	33461A	MY53220076	EEL.BP. 03/0265	09-Feb-23
Digital Multimeter	33461A	MY60024273	EEL.BP. 05/0265	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	EF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAI	34560495	AA-3005-22	22-Feb-23
Audio Analyzer	AVR-3360A	V744B6069	EF-0010-22	07-Feb-23

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Continuation of Calibration Certificate

Cert. No. : ACC23005
Job No. : VC66AC0024
Pages : 3 of 3

Result of calibration :

1. Sound pressure level

Specified sound pressure level (dB)	Measured value (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit (dB)
94	93.98	-0.02	0.14	0.40

2. Frequency

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

3. Total distortion

Measured value (%)	Uncertainty (%)	Tolerance limit (%)
0.35	0.10	3.0

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

End of Calibration Certificate

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
45 I-451/1 Sirinthorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND
Tel.0-2435-8800 Fax.0-2435-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.com

NSC-TISI-TIS 17025 CALIBRATION 0298

Cert. No. : ACL23087
Pages : 1 of 8

Calibration Certificate

Equipment :	SOUND LEVEL METER
Manufacturer :	RION
Model :	NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No.:	01120936 / 21737 / 22325
ID No.:	-
Condition As Found :	GOOD
Customer :	ALS LABORATORY GROUP (THAILAND) CO., LTD. 104 PHATTHANAKAN 40, PHATTHANAKAN ROAD, KHWAENG PHATTHANAKAN, KHET SUAN LUANG, BANGKOK, 10250 THAILAND.
Location :	-
Ambient Temperature :	(23.0 ± 3) °C
Pressure :	(101.3 ± 3) kPa
Relative Humidity :	(50.0 ± 20) %
Received Date :	24 JANUARY 2023
Calibration Date :	26-30 JANUARY 2023
Date of Issue :	31 JANUARY 2023

Nathakorn P.
APPROVED BY
EFFECTIVE DATE 26/1/24

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petchurai
(Thanukul 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.

Continuation of Calibration Certificate

Cert. No. : ACL23087
Job No. : VC66AC0030
Pages : 2 of 8

Calibration Procedure : CP-AC-01

Calibration Method :

This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :

1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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	✓	-	0.3	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

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.95)	94.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
13.4

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

Frequency Weighting	Measured value (dB)
A - weight	8.7
C - weight	14.4
Flat	19.9

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.0	0.0	± 1.0
1000	0.0	0.0	0.0	±0.7
8000	-0.7	-0.7	-0.7	+ 1.5, - 2.5

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	-0.1	±1.0
125	0.0	0.0	0.0	±1.0
250	0.0	0.0	0.0	±1.0
500	0.0	0.0	-0.1	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.0	0.0	+ 1.5, - 2.5
16000	0.0	-1.3	-1.2	+ 2.5, -16.0

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	± 0.1

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.1	0.1	±0.8
136.0	136.1	0.1	±0.8
135.0	135.1	0.1	±0.8
134.0	134.1	0.1	±0.8
133.0	133.1	0.1	±0.8
132.0	132.1	0.1	±0.8
131.0	131.0	0.0	±0.8
129.0	129.1	0.1	±0.8
124.0	124.0	0.0	±0.8
119.0	119.1	0.1	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.1	0.1	±0.8
99.0	99.1	0.1	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.0	0.0	±0.8
30.0	30.0	0.0	±0.8
29.0	28.9	-0.1	±0.8
28.0	27.9	-0.1	±0.8
27.0	27.0	0.0	±0.8
26.0	25.9	-0.1	±0.8
25.0	24.9	-0.1	±0.8

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	±0.8

9. Tone burst response

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

10. Peak C sound level

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

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	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

T. Petchurai

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	±0.1

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

End of Calibration Certificate

T. Petchurai

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND.
Tel.0-2433-8800 Fax.0-2433-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.com

ISO/IEC 17025 CALIBRATION 0384

Cert. No. : ACL23088
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No.: 01120937 / 21845 / 22326
ID No.: -

Condition As Found : GOOD

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

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

Received Date : 24 JANUARY 2023
Calibration Date : 26-30 JANUARY 2023
Date of Issue : 31 JANUARY 2023

REVIEW BY Monakorn P.
APPROVED BY
NEXT CAL DATE 26/1/24

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petchurai
(Thanukul 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.

Calibration Procedure : CP-AC-01

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :
1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

T. Petchurai

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	✓	-	0.3	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

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.95)	94.0	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	9.9
C - weight	14.9
Flat	20.4

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	± 1.0
1000	0.2	0.2	0.2	± 0.7
8000	-0.4	-0.4	-0.4	+ 1.5, - 2.5

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±1.0
125	0.0	0.0	0.0	±1.0
250	0.0	0.0	0.0	±1.0
500	0.0	0.0	0.0	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.1	0.1	+ 1.5, - 2.5
16000	0.0	-1.2	-1.2	+ 2.5, -16.0

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	± 0.1

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	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.1	0.1	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.0	0.0	±0.8
30.0	30.0	0.0	±0.8
29.0	29.0	0.0	±0.8
28.0	28.0	0.0	±0.8
27.0	27.0	0.0	±0.8
26.0	26.0	0.0	±0.8
25.0	24.9	-0.1	±0.8

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	±0.8

9. Tone burst response

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

10. Peak C sound level

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

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	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.7	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	±0.1

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

End of Calibration Certificate

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
451-451/1 Srinthorn Rd ,Bangoumru, Bangplud Bangkok 10700 THAILAND
Tel.0-2435-8800 Fax.0-2433-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.com

NSC-TISI-TIS 17025 CALIBRATION 0394

Cert. No. : ACL23075
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No.: 00920833 / 22193 / 22222
ID No.: -

Condition As Found : GOOD

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

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

Nathakorn P.
APPROVED BY
NEXT CAL DATE 23/1/24

Received Date : 06 JANUARY 2023
Calibration Date : 23-24 JANUARY 2023
Date of Issue : 25 JANUARY 2023

Calibrated by : Nathakorn Pisutpaisan

Approved by :
(Thanakul Petchurai)

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

Calibration Procedure : CP-AC-01

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :
1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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	✓	-	0.3	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

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.95)	94.0	0.0	±0.3

2. Self-generated noise

2.1 Normal test

Measured Value (dB)
13.1

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

Frequency Weighting	Measured value (dB)
A - weight	8.7
C - weight	14.2
Flat	19.7

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.1	0.1	± 1.0
1000	0.2	0.2	0.2	± 0.7
8000	-0.3	-0.3	-0.3	+ 1.5, -2.5

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	0.0	-0.1	±1.0
125	0.0	0.0	0.0	±1.0
250	0.0	0.0	0.0	±1.0
500	0.0	0.0	0.0	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.1	0.1	+ 1.5, - 2.5
16000	0.0	-1.2	-1.2	+ 2.5, -16.0

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	± 0.1

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	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	53.9	-0.1	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	38.9	-0.1	±0.8
34.0	33.9	-0.1	±0.8
30.0	29.9	-0.1	±0.8
29.0	28.9	-0.1	±0.8
28.0	27.9	-0.1	±0.8
27.0	26.9	-0.1	±0.8
26.0	25.9	-0.1	±0.8
25.0	24.9	-0.1	±0.8

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	±0.8

9. Tone burst response

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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	136.1	-0.3	±2.0

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	±1.0
Negative half cycle	135.4	135.2	-0.2	±1.0

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	±0.1

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

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND
Tel.0-2433-9800 Fax.0-2433-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.com

NSC-TISI-TIS 17025 CALIBRATION 0384

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-52A / Microphone UC-59 / Preamplifier NH-25
Serial No.: 01120938 / 21888 / 22327
ID No.: -

Condition As Found : GOOD

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

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

REVIEW BY ..... APPROVED BY ..... NEXT CAL. DATE 16/1/24

Received Date : 24 JANUARY 2023
Calibration Date : 26-30 JANUARY 2023
Date of Issue : 31 JANUARY 2023

Calibrated by : Nathakorn Pisutpaisan

Approved by :
(Thanakul Petchurai)

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

Calibration Procedure : (CP-AC-0)

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :
1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

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	✓	-	0.3	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

Result of calibration :

1. Absolute sensitivity

Reference Acoustic Signal (dB)	Measured Value (dB)	Deviation (dB)	Acceptance Limit (dB)
93.9 (93.95)	94.0	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	9.9
C - weight	15.1
Flat	20.7

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.0	0.0	± 1.0
1000	0.1	0.1	0.1	± 0.7
8000	0.0	0.0	0.0	+ 1.5, - 2.5

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	0.1	0.0	±1.0
125	0.1	0.1	0.0	±1.0
250	0.0	0.0	0.0	±1.0
500	0.0	0.1	0.0	±1.0
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.1	0.0	±1.0
4000	0.0	0.0	0.0	±1.0
8000	0.0	0.1	0.1	+ 1.5, - 2.5
16000	0.0	-1.2	-1.2	+ 2.5, -16.0

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

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

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	±0.8
136.0	136.0	0.0	±0.8
135.0	135.0	0.0	±0.8
134.0	134.0	0.0	±0.8
133.0	133.0	0.0	±0.8
132.0	132.0	0.0	±0.8
131.0	131.0	0.0	±0.8
129.0	129.0	0.0	±0.8
124.0	124.0	0.0	±0.8
119.0	119.0	0.0	±0.8
114.0	114.0	0.0	±0.8
109.0	109.0	0.0	±0.8
104.0	104.0	0.0	±0.8
99.0	99.0	0.0	±0.8
94.0	94.0	0.0	±0.8
89.0	89.0	0.0	±0.8
84.0	84.0	0.0	±0.8
79.0	79.0	0.0	±0.8
74.0	74.0	0.0	±0.8
69.0	69.0	0.0	±0.8
64.0	64.0	0.0	±0.8
59.0	59.0	0.0	±0.8
54.0	54.0	0.0	±0.8
49.0	49.0	0.0	±0.8
44.0	44.0	0.0	±0.8
39.0	39.0	0.0	±0.8
34.0	34.0	0.0	±0.8
30.0	29.9	-0.1	±0.8
29.0	28.9	-0.1	±0.8
28.0	27.9	-0.1	±0.8
27.0	26.9	-0.1	±0.8
26.0	25.9	-0.1	±0.8
25.0	24.9	-0.1	±0.8

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	±0.8

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	99.0	0.0	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lepeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.4	-1.0	±2.0

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	±1.0
Negative half cycle	135.4	135.1	-0.3	±1.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
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 (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

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
451-451/1 Sirikhorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND
Tel.0-2435-8800 Fax.0-2433-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.com

NSC-TISI-TIS 17025 CALIBRATION 0064

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00623390 / 198637 / 26418
ID No.: -

Condition As Found : GOOD

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

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

REVIEW BY Nakorn P.
APPROVED BY
NEXT CAL DATE 12/10/23

Received Date : 28 SEPTEMBER 2022
Calibration Date : 12-17 OCTOBER 2022
Date of Issue : 18 OCTOBER 2022

Calibrated by : Nathakorn Pisutpaisan

Approved by :
(Thanakul Petchurai)

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

Calibration Procedure : CP-AC-01

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :
1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

SITHIPORN associates SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

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)
14.6

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

Frequency Weighting	Measured value (dB)
A - weight	10.8
C - weight	17.3
Flat	23.1

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)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	0.4	0.5	0.5	±5.0

SITHIPORN associates SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	-0.1	±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

SITHIPORN associates SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

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	74.1	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

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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (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

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
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 (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

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND
Tel.0-2435-8800 Fax.0-2433-1679 e-mail:cal-center@sithiporn.com http://www.sithiporn.com

NSC-TISI-TIS 17025 CALIBRATION 0355

Cert. No. : ACL22230
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00623391 / 198638 / 26419
ID No.: -

Condition As Found : GOOD

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

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

REVIEW BY
APPROVED BY
NEXT CAL. DATE 12/10/23

Received Date : 28 SEPTEMBER 2022
Calibration Date : 12-17 OCTOBER 2022
Date of Issue : 18 OCTOBER 2022

Calibrated by : Nathakorn Pisutpaisan

Approved by :
(Thanakul Petchurai)

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

Calibration Procedure : UP/AC/01

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :
1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

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)
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	18.6
Flat	24.1

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)			
	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	0.9	0.9	1.0	±5.0

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	0.0	±2.0
125	0.0	0.1	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	± 0.2
Flat	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

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

6. Long - term stability

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

7. Level linearity on the reference level range

Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
137.0	137.1	0.1	± 1.1
136.0	136.1	0.1	± 1.1
135.0	135.1	0.1	± 1.1
134.0	134.1	0.1	± 1.1
133.0	133.0	0.0	± 1.1
132.0	132.0	0.0	± 1.1
131.0	131.0	0.0	± 1.1
129.0	129.0	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

8. Level linearity including the level range control

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

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	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
SEL	0.25	1	99.0	98.8	-0.2	1.5 ; -5.0
	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	Anticipated Value (dB)	Measured Value, Lcpeak (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	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

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
89.6	89.7	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

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND.
Tel.0-2435-8800 Fax.0-2433-1679 e-mail:cal-center@sithiporn.com http://www.sithiporn.com

NSC-TISI-TIS 17025 CALIBRATION 0894

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00623392 / 198639 / 26420
ID No.: - EVB_ES 0813

Condition As Found : GOOD

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

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

REVIEW BY Nanakorn P.
APPROVED BY
NEXT CAL DATE 20/10/23

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

Calibrated by : Nathakorn Pisutpaisan

Approved by :
(Thanakul Petchurai)

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

Calibration Procedure : CP-AC-01

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display

Condition of this result of calibration :
1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

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)
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	18.4
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
8000	0.8	0.8	0.8	±5.0

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

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

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
30.0	29.9	-0.1	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.8	-0.2	± 1.1
25.0	24.8	-0.2	± 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. Tone burst response

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

10. Peak C sound level

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

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

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
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 (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 lavel of confidence of approximately 95 %

End of Calibration Certificate

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND.
Tel.0-2435-8600 Fax.0-2433-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.com

NSC-TISI-TIS 17025 CALIBRATION 0389

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00623393 / 198640 / 26421
ID No.: [illegible]

Condition As Found : GOOD

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

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

REVIEW BY Napaporn P.
APPROVED BY
NEXT CAL. DATE 20/10/23

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

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petchurai
(Thanakul Petchurai)

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Calibration Procedure : CP-AC-01

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Condition of this result of calibration :
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Waveform Generator	33511B	MY52302742	EF-0008-22	04-Feb-23
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Digital Multimeter	34461A	MY53220076	EEL.BP. 03/0265	09-Feb-23
Digital Multimeter	34461A	MY60024273	EEL.BP. 05/0265	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	EF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAI	34560495	AA-3005-22	22-Feb-23

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

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)
14.6

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	±5.0

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
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

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
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	26.0	0.0	± 1.1
25.0	25.0	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. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	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	-
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

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 lavel of confidence of approximately 95 %

End of Calibration Certificate

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
451-451/1 Srinthorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND.
Tel.0-2435-8800 Fax.0-2433-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.com

NSC-TISI-TIS 17025 CALIBRATION 0394

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00623394 / 198641 / 26422
ID No.: - R36_TS 0139

Condition As Found : GOOD

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

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

REVIEW BY Nathakorn P.
APPROVED BY
NEXT CAL. DATE 20/10/23

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

Calibrated by : Nathakorn Pisutpaisan

Approved by :
(Thanakul Petchurai)

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

Calibration Procedure : CP-AC-01

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :
1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

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	Measured value (dB)
A - weight	10.8
C - weight	17.1
Flat	23.0

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
8000	0.1	0.1	0.1	±5.0

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

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

5. Frequency and time weightings at 1 kHz

5.1 Frequency weightings at 1 kHz

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

5.2 Time weighting at 1 kHz

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

6. Long - term stability

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

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	119.0	0.0	± 1.1
114.0	114.0	0.0	± 1.1
109.0	109.0	0.0	± 1.1
104.0	104.1	0.1	± 1.1
99.0	99.0	0.0	± 1.1
94.0	94.0	0.0	± 1.1
89.0	89.0	0.0	± 1.1
84.0	84.0	0.0	± 1.1
79.0	79.0	0.0	± 1.1
74.0	74.0	0.0	± 1.1
69.0	69.0	0.0	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.0	0.0	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	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

8. Level linearity including the level range control

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

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	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
SEL	0.25	1	99.0	98.8	-0.2	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, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	136.3	-0.1	±3.0

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

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 lavel of confidence of approximately 95 %

End of Calibration Certificate

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND
Tel.0-2435-8800 Fax.0-2433-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.com

NSC-TISI-TIS 17025 CALIBRATION 0384

Cert. No. : ACL22241
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42A/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00623395 / 198642 / 26423
ID No.: - RNO. FS 0820

Condition As Found : GOOD

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

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

REVIEW BY Nanakorn P.
APPROVED BY
NEXT CAL DATE 20/10/23

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

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petchurai
(Thanakul Petchurai)

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

Calibration Procedure : CP-AC-01

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :
1. Reference Standard Instruments :

Instrument	Model	Serial No.	Cert. No.	Due Date
Waveform Generator	33210A	MY48017076	EF-0007-22	04-Feb-23
Waveform Generator	33511B	MY52302742	EF-0008-22	04-Feb-23
Digital Multimeter	34461A	MY53220104	EEL.BP. 04/0265	09-Feb-23
Digital Multimeter	34461A	MY53220076	EEL.BP. 03/0265	09-Feb-23
Digital Multimeter	34461A	MY60024273	EEL.BP. 05/0265	09-Feb-23
Programmable Attenuator	MAT-1070	62100114	EF-0009-22	07-Feb-23
Condenser Microphone	4180	2977900	AA-1013-22	24-Feb-23
Measuring Amplifier	NA-42KAI	34560495	AA-1005-22	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).

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

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	Measured value (dB)
A - weight	9.9
C - weight	16.4
Flat	22.1

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)			
	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	0.4	0.5	0.5	±5.0

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
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

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
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	25.0	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. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

10. Peak C sound level

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

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

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 lavel of confidence of approximately 95 %

End of Calibration Certificate

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND.
Tel.0-2435-8800 Fax.0-2433-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.com

NSC-TISI-TIS 17025 CALIBRATION 0394

Cert. No. : ACL23081
Pages : 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00296518 / 66239 / 34375
ID No.: RYG_FS0431

Condition As Found : GOOD

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

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

REVIEW BY
APPROVED BY
NEXT CAL DATE 26/1/24

Received Date : 24 JANUARY 2023
Calibration Date : 25-26 JANUARY 2023
Date of Issue : 27 JANUARY 2023

Calibrated by : Nathakorn Pisutpaisan

Approved by :
(Thanakul Petchurai)

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

Calibration Procedure : CP-AC-01

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :
1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Continuation of Calibration Certificate

Cert. No. : ACL23081
Job No. : VC66AC0031
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

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CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23081
Job No. : VC66AC0031
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)
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 84 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	±5.0

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CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL23081
Job No. : VC66AC0031
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	0.0	-0.1	-0.1	±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

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Continuation of Calibration Certificate

Cert. No. : ACL23081
Job No. : VC66AC0031
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
30.0	29.9	-0.1	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.8	-0.2	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.8	-0.2	± 1.1

8. Level linearity including the level range control

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

9. Tone burst response

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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (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	135.4	135.2	-0.2	±2.0
Negative half cycle	135.4	135.2	-0.2	±2.0

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
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 (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

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
451-451/1 Sitthiporn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND.
Tel.0-2435-8900 Fax.0-2433-1679 e-mail:cal-center@sithiporn.com http://www.sithiporn.com
NSC-TISI-TIS 17025 CALIBRATION 0394

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00597167 / 157778 / 34375
ID No.: RYG_FS0437

Condition As Found : GOOD

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

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

REVIEW BY Nathakom P.
APPROVED BY
NEXT CAL. DATE 4/a/23

Received Date : 06 SEPTEMBER 2022
Calibration Date : 07-09 SEPTEMBER 2022
Date of Issue : 14 SEPTEMBER 2022

Calibrated by : Nathakom Pisutpaisan

Approved by :
(Thanakul Petchurai)

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

Calibration Procedure : CP-AC-01

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :
1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Continuation of Calibration Certificate

Cert. No. : ACL22193
Job No. : VC65AC0081
Pages : 3 of 8

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

Continuation of Calibration Certificate

Cert. No. : ACL22193
Job No. : VC65AC0081
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)
18.3

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

Frequency Weighting	Measured value (dB)
A - weight	15.1
C - weight	21.4
Flat	27.0

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	0.4	0.3	± 1.5
1000	-0.1	-0.1	-0.1	± 1.0
8000	-0.6	-0.6	-0.6	±5.0

Continuation of Calibration Certificate

Cert. No. : ACL22193
Job No. : VC65AC0081
Pages : 5 of 8

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	-0.1	±2.0
125	0.0	0.0	0.0	±1.5
250	0.0	0.0	-0.1	±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

Continuation of Calibration Certificate

Cert. No. : ACL22193
Job No. : VC65AC0081
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	79.1	0.1	± 1.1
74.0	74.1	0.1	± 1.1
69.0	69.1	0.1	± 1.1
64.0	64.0	0.0	± 1.1
59.0	59.1	0.1	± 1.1
54.0	54.0	0.0	± 1.1
49.0	49.0	0.0	± 1.1
44.0	44.0	0.0	± 1.1
39.0	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.1	0.1	± 1.1
26.0	26.0	0.0	± 1.1
25.0	24.9	-0.1	± 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. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.0	0.0	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.1	0.1	±1.0

10. Peak C sound level

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

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

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 lavel of confidence of approximately 95 %

End of Calibration Certificate

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND
Tel.0-2433-8800 Fax.0-2433-1679 e-mail:cal_center@sithiporn.com http://www.sithiporn.com

NSC-TISI-TIS 17025 CALIBRATION 0304

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00597168 / 179117 / 87524
ID No.: RYG_FS0438

Condition As Found : GOOD

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

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

REVIEW BY Nathakorn P.
APPROVED BY
NEXT CAL. DATE 4/9/23

Received Date : 06 SEPTEMBER 2022
Calibration Date : 07-09 SEPTEMBER 2022
Date of Issue : 14 SEPTEMBER 2022

Calibrated by : Nathakorn Pisutpaisan

Approved by :
(Thanakul Petchurai)

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

Calibration Procedure : CP-AC-01

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :
1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

SITHIPORN associates SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22194
Job No. : VC65AC0081
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)
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	11.6
C - weight	18.1
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	0.1	0.2	0.2	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	1.7	1.8	1.8	±5.0

QF-TS12-04-04-020664

SITHIPORN associates SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22194
Job No. : VC65AC0081
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	0.1	±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	± 0.2
Flat	94.0	0.0	± 0.2

5.2 Time weighting at 1 kHz

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

6. Long - term stability

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

QF-TS12-04-04-020664

SITHIPORN associates SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

Continuation of Calibration Certificate

Cert. No. : ACL22194
Job No. : VC65AC0081
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
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	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.9	-0.1	± 1.1
26.0	25.9	-0.1	± 1.1
25.0	24.9	-0.1	± 1.1

QF-TS12-04-04-020664

8. Level linearity including the level range control

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

9. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	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
SEL	0.25	1	99.0	98.8	-0.2	1.5 ; -5.0
	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	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	136.3	-0.1	±3.0

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

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

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND.
Tel.0-2435-8800 Fax.0-2433-1679 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.com

ISO/IEC 17025
CALIBRATION 0394

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00597169 / 180411 / 88181
ID No.: RYG_FS0439

Condition As Found : GOOD

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

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

REVIEW BY Nathakorn P
APPROVED BY
NEXT CAL. DATE 4/9/23

Received Date : 06 SEPTEMBER 2022
Calibration Date : 07-09 SEPTEMBER 2022
Date of Issue : 14 SEPTEMBER 2022

Calibrated by : Nathakorn Pisutpaisan

Approved by :
(Thanakul Petchurai)

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

Calibration Procedure : CP-AC-01

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :
1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

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)
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	13.1
C - weight	19.3
Flat	24.8

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.1	0.1	0.1	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	1.2	1.3	1.2	±5.0

4. Electrical signal tests of frequency weightings

Weighting network response with relative to 1 kHz.

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
63	-0.1	-0.1	-0.1	+2.0
125	0.0	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

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	39.0	0.0	± 1.1
34.0	34.0	0.0	± 1.1
30.0	30.0	0.0	± 1.1
29.0	29.0	0.0	± 1.1
28.0	28.0	0.0	± 1.1
27.0	27.0	0.0	± 1.1
26.0	26.0	0.0	± 1.1
25.0	25.0	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. Tone burst response

Time Weighting	Tone burst duration, Tb (ms)	Cycle	Anticipated Value (dB)	Measured Value (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Fast	0.25	1	108.0	107.9	-0.1	1.5 ; -5.0
	2	8	117.0	117.0	0.0	1.0 ; -2.5
	200	800	134.0	134.1	0.1	±1.0
Slow	2	8	108.0	108.0	0.0	1.5 ; -5.0
	200	800	127.6	127.6	0.0	±1.0
SEL	0.25	1	99.0	98.9	-0.1	1.5 ; -5.0
	2	8	108.0	108.0	0.0	1.0 ; -2.5
	200	800	128.0	128.0	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	-
One	136.4	136.3	-0.1	±3.0

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

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 lavel of confidence of approximately 95 %

End of Calibration Certificate

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND.
Tel.0-2433-8800 Fax.0-2433-1629 e-mail:cal-center@sithiporn.com http://www.sithiporn.com

ISO/IEC 17025
NSC-TISI-TIS 17025
CALIBRATION 0189

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00709746 / 187332 / 01297
ID No.: RYG_FS0491

Condition As Found : GOOD

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

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

REVIEW BY Nathakorn P.
APPROVED BY
NEXT CAL DATE 13/1/24

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

Calibrated by : Nathakorn Pisutpaisan

Approved by :
(Thanakul Petchurai)

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

Calibration Procedure : CP-AC-01

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :
1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

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)
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	12.5
C - weight	18.3
Flat	23.6

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.0	0.0	0.1	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	1.7	1.7	1.7	±5.0

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	-0.2	-0.2	-0.2	±2.0
125	-0.1	-0.1	-0.1	±1.5
250	0.0	-0.1	-0.1	±1.5
500	0.0	0.0	-0.1	±1.5
1000	0.0	0.0	0.0	±1.0
2000	0.0	0.0	0.0	±2.0
4000	0.0	0.0	0.0	±3.0
8000	0.0	0.1	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

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	79.1	0.1	± 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	49.1	0.1	± 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	28.0	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

8. Level linearity including the level range control

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

9. Tone burst response

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

10. Peak C sound level

Number of cycle in test signal	Anticipated Value (dB)	Measured Value, Lcpeak (dB)	Deviated Value (dB)	Acceptance Limits (dB)
Continuous	133.0	133.0	0.0	-
One	136.4	135.9	-0.5	±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

T. Petch

11. Overload indication

Measured value (dB)		Deviated Value (dB)	Acceptance Limits (dB)
Positive one-half cycle	Negative one-half cycle		
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 (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 lavel of confidence of approximately 95 %

End of Calibration Certificate

T. Petch

SITHIPORN ASSOCIATES CO.,LTD.
CALIBRATION LABORATORY

451-451/1 Sirinthorn Rd.,Bangbumru, Bangplud Bangkok 10700 THAILAND
Tel.0-2433-8800 Fax.0-2433-1979 e-mail:cal-center@sithiphorn.com http://www.sithiphorn.com

ISO/IEC 17025 CALIBRATION 0384

Cert. No. : ACL23042
Pages 1 of 8

Calibration Certificate

Equipment : SOUND LEVEL METER
Manufacturer : RION
Model : NL-42/ Microphone UC-52 / Preamplifier NH-24
Serial No.: 00900071 / 188464 / 01733
ID No.: RYG_FS0492

Condition As Found : GOOD

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

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

REVIEW BY Nathakorn P.
APPROVED BY
NEXT CAL DATE 13/1/24

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

Calibrated by : Nathakorn Pisutpaisan

Approved by : T. Petch
(Thanakul Petchurai)

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

Calibration Procedure : UP-AC401

Calibration Method :
This equipment was calibrated by based on IEC-61672-3 (2013) Standard for sound level meter (SLM).
The SLM had tests to Acoustical and Electrical signal tests of frequency weighting with Anechoic chamber and Reference Standard Instruments.
For tests results of each items were made by observation of each Instruments display and also with SLM's display.

Condition of this result of calibration :
1. Reference Standard Instruments :

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

2. This result of calibration was found accurate as shown on date and place of calibration for this calibrated item only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 National Institute of Metrology (Thailand).
   3.2 Thailand Institute of Scientific and Technological Research (TISTR).

T. Petch

Summary of Measurement Result :

Parameter	Pass	Fail	Uncertainty (dB)	Maximum-permitted uncertainty of measurement (dB)
1. Absolute sensitivity	✓	-	0.2	N/A
2. Self-generated noise	✓	-	0.2	N/A
3. Acoustical signal tests of frequency weightings				
125 Hz	✓	-	0.3	0.6
1000 Hz	✓	-	0.3	0.6
8000 Hz	✓	-	0.3	0.7
4. Electrical signal tests of frequency weightings				
For 10 Hz to 4 kHz	✓	-	0.3	0.6
For > 4 kHz to 10 kHz	✓	-	0.3	0.7
For > 10 kHz to 20 kHz	-	-	-	1.0
5. Frequency and time weightings at 1 kHz	✓	-	0.2	0.2
6. Long - term stability	✓	-	0.1	0.1
7. Level linearity on the reference level range	✓	-	0.2	0.3
8. Level linearity including the level range control	✓	-	0.2	0.3
9. Tone burst response	✓	-	0.2	0.3
10. Peak C sound level	✓	-	0.2	0.35
11. Overload indication	✓	-	0.2	0.25
12. High level stability	✓	-	0.1	0.1

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)
14.6

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

Frequency Weighting	Measured value (dB)
A - weight	11.6
C - weight	17.9
Flat	23.9

3. Acoustical signal tests of frequency weightings

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

Frequency (Hz)	Deviation from various frequency weighting response curve (dB)			
	Flat	C-weight	A-weight	Acceptance Limits
125	0.2	0.2	0.2	± 1.5
1000	0.0	0.0	0.0	± 1.0
8000	0.3	0.4	0.4	±5.0

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	0.0	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

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	43.9	-0.1	± 1.1
39.0	38.9	-0.1	± 1.1
34.0	33.9	-0.1	± 1.1
30.0	29.9	-0.1	± 1.1
29.0	28.9	-0.1	± 1.1
28.0	27.9	-0.1	± 1.1
27.0	26.8	-0.2	± 1.1
26.0	25.8	-0.2	± 1.1
25.0	24.8	-0.2	± 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. Tone burst response

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

10. Peak C sound level

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

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

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 lavel of confidence of approximately 95 %

End of Calibration Certificate

CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 01 December 2022 CERTIFICATE NUMBER 184072

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

REVIEW BY Markam P
APPROVED BY
NEXT CAL. DATE 1/12/23

Page 1 of 1
Test engineer:
Terry Goodrich
Electronically signed:
T. A. Goodrich

doseBadge Reader

Instrument

Manufacturer: Cirrus Research plc
Model Number: RC:110A
Serial Number: 73729
Notes:

Calibration Procedure

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

Date of Calibration: 01 December 2022

Functionality Results

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

Calibration Results

	Level (dB)	Frequency (Hz)	Distortion (% THD + Noise)
Result	113.96	998.2	0.64
Uncertainty	± 0.11	± 0.14	± 0.10
Tolerances	± 0.60	± 2.00	± 4.00

No adjustments were made during this calibration.

Environmental Conditions

Pressure: 102.11 kPa
Temperature: 23.5 °C
Humidity: 35.2 %

Notes

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

CERTIFICATE OF CALIBRATION

ISSUED BY Cirrus Research plc

DATE OF ISSUE 05 January 2023 CERTIFICATE NUMBER 185460

REVIEW BY Markam P
APPROVED BY
NEXT CAL. DATE 5/1/24

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

Page 1 of 1
Test engineer:
Terry Goodrich
Electronically signed:
T. A. Goodrich

doseBadge Reader

Instrument

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

Calibration Procedure

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

Date of Calibration: 05 January 2023

Functionality Results

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

Calibration Results

	Level (dB)	Frequency (Hz)	Distortion (% THD + Noise)
Result	113.97	1002.2	0.13
Uncertainty	± 0.11	± 0.14	± 0.10
Tolerances	± 0.60	± 2.00	± 4.00

No adjustments were made during this calibration.

Environmental Conditions

Pressure: 100.36 kPa
Temperature: 23.0 °C
Humidity: 41.7 %

Notes

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

CERTIFICATE OF CALIBRATION

ISSUED BY: Cirrus Research plc

DATE OF ISSUE: 03 November 2022 CERTIFICATE NUMBER 182475

REVIEW BY

APPROVED BY

NEXT CAL DATE 1/11/23

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

Page 1 of 1

Test engineer:
Nigel Smith
Electronically signed:

doseBadge Reader

Instrument

Manufacturer: Cirrus Research plc
Model Number: RC-110A
Serial Number: 75996
Notes:

Calibration Procedure

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

Date of Calibration: 01 November 2022

Functionality Results

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

Calibration Results

	Level (dB)	Frequency (Hz)	Distortion (% THD + Noise)
Initial	114.25	1004.0	0.26
Adjusted	114.00	1004.0	0.26
Uncertainty	± 0.11	± 0.14	± 0.10
Tolerances	± 0.60	± 2.00	± 4.00

Environmental Conditions

Pressure: 99.05 kPa
Temperature: 22.1 °C
Humidity: 48.6 %

Notes

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

ROTA METER CALIBRATION RESULT JANUARY 2023

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R^2)
BKK_FS0577	03 Jan 23	Y = 1.0259x - 0.6354	0.9997
BKK_FS0579	05 Jan 23	Y = 1.0005x + 0.2803	1.0000
BKK_FS0583	05 Jan 23	Y = 0.9976x + 1.2146	1.0000
BKK_FS0584	03 Jan 23	Y = 1.0104x - 0.3929	1.0000
BKK_FS0586	05 Jan 23	Y = 1.001x - 1.3619	0.9999
BKK_FS0587	03 Jan 23	Y = 1.0038x + 0.881	1.0000
BKK_FS0588	05 Jan 23	Y = 1.0015x - 0.6876	0.9999
BKK_FS0590	05 Jan 23	Y = 0.9958x + 1.7452	1.0000
BKK_FS0591	03 Jan 23	Y = 0.9677x + 64.54	0.9951
BKK_FS0593	03 Jan 23	Y = 0.9792x + 21.393	0.9972
BKK_FS0594	03 Jan 23	Y = 1.0455x - 43.344	0.9976
BKK_FS0595	05 Jan 23	Y = 0.9993x + 1.18	1.0000
BKK_FS0597	05 Jan 23	Y = 0.9788x + 22.286	0.9971
BKK_FS1004	03 Jan 23	Y = 0.9943x + 7.1619	0.9996
BKK_FS1005	03 Jan 23	Y = 1.0045x + 2.1167	0.9998
BKK_FS1006	03 Jan 23	Y = 1.0288x - 0.3852	0.9999
BKK_FS1008	03 Jan 23	Y = 1.0181x + 0.1282	0.9998
BKK_FS1009	05 Jan 23	Y = 1.0018x + 1.1293	1.0000
BKK_FS1011	03 Jan 23	Y = 1.0463x - 1.9344	0.9985
BKK_FS1012	03 Jan 23	Y = 1.0082x - 53.425	0.9999
BKK_FS1013	03 Jan 23	Y = 1.0058x - 9.701	1.0000
BKK_FS1014	05 Jan 23	Y = 0.9869x + 1.2643	0.9995
BKK_FS1015	05 Jan 23	Y = 1.004x - 0.7571	0.9999
BKK_FS1016	05 Jan 23	Y = 0.978x + 24.623	0.9973
BKK_FS1017	17 Jan 23	Y = 1.0022x + 0.4211	1.0000
BKK_FS1018	17 Jan 23	Y = 0.9893x + 5.8317	1.0000
BKK_FS1019	17 Jan 23	Y = 0.9859x - 11.574	0.9986
BKK_FS1020	03 Jan 23	Y = 1.0208x - 0.6221	0.9998
BKK_FS1021	03 Jan 23	Y = 0.992x - 44.599	0.9997
BKK_FS1022	03 Jan 23	Y = 1.0067x - 12.483	0.9999
BKK_FS1023	03 Jan 23	Y = 1.0013x + 0.5823	0.9993
BKK_FS1024	03 Jan 23	Y =1.0036x - 50.787	0.9999
BKK_FS1025	03 Jan 23	Y = 0.974x + 27.034	0.9969
BKK_FS1026	05 Jan 23	Y = 0.9783x + 1.7075	0.9991
BKK_FS1027	05 Jan 23	Y = 1.145x - 90.325	0.9797
BKK_FS1028	05 Jan 23	Y = 0.9815x + 13.626	0.9969
BKK_FS1029	03 Jan 23	Y = 0.9706x + 3.6283	0.9951
BKK_FS1030	03 Jan 23	Y = 1.0197x - 52.982	0.9999

ROTA METER CALIBRATION RESULT JANUARY 2023

Rotameter ID.	Calibration Date	Regression Result	Coefficient (R^2)
BKK_FS1031	03 Jan 23	Y = 0.9995x - 0.1581	1.0000
BKK_FS1039	03 Jan 23	Y = 1.0242x - 4.3007	0.9986
BKK_FS1040	03 Jan 23	Y = 1.0035x + 1.0705	0.9998
BKK_FS1041	03 Jan 23	Y = 0.9791x + 0.252	1.0000
BKK_FS1042	03 Jan 23	Y = 1.0186x - 3.7429	0.9999
BKK_FS1043	03 Jan 23	Y = 1.0038x + 2.961	0.9999
BKK_FS1044	03 Jan 23	Y = 1.0189x + 0.2969	1.0000
BKK_FS1163	18 Jan 23	Y = 1.0127x + 0.8332	0.9996
BKK_FS1164	18 Jan 23	Y = 1.2176x + 4.7376	0.9952
BKK_FS1165	18 Jan 23	Y = 1.0005x - 47.94	1.0000
BKK_FS1166	18 Jan 23	Y = 1.0346x - 35.841	0.9996
BKK_FS1200	03 Jan 23	Y = 1.0168x + 0.4034	0.9997
BKK_FS1201	03 Jan 23	Y = 0.7655x + 60.985	0.9986
BKK_FS1202	03 Jan 23	Y = 0.9593x + 87.615	0.9958
RYG_FS0197	03 Jan 23	Y = 1.0305x - 94.849	0.9991
RYG_FS0198	03 Jan 23	Y = 1.0103x - 19.254	0.9999
RYG_FS0199	03 Jan 23	Y = 0.9897x + 0.998	0.9983

Review By : (Mr. Wichan Choonharat) Enviro Field Services Manager

Approved By : (Mr.Sarayuth Jittranont) Assistant General Manager

RYG_EN0004

PENTA CALIBRATION

PENTA CALIBRATION CO., LTD.
88/124 The Connect 33 Village Kanchanaphisek Road
Dokmai Prawet Bangkok 10250
tel. +66 (0) 2099-9773
www.pentacal.com

Certificate of Calibration

Represent to Certificate of Calibration ,PTC/07/22104

NSC-TISI-TIS17025 CALIBRATION 0324

Certificate No.:	PTC/07/22104	Page:	1 of 3
Equipment:	Digital Balance	Condition:	Normal
Manufacturer:	Sartorius	Serial No:	33108993
Model:	MSE125P-100-DU	ID No:	RYG_FA0004
Type of Balance:	Single interval		

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

REVIEW BY Thanitat U.
APPROVED BY
NEXT CAL. DATE 29/06/23.

Environment Condition: Temperature 23.9 °C ± 0.9 °C
Humidity 58.1 %RH ± 4.4 %RH
Air density 1.17 kg/m^3

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

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

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

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

PENTA CALIBRATION CO.,LTD.

(Mr.Kriangsak Kalasri) Reviewed by

Approved By : (Mr. Keattisak Kerdto) Laboratory Manager

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

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

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

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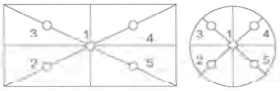
Certificate No.: PTC/07/22104 Page: 2 of 3

Measurement Results:

Without Adjustment :

Function Calibration: Non Adjustment

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



Eccentricity test 50 (g)

Position (g)				
1	2	3	4	5
0.00000	-0.00004	-0.00001	0.00000	0.00001
Maximum deviation:		0.00004		

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

Determination of the standard deviation of weighing balance., Readability 0.00001 (g)

Nominal test value (g)	Standard Deviation
50	0.000007

Error of indication : from nominal value., Readability 0.00001 (g)

Nominal Value (g)	Conventional Mass (g)	Indication (g)	Correction of Balance (g)	Uncertainty (g)	k
0	0.000000	0.00000	0.00000	0.000020	2.00
0.01	0.010001	0.01000	0.00000	0.000022	2.17
0.05	0.050002	0.04999	0.00001	0.000022	2.17
0.1	0.099999	0.09999	0.00001	0.000022	2.17
0.5	0.500001	0.50001	-0.00001	0.000022	2.17
1	1.000004	0.99999	0.00001	0.000022	2.14
2	1.999999	1.99999	0.00001	0.000022	2.14
5	5.000015	4.99999	0.00002	0.000023	2.14
10	10.000004	10.00000	0.00000	0.000024	2.10
20	20.000029	20.00000	0.00003	0.000032	2.00
50	50.000043	49.99999	0.00005	0.000069	2.00

Note: Weight of adjust - (g)

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Represent to Certificate of Calibration ,PTC/07/22104

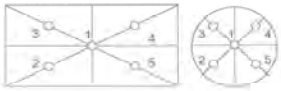
Certificate No.: PTC/07/22104 Page: 3 of 3

Measurement Results:

Without Adjustment :

Function Calibration: Non Adjustment

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



Eccentricity test 50 (g)

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

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

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

Nominal test value (g)	Standard Deviation
100	0.00000

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

Nominal Value (g)	Conventional Mass (g)	Indication (g)	Correction of Balance (g)	Uncertainty (g)	k
65	65.00006	65.0000	0.0001	0.00013	2.00
70	70.00007	70.0000	0.0001	0.00013	2.00
75	75.00009	75.0000	0.0001	0.00014	2.00
80	80.00008	80.0000	0.0001	0.00014	2.00
85	85.00009	85.0000	0.0001	0.00015	2.00
90	90.00010	90.0000	0.0001	0.00015	2.00
95	95.00012	95.0000	0.0001	0.00016	2.00
100	100.00004	100.0000	0.0000	0.00014	2.00
110	110.00004	110.0000	0.0000	0.00015	2.00
120	120.00007	120.0000	0.0001	0.00016	2.00

Note: Weight of adjust - (g)

The End of Certificate

RYG_EN0004

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

NSC-TISI-TIS 17025
CALIBRATION 0426

REVIEW BY Thanitha
APPROVED BY D.
NEXT CAL. DATE 01/03/24

Certificate of Calibration

Model Number :	MSE125P-100-DU	Certificate No. :	23BCI0114
Description :	Semi-micro Balance	Issued Date :	Friday, March 03, 2023
Serial Number :	0033108993	Reference No. :	204833
ID No. :	RYG_EN0004		
Manufacturer :	Sartorius	Page No. :	1 of 3

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

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

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

Metrological data :
Capacity : 120 g Readability : 0.00001 g

Ambients Conditions.
Temperature : 24.0 °C ± 5.0 °C
Humidity : 63.0 % RH ± 10.0 % RH
Pressure ± -

Reasons for calibration
☐ New Installation ☐ Service / Repaired ☑ Re-calibration/ Maintenance

Equipment Condition: ☑ Good Operate ☐ Fail

Measurement Method UKAS Publication Ref :Lab 14

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

Traceability:

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

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

Mr.chonchai Inthana(Technical Manager)

STAMP SARTORIUS ISO/IEC 17025:2017

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: 066 2643 8361-6 Fax: +66 2643-8367, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

Model Number :	MSE125P-100-DU	Certificate No. :	23BCI0114
Description :	Semi-micro Balance	Issued Date :	Friday, March 03, 2023
Serial Number :	0033108993	Reference No. :	204833
ID No. :	RYG_EN0004		
Manufacturer :	Sartorius	Page No. :	2 of 3

Calibration Results : Without Adjustment

Repeatability

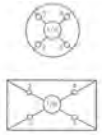
The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.

Nominal Value : (Low Load)			
5	g	5.00002	50.00002
Tolerance		5.00003	50.00002
0.000015	g	5.00001	50.00002
		5.00002	50.00001
		5.00000	50.00001
Nominal Value : (High Load)		5.00002	50.00000
50	g	5.00001	50.00000
Tolerance		5.00001	50.00000
0.000015	g	5.00003	50.00001
		5.00002	50.00002
Standard Deviation		0.000007	0.000009

Eccentricity (Off-center loading error)

The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of max/min capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).

Nominal value : 50 g
Tolerance 0.00015 g



	Difference
1	-
2	-0.00001
3	0.00000
4	0.00002
5	0.00002
6	-

Linearity

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

Tolerance 0.00004 g

Nominal Value (g)	Conventional Mass Value (g)	Displayed Value (g)	Deviation (g)	Uncertainty (g)
0.01	0.01000	0.01000	0.00000	0.000028
0.1	0.10000	0.10000	0.00000	0.000028
1	1.00000	1.00000	0.00000	0.000028
2	2.00002	2.00002	0.00000	0.000030
5	5.00002	5.00001	-0.00001	0.000033
10	10.00002	10.00002	0.00000	0.000038
20	20.00000	20.00000	0.00000	0.000048
30	30.00002	30.00002	0.00000	0.000060
40	40.00003	40.00002	-0.00001	0.000071
50	50.00002	50.00001	-0.00001	0.000081

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8331-5 Fax: +66 2643-8367, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

Model Number :	MSE125P-100-DU	Certificate No. :	23BCI0114
Description :	Semi-micro Balance	Issued Date :	Friday, March 03, 2023
Serial Number :	0033108993	Reference No. :	204833
ID No. :	RYG_EN0004		
Manufacturer :	Sartorius	Page No. :	3 of 3

Calibration Results : Without Adjustment

Repeatability

The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.

Nominal Value : (Low Load)
100 g
Tolerance
0.000015 g

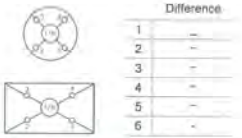
Nominal Value : (High Load)
100 g
Tolerance
0.000015 g

	100.0000
	100.0000
	100.0000
	100.0000
	100.0000
	100.0001
	100.0000
	100.0000
	100.0000
Standard Deviation	0.00003

Eccentricity (Off-center loading error)

The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximin capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).

Nominal value : 50 g
Tolerance 0.00015 g



	Difference
1	-
2	-
3	-
4	-
5	-
6	-

Linearity

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

Tolerance 0.0001 g

Nominal Value (g)	Conventional Mass Value (g)	Displayed Value (g)	Deviation (g)	Uncertainty (g)
65	65.0000	65.0000	0.0000	0.00015
70	70.0000	70.0000	0.0000	0.00015
75	75.0000	75.0000	0.0000	0.00016
80	80.0000	80.0000	0.0000	0.00017
85	85.0001	85.0001	0.0000	0.00018
90	90.0001	90.0001	0.0000	0.00018
95	95.0001	95.0001	0.0000	0.00020
100	100.0000	100.0000	0.0000	0.00024
110	110.0000	110.0000	0.0000	0.00026
120	120.0000	120.0000	0.0000	0.00026

End of Report

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Certificate of System Qualification

GC-OQ

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

REVIEW BY Suchada T.
APPROVED BY
NEXT CAL DATE 21 Apr 2023

System Inspection and Basic Safety and Operation

Name: 7890
Setpoint Status: **Pass**

Overall System Inspection and Basic Safety and Operation Test Status
Pass

Inlet Pressure Decay

Name: 7890
Front SSL

Setpoint Status: **Pass**
Pressure: 25.0 psi
Pressure Change: 0.0 psi /5 minutes
Agilent Recommended: >= -2.0 and <= 0.5

Overall Inlet Pressure Decay Test Status
Pass

Inlet Pressure Accuracy

Name: 7890
Front SSL

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Setpoint Status: **Pass**

	Setpoint		Actual	
Inlet Pressure:	25.0	psi	24.9	psi

Accuracy: 0.1 psi
Agilent Recommended: <= 1.2

Overall Inlet Pressure Accuracy Test Status
Pass

Inlet Pressure Decay

Name: 7890
Back SSL

Setpoint Status: **Pass**
Pressure: 25.0 psi
Pressure Change: 0.0 psi /5 minutes
Agilent Recommended: >= -2.0 and <= 0.5

Overall Inlet Pressure Decay Test Status
Pass

Inlet Pressure Accuracy

Name: 7890
Back SSL

Setpoint Status: **Pass**

	Setpoint		Actual	
Inlet Pressure:	25.0	psi	24.9	psi

Accuracy: 0.1 psi
Agilent Recommended: <= 1.2

Overall Inlet Pressure Accuracy Test Status
Pass

Detector Flow Accuracy

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Name: 7890
Front FID

Setpoint Status: **Pass**
Flow Type: Fuel
Setpoint: 30.0 mL/min Measured Flow: 30.5 mL/min
Accuracy: 0.5 mL/min
Agilent Recommended: <= 10.0 % setpoint (3.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: **Pass**
Flow Type: Oxidizer
Setpoint: 400.0 mL/min Measured Flow: 394.0 mL/min
Accuracy: 6.0 mL/min
Agilent Recommended: <= 10.0 % setpoint (40.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: **Pass**
Flow Type: Makeup
Setpoint: 25.0 mL/min Measured Flow: 24.2 mL/min
Accuracy: 0.8 mL/min
Agilent Recommended: <= 10.0 % setpoint (2.5 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Overall Detector Flow Accuracy Test Status
Pass

Detector Flow Accuracy

Name: 7890
Back FID

Setpoint Status: Pass

Flow Type: Fuel

Setpoint:	30.0	mL/min	Measured Flow:	29.1	mL/min

Accuracy: 0.9 mL/min

Agilent Recommended: <= 10.0 % setpoint (3.0 ml/min)

Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: Pass

Flow Type: Oxidizer

Setpoint:	400.0	mL/min	Measured Flow:	397.3	mL/min

Accuracy: 2.7 mL/min

Agilent Recommended: <= 10.0 % setpoint (40.0 ml/min)

Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: Pass

Flow Type: Makeup

Setpoint:	25.0	mL/min	Measured Flow:	24.4	mL/min

Accuracy: 0.6 mL/min

Agilent Recommended: <= 10.0 % setpoint (2.5 ml/min)

Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Overall Detector Flow Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 7890

Setpoint Status: Pass

Zone: Oven

Setpoint/Actual

Temperature:	230.0	231.5	°C

Accuracy: 1.5 °C

Agilent Recommended:	>=	-1.0	% setpoint in K	(	-5.0	°C)
	<=	1.0	% setpoint in K	(	5.0	°C)

Setpoint Status: Pass

Zone: Oven

Setpoint/Actual

Temperature:	100.0	100.5	°C

Accuracy: 0.5 °C

Agilent Recommended:	>=	-1.0	% setpoint in K	(	-3.7	°C)
	<=	1.0	% setpoint in K	(	3.7	°C)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: 7890

Setpoint Status: Pass

Setpoint/Average

Temperature:	100.0	100.4867	°C

Stability: 0.1 °C

Agilent Recommended: <= 0.5

Overall GC Oven Temperature Stability Test Status

Pass

Scouting Run

Tested Combination1 Front SSL / Front FID

Injection Tower

Name: 7693A

Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination1 Front SSL / Front FID

Name: 7890

Setpoint Status: Pass

Base Signal: 12.7 pA

		ASTM Noise		Drift
		pA		pA/Hr
		0.06		0.10
Agilent Recommended:	<=	0.10	<=	2.50
Status:	Pass		Pass	

Overall Noise and Drift Test Status

Pass

Injection Precision

Tested Combination1 Front SSL / Front FID

Name: 7693A

Setpoint Status: Pass

Injection Volume on Column: 1.0 uL

Area RSD:	0.42 %	Retention Time RSD:	0.16 %
Agilent Recommended:	<= 3.00	<=	1.00

Overall Injection Precision Test Status

Pass

Signal to Noise

Tested Combination1 Front SSL / Front FID

Injection Tower

Name: 7890

Setpoint Status: Pass

Signal to Noise: 1174861

Agilent Recommended: >= 300000

Overall Signal to Noise Test Status

Pass

Scouting Run

Tested Combination2 Back SSL / Back FID

Injection Tower

Name: 7693A

Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination2 Back SSL / Back FID

Name: 7890

Setpoint Status: Pass

Base Signal: 10.4 pA

		ASTM Noise		Drift
		pA		pA/Hr
		0.05		0.00
Agilent Recommended:	<=	0.10	<=	2.50
Status:	Pass		Pass	

Overall Noise and Drift Test Status

Pass

Injection Precision

Tested Combination2 Back SSL / Back FID

Name: 7693A

Setpoint Status: Pass

Injection Volume on Column: 1.0 uL

Area RSD: 1.16 % Retention Time RSD: 0.12 %

Agilent Recommended: <= 3.00 <= 1.00

Overall Injection Precision Test Status

Pass

Signal to Noise

Tested Combination2 Back SSL / Back FID

Injection Tower

Name: 7890

Setpoint Status: Pass

Signal to Noise: 805466

Agilent Recommended: >= 300000

Overall Signal to Noise Test Status

Pass

Instrument Details

Purpose

This section describes the as found system configuration

Details

System
- System ID: GC-6
- Manufacturer: Agilent Technologies
- Name: 7890
- Flow Data Input: Manual Data
- Temperature Data Input: Manual Data or Other Data Logging

Tested Combination1
- Injection Technique: Injection Tower
- Sampler Identifier: Sampler 2
- Inlet: Front
- Detector: Front
- LTM Included?: No

Tested Combination2
- Injection Technique: Injection Tower
- Sampler Identifier: Sampler 1
- Inlet: Back
- Detector: Back
- LTM Included?: No

Sampler 1
- Manufacturer: Agilent Technologies
- Type: Tray
- Name: 7693A
- Model Number: G4514A
- Serial Number: CN15389030
- Firmware Revision: A.11.01
- Vial Heater: Not installed

Sampler 2
- Manufacturer: Agilent Technologies
- Type: Injection Tower
- Name: 7693A
- Model Number: G4513A
- Serial Number: CN10340103
- Firmware Revision: A.10.09
- Usage: Sample Injection
- Location: Front
- Syringe Volume (uL): 10

Sampler 3
- Manufacturer: Agilent Technologies
- Type: Injection Tower
- Name: 7693A
- Model Number: G4513A
- Serial Number: CN10280128
- Firmware Revision: A.10.09
- Usage: Sample Injection
- Location: Back
- Syringe Volume (uL): 10

Mainframe 1
- Manufacturer: Agilent Technologies
- Name: 7890
- Model Number: G3440A
- Serial Number: CN11461068
- Firmware Revision: Version 4.27
- Component ID/Asset No: GC-6
- Oven Type: Standard

Inlet 1
- Manufacturer: Agilent Technologies
- Name: 7890
- Type: SSL
- Location: Front
- Carrier Gas: Helium
- Control Type: Electronic Pressure Control (EPC)
- Purged Inlet: Yes

Inlet 2
- Manufacturer: Agilent Technologies
- Name: 7890
- Type: SSL
- Location: Back
- Carrier Gas: Helium
- Control Type: Electronic Pressure Control (EPC)
- Purged Inlet: Yes

Detector 1
- Manufacturer: Agilent Technologies
- Name: 7890
- Type: FID
- Adapter: Capillary
- Control Type: Electronic Pressure Control (EPC)
- Location: Front
- Makeup Gas: Nitrogen

Detector 2
- Manufacturer: Agilent Technologies
- Name: 7890
- Type: FID
- Adapter: Capillary
- Control Type: Electronic Pressure Control (EPC)
- Location: Back
- Makeup Gas: Nitrogen

Electronic Signature

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Reason for Signature:	Executed protocol and published this original version of document

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User Name: suriya.thongkaew System Id: GC-6
Print Date: October 21, 2021 10:05:40 AM

OQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 12:18:50 PM	Audit	SessionCreated	Session	None
October 20, 2021 12:18:50 PM	Start	Configuration	Session	None
October 20, 2021 12:18:50 PM	Audit	Entitlement	Licensing	User is Nonsaving and does not require an unlock code
October 20, 2021 12:24:57 PM	Audit	EqpLoaded	Session	EQP details for primary technique [GC] - File path: (Protocol\Packs\Gc\Configurations\02.51\Gc02.51.eqp), EQP File Name: [Gc02.51.eqp], EQP Name: [AgilentRecommended]
October 20, 2021 12:25:03 PM	End	Configuration	Session	None
October 20, 2021 12:25:09 PM	Start	Qualification	Location	OQ
October 20, 2021 12:25:09 PM	Start	Execution	System Inspection and Basic Safety and Operation - TB90: Qualitative Test - No setpoints associated	None
October 20, 2021 12:30:25 PM	End	Execution	System Inspection and Basic Safety and Operation - TB90: Qualitative Test - No setpoints associated	Run Count : 1
October 20, 2021 12:56:29 PM	Start	Execution	Inlet Pressure Decay - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None

User Name: suriya.thongkaew System Id: GC-6
Print Date: October 21, 2021 10:05:40 AM

OQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 1:02:16 PM	End	Execution	Inlet Pressure Decay - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	Run Count : 1
October 20, 2021 1:02:18 PM	Start	Execution	Inlet Pressure Accuracy - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= 1.2 psi	None
October 20, 2021 1:02:26 PM	End	Execution	Inlet Pressure Accuracy - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= 1.2 psi	Run Count : 1
October 20, 2021 1:02:29 PM	Start	Execution	Inlet Pressure Decay - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None
October 20, 2021 1:04:21 PM	End	Execution	Inlet Pressure Decay - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	Run Count : 1
October 20, 2021 1:07:53 PM	Start	Execution	Inlet Pressure Accuracy - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= 1.2 psi	None
October 20, 2021 1:08:11 PM	End	Execution	Inlet Pressure Accuracy - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= 1.2 psi	Run Count : 1
October 20, 2021 1:08:16 PM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None
October 20, 2021 1:09:23 PM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
October 20, 2021 1:09:26 PM	End	Execution	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count : 1

User Name: suriya.thongkaew System Id: GC-6
Print Date: October 21, 2021 10:05:40 AM

OQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 1:30:29 PM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None
October 20, 2021 1:30:37 PM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
October 20, 2021 1:33:29 PM	End	Execution	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
October 20, 2021 1:33:31 PM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
October 20, 2021 1:27:50 PM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
October 20, 2021 1:27:52 PM	End	Execution	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
October 20, 2021 1:27:56 PM	Start	Execution	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None
October 20, 2021 1:32:10 PM	Audit	Data	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
October 20, 2021 1:32:12 PM	End	Execution	Detector Flow Accuracy - Back FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
October 20, 2021 1:32:14 PM	Start	Execution	Detector Flow Accuracy - Back FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None
October 20, 2021 1:34:13 PM	Audit	Data	Detector Flow Accuracy - Back FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry

User Name: suriya.thongkaew System Id: GC-6
Hostname: ASDRKW7010 Print Date: October 21, 2021 10:05:40 AM

OQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 1:34:16 PM	End	Execution	Detector Flow Accuracy - Back FID - Type : Diviuter - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
October 20, 2021 1:34:48 PM	Start	Execution	Detector Flow Accuracy - Back FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
October 20, 2021 1:35:22 PM	Audit	Data	Detector Flow Accuracy - Back FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
October 20, 2021 1:35:36 PM	End	Execution	Detector Flow Accuracy - Back FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
October 20, 2021 1:36:38 PM	Start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
October 20, 2021 2:04:31 PM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
October 20, 2021 2:04:33 PM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
October 20, 2021 2:04:34 PM	Start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
October 20, 2021 2:10:47 PM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry

User Name: suriya.thongkaew System Id: GC-6
Hostname: ASDRKW7010 Print Date: October 21, 2021 10:05:40 AM

OQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 20, 2021 2:10:49 PM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
October 20, 2021 2:10:51 PM	Start	Execution	GC Oven Temperature Stability - 7890 - Temperature : Oven - S: 140.0°C - L: <= 0.5°C	None
October 20, 2021 2:31:39 PM	Audit	Data	GC Oven Temperature Stability - 7890 - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
October 20, 2021 2:31:41 PM	End	Execution	GC Oven Temperature Stability - 7890 - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Run Count : 1
October 20, 2021 2:31:44 PM	Start	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	None
October 20, 2021 2:43:06 PM	Audit	AcqClosed	Session	None
October 21, 2021 9:18:59 AM	Audit	AcqReopened	Session	None
October 21, 2021 9:19:02 AM	Audit	SessionRetested	Session	None
October 21, 2021 9:19:09 AM	Start	Qualificatio	Session	OQ
October 21, 2021 9:19:09 AM	Start	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	None
October 21, 2021 9:19:41 AM	Audit	AcqClosed	Session	None

User Name: suriya.thongkaew System Id: GC-6
Hostname: ASDRKW7010 Print Date: October 21, 2021 10:05:40 AM

OQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:20:08 AM	Audit	AcqReopened	Session	None
October 21, 2021 9:20:09 AM	Audit	SessionReleased	Session	None
October 21, 2021 9:20:13 AM	Start	Qualificatio	Session	OQ
October 21, 2021 9:20:13 AM	Start	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	None
October 21, 2021 9:29:45 AM	Audit	Data	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_F 2021-10-20 15-49-01\SCOUT_F001.DFI D1A.ch
October 21, 2021 9:30:05 AM	End	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID - Part of System Preparation - No limits associated	Run Count : 1
October 21, 2021 9:30:08 AM	Start	Execution	Noise and Drift - Front FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/hour	None
October 21, 2021 9:30:41 AM	Audit	Data	Noise and Drift - Front FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/hour	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_F 2021-10-20 15-49-01\SUNDUR1_F001 DIFID1A.ch
October 21, 2021 9:31:16 AM	End	Execution	Noise and Drift - Front FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/hour	Run Count : 1

User Name: suriya.thongkaew System Id: GC-6
Hostname: ASDRKW7010 Print Date: October 21, 2021 10:05:40 AM

OQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:31:42 AM	Start	Execution	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	None
October 21, 2021 9:32:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_F 2021-10-20 15-51-16\INJPREC_F002.DI FID1A.ch
October 21, 2021 9:32:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_F 2021-10-20 15-51-16\INJPREC_F003.DI FID1A.ch
October 21, 2021 9:32:56 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_F 2021-10-20 15-51-16\INJPREC_F004.DI FID1A.ch
October 21, 2021 9:32:56 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_F 2021-10-20 15-51-16\INJPREC_F005.DI FID1A.ch
October 21, 2021 9:32:56 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_F 2021-10-20 15-51-16\INJPREC_F006.DI FID1A.ch
October 21, 2021 9:32:56 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_F 2021-10-20 15-51-16\INJPREC_F007.DI FID1A.ch

User Name: suriya.thongkaew System Id: GC-6
Hostname: ASBKKW7015 Print Date: October 21, 2021 10:03:40 AM

DQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:33:07 AM	End	Execution	Injection Precision - Injection Tower, Front SSL, Front FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	Run Count : 1
October 21, 2021 9:33:23 AM	Start	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID - Detector FID - L >= 300000	None
October 21, 2021 9:34:01 AM	Audit	Data	Signal to Noise - Injection Tower, Front SSL, Front FID - Detector FID - L >= 300000	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_F 2021-10-20 16-51-10\ROTONS_F001.D\ FID1A.ch
October 21, 2021 9:34:15 AM	End	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID - Detector FID - L >= 300000	Run Count : 1
October 21, 2021 9:34:19 AM	Start	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID - Part of System Preparation - No limits associated	None
October 21, 2021 9:35:04 AM	Audit	Data	GC Scouting Run - Injection Tower, Back SSL, Back FID - Part of System Preparation - No limits associated	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17-13-45\SCDUT_B001.D\ 02B.ch
October 21, 2021 9:35:27 AM	End	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID - Part of System Preparation - No limits associated	Run Count : 1
October 21, 2021 9:35:32 AM	Start	Execution	Noise and Drift - Back FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/min	None

User Name: suriya.thongkaew System Id: GC-6
Hostname: ASBKKW7015 Print Date: October 21, 2021 10:03:40 AM

DQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:36:06 AM	Audit	Data	Noise and Drift - Back FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/min	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17-13-45\SIGNSDRF_B001 .D\FID2B.ch
October 21, 2021 9:36:16 AM	End	Execution	Noise and Drift - Back FID - Detector FID - L (Noise) <= 0.10 pA - L (Drift) <= 2.50 pA/min	Run Count : 1
October 21, 2021 9:36:20 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	None
October 21, 2021 9:38:57 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17-13-45\INJPREC_B002.D\ FID2B.ch
October 21, 2021 9:38:57 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17-13-45\INJPREC_B003.D\ FID2B.ch
October 21, 2021 9:38:57 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17-13-45\INJPREC_B004.D\ FID2B.ch
October 21, 2021 9:38:57 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17-13-45\INJPREC_B005.D\ FID2B.ch

User Name: suriya.thongkaew System Id: GC-6
Hostname: ASBKKW7015 Print Date: October 21, 2021 10:05:40 AM

DQ GC ALS CN11461066 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
October 21, 2021 9:38:57 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17-13-45\INJPREC_B006.D\ FID2B.ch
October 21, 2021 9:38:57 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17-13-45\INJPREC_B007.D\ FID2B.ch
October 21, 2021 9:39:06 AM	End	Execution	Injection Precision - Injection Tower, Back SSL, Back FID - GC - L (Area) <= 3.00% - L (Rel. Time) <= 1.00%	Run Count : 1
October 21, 2021 9:39:11 AM	Start	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L >= 300000	None
October 21, 2021 9:39:28 AM	Audit	Data	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L >= 300000	Data files Path : C:\Chem32\1\DATA\OQPV20 21\OQPV2021_B 2021-10-20 17-13-45\SIGTONS_B001.D\ FID2B.ch
October 21, 2021 9:39:39 AM	End	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID - Detector FID - L >= 300000	Run Count : 1
October 21, 2021 9:39:43 AM	End	Qualification	Session	151
October 21, 2021 9:39:43 AM	Start	Reporting	Session	None
October 21, 2021 10:04:15 AM	Audit	Reporting	Session	Report Generated : Certificate

Certificate of System Qualification

GC-OQ

REVIEW BY linda k.
APPROVED BY Tanyatam M.
NEXT CAL DATE 21 Oct 24

System ID:	CN11461066
Organization Name:	ALS Laboratory Group (Thailand) Co., Ltd.
Organization Location:	104 Soi 40 Phatthanakan Rd,Khwang Suan Luang, Khet Suan Luang, Bangkok 10250
Date:	April 21, 2023 3:26:38 PM
EQP Name:	AgilentRecommended
EQP Revision:	GC.02.52
Overall Qualification Status:	Pass

CDS Logon Verification - GC

Logon: Saenguthai Tarak

Overall CDS Logon Verification - GC Test Status

Pass

System Inspection and Basic Safety and Operation

Name: 7890

Setpoint Status: **Pass**

Overall System Inspection and Basic Safety and Operation Test Status

Pass

Inlet Pressure Decay

Name: 7890
Front SSL

Setpoint Status: **Pass**

Pressure: 25.0 psi

Pressure Change: -0.1 psi /5 minutes

Agilent Recommended: >= -2.0 and <= 0.5

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name: 7890
Front SSL

Setpoint Status: Pass

	Setpoint		Actual	
Inlet Pressure:	25.0	psi	25.2	psi

Accuracy: 0.2 psi
Agilent Recommended: <= 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Decay

Name: 7890
Back SSL

Setpoint Status: Pass
Pressure: 25.0 psi

Pressure Change: 0.0 psi /5 minutes
Agilent Recommended: >= -2.0 and <= 0.5

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name: 7890
Back SSL

Setpoint Status: Pass

	Setpoint		Actual	
Inlet Pressure:	25.0	psi	24.8	psi

Accuracy: 0.2 psi
Agilent Recommended: <= 1.2

Overall Inlet Pressure Accuracy Test Status

Pass

Detector Flow Accuracy

Name: 7890
Front FID

Setpoint Status: Pass
Flow Type: Fuel
Setpoint: 30.0 mL/min Measured Flow: 28.9 mL/min
Accuracy: 1.1 mL/min
Agilent Recommended: <= 10.0 % setpoint (3.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: Pass
Flow Type: Oxidizer
Setpoint: 400.0 mL/min Measured Flow: 400 mL/min
Accuracy: 0.0 mL/min
Agilent Recommended: <= 10.0 % setpoint (40.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: Pass
Flow Type: Makeup
Setpoint: 25.0 mL/min Measured Flow: 24.9 mL/min
Accuracy: 0.1 mL/min
Agilent Recommended: <= 10.0 % setpoint (2.5 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Overall Detector Flow Accuracy Test Status

Pass

Detector Flow Accuracy

Name: 7890
Back FID

Setpoint Status: Pass
Flow Type: Fuel
Setpoint: 30.0 mL/min Measured Flow: 30.7 mL/min
Accuracy: 0.7 mL/min
Agilent Recommended: <= 10.0 % setpoint (3.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: Pass
Flow Type: Oxidizer
Setpoint: 400.0 mL/min Measured Flow: 399 mL/min
Accuracy: 1.0 mL/min
Agilent Recommended: <= 10.0 % setpoint (40.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: Pass
Flow Type: Makeup
Setpoint: 25.0 mL/min Measured Flow: 24.6 mL/min
Accuracy: 0.4 mL/min
Agilent Recommended: <= 10.0 % setpoint (2.5 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Overall Detector Flow Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 7890

Setpoint Status: Pass
Zone: Oven

	Setpoint	Actual	
Temperature:	230.0	230.6	°C

Accuracy: 0.6 °C
Agilent Recommended: >= -1.0 % setpoint in K (-5.0 °C)
<= 1.0 % setpoint in K (5.0 °C)

Setpoint Status: Pass
Zone: Oven

	Setpoint	Actual	
Temperature:	100.0	100.9	°C

Accuracy: 0.9 °C
Agilent Recommended: >= -1.0 % setpoint in K (-3.7 °C)
<= 1.0 % setpoint in K (3.7 °C)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name: 7890
Setpoint Status: Pass

	Setpoint	Average	
Temperature:	100.0	100.8833	°C

Stability: 0.1 °C
Agilent Recommended: <= 0.5

Overall GC Oven Temperature Stability Test Status

Pass

Scouting Run

Tested Combination1 Front SSL / Front FID
Injection Tower
Name: 7693A

Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination1 Front SSL / Front FID

Name: 7890

Setpoint Status: Pass

Base Signal: 22.7 pA

	ASTM Noise pA		Drift pA/Hr
	0.06		0.05
Agilent Recommended:	<= 0.10	<=	2.50
Status:	Pass	Pass	

Overall Noise and Drift Test Status

Pass

Injection Precision

Tested Combination1 Front SSL / Front FID

Name: 7693A

Setpoint Status: Pass

Injection Volume on Column: 1.0 uL

Area RSD: 0.32 % Retention Time RSD: 0.67 %

Agilent Recommended: <= 3.00 <= 1.00

Overall Injection Precision Test Status

Pass

Signal to Noise

Tested Combination1 Front SSL / Front FID Injection Tower

Name: 7890

Setpoint Status: Pass

Signal to Noise: 721755

Agilent Recommended: >= 300000

Overall Signal to Noise Test Status

Pass

Scouting Run

Tested Combination2 Back SSL / Back FID Injection Tower

Name: 7693A

Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination2 Back SSL / Back FID

Name: 7890

Setpoint Status: Pass

Base Signal: 22.6 pA

	ASTM Noise pA		Drift pA/Hr
	0.07		0.09
Agilent Recommended:	<= 0.10	<=	2.50
Status:	Pass	Pass	

Overall Noise and Drift Test Status

Pass

Injection Precision

Tested Combination2 Back SSL / Back FID

Name: 7693A

Setpoint Status: Pass

Injection Volume on Column: 1.0 uL

Area RSD: 1.28 % Retention Time RSD: 0.83 %

Agilent Recommended: <= 3.00 <= 1.00

Overall Injection Precision Test Status

Pass

Signal to Noise

Tested Combination2 Back SSL / Back FID Injection Tower

Name: 7690

Setpoint Status: Pass

Signal to Noise: 2404396

Agilent Recommended: >= 300000

Overall Signal to Noise Test Status

Pass

Instrument Details

Purpose

This section describes the as found system configuration.

Details

System	
System ID	CN11461066
Manufacturer	Agilent Technologies
Name	7890
Flow Data Input	Manual Data
Temperature Data Input	Manual Data or Other Data Logging
Tested Combination1	
Injection Technique	Injection Tower
Sampler Identifier	Sampler 2
Inlet	Front
Detector	Front
LTM included?	No
Tested Combination2	
Injection Technique	Injection Tower
Sampler Identifier	Sampler 3
Inlet	Back
Detector	Back
LTM included?	No
Sampler 1	
Manufacturer	Agilent Technologies
Type	Tray
Name	7693A
Model Number	G4514A
Serial Number	CN15380020
Firmware Revision	A.11.01
Vial Heater	Not installed

Sampler 2

Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN16280126
Firmware Revision	A.10.09
Usage	Sample Injection
Location	Front
Syringe Volume (µL)	10

Sampler 3

Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN10340103
Firmware Revision	A.10.09
Usage	Sample Injection
Location	Back
Syringe Volume (µL)	10

Mainframe 1

Manufacturer	Agilent Technologies
Name	7890
Model Number	G3440A
Serial Number	CN11461066
Firmware Revision	Version 4.27
Oven Type	Standard

Inlet 1

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

Inlet 2

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

Detector 1

Manufacturer	Agilent Technologies
Name	7890
Type	FID
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Front
Makeup Gas	Nitrogen

Detector 2

Manufacturer	Agilent Technologies
Name	7890
Type	FID
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Back
Makeup Gas	Nitrogen

Electronic Signature

Purpose

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Details

Full Name of Signer:	Saenguthai Tarak
Logged On User Name:	saenguthai.tarak@non.agilent.com
Signature Creation Date:	April 21, 2023
Reason for Signature:	Executed protocol and published this original version of document

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User Name: saenguthai.tarak
Hostname: LAPTOP-CQ3SKOMV

System Id: CN11461066
Print Date: April 21, 2023 3:26:48 PM

GC-6_SKK_EN0137_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:21:36 AM	Audit	SessionCreated	Session	None
April 21, 2023 11:21:36 AM	Start	Configuration	Session	None
April 21, 2023 11:21:36 AM	Audit	Entitlement	Licensing	User is Nonpaying and does not require an unlock code
April 21, 2023 11:22:04 AM	Audit	EdpLoaded	Session	EDP details for primary technique (Gc) - File path: (Protocol\Packs\Gc\Configuration\02.52\Gc.02.52.acq), EDP File Name: (Gc.02.52.acq), EDP Name: (AgilentRecommended), Protocol Revision: (Gc.02.52)
April 21, 2023 11:22:09 AM	End	Configuration	Session	None
April 21, 2023 11:22:14 AM	Start	Qualification	Session	DQ
April 21, 2023 11:22:14 AM	Start	Execution	CDS Logon Verification - GC - Qualitative test	None
April 21, 2023 11:23:14 AM	End	Execution	CDS Logon Verification - GC - Qualitative test	Run Count : 1
April 21, 2023 11:23:16 AM	Start	Execution	System Inspection and Basic Safety and Operation - 7890 - Qualitative Test - No setpoints associated	None
April 21, 2023 11:23:35 AM	End	Execution	System Inspection and Basic Safety and Operation - 7890 - Qualitative Test - No setpoints associated	Run Count : 1
April 21, 2023 11:23:37 AM	Start	Execution	Inlet Pressure Decay - Front SSL - Pressure Controlled (mix : S: 25.3 psi - L: 1+ -2.0 psi and <= 0.5 psi)	None

User Name: saengulthai.tarak
Hostname: LAPTOP-CQ3SKOMV
System Id: CN11461066
Print Date: April 21, 2023 3:26:50 PM

GC-E_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:24:01 AM	End	Execution	Inlet Pressure Decay - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.0 psi	Run Count : 1
April 21, 2023 11:24:04 AM	Start	Execution	Inlet Pressure Accuracy - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
April 21, 2023 11:24:09 AM	End	Execution	Inlet Pressure Accuracy - Front SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
April 21, 2023 11:24:11 AM	Start	Execution	Inlet Pressure Decay - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None
April 21, 2023 11:24:45 AM	End	Execution	Inlet Pressure Decay - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	Run Count : 1
April 21, 2023 11:24:45 AM	Start	Execution	Inlet Pressure Accuracy - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
April 21, 2023 11:24:51 AM	End	Execution	Inlet Pressure Accuracy - Back SSL - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
April 21, 2023 11:24:53 AM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:25:20 AM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:25:25 AM	End	Execution	Detector Flow Accuracy - Front FID - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count : 1

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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Hostname: LAPTOP-CQ3SKOMV
System Id: CN11461066
Print Date: April 21, 2023 3:26:40 PM

GC-E_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:25:26 AM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:25:40 AM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:25:42 AM	End	Execution	Detector Flow Accuracy - Front FID - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:25:44 AM	Start	Execution	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:26:01 AM	Audit	Data	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:26:04 AM	End	Execution	Detector Flow Accuracy - Front FID - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:26:05 AM	Start	Execution	Detector Flow Accuracy - Back FID2 - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:26:19 AM	Audit	Data	Detector Flow Accuracy - Back FID2 - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:26:22 AM	End	Execution	Detector Flow Accuracy - Back FID2 - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:26:24 AM	Start	Execution	Detector Flow Accuracy - Back FID1 - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:26:36 AM	Audit	Data	Detector Flow Accuracy - Back FID1 - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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GC-E_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:26:43 AM	End	Execution	Detector Flow Accuracy - Back FID2 - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:26:45 AM	Start	Execution	Detector Flow Accuracy - Back FID1 - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
April 21, 2023 11:27:01 AM	Audit	Data	Detector Flow Accuracy - Back FID1 - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Manual Data Entry
April 21, 2023 11:27:05 AM	End	Execution	Detector Flow Accuracy - Back FID1 - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
April 21, 2023 11:27:07 AM	Start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 220.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 21, 2023 11:27:33 AM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 220.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
April 21, 2023 11:27:35 AM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 220.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
April 21, 2023 11:27:37 AM	Start	Execution	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 150.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
April 21, 2023 11:27:54 AM	Audit	Data	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 150.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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System Id: CN11461066
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GC-E_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:27:57 AM	End	Execution	GC Oven Temperature Accuracy - 7890 - Temperature : Oven - S: 150.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
April 21, 2023 11:27:58 AM	Start	Execution	GC Oven Temperature Stability - 7890 - Temperature : Oven - S: 150.0°C - L: <= 0.5°C	None
April 21, 2023 11:29:07 AM	Audit	Data	GC Oven Temperature Stability - 7890 - Temperature : Oven - S: 150.0°C - L: <= 0.5°C	Manual Data Entry
April 21, 2023 11:29:10 AM	End	Execution	GC Oven Temperature Stability - 7890 - Temperature : Oven - S: 150.0°C - L: <= 0.5°C	Run Count : 1
April 21, 2023 11:29:12 AM	Start	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID: - Part of System Preparation - No limits associated	None
April 21, 2023 11:30:07 AM	Audit	Data	GC Scouting Run - Injection Tower, Front SSL, Front FID: - Part of System Preparation - No limits associated	Data file Path : C:\Users\Public\Documents\ChemStation\2\Data\OQ_GC-E_ALS_2023-04-20\OQ_GC-E_2023 2023-04-20 14-34-08\F_S001\DFID1A.ch
April 21, 2023 11:31:04 AM	End	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID: - Part of System Preparation - No limits associated	Run Count : 1
April 21, 2023 11:31:07 AM	Start	Execution	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	None

Date: April 21, 2023 3:26:38 PM
System ID: CN11461066

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System Id: CN11461065
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GC-6_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:31:43 AM	Audit	Data	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023 2023-04-20 14-38-08\HD01-008F.DFID1A.ch
April 21, 2023 11:32:00 AM	End	Execution	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Run Count : 1
April 21, 2023 11:32:03 AM	Start	Execution	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Rel. Time): <= 1.00%	None
April 21, 2023 11:32:23 AM	Start	Execution	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Rel. Time): <= 1.00%	None
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Rel. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023 2023-04-20 14-38-08\Pre01-015F.DFID1A.ch
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Rel. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023 2023-04-20 14-38-08\Pre01-016F.DFID1A.ch

Date: April 21, 2023 3:26:38 PM
System ID: CN11461065

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System Id: CN11461065
Print Date: April 21, 2023 3:26:48 PM

GC-6_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Rel. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023 2023-04-20 14-38-08\Pre01-015F.DFID1A.ch
April 21, 2023 11:33:55 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Rel. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023 2023-04-20 14-38-08\Pre01-016F.DFID1A.ch
April 21, 2023 11:33:59 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Rel. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023 2023-04-20 14-38-08\Pre01-017F.DFID1A.ch
April 21, 2023 11:33:59 AM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Rel. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023 2023-04-20 14-38-08\Pre01-018F.DFID1A.ch
April 21, 2023 11:34:00 AM	End	Execution	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Rel. Time): <= 1.00%	Run Count : 1
April 21, 2023 11:34:04 AM	Start	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID: - Detector FID - L: >= 300000	None

Date: April 21, 2023 3:26:38 PM
System ID: CN11461065

User Name: samgulhal.tarak
Hostname: LAPTOP-CQ35K0MV
System Id: CN11461065
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GC-6_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:35:28 AM	Audit	Data	Signal to Noise - Injection Tower, Front SSL, Front FID: - Detector FID - L: >= 300000	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023 2023-04-20 14-38-08\SN_Front.DFID1A.ch
April 21, 2023 11:36:00 AM	End	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID: - Detector FID - L: >= 300000	Run Count : 1
April 21, 2023 11:36:03 AM	Start	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID: - Part of System Preparation - No limits associated	None
April 21, 2023 11:36:36 AM	Audit	Data	GC Scouting Run - Injection Tower, Back SSL, Back FID: - Part of System Preparation - No limits associated	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023 2023-04-20 14-36-09\B_SC01.DFID2B.ch
April 21, 2023 11:37:00 AM	End	Execution	GC Scouting Run - Injection Tower, Back SSL, Back FID: - Part of System Preparation - No limits associated	Run Count : 1
April 21, 2023 11:37:02 AM	Start	Execution	Noise and Drift - Back FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	None

Date: April 21, 2023 3:26:38 PM
System ID: CN11461065

User Name: samgulhal.tarak
Hostname: LAPTOP-CQ35K0MV
System Id: CN11461065
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GC-6_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:38:06 AM	Audit	Data	Noise and Drift - Back FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023 2023-04-20 14-38-08\N3-01--005B.DFID2B.ch
April 21, 2023 11:38:23 AM	End	Execution	Noise and Drift - Back FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Run Count : 1
April 21, 2023 11:38:52 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Rel. Time): <= 1.00%	None
April 21, 2023 11:38:51 AM	Start	Execution	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Rel. Time): <= 1.00%	None
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Rel. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023_Pre 2023-04-21 10-37-32\Pre11-004B.DFID2B.ch
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Rel. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023_Pre 2023-04-21 10-37-32\Pre11-005B.DFID2B.ch

Date: April 21, 2023 3:26:38 PM
System ID: CN11461065

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Hostname: LAPTOP-CQ39NOMV

System Id: CN11461056
Print Date: April 21, 2023 3:26:46 PM

GC-6_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:48:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023_Pre 2023-04-21 10-37-32\Pre11--006B.D\FID2B.ch
April 21, 2023 11:40:17 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023_Pre 2023-04-21 10-37-32\Pre11--007B.D\FID2B.ch
April 21, 2023 11:40:21 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023_Pre 2023-04-21 10-37-32\Pre11--008B.D\FID2B.ch
April 21, 2023 11:40:21 AM	Audit	Data	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023_Pre 2023-04-21 10-37-32\Pre11--009B.D\FID2B.ch
April 21, 2023 11:41:29 AM	End	Execution	Injection Precision - Injection Tower, Back SSL, Back FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Run Count : 1
April 21, 2023 11:41:33 AM	Start	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID: - Detector FID - L: >= 300000	None

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User Name: kaengudom.lerak
Hostname: LAPTOP-CQ39NOMV

System Id: CN11461056
Print Date: April 21, 2023 3:26:46 PM

GC-6_BKK_EN0127_ALS Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 21, 2023 11:42:22 AM	Audit	Data	Signal to Noise - Injection Tower, Back SSL, Back FID: - Detector FID - L: >= 300000	Data files Path : C:\Users\Public\Documents\ChemStation\3\Data\OQ_GC-6_ALS_2023-04-20\OQ_GC-6_2023 2023-04-20 14-36-08\SN_Back.D\FID2B.ch
April 21, 2023 11:42:30 AM	End	Execution	Signal to Noise - Injection Tower, Back SSL, Back FID: - Detector FID - L: >= 300000	Run Count : 1
April 21, 2023 11:42:53 AM	End	Qualification	Session	OQ
April 21, 2023 11:42:53 AM	Start	Reporting	Session	None
April 21, 2023 12:01:47 PM	Audit	AceClosed	Session	None
April 21, 2023 3:16:07 PM	Audit	AceRestarted	Session	None
April 21, 2023 3:16:10 PM	Audit	SessionReleased	Session	None
April 21, 2023 3:16:31 PM	Start	Qualification	Session	OQ
April 21, 2023 3:20:59 PM	Audit	AceRestarted	Session	None
April 21, 2023 3:21:00 PM	Audit	SessionAcquired	Session	None
April 21, 2023 3:21:07 PM	Start	Qualification	Session	OQ
April 21, 2023 3:25:49 PM	Audit	Reporting	Session	Report Generated: CertName

Date: April 21, 2023 3:26:38 PM
System ID: CN11461056

Date: April 21, 2023 3:26:38 PM
System ID: CN11461056

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

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

Certificate of Testing

Equipment :	DO Meter
Manufacturer :	YSI
Model :	5000-115V
Serial No. :	15E102796
ID No. :	RYG_EN0032
Received Date :	11 February 2022
Test Date :	14 February 2022
Reference :	2202-0404DSC-4
Submitted by :	ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch) 616/10 Moo 5 T.Maenam Khu, A.Pluakdaeng, Rayong 21140, Thailand
Laboratory Condition :	Temperature (25 ± 5) °C Humidity (50 ± 20) %
Test Procedure :	In - house method : CP-CH9 by Comparison Technique with Azide Modification Method
Tested by :	Walailak Sirithean
Approved by :	Saithip Approved Signatory

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

( ) Malee Butkruea
(✓) Saithip Meangmai
( ) Warakorn Lerngagtrakul

Issue Date : 18 February 2022

B 0281285

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

Result : Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: 15E100464

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.02	8.02	0.0084

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

-o0o-

Saithip

a 1094744

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX. 0-2719-9484

Cert. No.: 22LM12
Page.: 1 of 2

Certificate of Calibration

Equipment :	DO Meter with Sensor
Manufacturer :	YSI
Model :	5000-115V
Serial No. :	15E102796
ID No. :	RYG_EN0032
Submitted by :	ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branc 616/10 Moo 5 T.Maenam Khu, A.Pluakdaeng, Rayong 21140, Thailand
Location :	TPA On Site Calibration Laboratory
Received Order :	11 February 2022
Calibrated Date :	21 February 2022
Ambient Temperature :	(26 ± 10) °C
Relative Humidity :	(50 ± 30) %
AC Line Voltage :	(220 ± 22) V
Calibrated by :	Kunchit Promprat
Approved by :	Approved Signatory

( ) Pornthipoa Tameyakul
(✓) Malee Butkruea
( ) Suwit Imjai

Issue Date : 21 February 2022

The Uncertainties are for a confidence probability of approximately 95%

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

A 0038008

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

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

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

Condition of this result of calibration
1. Reference standard instrument:-

Instrument	Model	Serial No.	Cert. No.	Due Date
1) Digital Thermometer	1523	2188080	2111273	22 Nov 2022

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment
Function : Temperature measurement.
This instrument was connected with temperature sensor, S/N.: 15E100464

Calibration Point (°C)	Immersion Depth (mm)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty (± °C)	Coverage Factor *k*
20.00	45	20.001	19.88	-0.121	0.15	2.00

UUC* : Unit Under Calibration

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

-o0o-

a 1095714

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX. 0-2719-9484

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

Certificate of Calibration

Equipment :	Low Temp. Incubator
Manufacturer :	Memmert
Model :	IPP750
Serial No. :	V818.0084
ID No. :	RYG_EN0154
Submitted by :	ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch) 616/10 Moo 5 T.Maenam Khu, A.Pluakdaeng, Rayong 21140, Thailand
Location :	BOD Room
Received Order :	22 April 2022
Calibration Date :	22 April 2022
Ambient Temperature :	(26 ± 10) °C
Relative Humidity :	(50 ± 30) %
Calibrated by :	Man Pattanapongpaiboon
Approved by :	Approved Signatory

REVIEW BY N.Bamrat
APPROVED BY D
NEXT CAL. DATE 21/10/23

( ) Pornthipa Tameyakul
(✓) Malee Butkruea
( ) Suwit Imjai

Issue Date : 3 May 2022

The Uncertainties are for a confidence probability of approximately 95%

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

A 0040735

Equipment : Low Temp. Incubator
Condition As-Received : Used Item
Reference : 2204-0146OC-1

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

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

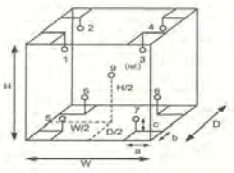
Condition of this result of calibration
1. Reference standard instrument:-

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

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

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



Probe Installation Details :
a = 10 cm
b = 10 cm
c = 10 cm

Dimension of Chamber :
D = 0.60 m
W = 1.0 m
H = 1.2 m
Capacity = 0.75 m³

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

a 1106485

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

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

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (±°C)	Coverage Factor *k*
20.0	20.0	20.0	0.022	0.20	0.22	0.30	2

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

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor.
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation.
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

-o0o-

a 1106484

DKSH

Certificate of Calibration

Equipment:	SPECTROPHOTOMETER	Certificate No.:	C06220464
Model:	DR6000	Issued Date:	27 September 2022
Serial No. (or ID.):	1627845 (RYG_EN0037)	Job No.:	KSPR2212224
Manufacturer:	HACH	Page:	1 of 3
Condition:	In Condition		

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

REVIEW BY
APPROVED BY
NEXT CAL. DATE 27/3/24

Environment Condition: Temperature 23.1 °C ± 0.6 °C
Humidity 65.4 %RH ± 3.2 %RH

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

Calibration By: Mr. Chattuphon Folthong
Calibration Date: 27 September 2022
The Method used: In house method, CAL-WI-24, base on ASTM E 275-08 and ASTM E 387-04
Traceability: This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Starna Scientific Limited.
The standard for Wavelength Certificate No. 91418 and 91435
The standard for Photometric Certificate No. 91441 and 101088
The standard for Stray light Certificate No. 101041 and 101040
The standard for Spectral resolution Certificate No. 101037

(Mr. Chattuphon Folthong)
Person in charge

(Mr. Thalerngkeat Poungngam)
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

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DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงพระโขนงเหนือ เขตวัฒนา กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Phone: +66 2630 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

DKSH

Calibration Results:

Without Adjustment

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

Standard Wavelength	Unit Under Calibration	Correction	Uncertainty
418.61	418.4	0.21	0.14
636.66	636.7	-0.04	0.14
637.96	638.3	-0.32	0.14
746.46	746.8	-0.32	0.14
807.03	807.4	-0.37	0.13

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
420 nm	0.0000	0.000	0.0000	0.0045
	0.5905	0.593	-0.0025	0.0045
	0.7334	0.737	-0.0036	0.0045
	1.0534	1.057	-0.0036	0.0045
440 nm	0.0000	0.000	0.0000	0.0045
	0.5503	0.553	-0.0027	0.0045
	0.7179	0.720	-0.0021	0.0045
	1.0312	1.034	-0.0028	0.0045
465 nm	0.0000	0.000	0.0000	0.0045
	0.5024	0.506	-0.0036	0.0045
	0.6693	0.672	-0.0027	0.0045
	0.9904	0.994	-0.0036	0.0045
546.1 nm	0.0000	0.000	0.0000	0.0045
	0.5156	0.518	-0.0022	0.0045
	0.6903	0.691	-0.0007	0.0045
	0.9904	0.992	-0.0016	0.0045
590 nm	0.0000	0.000	0.0000	0.0045
	0.5525	0.554	-0.0015	0.0045
	0.7175	0.718	-0.0005	0.0045
	1.0301	1.031	-0.0009	0.0045
635 nm	0.0000	0.000	0.0000	0.0045
	0.5367	0.538	-0.0013	0.0045
	0.6847	0.685	-0.0003	0.0046
	0.9823	0.983	-0.0007	0.0045

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงพระโขนงเหนือ เขตวัฒนา กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Phone: +66 2630 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

DKSH

Calibration Results:

Without Adjustment

Photometric Accuracy (Absorbance)

Wavelength	Standard absorbance	Unit Under Calibration	Correction	Uncertainty
235 nm	0.0000	0.000	0.0000	0.0080
	0.7423	0.744	-0.0017	0.0083
257 nm	0.0000	0.000	0.0000	0.0080
	0.8609	0.861	-0.0001	0.0084
313 nm	0.0000	0.000	0.0000	0.0080
	0.2895	0.292	-0.0025	0.0080
350 nm	0.0000	0.000	0.0000	0.0080
	0.6381	0.638	0.0001	0.0080

Stray light *

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

Spectral Resolution *

Nominal Concentration 0.02 % v/v	Peak	Trough	Ratio	SBW
Standard Wavelength (nm)	266.60	266.63	1.39	2.00
UUC: Wavelength (nm)	266.2	266.1		
Std Absorbance (A)	0.4810	0.3176		
Absorbance (A)	0.373	0.268		

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

The End of Certificate

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงพระโขนงเหนือ เขตวัฒนา กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Phone: +66 2630 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

RYG_EN0002

DKSH

ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: KBPR2212224

ชนิดเครื่องมือ: SPECTROPHOTOMETER รุ่น: DR6000 หมายเลขเครื่อง: 1627845

ตรวจสอบ (รับ) 27 Sep 2022 ปกติ	ไม่ปกติ	รายการตรวจเช็ค	ตรวจสอบ (ส่ง) 27 Sep 2022 ปกติ	ไม่ปกติ	หมายเหตุ
		General			
☑	☐	1. ความสมบูรณ์เครื่อง	☑	☐	
☑	☐	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	☑	☐	
☑	☐	3. สวิทช์ ปิด – เปิด เครื่อง (On-Off Swicth)	☑	☐	
☑	☐	4. ปุ่มกด (Keypad)	☑	☐	
☑	☐	5. หน้าจอ (Display, Screen Contrast)	☑	☐	
		Spectrophotometer			
☐	☐	6. แรงดันไฟฟ้า (Battery Backup) >= 2.5 VDC	☐	☐	
☐	☐	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	☐	☐	
☑	☐	8. ความยาวคลื่น (Wavelength Check)	☑	☐	656.1 ได้ 656.1 nm
☑	☐	9. แหล่งกำเนิดแสง (UV < 3,000 hour)	☑	☐	
☑	☐	10. แหล่งกำเนิดแสง (Visible < 5,000 hour)	☑	☐	
☑	☐	11. ช่องวัดหลายตัวอย่าง (Carousel Module)	☑	☐	
		pH Meter and Conductivity Meter			
☐	☐	12. อิเล็คโทรด (Electrode and Connection Cable)	☐	☐	
☐	☐	13. ระดับสารละลายใน Electrode (Level KCl)	☐	☐	
☐	☐	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	☐	☐	
☐	☐	15. ขาจับอิเล็คโทรด (Stand)	☐	☐	
		Turbidimeter			
☐	☐	16. ค่าความขุ่นเริ่มต่ำสุด (No Sample)	☐	☐	
☐	☐	17. ระดับการส่องสว่างของแสง (>= 2.5 ไม่เกิน 3.0)	☐	☐	
		Automatic titrator			
☐	☐	18. สภาพ Piston Burettes	☐	☐	
☐	☐	19. Function Rinsing and Dosing	☐	☐	
☐	☐	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	☐	☐	

เพิ่มเติม/ข้อแนะนำ :

Mr. Chattuphon Foithong
Service Engineer

DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร 10260
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Delivering Growth – in Asia and Beyond.

CAL-FM-R31-03: 20 Jul 2022

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
tel: +66 2643 8301-6 , e-mail: service.thailand@sartorius.com

NSC-TISI-TIS 17025
CALIBRATION 0426

SARTORIUS

REVIEW BY Thanitall.
APPROVED BY D.
NEXT CAL. DATE 01/03/24

Certificate of Calibration

Model Number :	MSE224S-100-DU	Certificate No. :	23BCI0112
Description :	Analytical Balance	Issued Date :	Friday, March 03, 2023
Serial Number :	0026207038	Reference No. :	204833
ID No. :	RYG_EN0002		
Manufacturer :	Sartorius	Page No. :	1 Of 2

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

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

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

Calibration
Procedure No. : This calibration was conducted by
Using in-house calibration procedure number (WI-003)
Based on UKAS LAB 14 : 2019

Metrological data :
Capacity : 220 g Readability : 0.0001 g

Reasons for calibration
☐ New Installation ☐ Service / Repaired ☑ Re-calibration/ Maintenance

Ambients Conditions
Temperature : 23.6 °C ± 5.0 °C
Humidity : 60.0 % RH ± 10.0 % RH
Pressure ± —

Equipment Condition: ☑ Good Operate ☐ Fair

Measurement Method UKAS Publication Ref :Lab 14

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

Traceability:

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

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

Mr.chonchai Inthana(Technical Manager)

STAMP

SOP FM 33 03 February 2022

RYG_EN0006

Sartorius (Thailand) Co., Ltd.
129 Rama 9 Road, Huaykwang, Huaykwang, Bangkok 10310
Tel: +66 2643 8301-6 Fax: +66 2643 8307, e-mail: service.thailand@sartorius.com

SARTORIUS

Certificate of Calibration

Model Number :	MSE224S-100-DU	Certificate No. :	23BCI0112
Description :	Analytical Balance	Issued Date :	Friday, March 03, 2023
Serial Number :	0026207038	Reference No. :	204833
ID No. :	RYG_EN0002		
Manufacturer :	Sartorius	Page No. :	2 of 2

Calibration Results : Without Adjustment

Repeatability

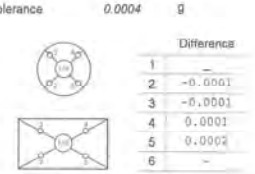
The reproducibility is the ability of a weighing instrument to display nearly identical readouts under constant test conditions when the same load within a measurement series is placed repeatedly on the weighing pan in the same manner. The standard deviation is used to express reproducibility quantitatively.

Nominal Value : (Low Load)	20.0000	199.9999
20 g	20.0000	200.0000
Tolerance	20.0000	199.9999
0.0001 g	20.0000	200.0000
	20.0000	199.9999
Nominal Value : (High Load)	20.0000	199.9999
200 g	19.9999	200.0000
Tolerance	20.0000	200.0000
0.0001 g	20.0000	199.9999
	20.0000	200.0000
Standard Deviation	0.00003	0.00005

Eccentricity (Off-center loading error)

The off-center loading error is yielded by the difference between the readout of the load, i.e. 1/3 or 1/4 of maximin capacity, placed in the middle of the weighing pan and between each of four additional measurement points (positions defined according to OIML R76).

Nominal value : 100 g
Tolerance 0.0004 g



	Difference
1	—
2	-0.0001
3	-0.0001
4	0.0001
5	0.0002
6	—

Linearity

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

Tolerance 0.0002 g

Nominal Value (g)	Conventional Mass Value (g)	Displayed Value (g)	Deviation (g)	Uncertainty (g)
0.01	0.0100	0.0100	0.0000	0.00014
0.05	0.0500	0.0500	0.0000	0.00014
0.1	0.1000	0.1000	0.0000	0.00014
0.5	0.5000	0.5000	0.0000	0.00014
1	1.0000	1.0000	0.0000	0.00014
5	5.0000	5.0000	0.0000	0.00014
10	10.0000	10.0001	0.0001	0.00014
20	20.0000	20.0000	0.0000	0.00024
50	50.0000	50.0000	0.0000	0.00015
100	100.0000	99.9999	-0.0001	0.00018
200	200.0000	200.0000	0.0000	0.00032

End of Report.

SOP FM 33 03 February 2022

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
53/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX. 0-2719-6484

NSC-TISI-TIST1620
CALIBRATION 0005

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

Certificate of Calibration

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

REVIEW BY Thanitall.
APPROVED BY D.
NEXT CAL. DATE 20/04/24

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

Issue Date : 2 November 2022

The Uncertainties are for a confidence probability of approximately 95%

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A 0046905

Equipment : Hot Air Oven **Cert. No.:** 22TM1492
Condition As-Received : Used Item **Page :** 2 of 3
Reference : 2210-0376OC-1
Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

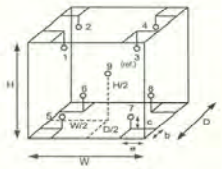
1. Reference standard instrument:-

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

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

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



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

Probe Installation Details :

a = 5.0 cm
b = 5.0 cm
c = 5.0 cm

Dimension of Chamber :

D = 0.33 m
W = 0.40 m
H = 0.40 m
Capacity = 0.053 m³

a 1132473

Equipment : Hot Air Oven **Cert. No.:** 22TM1492
Condition As-Received : Used Item **Page :** 3 of 3
Reference : 2210-0376OC-1
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*
70.0	70.0	70.0	0.079	0.47	0.77	0.42	2

Calibration Point	Measured Temperature (°C)								
	Position								
(°C)	1	2	3	4	5	6	7	8	9 (ref.)
70.0	70.262	69.995	70.079	70.177	70.664	70.039	70.688	70.149	70.328

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one senso
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 observatior
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 %.

-o0o-

a 1132472

R46_PS0607

METTLER TOLEDO

Certificate Number CPH-0204-22

Calibration Certificate
Seven2Go™ pH/mV meter S2

Customer

Company ALS LABORATORY GROUP (THAILAND) CO.,LTD.
Address 616/10 Moo 5, T.Makamkoo, A.Pluakdaeng
RAYONG 21140
Customer ID number 10166873
Customer representative -

Instrument

Type Seven2Go™ pH/mV S2 **Instrument Serial Number** C732568422
Internal identification - **Firmware version** 1.01

Technical specifications

Measuring Range	-1999.9 ... 1999.9 mV	-2 ... 20 pH
Resolution	1 mV	0.01 pH
Limit of Error	± 1 mV	± 0.01 pH

Temperature range MTC -5 ... 105 °C
Temperature range ATC -5 ... 105 °C
Resolution 0.1 °C
Limit of Error ± 0.5 °C/°C

REVIEW BY Tanasi
APPROVED BY Supt S.
NEXT CAL. DATE Sep 7, 23

Procedure Statement

METTLER TOLEDO Seven2Go Service Manual Section B (Doc. No. 30212215) will be used as reference documentation to adjust and certify the instrument indicated in the "Type" and "Serial number" section. The measurement results of this certificate were obtained at ambient conditions.

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METTLER TOLEDO

Certificate Number CPH-0204-22

Certification Tools

Certified digital voltmeter Manufacturer HEWLETT PACKARD / 34401A Serial number US39033181
Type Certificate number E1U223031
Date of Certification September 7, 2021

Certified Temperature Resistors Manufacturer METTLER TOLEDO Serial number A227
Type 51302410 Certificate number 63071
Date of Certification April 27, 2022

Designation	Nominal value	Certified value
NTC 30 kΩ, 0 °C	84.980 kΩ	84.6814 kΩ
NTC 30 kΩ, 25 °C	30.000 kΩ	30.0072 kΩ
NTC 30 kΩ, 50 °C	10.969 kΩ	10.96530 kΩ
NTC 30 kΩ, 75 °C	4.529 kΩ	4.52584 kΩ
NTC 30 kΩ, 100 °C	2.070 kΩ	2.06626 kΩ

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METTLER TOLEDO

nber CPH-0204-22

easurements

Input

Designation	Certified value	Measured value	Max. Tolerance	Passed / Failed
-1900 mV	-1900.0 mV	-1900 mV	1 mV	Passed
-1000 mV	-1000.0 mV	-1000 mV	1 mV	Passed
-500 mV	-500.0 mV	-500 mV	1 mV	Passed
-180 mV	-180.0 mV	-180 mV	1 mV	Passed
0 mV	0.0 mV	0 mV	1 mV	Passed
180 mV	180.0 mV	180 mV	1 mV	Passed
500 mV	500.0 mV	500 mV	1 mV	Passed
1000 mV	1000.0 mV	1000 mV	1 mV	Passed
1900 mV	1900.0 mV	1900 mV	1 mV	Passed

Input

Designation	Nominal value	Measured value	Max. Tolerance	Passed / Failed
NTC 30 kΩ, 0 °C	0.0 °C	0.0 °C	0.5 °C	Passed
NTC 30 kΩ, 25 °C	25.0 °C	25.1 °C	0.5 °C	Passed
NTC 30 kΩ, 50 °C	50.0 °C	50.1 °C	0.5 °C	Passed
NTC 30 kΩ, 75 °C	75.0 °C	75.1 °C	0.5 °C	Passed
NTC 30 kΩ, 100 °C	100.0 °C	100.0 °C	0.5 °C	Passed

ertification

Certification of instrument: **Passed**

The instrument referred to in this certificate has fulfilled the criteria of the certification. This is indicated by the notation Passed in the column above.

marks Service Assignment ID : 0370210803

Test high impedance at 1900.0 mV, Results : 1900 mV

Difference = 0.0% Within MPE (0.1%)

Certification of the instrument was performed by

Mettler-Toledo (Thailand) Limited

METTLER TOLEDO

Performance Test

Attachment to Certificate No. CPH-0204-22

pH Electrode

Type: InLab Expert Go-ISM S/N: 2304441

Certified standards used

Standard 1:	Type: pH Buffer	Manufacturer: METTLER TOLEDO	Exp. date:	Jun-24
	Nominal value: pH (25.00 °C):	4.01	Lot No.:	1H158G
Standard 2:	Type: pH Buffer	Manufacturer: METTLER TOLEDO	Exp. date:	Jan-24
	Nominal value: pH (25.00 °C):	7.00	Lot No.:	1H013D
Standard 3:	Type: pH Buffer	Manufacturer: METTLER TOLEDO	Exp. date:	May-24
	Nominal value: pH (25.00 °C):	9.20	Lot No.:	1H139A
Standard 4:	Type: Redox Solution	Manufacturer: METTLER TOLEDO	Exp. date:	-
	Nominal value: pH (25.00 °C):	-	Lot No.:	-

Adjustment

Set Calibration Buffer		*B3 (25 °C) 2.00, 4.01, 7.00, 9.21, 11.00*						
Select Calibration Mode		*3-Point calibration*		*2-Point calibration*		*2-Point calibration*		
3-Point Calibration		°C	pH	°C	pH	°C	pH	
Cal 1	ATC	25.0	4.01	ATC 25.0	-	ATC 25.0	-	
Cal 2	ATC	24.8	7.00	ATC 25.0	-	ATC 25.0	-	
Offset (mV)		9		-		-		
Slope % (or mV/pH)		98.8		-		-		
Cal 3	ATC	25.0	9.21					
Slope % (or mV/pH)		99.3						

Measurements

Before adjustment					*After adjustment*				
Buffer Values	*Measured*			*Difference*	*Buffer Values*	*Measured*			*Difference*
pH	°C		pH	pH	pH	°C		pH	pH
4.01	25.4	ATC	3.96	-0.05	4.01	25.1	ATC	4.01	0.00
7.00	25.1	ATC	6.97	-0.03	7.00	24.8	ATC	7.01	0.01
9.20	25.2	ATC	9.17	-0.03	9.20	25.0	ATC	9.21	0.01

Redox Measurement Result = - mV

Note: The difference result of calibrated electrode should be within +/- 0.05 pH

Remarks: -

Place: Chemical Laboratory *Calibration Date:* September 28, 2022

Service Specialist: Watinee Thongrod *Signature:* Watinee T

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RYG_EN0010

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
33/3 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX. 0-2719-0460

ilac-MRA MRA CALIBRATION 0008

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

Certificate of Calibration

Equipment :	Hot Air Oven
Manufacturer :	Memmert
Model :	UFE 500
Serial No. :	G511.1572
ID No. :	RYG_EN0010
Submitted by :	ALS Laboratory Group (Thailand) Co.,Ltd. (Rayong Branch) 616/10 Moo 5 T. Maenam Khu, A. Pluakdaeng, Rayong 21140 Thailand
Location :	Oven Room
Received Order :	20 October 2022
Calibration Date :	20 October 2022
Ambient Temperature :	(26 ± 10) °C
Relative Humidity :	(50 ± 30) %
Calibrated by :	Man Patlanapongpaiboon
Approved by :	Approved Signatory

REVIEW BY Thanitoll
APPROVED BY
NEXT CAL. DATE 30/04/24

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

Issue Date : 2 November 2022

The Uncertainties are for a confidence probability of approximately 95%

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

A 0046908

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

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

Procedure Used :-

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

The temperature scale used was based on ITS-90.

Condition of this result of calibration

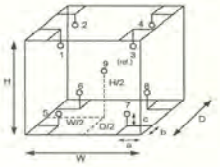
1. Reference standard instrument:-

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

2. This certificate is valid only to the item calibrated on date and place of calibration.
3. This certification is traceable to the International System of Unit.

Result of Calibration :- (*) Without Adjustment
Function of UUC* : Temperature Source
Fresh air setting : Close

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



Probe Installation Details :

a =	5.0	cm
b =	5.0	cm
c =	5.0	cm

Dimension of Chamber :

D =	0.40	m
W =	0.56	m
H =	0.48	m
Capacity =	0.11	m³

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

A 1132466

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

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

Calibration Point (°C)	UUC* Setting (°C)	UUC* Reading (°C)	Temperature stability (± °C)	Temperature uniformity (°C)	Overall Variation (°C)	Uncertainty (±°C)	Coverage Factor k
104.0	104.0	104.0	0.076	0.52	0.60	0.42	2
180.0	160.0	180.0	0.13	0.88	1.2	1.1	2

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

Average* : The average of 30 values in each position.
Temperature stability : One-half of the greatest maximum difference of measured temperature at any one sensor
Temperature uniformity : The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time or at as close an observation time as possible to determine the temperature pattern or homogeneity within the chamber under steady-state conditions.
Overall Variation : The Difference of the maximum and minimum measured temperatures throughout observation
UUC* : Unit Under Calibration
Note : The reported uncertainty of measurement was included stability and excluded uniformity .

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

-o0o-

a 1132465

RYG_EN0188

DKSH

Certificate of Calibration

Equipment: Block Digestion Unit
Model: KT-20s
Serial No. (or ID.): 5720210009/5770200073
Manufacturer: Gerhardt
Condition: In Condition

Certificate No.: C29230010
Issued Date: 16 March 2023
Job No.: KSPR2304362
Page: 1 of 4
Digestion Block: 20 holes.

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

REVIEW BY N. Ruenros
APPROVED BY
NEXT CAL. DATE 15/03/24

Environment Condition: Temperature: 25 °C ± 0.5 °C
Humidity: 65 %RH ± 3.7 %RH
Voltage: 231 VAC ± 3.1 VAC

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

Calibration By: Mr. Nakarin Ruenros
Calibration Date: 15 March 2023
The Method used: In house method, base on by comparison with standard
Traceability: This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through N.M. Technical Center Laboratory (NTL) Certificate No.: TC22/0080

(Mr. Nakarin Ruenros)
Person in charge

(Mr. Udon Srichana)
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

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DKSH Technology Limited
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2533 Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

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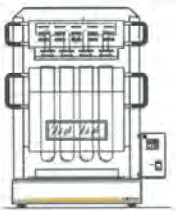
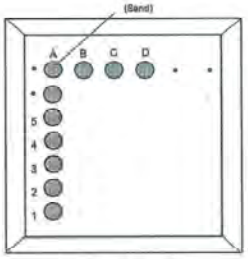


Fig. 1.: Front view



Location of standard

Fig. 2.: Digestion block

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the Digestion block.

Measured Temperature: The average reading of working standard at any positions or location.

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DKSH Technology Limited
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2533 Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

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Calibration Results:
Before adjustment

Locations	Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
A1	380	380	380	375.1	-4.9	1.5
A2				374.3	-5.7	1.5
A3				374.6	-5.4	1.5
A4				376.3	-3.7	1.5
A5				373.2	-6.8	1.5
B1				374.4	-5.6	1.5
B2				374.3	-5.7	1.5
B3				374.6	-5.4	1.5
B4				375.2	-4.8	1.5
B5				375.1	-4.9	1.5
C1				373.5	-6.5	1.5
C2				372.8	-7.2	1.5
C3				372.1	-7.9	1.5
C4				372.2	-7.8	1.5
C5				374.5	-5.5	1.5
D1				374.7	-5.3	1.5
D2				375.3	-4.7	1.5
D3				375.5	-4.5	1.5
D4				375.8	-4.2	1.5
D5				375.1	-4.9	1.5

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2533 Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

DKSH

Calibration Results:
After adjustment

Locations	Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
A1	380	380	380	379.0	-1.0	1.5
A2				378.7	-1.3	1.5
A3				379.4	-0.6	1.5
A4				379.2	-0.8	1.5
A5				379.2	-0.8	1.5
B1				379.8	-0.2	1.5
B2				379.2	-0.8	1.5
B3				379.5	-0.5	1.5
B4				378.9	-1.1	1.5
B5				379.1	-0.9	1.5
C1				379.1	-0.9	1.5
C2				377.7	-2.3	1.5
C3				378.4	-1.6	1.5
C4				378.2	-1.8	1.5
C5				378.0	-2.0	1.5
D1				379.5	-0.5	1.5
D2				378.7	-1.3	1.5
D3				379.7	-0.3	1.5
D4				379.5	-0.5	1.5
D5				379.4	-0.6	1.5

The End of Certificate

DKSH Technology Limited
2633 Phatthanakan Road, Bangkok, Phrakhanong, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

DKSH

ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSPR2304362

ชนิดเครื่องมือ: Block Digestion Unit รุ่น: KT-20s

หมายเลขเครื่อง: 5720210009/5770200073

ตรวจสอบ (รับ) 15 Mar 2023 ปกติ	ตรวจสอบ (รับ) 15 Mar 2023 ไม่ปกติ	รายการตรวจเช็ค	ตรวจสอบ (ส่ง) 15 Mar 2023 ปกติ	ตรวจสอบ (ส่ง) 15 Mar 2023 ไม่ปกติ	หมายเหตุ
		General			
☑	☐	1. สายไฟ	☑	☐	
☑	☐	2. การทำงาน Main Switch	☑	☐	
☑	☐	3. การทำงาน Selector Key	☑	☐	
☑	☐	4. การแสดงผล Display	☑	☐	
☑	☐	5. สภาพ Hole	☑	☐	
☐	☐	6. สภาพฝาปิด	☐	☐	ไม่มี
☑	☐	7. สภาพตัวเครื่อง	☑	☐	
☑	☐	8. สภาวะแวดล้อม ณ สถานที่ตั้งเครื่อง	☑	☐	

ข้อแนะนำ :

Mr. Nakarin Ruenros
Service Engineer

DKSH Technology Limited
2633 Phatthanakan Road, Bangkok, Phrakhanong, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 2: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-29 FAX. 0-2719-9464

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

Certificate of Calibration

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

REVIEW BY N.Benit
APPROVED BY
NEXT CAL. DATE 27/2/24

( ) Malee Butkruea
(✓) Saithip Meangmai
( ) Warakorn Lerngagtrakul

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

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

A 0051538

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

Condition of this calibration result

1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	22E2769	24 Aug 2023
2) Ref. Standard Thermometer	4982054	110RC044	22I1306	27 Oct 2023

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

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

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.008	CPA chem	826588	09 July 2024
pH 6.987	CPA chem	826589	09 July 2023
pH 10.010	CPA chem	883835	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
	pH	mV	mV	pH		k
pH Meter	4.000	177.48	177.4	4.000	0.058	2.00
S/N.: C104059460	7.000	0.00	-0.1	7.000	0.058	2.00
	10.000	-177.48	-177.5	10.000	0.058	2.00

a 1149925

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

Calibration Results

Function : pH Measurement

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

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

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLabExpert Pro-ISM
- Serial No. : 1453404

Dimension of probe;

- Length : 120 mm.
- Diameter : 12 mm.
- Immersion Depth : 100 mm.

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

Remark : - UUC* = Unit Under Calibration

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

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a 1149924

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG, BANGKOK 10250
TEL. 0-2717-3000-24 FAX. 0-2719-9484

NSC-TH-TI017025 CALIBRATION 0058

Certificate of Calibration

Certificate No. : 23E753
Page : 1 of 2

Equipment :	pH Meter
Manufacturer:	Mettler Toledo
Model :	SevenCompact S220
Serial No.:	C104059460
ID No.:	RYG_EN0183
Condition As-Received:	Used Item
Received Date:	24 February 2023
Calibration Date:	28 February 2023
Reference:	2302-0886DSC
Ambient Temperature:	(23 ± 2) °C
Relative Humidity:	(50 ± 10) %

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

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

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

Condition of this result of calibration

1.Reference standards instuments :

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

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

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

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

-National Institute of Metrology Thailand (NIMT)

Calibrated by : Wutchareeporn Wongchutikrang **Approved Signatory :**
Issue Date : 02 March 2023

[ ] Phalinee Prabpaipat
[✓] Nuntawat Khamchai
[ ] Pornthippa Tameyakul

B 0309672

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

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

Function: DC voltage measuremer **Range:** 2000 mV

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

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

UUC* = Unit Under Calibration.

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a 1150477

ภาคผนวก ฏ

สำเนาหนังสืออนุญาตขึ้นทะเบียน

ห้องปฏิบัติการวิเคราะห์เอกชน



ที่ อก ๐๓๑๐(๑)/ ๑๐๖๙

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๔๐๐

๒๘ มกราคม ๒๕๖๕

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี 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 แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกขน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบอราทอรี 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 หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายศิระ จันทร์เฉิด)
นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาราชการแทน
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๒๐๒ ๔๑๔๖ ๐ ๒๒๐๒ ๔๐๐๒
โทรสาร ๐ ๒๓๕๔ ๓๒๐๘ ๐ ๒๓๕๔ ๓๔๑๕

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอแอลเอส แลบอราทอรี 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) นางสาวชัชนัย 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 ชุณหรัต	ทะเบียนเลขที่ ว-๒๐๔-ค-๖๑๑๓

(นายศิระ จันทร์เฉิด)

นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาราชการแทน

ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน

ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ๓๐๖๙ ลงวันที่ ๒๘ มกราคม ๒๕๖๕

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑๖๒ ราย

๑) นางสาวจินดา โขจุลธรรม ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๐๘
๒) นางสาวสาวิตรี น้อยเสงี่ยม ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๐๙
๓) นางสาวชณัฐกาญจน์ อิ่มชม 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) นางสาวสรารัศมิ์ มงคลจิรวุฒิ ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๙
๘) นางสาวศิริลักษณ์ พึ่งแพง ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๒๐
๙) นายนพพงศ์ จันทรุพันธุ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๐๘
๑๐) นายนรเศรษฐ์ โกมาลย์ ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๑
๑๑) นายธันวา จริยา ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๔
๑๒) นางสาวเกศรินทร์ แก้วมั่น ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๖
๑๓) นางสาวสุวิมล ชัยเรืองวุฒิ ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๗
๑๔) นางสาวสุชาดา ธรรมถาวร ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๑
๑๕) นางสาวเปมิกา ขัยเดชธนกุล 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) นางจิลตา คำภูแก้ว ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๓๑
๒๒) นางสาวอรวรรณ รักยง ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๕
๒๓) นางสาวนพรัตน์ แย้มกรานต์ ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๙
๒๔) นายจุลเดช วารินทร์ ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๐
๒๕) นางสาวดายุรัตน์ 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-๖๒๔๒
๓๔) นางสาวจารุวรรณ พิมพ์อภิกฤติยา ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๗๖

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ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

๓๕) นางสาวปรางค์ทิพย์...

๓๕) นางสาวปรางค์ทิพย์ กิจไพศาลศักดิ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๗๙
๓๖) นางสาวเตือนใจ ทางกลาง ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๐
๓๗) นางสาวจิราพร ศิริเวช ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๒
๓๘) นายวรากร ผูกรักษ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๓
๓๙) นายทนง วิริยะสหกิจ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๔
๔๐) นายธนิต เจนจบ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๕
๔๑) นายคณิศร ขำเพชร ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๖
๔๒) นายอรรคพล นิยมวิทยาพัน ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๗
๔๓) นายภูวิช พรหมสะอาด ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๘
๔๔) นายธนเดช โภคาพิพัฒน์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๙
๔๕) นายชวฤทธิ์ วงษ์จันทร์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๐
๔๖) นายอาทิตย์ ศรีเสน ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๑
๔๗) นายเจษดินทร์ คงศักดิไทย ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๒
๔๘) นายจรัส บุญยิ่ง ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๕
๔๙) นายธนาณัติ เอนก ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๖
๕๐) นายอภิวัฒน์ ทุมหนู ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๗
๕๑) นางสาวสุภาขวัญ มาก ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๙๘
๕๒) นางสาวทัตพร ขวาลสมบูรณ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๐
๕๓) นางสาวธิติมา บุญเพ็ง ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๑
๕๔) นางสาวกนกอร เข็มเพ็ชร ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๒
๕๕) นางสาวพัชรียา หงษ์สมดี ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๓
๕๖) นางสาวภานิดา สุรวงศ์ตระกูล ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๔
๕๗) นางสาวภานุมาศ นามวัฒน์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๕
๕๘) นางสาวอุไรรัตน์ ทึงสร้างแป้น 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) นายขยธร 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) นางศิลาวรรณ ใจบุญ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๐๕
๖๗) นางสาวพรรณธิดา พุ่มคง ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๐๘
๖๘) นางสาวศรวณีย์ ยิ่งดี ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๐๙
๖๙) นายนวภัทร ศรีวิริยะ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๐
๗๐) นายสุวิชา ทองอ่อน ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๑
๗๑) นายวิญญู บุญตะนัย ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๓

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๗๒) นายสมบูรณ์...

๗๒) นายสมบูรณ์ บุตรจันทร์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๔
๗๓) นายวิรัตน์ ไชยนะรา ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๕
๗๔) นายนฤเบศน์ เพิ่มพูน ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๖
๗๕) นายจิรณัฐ ขาวละออ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๗
๗๖) นายสมโภช วันสา ทะเบียนเลขที่ ว-๒๐๔-จ-๗๕๑๙
๗๗) นายอัสรี นามบุรี ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๑๗
๗๘) นายณัฐนันท์ ปานประเสริฐ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๑๙
๗๙) นายอัศวเรศ จ่อสาว ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๐
๘๐) นายประเสริฐ สุระขันธ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๑
๘๑) นายนุกูล จันทร์เนียม ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๒
๘๒) นายพีรพงษ์ ทองคูณปรีดา ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๓
๘๓) นายนฤพล ทองนุช ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๔
๘๔) นายอนุวัฒน์ ม่วงแพร ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๕
๘๕) นายเจตศราวุฒิ ปัตตะมะ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๖
๘๖) นายกฤษณะ สายวรรณ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๗
๘๗) นายพิชัย บุญยงค์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๘
๘๘) นายภานุพงศ์ โฮมวงศ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๒๙
๘๙) นายสามารถ คุ้มปลี ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๐
๙๐) นายสัญชัย โกศรีนาม ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๑
๙๑) นายณัฐวุฒิ ศรีประเสริฐ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๒
๙๒) นายขวัลธัช นาคพนม ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๓
๙๓) นายพงศธร ชัยทิพย์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๕
๙๔) ว่าที่ร้อยตรี ภาณุพงศ์ แสนศรี ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๖
๙๕) นายสิทธิโชค ทาสีดา ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๗
๙๖) นายธนากร อินสุตา ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๘
๙๗) นางสาววรณิชชา ชาติวันชัย ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๓๙
๙๘) นางสาวพิมพ์ตะวัน มินากูล ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๔๑
๙๙) นางสาวเพชรัตน์ สิงห์สมบุญ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๔๒
๑๐๐) นางสาวชญานิน พรหมจันทร์ ทะเบียนเลขที่ ว-๒๐๔-จ-๗๘๔๓
๑๐๑) นายกีรติ ทวีราช ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๘๖
๑๐๒) นายจักริน หมั่นวิชา ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๘๗
๑๐๓) นายฉัตรชัย สุขเปีย ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๘๘
๑๐๔) นายณรนนท์ ต๊ะทองคำ ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๘๙
๑๐๕) นายดุลยพล สนนอก ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๐
๑๐๖) นายทักษ์ดนัย อุบลศรี ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๑
๑๐๗) นายธนศวร นามะกุณณา ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๒
๑๐๘) นายธิติพงศ์ บัวแดง ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๓

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๑๐๙) นายนนทชัย...

๑๐๙) นายนนทชัย อุปถัมภ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๔
๑๑๐) นายนัฐพล คุณสุทธิ์ ทะเบียนเลขที่ ว-๒๐๔-จ-๘๕๙๕
๑๑๑) นายนันทวัฒน์ 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) นายมุนินทร์ พูลศิริ ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๒
๑๑๘) นายสิรินนท์ ทองอั้น ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๓
๑๑๙) นายอเนขา ทันสมัย ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๔
๑๒๐) นายอดิศักดิ์ ผมไผ ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๕
๑๒๑) นายอนันตชัย วีสม ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๖
๑๒๒) นายณัฐดนัย เจือละออง ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๗
๑๒๓) นายวรวุธ ดีนัก ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๘
๑๒๔) นายแสงตะวัน นะตะสัต ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๙
๑๒๕) นายยุทธพงศ์ รัตนะ ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๑๐
๑๒๖) นายชยัณวุฒิ ไชยฮะนิจ ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๑๑
๑๒๗) นายวิศรุต ศรีธรรมมา ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๑๒
๑๒๘) นายนนทกร 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) นายไพรวัลย์ เปรี่ยมพิมาย ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๓
๑๓๕) นางสาวศุภมาศ ทองมาก ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๔
๑๓๖) นางสาวลลิตา จิตรสว่าง ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๕
๑๓๗) นางสาวชไมพร เสิกภู่เขียว ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๖
๑๓๘) นางสาวกฤติมาพร คำมีแก่น ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๗
๑๓๙) นางสาวสกุลรัตน์ ภาคภูมิ ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๘
๑๔๐) นางสาวกาญจนา คงคูณ ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๙
๑๔๑) นางสาวไพรินทร์ ศรีรูปี ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๐
๑๔๒) นางสาวทิพเนตร ผุยปัญญา ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๑
๑๔๓) นางสาวสาธิตา ปานทอง ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๒
๑๔๔) นางสาวอริสา ทองนวล ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๓
๑๔๕) นางสาวอรยา ค้าคล่อง ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๔

(นายศิระ จันทร์เฉิด)
นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาราชการแทน
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน

๑๔๖) นางสาวชุดาภรณ์...

๑๔๖) นางสาวชุดาภรณ์ สุนทรสนาน	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๕
๑๔๗) นางสาวสุดารัตน์ นนท์ประสาท	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๖
๑๔๘) นางสาวรัชนีกร 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 ปั้นมยุรา	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๒
๑๕๔) นางสาวพาฤดี คุณนาน	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๓
๑๕๕) นางสาวจิราเจต ฟองดา	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) นางสาววิชชุตา นาคผจญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๙
๑๖๑) นางสาวพนิดา ยอดอินทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๕๐
๑๖๒) นางสาวนันทิยา จันทะลุน	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๕๑

(นายศิระ จันทร์เฉิด)
นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาราชการแทน
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๒๐๔
ที่ อก ๐๓๑๐(๑)/ ๑๐๖๙ ลงวันที่ ๒๘ มกราคม ๒๕๖๔

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม 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, Tritimetric 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 ฉัตรสกุลวิไล)
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]

44 Methomyl...

(นางริกาญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
...เชี่ยวชาญด้านปฏิบัติการ

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 ^{0}C[4]
55	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method[4]
56	Total Suspended Solids	Dried at 103-105 ^{0}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]

<u>น้ำใต้ดิน จำนวน 126 รายการ</u>

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]

3 Aldrin...

(นางริกาญจน์ 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]

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 ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ

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

51 cis-1,2-Dichloroethylene...

(นางริกาญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และรองเลขาธิการปฏิบัติการ

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]

84 Methanol...

(นางริกาญจน์ ฉัตรสกุลวิไล)
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
แทนอธิบดีกรมควบคุมมลพิษ

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-Methylnapthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
90	Methyl tert-Butyl Ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[4]
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
92	Nickel	1) Digestion, Inductively Coupled Plasma Method[4] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[4]
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
95	N-Nitrosodi-n-Propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
96	Polychlorinated Biphenyls - PCB 1016 - PCB 1221 - PCB 1232 - PCB 1242 - PCB 1248 - PCB 1254 - PCB 1260	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]

97 Pentachlorophenol...

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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_8)	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]

114 1,1,2-Trichloroethane...

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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]

<u>อากาศเสีย (ปล่องระบาย) จำนวน 16 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic, Digestion, Inductively Coupled Plasma Method[5]
2	Arsenic	Isokinetic, Digestion, Inductively Coupled Plasma Method[5]

3 Carbon Monoxide...

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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]

สิ่งปฏิกูล...

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<u>สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 35 รายการ</u>

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]

6 Cadmium...

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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]

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11 Cobalt...

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]

2) Soxhlet...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		2) Soxhlet Extraction, Gas Chromatographic Method[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method[10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
20	Lead	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method [10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[1,6,18]

2) Waste Extraction...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		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]
23	Methoxychlor	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]
24	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 2) Soxhlet Extraction, Gas Chromatographic Method [10,22] 3) Automated Soxhlet Extraction, Gas Chromatographic Method [22,31]
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
26	Nickel	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma/Mass Spectrometric Method[1,6,16] 3) Digestion, Inductively Coupled Plasma Method[7,15] 4) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]

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27 Polychlorinated...

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

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28 Pentachlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,25] 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]

4) Digestion...

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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]

<u>ดิน จำนวน 125 รายการ</u>

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]

9 Benz(a)anthracene...

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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]

26 Carbon tetrachloride...

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ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
27	Chlordane	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
28	p-Chloroaniline	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,24]
32	2-Chlorophenol	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
33	Chromium	1) Digestion, Inductively Coupled Plasma Method[7,15] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method[7,16]
34	Chromium (III)	1) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation Method[7,8,15,17] 2) Digestion, Inductively Coupled Plasma/ Mass Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation Method[7,8,16,17]
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method[8,17]
36	Chrysene	Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
37	Cyanide	Extraction, Distillation, Colorimetric Method[26,27,28]
38	2,4-D	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]
39	DDD	1) Soxhlet Extraction, Gas Chromatographic Method[10,22] 2) Automated Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[25,31]

40 DDE...

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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]

57 Dieldrin...

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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]

71 Hexachlorobenzene...

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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 ฉัตรสกุลวิไล)
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และทะเบียนห้องปฏิบัติการ

2) Thermal...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		2) Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry[19] 3) Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method[20]
84	Methanol	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]

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- Aroclor 1242...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
	- Aroclor 1242	
	- Aroclor 1248	
	- Aroclor 1254	
	- Aroclor 1260	
	- 2-Chlorobiphenyl	
	- 2,2',3,5'-Tetrachlorobiphenyl	
	- 2,2',5,5'-Tetrachlorobiphenyl	
	- 2,3',4,4'-Tetrachlorobiphenyl	
	- 2,2',3,4,5'-Pentachlorobiphenyl	
	- 2,2',4,5,5'-Pentachlorobiphenyl	
	- 2,3,3',4',6-Pentachlorobiphenyl	
	- 2,2',3,4,4',5'-Hexachlorobiphenyl	
	- 2,2',3,4,5,5'-Hexachlorobiphenyl	
	- 2,2',3,5,5',6-Hexachlorobiphenyl	
	- 2,2',4,4',5,5'-Hexachlorobiphenyl	
	- 2,2',3,3',4,4',5-Heptachlorobiphenyl	
	- 2,2',3,4,4',5,5'-Heptachlorobiphenyl	
	- 2,2',3,4,4',5',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]

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และทะเบียนห้องปฏิบัติการ

101 Selenium...

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]

116 2,4,6-Trichlorophenol...

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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]

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(นางริกาญจน์ ฉัตรสกุลวิไล)
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และทะเบียนห้องปฏิบัติการ



ที่ อก ๐๓๑๐(๑)/ ๕๓๗๙

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๐๙ มีนาคม ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๔ กุมภาพันธ์ ๒๕๖๖

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี 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 นิยมวิทยาพัน	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๐๘๗
๔) นางสาวพัชรียา หงษ์สมดี	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๓
๕) นางสาวภานิดา สุรวงศ์ตระกูล	ทะเบียนเลขที่ ว-๒๐๔-จ-๗๑๐๔
๖) นางสาวศรวณีย์ 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) นายมุนินทร์ พูลศิริ	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๒
๑๑) นายณัฐดนัย เจือละออง	ทะเบียนเลขที่ ว-๒๐๔-จ-๘๖๐๗
๑๒) นางสาวกาญจนา คงคูณ	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๒๙
๑๓) นางสาวรัชนีกร เนียมกลาง	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๗
๑๔) นางสาวกัญญารัตน์ ศรีนิลทา	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๓๘
๑๕) นายศิริวัฒน์ พานิชย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๙๒๔๑
๑๖) นางสาวกนกภรณ์ อุระ	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 กิตติศุภวณิชย์	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 ด้วงแพง	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 ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางริกาญจน์ ฉัตรสกุลวิไล)
นักวิทยาศาสตร์ชำนาญการพิเศษ รักษาราชการแทน
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)/ ๖๑๒๕

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๓ มีนาคม ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๐ มีนาคม ๒๕๖๖

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงพัฒนาการ เขตสวนหลวง กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้เปลี่ยนแปลงชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จากเดิม นางสาวสรารัศมิ์ มงคลจิรวุฒิ ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๙ เป็น นางสาวธัญญธร มงคลจิรวุฒิ ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๙

ทั้งนี้ หากท่านมีความประสงค์จะยื่นคำขอใดๆ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม 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



ที่ อก ๐๓๑๐(๓)/ ๖๔๗๐

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๘ มิถุนายน ๒๕๖๔

เรื่อง ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๙ เมษายน ๒๕๖๔

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ และรายการสารมลพิษที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ว-๓๒๓ สถานที่ตั้งเลขที่ ๖๑๖/๑๐ หมู่ที่ ๕ ตำบลแม่น้ำคู้ อำเภอปลวกแดง จังหวัดระยอง โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายเดช ช้างชน	ทะเบียนเลขที่ ว-๓๒๓-ค-๙๔๔๒
๒) นางวิลาวัณย์ 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) นางสาวธนิตา กุลสุริวงศ์	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๔๗
๔) นายพิทยา ทองแตง	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๔๘
๕) นางชลธิชา สุบงกช	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๔๙
๖) ว่าที่ ร.ต.รณชัย ม่วงมา	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๐
๗) นายวราวุฒิ พับพา	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๑
๘) นายศักดิ์นรินทร์ จรัสกาย	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๒
๙) นายสุรศักดิ์ สาชิน	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๓
๑๐) นางสาวเพชรคุณ ภวภูตานนท์	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๔
๑๑) นายสถาพร ถาแก้ว	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๕
๑๒) นายสุทธิ์ดำรงค์ โชคปิตินันท์	ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๖

๑๓) นายวัลลภ...

๑๓) นายวัลลภ หันไชยเนาว์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๗
๑๔) นางสาววนาลี เหรียญตระกูล ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๘
๑๕) นางสาววนิดา ผดุงจิตต์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๕๙
๑๖) นายธนะสิทธิ์ วงศ์ษาไชย ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๐
๑๗) นายชัยนุสรณ์ เลิศนันทกุลชัย ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๑
๑๘) นายสัจจา เพ็ชรแสวง ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๒
๑๙) นายกันตภณ มณีสัมพันธ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๓
๒๐) นางสาวจันทนีย์ โกเมนชนะ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๖๔
๒๑) นายธารินทร์ อ๊อกจินดา 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 ต้นโพธิ์ 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 ศิริมังคะโร ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๓
๓๐) นายพิพัฒน์ นิภัทร์เศรษฐ์ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๔
๓๑) นายศิริวิทย์ เรืองสม ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๕
๓๒) นายปาราเมศ สัตยาคุณ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๗๖
๓๓) นายนฤนาท ธรรมสะโร 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 ทองขจรศักดา ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๘๑
๓๘) นายอภิชาติ วิลาศ ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๘๒
๓๙) นายจรัสระวี ศรีรักษา ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๘๓
๔๐) นายประสานมิตร เขื่อนเพชร ทะเบียนเลขที่ ว-๓๒๓-จ-๙๔๘๔
๔๑) นายภานุวัฒน์ 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

(นางจินตา เตชะศรินทร์)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม
๒๘ มิ.ย. ๒๕๖๔

กองวิจัยและเตือนภัยมลพิษโรงงาน
ศูนย์วิจัยและเตือนภัยมลพิษโรงงานภาคตะวันออก
โทร. ๐ ๓๘๐๕ ๗๒๖๑-๓
ไปรษณีย์อิเล็กทรอนิกส์ eirw@diw.mail.go.th

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-๓๒๓
ที่ อก ๐๓๑๐(๓)/ ๖๔๗๐ ลงวันที่ ๒๘ มิถุนายน ๒๕๖๔

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม 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 ^{O}C[2]
13	Total Kjeldahl Nitrogen	Semi-Micro Kjeldahl Method[2]
14	Total Suspended Solids	Dried at 103-105 ^{O}C[2]

อากาศเสีย (ปล่องระบาย) 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]

วิชุดา สัมฤทธิ์

(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]

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